Climate Change

Climate Technology Initiative
Capacity Building Seminar for CEE/FSU Countries

Climate Change
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Climate Technology and Energy Efficiency - From "Best Practice" Experiences to Policy Diffusion

- Seminar Proceedings -

Umwelt Bundes Amt
Für Mensch und Umwelt

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Tutzing, Germany 16 - 20 November 2002

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CTI Capacity Building Seminar for CEE/FSU Countries

Climate Technology and Energy Efficiency –

From "Best Practice" Experiences to Policy Diffusion

Organized by

Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit

Umwelt Bundes Amt
für Mensch und Umwelt

ffu
Environmental Policy
Research Unit

ITUT
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des internationalen Transfers
von Umwelttechnologie - ITUT e.V.

November 16 – 20, 2002

Evangelische Akademie

Tutzing, Germany

Seminar Program

Saturday, November 16, 2002

		Arrival in Munich
Evening	20.00	*Bavarian dinner at Augustiner Keller*

Sunday, November 17, 2002

Morning	09.00	*Excursion to Pfaffenhofen Biomass CHP*
		Lunch
		Transfer to Tutzing by bus
Evening	18.00	*Dinner (Buffet)*

Monday, November 18, 2002

Morning Session

Climate Protection and Energy Efficiency

Chair: Dr. Jürgen Landgrebe, Federal Environmental Agency, Berlin

09.00 – 09.30	*Welcome and opening address* Dr. Martin Held, Evangelische Akademie Tutzing Ture Hammar, CTI
09.30 – 10.00	*Germany´s Climate Protection Program – a step by step approach* Franzjosef Schafhausen, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Berlin
10.00 – 10.30	*The German Renewable Energy Sources Act (EEG)* Hans-Josef Fell, MP
10.30 – 11.00	*Coffee Break*
11.00 – 11.30	*CTI´s activities for technology transfer on climate change* Prof. Morihiro Kurushima, NEDO, Tokyo
11.30 – 12.00	*The climate protection programs of the Länder (Federal States): The example of Bavaria* Gotthard Gietl, Bavarian State Ministry for Regional Development and Environmental Affairs, Munich
12.00 – 12.30	*Lessons from UNECE activities in CEE and FSU transition countries* Dr. Sead Vilogorac, UNECE, Geneva
12.30 - 13.45	*Lunch*

Afternoon Session

Policy Instrumentation

Chair: Honoriu Pitaru, APER, Bucharest

14.00 – 14.30	*Energy efficiency – policy design and implementation in PEEREA countries* Dr. Tudor Constantinescu, Energy Charter Secretariat, Brussels
14.30 – 15.00	*Ecological Finance Reform in Germany* Kai Schlegelmilch, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Berlin
15.00 – 15.30	*Policy instruments to overcome existing barriers to energy efficiency projects in Bulgaria* Dr. Zdravko Genchev, EnEffect, Sofia
15.30 – 16.00	*Coffee Break*
16.00 – 17.00	*The Baltic Sea Region as a testing ground for JI and ET* Harro Pitkänen, NEFCO, Helsinki *Co-presentation: The Estonian perspective* Dr. Tiit Kallaste, Stockholm Environmental Institute, Tallinn
17.00 – 17.30	*Discussant* Dr. Gábor Bartus, Hungary Energy Centre, Budapest
18.00 – 19.15	*Dinner*

Evening Session

The German REN Technology Export Initiative & Dutch experiences with JI and CDM projects

19.30 – 20.00	*Financing international market penetration of renewable energies: A report from the German export initiative for renewable energies* Dr. Petra Opitz, German Energy Agency (dena), Berlin
20.00 – 20.30	*The Dutch ERUPT and CERUPT programs – lessons and outlook* Lennard de Klerk, Senter Internationaal, The Hague

Tuesday, November 19, 2002

Morning Session

Energy conversion: Biomass and small-scale CHP
Chair: Villu Vares, Estonian Energy Research Institute OPET Estonia, Tallinn

09.00 – 09.30	*Co-operation between Austria and Central & Eastern Europe* Dr. Alois Geißlhofer, Austrian Energy Agency (E.V.A.), Vienna
09.30 – 10.00	*Pellet market and implementation strategies in Slovakia* Vladimir Hecl, Energy Center Bratislava
10.00 – 10.30	*Results from monitoring the German Biomass Ordinance* Dr. Joachim Fischer, Institut für Energetik und Umwelt, Leipzig
10.30 – 11.00	*Coffee Break*
11.00 – 11.30	*Developing a RES strategy for the Czech Republic* RNDr. Martin Bursík, Ecoconsulting s.r.o., Prague
11.30 – 12.00	*Combining building retrofits and renewable energy* Katarzyna Grecka, BAPE, Gdańsk
12.00 – 12.30	*Discussant* Dr. Georgiy Geletukha, Scientific Engineering Centre "Biomass", Kiev
12.30 – 13.45	*Lunch*

Afternoon Session

Improving energy efficiency in residential and public buildings
Chair: Dr. Peter Pichl, Federal Environmental Agency, Berlin

14.00 – 14.30	*Between economics and environment – energy saving in the German building sector* Siegfried Rehberg, Association of Housing Companies in Berlin-Brandenburg
14.30 – 15.00	*Implementation of performance contracting in Slovenia* Barbara Petelin Visočnik, Jožef Stefan Institute, Ljubljana Ralf Goldmann, Berlin Energy Agency
15.00 – 15.30	*Sustainable institutional mechanisms to promote energy efficiency in the Russian social and housing sector* Dr. Igor Bashmakov, CENEf, Moscow
15.30 – 16.00	*Coffee Break*
16.00 – 16.30	*Developing a national housing strategy and sustainable housing program in Lithuania* Eduardas Kazakevičius, Lithuanian Housing and Urban Development Fund, Vilnius
16.30 – 17.00	*Emission trading helps to introduce renewable energies and energy saving measures into the markets* Michael Schmalholz, Future Camp GmbH, Munich
17.00 – 17.30	*Discussant* Prof. Dagnija Blumberga, Riga Technical University
18.00 – 19.15	*Dinner*

Evening Session

Future perspectives of climate protection strategies and policies

19.30 – 20.30	Dr. Hans-Joachim Ziesing, German Institute for Economic Research, Berlin
20.30	*Informal get-together on the bel etage of the Schloss*

Wednesday, November 20, 2002

Morning Session		***Long term perspectives for energy supply and consumption*** **Chair: Dr. Hans-Joachim Ziesing** **German Institute for Economic Research, Berlin**
	09.00 – 09.30	*Long term perspectives for a sustainable energy future of Germany* Dr. Jürgen Landgrebe, Federal Environmental Agency, Berlin
	09.30 – 10.00	*The Danish program "Energy 21"* Ture Hammar, Danish Energy Authority, Copenhagen
	10.00 – 10.30	*The Japanese program to prevent global warming* Yashushi Nagami, Ministry of the Environment of Japan, Tokyo
	10.30 – 11.00	*Coffee Break*
	11.00 – 11.30	*Activities of Georgia on the way to CDM* Paata Janelidze, National Agency for Climate Change, Tbilisi
	11.30 – 12.00	*Flexible mechanisms under the Kyoto Protocol – the German view* Franzjosef Schafhausen, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Berlin
	12.00 – 12.30	*Energy saving policy diffusion and comparative policy monitoring* PD Dr. Lutz Mez, Environmental Policy Research Unit, FU Berlin
	12.30 – 13.00	*Lunch*
Afternoon	14.00	*Departure*

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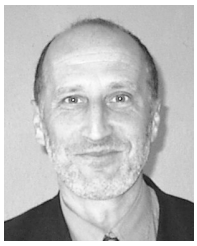

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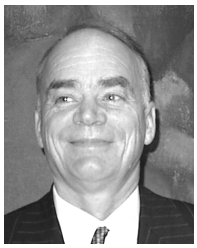

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List of Abbreviations

AIJ	Activities Implemented Jointly
ALTENER	EU Program Promoting the Use of Renewable Energy Sources
APER	Romanian Energy Policy Association
ARCE	Romanian Agency for Energy Conservation
ARENA-Eco	Agency for Rational Energy Use and Ecology (Ukraine)
AURE	Agency for Energy Efficiency (Slovenia)
Baltic CHAIN	Baltic Clearing House And Information Network
BAPE	Baltic Energy Conservation Agency
BelVIEC	Belorussian Scientific and Industrial Information Centre for Energy Saving
BMU	German Federal Ministry of Environment, Nature Conservation and Reactor Security
BOM	Board Of Management
BSR	Baltic Sea Region
CC-CHP	Combined Cycle – CHP
CDM	Clean Development Mechanism
CEA	Czech Energy Agency
CEE	Central and Eastern Europe
CEEC	Central and Eastern European Countries
CENEf	Center for Energy Efficiency, Moscow
CH_4	Methane
CHP	Combined Heat and Power Generation
CIS	Commonwealth of Independent States
CO	Carbon MoNO_xide
CO_2	Carbon Dioxide
COP	Conference of the Parties of UNFCCC
CR	Czech Republic
CTI	Climate Technology Initiative
CTIP	Cooperative Technology Implementation Plan
CZK	Czech Crown
DCA	Development Credit Authority
DEA	Danish Energy Authority
dena	Deutsche Energie Agentur
DH	District Heating
DHC	District Heating Company
DHP	District Heating Plant
DIW	German Institute for Economic Research
DSM	Demand Side Management
EAES	Environmentally Adapted Energy System in the Baltic Region and Europe
EBRD	European Bank for Reconstruction and Development
EC	European Community
EC BREC	EC Baltic Renewable Energy Center
ECCJ	Energy Conservation Center, Japan
EE	Energy Efficiency

EEC	Energy Efficiency Center
EEF	EBRD Energy Efficiency Fund
EEHPP	Energy Efficiency Housing Pilot Project in Lithuania
EEK	Estonian Crown
EERI	Estonian Energy Research Institute
EIA	US Energy Information Agency
EIT	Economies in Transition
ELI	Efficient Lighting Initiative
EMA	Emissions Marketing Association
ENERO	Center for the Promotion of Clean and Efficient Energy in Romania
ENSVET	Energy Advisory Network in Slovenia
EPC	Energy Performance Contracting
ESCO	Energy Service Company
ESF	Energy Saving Fund
ESI	Electricity Supply Industry
ET	Emissions Trading
EU	European Union
FFU	Environmental Policy Research Unit
FSU	Former Soviet Union
Gcal	Giga calory
GDP	Gross Domestic Product
GEF	Global Environmental Facility
Gg	Gigagramm
GHG	Greenhouse Gas
GHGM	Greenhouse Gas Mitigation
GJ	Giga Joule
GNP	Gross National Product
GPO	Gross Production Output
GT-CHP	Gas Turbine CHP
GWh	Giga Watt hour
GWP	Global Warming Potential
GWth	Gigawatt thermal
HFC	Hydrofluorocarbons
HOB	Heat Out Boilers
HPP	Hydro Power Plant
HUF	Hungarian Forint
ICECC	Intergovernmental Commission of Experts on Climate Change
ICEU	International Center for Energy and Environmental Technology
IEA	International Energy Agency
IEEN	Lithuanian Energy Efficiency Network
IFC	International Finance Corporation
IISD	International Institute for Sustainable Development
IJS	Institute Jožef Stefan, Ljubljana
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producer

ISO	International Organization for Standardization
JI	Joint Implementation
JICA	Japanese International Cooperation Agency
KAPE	Polish Energy Conservation Agency
KfW	Kreditanstalt für Wiederaufbau
LDA	Latvian Development Agency
LFO	Light Fuel Oil
LPG	Loan Portfolio Guarantee
LVL	Latvian Lat
MAOP	Maximum Allowable Operation Pressure
MAPPM	Romanian Ministry of Waters, Forests and Environmental Protection
Masut	Heavy Oil
MEA	Ministry of Economic Affairs
MEEN	Municipal Energy Efficiency Network
MW	Mega Watt
Mwe	Megawatt electric
MWth	Megawatt thermal
N_2O	Nitrous Oxide
NCRC	National Climate Research Center
NEDO	New Energy and Industrial Technology Development Organization
NEFCO	Nordic Environment Finance Corporation
NGO	Non Governmental Organization
NIB	Nordic Investment Bank
NO_x	Nitrogen Oxide
NPP	Nuclear Power Plant
NUTEK	National Board of Industry and Technology of the Swedish Kingdom
OECD	Organisation for Economic Cooperation and Development
OPET	Organisation for Promotion of Energy Technologies
PC	Performance Contracting
PFC	Perfluorocarbons
PHARE	Poland and Hungary: Assistance for Reconstruction of the Economy
PJ	Peta Joule
PLN	New Polish Zloty
PNNL	Pacific Northwest National Laboratory, USA
PPC	Project Preparation Committee
ppm	parts per million
PPP	Purchasing Price Parity
PR	Public Relations
QP	Qualified Producer
R&D	Research and Development
RD & D	Research, Development and Demonstration
RE	Renewable Energy
REC	Regional Energy Center
REEF	Renewable Energy and Energy Efficiency Fund of the World Bank
Ref.	References

RENEUER	Regional Network for Efficient Use of Energy Resources
RES	Renewable Energy Sources
RF	Russian Federation
SAVE	Special Actions for Vigorous Energy Efficiency
SECI	South East European Cooperative Initiative
SEF	State Environmental Fund
SEI	Stockholm Environment Institute
SEVEn	The Energy Efficiency Center, Prague
SHPP	Small Hydro Power Plant
SIDA	Swedish Development Agency
SIT	Slovenian Tolar
SME	Small and Medium-sized Enterprises
SO_2	Sulfur Dioxide
SOCER	Society for the Optimization of Energy Consumption in Romania
SYNERGY	Energy Framework Program 1998-2002 of the EU
TACIS	Technical Assistance for CIS
TFC	Total Final Consumption
tfe	tons of fuel equivalent
THERMIE	Technologies Européennes pour la Maîtrise de L'Énergie
toe	tons of oil equivalent
TPES	Total Primary Energy Supply
TPF	Third Party Financing
TPP	Thermal Power Plant
TWh	Tera Watt hour
UBA	Federal Environmental Agency, Germany
UCPTE	Union for the Coordination of Production and Transmission of Electricity
UN	United Nations
UNCED	UN Conference on Environment and Development
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention on Climate Change
UNITAR	United Nations Institute for Training and Research
US DOE	US Department of Energy
US EPA	US Environmental Protection Agency
US AID	US Agency for International Development
VAT	Value Added Tax
WB	World Bank

Welcome Note

Results of the last Ostritz Seminar in 2001
Expectations on the Third CTI Capacity Building Seminar for CEE/FSU
"Climate Technology and Energy Efficiency" – From 'Best Practice' Experiences to Policy Diffusion

Dr. Jürgen Landgrebe

Federal Environmental Agency, Berlin

Mr. Hammar (CTI Presidency),
Mr. Schafhausen (Ministry for Environment, Nature Protection and Nuclear Safety),
dear colleagues and energy experts from so many countries all over the world,

On behalf of the German Federal Minister for the Environment, Jürgen Trittin, and the President of the Federal Environmental Agency, Prof. Andreas Troge, it is with great pleasure that I welcome you to Tutzing, Germany, on the occasion of the third CTI Capacity Building Seminar for Central and Eastern European and Former Soviet Union Countries on "Climate Technology and Energy Efficiency – From 'Best Practice' Experiences to Policy Diffusion.

My name is Jürgen Landgrebe. I work at the German Federal Environmental Agency in Berlin as head of the unit "Environment and Energy, and New Energy Technologies". On the one hand, I am very glad to see so many well known faces in this round. Your presence is a sign of continuity in our common work of capacity building. On the other hand, I appreciate finding plenty of new people in our team, who will bring new ideas and put fresh impetus to our work. Welcome you all aboard!

At our last seminar, in December 2001, we discussed the following topics:

- Biomass application
- Project financing together with ESCOS and third part financing
- CHP as a climate protection strategy
- Thermal conservation in the building sector
- Rational energy use in industry and household appliances.

To refresh your memory a bit on our last year's experiences, we have printed out copies of the proceedings including all your contributions and country reports. I hope they will be helpful for your work and if you should require more copies, don't hesitate to order them by e-mail. We really had an intensive and fruitful exchange of experience on energy efficiency centers and debated future tasks and challenges for energy efficiency networks. I do hope that the last seminar inspired you to start new activities on the basis of the network of energy experts we have established.

Since our last Seminar, the energy experts in my team at the Federal Environmental Agency have completed the energy chapter of the booklet "Sustainability in Germany – creating a lasting environmentally compatible future". In preparation of the Johannesburg summit this was our most important publication, because it outlines a strategy and drafts pathways for solving the main environmental problems in German environmental problems. You can download this publication on the internet (www.umweltbundesamt.de).

Following the Johannesburg summit and the New Delhi conference, we feel well prepared to start on new efforts for climate protection and energy conservation strategies.

You may be well aware of the fact that the new coalition agreement of the governing parties in Germany contains the option of a 40 % reduction target for greenhouse gas emissions for the year 2020 if the European Union adopts a reduction of 30 % for the same time period. Ambitious targets require additional innovative policies and measures.

In order to continue our common activities to combat Climate Change, we have invited you all to this third seminar, to encourage each other and to exchange the most recent and best experiences on energy efficiency and climate protection policy implementation. It is my sincere hope that over the course of the next three days, in this wonderful setting, the discussion of our common experiences in addressing global challenges will inspire all of you to create new ideas not only for technical solutions, but also for new instruments for climate protection and energy saving.

This year, in 2002, *policy diffusion of good practices* will be an important element of our seminar. I'm convinced that every country can learn from the different approaches and results of implemented policies and measures.

Today, *policy instrumentation* will form a central point of our discussions. *Use of biomass* and *building insulation* will be focal points tomorrow. For Wednesday, *long-term strategies and scenarios* are on the agenda.

We will listen to the Danish, the Japanese and the German colleagues and hear their positions and plans for future developments. The same day, we will have a discussion on the *flexible mechanisms* of the Kyoto protocol and its application status. We know that many countries in transition are interested in discussing the terms of co-operation with OECD countries. The German perspective on this question may be of special interest. In conclusion, we would like to invite you to attend the *evening events*.

This evening, the work of the German Energy Agency and the Dutch program for the use of Kyoto mechanisms and emission trading will be introduced. Tomorrow evening, we will have a presentation on future perspectives of climate protection strategies and policies.

After so many sessions, I think, we have earned the right to relax a bit. So, it is a pleasure for me, to announce, that on Tuesday night at 8.30 p.m. we will host an informal get-together on the "bel etage" of Tutzing Castle.

Thank you very much for your attention, and without further delay, I would now like to give the floor to Mr. Martin Held, Evangelische Akademie Tutzing, and Ture Hammar, CTI, for their welcoming addresses.

Opening Address at the CTI Capacity Building Seminar for CEE/FSU Countries

Ture Hammar

Danish Energy Authority, Copenhagen

First of all, thanks to the arrangers and supporters of this seminar. Congratulations on a program with very relevant and comprehensive contributions to the title: *Climate Technology and Energy Efficiency - From 'Best Practice' Experiences to Policy Diffusion.* The seminar lies in good continuation of the previous seminars arranged over the last two or three years, sponsored by CTI and the German government.

As all of you know, the CTI - the Climate Technology Initiative - was initiated in 1995 at the first conference of parties to the UN/FCCC - COP 1. The idea has exactly been to build capacity and disseminate technology, especially by linking up the developing countries to climate technology issues. Since 1995 a number of activities throughout the world, including Africa, Asia, South America, and of course Central and Eastern Europe and the NIS, has been carried out by CTI. A very useful insight is offered by the CTI web site www.climatetech.org.

CTI has its own life in parallel to other items handled inside the UN/FCCC, and discussed at the annual conferences, recently COP 8 in New Delhi. Unfortunately, the CTI activities are mostly relying on voluntary contributions from governments. To collect such contributions has been a growing challenge, also after CTI's seven years of existence.

CTI is by far the only initiative in the field of climate policies and energy efficiency. Energy efficiency policies are in the focus in the Kyoto Protocol, in a number of international agreements including PEEREA, and in national policies within all European countries.

In October 2002 we had an international seminar in Warsaw where a number of European and international organizations considered how to progress in promotion of energy efficiency policies and intergovernmental co-operation. There are several actors, as IEA, CTI, Energy Charter PEEREA, UN/ECE, UN/FCCC, NGOs, etc.

One observation from the Warsaw seminar is that there is much commitment and development taking place in energy efficiency policies throughout Europe, and that there is a role for international and European co-operation.

Many policy ideas and capacity building initiated over the last few years have given fruitful results. Across the new democracies, energy efficiency policies have achieved considerable grounds.

- The possible enlargement of EU will certainly affect the co-operation in this part of the world. The European Union has announced that it will be promoting energy efficiency policies inside the Union.
- Energy efficiency policies are also in focus in the Russian-European energy co-operation that has been developing over a number of years, also in certain regions.
- In addition comes regional co-operation, such as the BASREC energy efficiency group, and networking funded by bilateral and EU programs.

When looking into the future, ideas for further co-operative activities exist. Ideas could be covering e.g. new financing mechanisms for energy efficiency investments, experience in combined heat and power production and district heating, and exchange of ideas in energy efficiency programs and networking.

This CTI seminar will be an opportunity to share experience and ideas.

A milestone for the further promotion of energy efficiency policies will be the Kiev meeting in May 2003 where the follow-up of the Energy Efficiency Initiative from Aarhus 1998 as part of the 'Environment for Europe' process will be considered.

The key word is implementation of energy efficiency policies.

CTI seminar in Tutzing

November 2002

Ture Hammar

Danish Energy Authority
Ministry of Economic & Business Affairs

Slide 1

What is CTI?

- Initiative Berlin 1995 COP 1
- Climate technology deployment and capacity building
- Transfer to developing countries - Africa, Asia, Latin America
- Partnership with CEE & FSU
- Activities in seminars, awards, involvement of industry, R&D&D related approaches
- Based on voluntary contributions
- Shifting chairmanship

Slide 2

European activities related to CTI & capacity building

- Bratislava meeting
- Seminars in Ostritz twice, Tallinn, Tutzing
- Focus on capacity building & best practice dissemination
- Thematic: Tutzing policy design
- Networking - continuation….
- www.climatetech.org

Slide 3

The environment of related European activities

- International co-operation: IEA, UN/ECE, Energy Charter, UN/FCCC, GEF, WB etc.
- EU-initiated activities PHARE, TACIS, SAVE, ALTENER, 6th FP….
- Intelligent energy for Europe
- Bilateral activities (DK, Japan, NL, D, US etc.)
- Regional co-operation (BASREC etc.)
- Environment for Europe
- EU enlargement December 2002 Copenhagen
- Russia-EU dialogue

Slide 4

Results from international seminar 23 October 2002 in Warsaw

- *Many parallel activities and some duplication*
- *Good progress in capacity building and real results (e.g. financing instruments)*
- *Co-operation creates added value*
- *Use of flexible mechanisms a long process*
- *Sustainable energy basis for activities*
- *Focus areas in future co-operation: networking, CHP&DH, EE agencies, project finance, PEEREA*
- *EU enlargement & Kiev meeting*

Slide 5

Conclusion

- CTI European seminars fit into a positive picture
- Support to CTI funding
- Next opportunity Kiev - 5 years after Aarhus & PEREEA enforcement

Slide 6

Germany's Climate Protection Program – a Step by Step Approach

Franzjosef Schafhausen

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Berlin

The global warming being over the last century is attributed to an intensification of the natural greenhouse gas effect as a result of climate gas emissions from human activities.

The Intergovernmental Panel on Climate Change (IPCC) concluded back in 1996 in its second assessment report that the balance of scientific evidence suggests an appreciable human impact on global climate. It found that the rises in global mean surface temperature of 0.3 to 0.6º C observed in the last hundred years were very unlikely to be entirely natural in origin. In its third assessment report the IPCC makes it clear that the scientific evidence continues to mount up, pointing increasingly to the fact that human activities are the cause of the already palpable changes in global climate.

In the event of global climate change, the damage will be on an enormous scale. It would therefore amount to gross negligence if this knowledge were not used as soon as possible to develop precautionary action. Moreover, we must also bear in mind that even in the case of a stabilization of global emissions at the current level the concentration of CO_2 and other greenhouse gasses (GHG) would continue to rise, so that the climate would continue to change despite active counter-measures. In order to stabilize the atmospheric concentration and thus climate change at an acceptable level, it would require a reduction of greenhouse gas emissions world- wide at roughly half of today's value by the second half of this century.

Against the background of growing scientific certainty about the global climate change due to human activities, and also in response to the need to use finite raw materials more economically, the German Federal Government began at a very early stage to address the problem politically by working on a comprehensive climate program from the beginning of 1990 and creating the institutional arrangements required to tackle such a cross-sectional task. This federal program is now being effectively enhanced by complementary programs run by the Länder and local authorities. The overall picture is completed by the activities of environmentalist groups, consumer associations, industry, trade unions and other socially-relevant groups.

From the outset, however, the German government has also pointed out that Germany's ambitious and cross-cutting climate policies are not capable on their own of solving the global problem. Rather, effective climate protection demands globally coordinated efforts.

The Framework Convention on Climate Change, which came into effect in 1994, and the Kyoto Protocol, adopted in 1997, have laid some sturdy foundations for an internationally coordinated global approach. In view of the fact that the industrial nations are responsible for a large share of greenhouse gas emissions (around 75 % of current greenhouse gas emissions) and enjoy a high level of technical and economic development, they will have a special responsibility also beyond the year 2012.

A. German climate protection policy between 1990 and 2002

The starting signal for the development and implementation of the Federal Government's Climate protection programs was given on 15 January 1990.

Following very intensive discussions and an often controversial debate within the German government, the Federal Environment Ministry presented the Cabinet on 13 June 1990 with initial recommendations which prefigured the subsequent objectives and structures. Following this landmark decision, we have so far seen five reports from the Interministerial Working Group on "CO_2 Reduction" and six decisions by the Federal Government:

- 7 Nov. 1990 (1st Report of "IMA CO_2 reduction"),
- 11 Dec. 1991 (2nd Report of "IMA CO_2 reduction"),
- 29 Sept. 1994 (3rd Report of "IMA CO_2 reduction"),
- 6 Nov. 1997 (4th Report of "IMA CO_2 reduction") ,
- 26 July 2000 (Interim Report of the Climate Protection Program of the Federal Government),
- 18 October 2000 (5th Report of "IMA CO_2 reduction").

In the course of all these climate policy decisions, which initially related to pre-unification Federal Germany and after November 1990 extended to the territory of the former GDR, a comprehensive strategy has now emerged with very ambitious objectives. By international comparison this program not only constitutes one of the very first political programs to combat the greenhouse effect, but is also probably the most ambitious.

Table 1: Structure of the Interministerial Working Group "CO_2 Reduction"

Interministerial Working Group "CO_2 Reduction" (IMA "CO_2 Reduction") Chair: Federal Environment Ministry					
Working Party I	**Working Party II**	**Working Party III**	**Working Party IV**	**Working Party V**	**Working Party VI**
"Energy supply"	"Transport"	"Buildings"	"New Technologies"	"Agriculture and Forestry"	"Emissions Inventory"
Chair: BMWI -	Chair: BMVBW	Chair: BMVBW	Chair: BMWI	Chair: BMVEL	Chair: BMU -
Economics Ministry	Transport Ministry	Transport & Housing Ministry	Economics Ministry	Consumer Affairs, Agriculture	Environment Ministry

1. Main elements

As early as 13 June 1990 the Federal Government had identified the central technical elements of its climate protection program as follows:

- "Energy saving and rational use of energy on the supply and on the demand side are a priority of any viable policy to reduce CO_2 emissions and other energy-related greenhouse gases.
- The contribution of existing energy sources must be made as environmentally sound as possible.
- The long-term economic potential of renewable energy sources should be exploited as quickly as possible to help cut emissions."[1]

Apart from the fact that the second policy formulation was elaborated by an "agreement on the orderly phasing out of the use of nuclear power in Germany",[2] these remain to this day the key elements of the climate protection policy pursued by the German Federal Government.

The mission still to be accomplished depends in part on clarification of the questions formulated as follows in a government decision:

"To this end we must consider

- what combination of regulatory and economic instruments, with special regard to a CO_2 levy or tax, can best be used to implement these measures, considering the need to prioritize market instruments,
- what macroeconomic and social policy consequences are associated with the measures,
- which priorities arise on the basis of cost-benefit estimates,
- what implementation periods can be expected, taking into consideration, for instance, the age structure of existing installations, the available production capacities in the manufacturing sector and administrative and behavioral impediments,
- what interdependencies and conflicts of objectives may occur between the sectors directly concerned and with other policy sectors,
- which measures require international consultation and coordination."[3]

The steps taken towards the development of Germany's climate protection program proceeded as follows:

- reviewing the status quo (determining the prevailing structures and conditions),
- identifying the physical, technical and economic potentials and options,

[1] Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (publ.), Beschluss der Bundesregierung vom 11. Dezember 1991: Verminderung der energiebedingten CO2 Emissionen in der Bundesrepublik Deutschland, Bonn, 1st edition January 1992, p. 84

[2] Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (publ.), Vereinbarung über die geordnete Beendigung der Nutzung der Kernenergie in Deutschland vom 14 Juni 2000, Berlin

[3] Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (publ.), Beschluss der Bundesregierung vom 11. Dezember 1991: Verminderung der energiebedingten CO2 Emissionen in der Bundesrepublik Deutschland, Bonn, 1st edition January 1992, p. 85

- identifying impediments (administrative, organizational, informational, institutional, legal and economic barriers),
- analyzing the available measures to remove or reduce the impediments identified,
- designing a program and defining the measures to be employed,
- political implementation of the defined package of measures,
- reviewing and where necessary modifying the package of measures being applied.

In taking this approach, the government very soon realized that

- there could be no instrumental panacea to solve the problem of global problem of climate change. Rather, it very quickly became clear that the climate protection program would have to contain not only regulatory requirements but also economic incentives and supporting measures such as information and advice as well as training provision. Over the last decade this has led to the development of an interdependent, multifaceted and very complex package of measures that is being implemented step by step;
- it could not be the task of the Federal Government alone to make a sustained contribution to combating the anthropogenic greenhouse effect. Rather, such a goal can only be achieved if every level of economy and society makes its contribution. This insight has since led to the fact that, alongside the Federal Government's climate protection program, numerous Länder and more than 1,000 local authorities also have drawn up their own climate protection programs. In addition, industry and other socially relevant groups have developed appropriate strategies and concepts and are now applying them.

2. Status quo

The following remarks concern the Federal Government's last climate policy decision of 18 October 2000 and consider the progress made so far in implementing this decision.

Germany's Red-Green coalition government took this decision in the context of an extremely difficult situation. Although, in its coalition agreement, the new government had unconditionally accepted the climate policy targets set by the former federal government, namely a 25% reduction of CO_2 emissions of 1990 levels by 2005, by the end of 1998 various studies had already found that Germany would fall significantly short of this ambitious national target by using the combination of instruments adopted by the time the new government was voted into office. The prediction for 2005 was for a CO_2 reduction of just 15 to 17 %.

The following measures taken after the change of government at the end of 1998 have since contributed to the overall downward trend in CO_2 emissions:

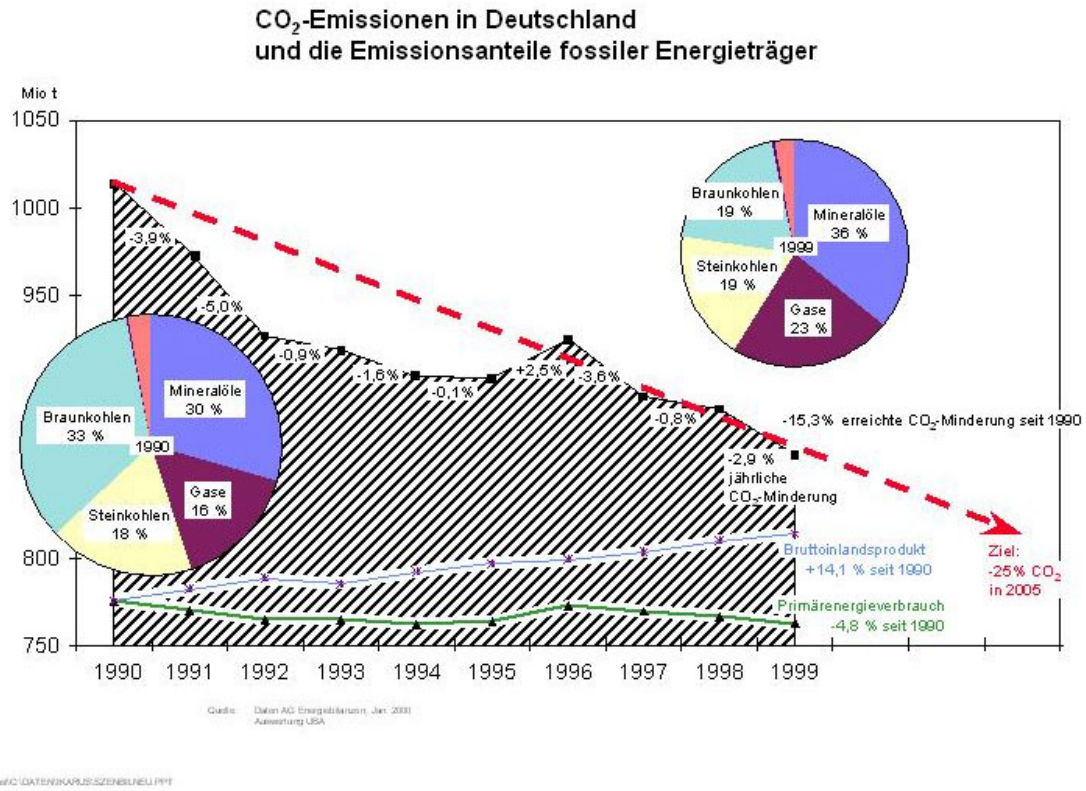
- the ecological tax reform, which provides for graduated rises in energy prices in all areas and thus creates incentives for the development and market introduction of new technologies and for the rational and economical use of energy,
- the Renewable Energy Sources Act and the Biomass Ordinance, which promote electricity supplies from renewable energy sources,
- the program to introduce renewable energy onto the market, which above all benefits the use of solar collectors,
- the 100,000 roofs program, which encourages investment in photovoltaic systems,
- the promotion of low-sulfur or sulfur-free fuels, which is also helping the breakthrough of low-consumption and low-emission engine technologies.

With these measures in place, a CO_2 reduction of 18 - 20 % (roughly 180 to 200 million tons CO_2) is predicted by 2005 (against 1990).

This meant that the Federal Government was working on the basis of a clear baseline scenario in 2000. Taking into account the measures already taken, it realized that further efforts were necessary to achieve a CO_2 reduction of 25 % (this amounts to about 250 million tons CO_2) by 2005 and a cut in the six greenhouse gases of the Kyoto Protocol of 21 % by 2008 / 2012.

Between 1990 and 2001 CO_2 emissions fell in Germany by 15.5 %.

Figure 1: Development of CO_2 emissions in relation to gross domestic product and primary energy consumption in Germany and the emission contributions of fossil fuels



Key: Cake diagram: lignites / mineral oils / gases / hard coals
GDP +14.1% since 1990
Primary energy consumption –4.8% since 1990
-15.3% CO_2 reduction achieved since 1990
-2.9% annual CO_2 reduction
Target –25% CO_2 in 2005

If we compare the changes in CO_2 emissions studied in the period 1990 to 2000, the annual rate of change shows enormous fluctuations of between plus 2.5 % (1996) and minus 5.0 % (1992).

The factors behind the emissions trend during the previous decade are extremely diverse. The reasons lie in the restructuring of industry in the eastern part of Germany, in the rising number of households and living space in homes, but also in the massive investment to improve building fabrics and modernize the energy supply, especially in eastern Germany.

The regional shift in CO_2 emissions has occurred due to a substantial population movement from east to west. Other factors contributing to the downward emissions trend have been the very considerable progress made in improving the industrial, local and regional infrastructure and, not least, the activities on climate change undertaken in the past by the Federation, Länder and local authorities. The factors responsible for this trend have been analyzed by the Deutsches Institut für Wirtschaftsforschung (DIW) in Berlin and the Fraunhofer Institut für Systemtechnik und Innovationsforschung (ISI) in Karlsruhe.[1]

Between 1990 and 2000 we saw a significant weakening of the link between CO_2 emissions and gross domestic product, with their ratio declining by 28 %. Moreover, energy-related CO_2 emissions underwent a disproportionate per capita reduction of around 18 %. Taking the temperature-adjusted CO_2 emissions for 1999 as our basis, we must reduce CO_2 emissions by a further 9.4 percentage points, or 95 million tons, by 2005.

The trends for the other greenhouse gases and precursor substances show the following picture: methane emissions declined by 36.2 % between 1990 and 1998, while N_2O emissions fell by 27.6 %. Significant rises were recorded,

[1] Umweltbundesamt (ed): Treibhausgasminderungen in Deutschland und UK. Folge „glücklicher" Umstände oder gezielter Politikmaßnahmen? Ein Beitrag zur internationalen Klimapolitik, Berlin, Juli 2001

however, for HFC emissions (1995 to 1998: 35.1 %), while SF_6 emissions between 1995 and 1998 went down by 8.5 %. Partially falling trends can be observed for the group of PFCs. Thus, measures taken by the aluminum industry were particularly important in reducing CF_4 emissions by 23.7 %, although C_2F_6 and C_3F_8 saw an upturn over the period studied (+ 31.3 % and + 300 % respectively).

Overall, the general downward trend in greenhouse gas emissions in Germany aggregates over the 1990 - 2001 period to a 19.1 % fall (expressed in CO_2 equivalent values as defined by the IPCC). This means that Germany is still 1.9 per cent short of achieving its commitment given under the EU's burden sharing arrangement (21 % reduction of the "Kyoto gases" – CO_2, CH_4, N_2O, HFCs, PFCs), SF_6 – in the period 2008 – 2012). Indeed, its seems Germany will exceed its contribution to the EU's internal targets by the end of this year. If this occurs, we would clearly occupy the position of a seller in the context of the emissions trading system being discussed as an instrument of sustainable climate policy.

As for the precursor substances, we can also find some very considerable emission reductions. Carbon monoxide was cut by 51.6 % between 1990 and 1998, while NMVOC and NO_x could be brought down by 47.1 % and 34.3 % respectively. The emission of sulfur dioxide fell very dramatically by 75.7 % in the wake of enormous emissions reduction efforts in the eastern part of Germany (flue gas desulfurization of power stations, fuel substitution) but also due to the introduction of low-sulfur fuels.

The structural development of greenhouse gas emissions in Germany is remarkable. Since 1990 the share of carbon dioxide in the overall balance of German greenhouse gases has increased considerably. By the end of 1998, carbon dioxide made up nearly 87 % of total greenhouse gas emissions. [1]

The climate targets

The Federal Government's national policy on climate change is designed to achieve the following targets:

Reducing carbon dioxide emissions

- The Federal Government is sticking to the target for 2005 of a 25 % CO_2 emissions reduction on 1990 levels. The target formulated for the year 2005 is an important intermediate step consistent with the "demonstrable progress" demanded by the Kyoto Protocol. The realization of this objective represents an major contribution by Germany to the EU burden sharing arrangement.

Reducing the "Kyoto gases" (CO_2, CH4, N2O, HFCs, PFCs and SF6)

- Under its commitment to cut the "Kyoto gases" (CO_2, CH_4, N_2O, HFCs, PFCs, SF_6) on the basis of the burden sharing agreements of 1998 between the Member States of the European Union, the German Federal Government agreed to reduce, over the period 2008 to 2012, the GHG emissions (calculated in CO_2 equivalents as defined by the IPCC) by 21 % of the 1990 figure. With this target Germany is making a very substantial contribution to the European Union's task of meeting the commitment it undertook in Kyoto (reducing the EU's greenhouse gas emissions over the 2008-2012 period by a 8 % overall compared to 1990 levels).

Long-term goal

- The long-term goal is to make a 40 % reduction in greenhouse gas emissions by 2020 on condition that the European Union as a whole commits to lowering its greenhouse gas emissions by 30 % by 2020 (measured against 1990 levels).

Medium and long-term goals

- For national and international climate policy, 2005 or 2012 cannot be the end of the road. The German government believes it is absolutely essential that all the relevant actors are given long-term perspectives and thus reliable frameworks in which to operate. It underlines the necessity for further drastic reductions in greenhouse gas emissions. At both national and international level it is essential to achieve further major cuts in GHG emissions beyond the Kyoto target timeframe of 2008/2012. The Federal Government expects other industrialized countries to commit to similarly demanding targets so that German industry will not be put at a disadvantage in the context of international competition. Agreeing with the conclusions reached by the German Bundestag's two study commissions on climate change, the Federal Environment Ministry takes the view that a greenhouse gas emissions reduction of 40 % by 2020 and 80 % by 2050 is needed.

[1] Figures in CO_2 equivalent values as defined by the IPCC

- The Federal Government also believes that the commitments set out in the Kyoto Protocol for the first commitment period (2008-2012) for the industrial nations will have to be made much tougher in the following commitment periods and that, in addition to the industrialized countries (Annex B countries), the developing countries (non-Annex B countries) will also have to accept limitation commitments.

Technology- and energy-related targets

- doubling the current contribution of renewable energy sources to the German energy supply by 2010,
- expanding cogeneration (combined heat and power) with the aim of reducing CO_2 emissions on a scale of 10 million by 2005 and 23 million by 2010,
- significantly raising energy productivity.

Targets for the coming years are indicated in Table 2:

Table 2: Indication of targets for the reduction of Kyoto gases

Greenhouse gases	Reference year 1990 / 1995 (PFCs,HFCs,SF_6) in Gg	Emissions 1998 or 1999 (CO_2) 1998 / 1999 (CO_2) in Gg	Trend Until 2005 In Gg	Trend until 2008-2012 in Gg	Changes 1990 / 1998 or 1999	Changes 1990 / 2005	Changes 1990 / 2008-2012
CO_2 emissions (IPCC targets)	1,014,500	859,000	760,500		- 15.5 %	- 25 % [1]	- 32 %
CH_4	5,571	3,555	2,871	2,628	- 36 %	- 48 %	- 53 %
N_2O	225	163	159	157	- 28 %	- 29 %	- 30 %
HFCs	2,135	2,884	14,361	18,825	35 %	573 %	782 %
CF_4	0.224	0.171	0.105		- 24 %	- 53 %	
C_2F_6	0.032	0.042	0.011		31 %	-66 %	
C_3F_8	0.002	0.008			300 %		
PFCs	0.258	0.221	0.281	0.340	- 14 %	9 %	32 %
SF_6	0.261	0.238	0.168	0.209	- 9 %	- 36 %	- 20 %
GHG emissions in CO_2 equivalents	1,210,049	1,022,346	896,986		18.5 %	- 25.9 % [2]	
NMVOC	3,225	1,703	1,380 [4]	995 [3]	- 47 %	- 57 % [4]	- 69 % [3]
NO_x	2,709	1,780	1,421 [4]	1,051 [3]	- 34 %	- 48 % [4]	- 61 % [3]
CO	11,219	5,425	5,400		- 52 %	- 52 %	
SO_2	5,321	1,290	867 [4]	520 [3]	- 76 %	- 84 % [4]	- 90 % [3]

[1] Targets of the Federal Government
[2] Taking into account the targets of the Federal Government for reducing CO_2 emissions
[3] Targets arising from the Decision of the EU Council of Environment Ministers of 22.6.2000 on the NEC Guideline
[4] Corresponding to the reference scenario of the Federal Environment Agency (UBA) for the NEC Directive

Integrating the national program

In view of the global dimensions of the climate change problem, attempts at a national go-it-alone will offer no adequate solution to the problem. What we require is an EU-wide and internationally coordinated strategy. Against this background, the German Federal Government notes with grave concern that greenhouse gas emissions in most of the western industrialized counties are showing a clear upward trend. Only in Great Britain, Luxembourg, France, Finland and Germany do the emission figures show a downward trend. The era of drastic falls in emission levels in the countries of Central and Eastern Europe is also coming to an end. Many countries in this region are again registering rising tendencies.

The package of climate policy measures

The Interministerial Working Group "CO_2 Reduction" based their consultations on the following reduction targets in the individual sectors:

- private households and buildings sector: 18-25 mln tons
- energy sector and industry: 20-25 mln tons,
- transport: 15-20 mln tons.

Table 3: Overview of CO_2 reduction contributions

Field of action	Reduction contributions in million tons CO_2 by 2005* set under the Federal Government's new climate protection program	Reduction contributions in million tons CO_2 by 2010 set under the Federal Government's new climate protection program
Ecological tax reform	10 million tons (reduction contribution as the sum of all sectors)	20 million tons (reduction contribution as the sum of all sectors)
Buildings sector (heating/process water)	13 – 20 million tons	
Private households excluding buildings sector (electricity and similar)	5 million tons	
Industry	15 – 20 million tons	
Transport	15 – 20 million tons *	
Energy sector	20 million tons	
Renewable energy sources	13 – 15 million tons	Approx. 20 million tons
Waste management	15 million tons*	20 million tons
Agriculture	not quantifiable	
Total effect allowing for reductions counted twice	90 – 95 million tons	
For comparison: Sink function of German forests	30 million tons	30 million tons
* The figures in these columns express the reduction impacts of measures already adopted (24-34 million tons) and measures adopted additionally on the basis of this report.		

Should it become apparent in the course of implementing the climate protection program that the reduction contribution of individual sectors cannot be achieved by means of certain measures, other measures shall then be considered. Should the new measures still fail to bring about the required cut in emissions, the reduction deficit must then be compensated by enhanced efforts in other sectors.

In order to close the gap that still exists in the race towards the 25 % target (50 – 70 million tons CO_2), the Federal Government has decided to initiate more than 60 additional measures. These include above all the following points referred to in the review of decisions of 18 October 2000:

1. development of combined heat and power generation ,
2. adoption of the Energy Saving Ordinance,
3. program encouraging CO_2 reduction in existing buildings,
4. declaration by German industry on climate protection,
5. package of measures for the transport sector,
6. voluntary commitment by the Federal Government for its sphere,
7. measures on other greenhouse gases.

A complete overview of all the measures additionally adopted on 18 October 2000 is contained in the German Federal Government's climate protection program, "Nationales Klimaschutzprogramm", published by the Federal Environment Ministry.

The integration of all levels and all actors

The climate protection program seeks to integrate all levels of the economy and society and all the actors. The program document presents the current programs of the Länder, pays tribute to the efforts of towns and communities, gives critical appreciation of the framework for local authority climate policies, and describes the contributions of industry[2] and other socially relevant groups.

[1] Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (ed.), Nationales Klimaschutzprogramm, Fünfter Bericht der Interministeriellen Arbeitsgruppe „CO_2-Reduktion", Berlin 2001

[2] Vereinbarung zwischen der Regierung der Bundesrepublik Deutschland und der deutschen Wirtschaft zur Klimavorsorge, 9. Nov. 2000

3. The status of implementation

Immediately after the Federal Government had adopted its new climate protection program, work began on implementing its core measures. These were primarily the voluntary commitment declared by declaration by German industry and trade on global warming prevention, the measures to maintain, modernize and develop combined heat and power generation, the adoption of the Energy Saving Ordinance, the offer of low-interest loans under the climate change program of the Kreditansalt für Wiederaufbau (KfW), and the Biomass Ordinance.

3.1 The Declaration of German Industry and Trade on Global Warming

German industry has entered into a voluntary commitment that is to last until the Kyoto target year of 2012. The previously unilateral declarations by the Federal Government and German industry were replaced by a long-term "Agreement between the Government of the Federal Republic and German industry and trade on global warming prevention" signed in Berlin on 9 November 2000 (cf. fn. 10). In this document, industry declares its willingness to reduce its specific CO_2 emissions by 28 % by 2005, and achieve a 35 % decrease by 2012 in its specific emissions for all six greenhouse gases named in the Kyoto Protocol. The government and German industry reckon this will bring down emission volumes by an additional 10 million tons of CO_2 by 2005, and by another additional 10 million tons in CO_2 equivalents by 2012, i.e. additional to the emission cuts estimated under the previous voluntary commitment.

3.2 Measures to promote combined heat and power generation

In March 2000 the German Bundestag passed the Act on the Protection of Electricity Generation from Cogeneration (Combined Heat and Power Act). The purpose of this law was to ensure that cogeneration can flourish in the context of the wider electricity industry in Germany.

On 26 July and 18 October 2000, the Federal Government assigned the Federal Economics Ministry the task of drawing up by the end of 2000, together with the Federal Environment Ministry, a framework for setting quotas to increase the use of combined heat and power generation (CHP) and requested that draft legislation be prepared in good time with a view to concluding the legislative process by mid 2001. However, the political decision-making process then took a quite different direction.

In response to persistent interventions by the electricity industry and by individual Länder, the Federal Government now decided to achieve its cogeneration targets by a set of measures that comprised an industry-wide voluntary commitment centered on the electricity industry in combination with a combined heat and power law. The new CHP Act entered into force on 1 April 2002. It provides for limited surcharges on the electricity prices for industry (maximum of 0.1 Pfg/kWh) and, in principle, unlimited surcharges on electricity prices for tariff customers. The revenue, which has been calculated at DM 8.7 billion by 2010, is to be used to promote cogeneration (by offering suppliers with certain types of cogeneration plants guarantied rates of remuneration for their electricity). The work required to reduce emissions by this means is to be divided between the various instruments: the new act is expected to lead to a saving of 11.5 million tons of CO_2, while the electricity industry's voluntary commitment should reduce CO_2 emissions by a further 11.5 million tons. Across the board, German industry as a whole has committed itself to saving a total of 45 million tons of carbon dioxide by 2010 (base year 1998) under its Agreement on Global Warming Prevention of 9 November 2000 and the supporting agreement on CHP.

3.3 The Energy Saving Ordinance

After a year-long negotiating marathon, the Federal cabinet finally adopted the Energy Saving Ordinance in June 2001, which, having been passed by the Bundesrat, entered into force on 1 February 2002. This ordinance raises the standards required under the 1995 Thermal Insulation Ordinance by about 30 % (in terms of the specific energy consumption of buildings) and introduces the primary energy approach as a new and welcome energy policy development. In principle the intention here is to establish fair competition between the individual energy sources, with the laws of physics determining energy choices. Unfortunately, this objective has been watered down significantly

in the political process. Pursuant to the Bundesrat's conditional decision of 13 July 2001, the bonus for using electricity was significantly improved. On the whole, the arrangements under this regulation hardly go anywhere towards ensuring full use is made of the technical possibilities currently available. The implementation of the Energy Saving Ordinance must be monitored to see whether the targets set by the Federal Government are being achieved.

3.4 The Biomass Ordinance

The government has now also adopted the Biomass Ordinance on the basis of the Renewable Energy Sources Act (EEG). Electricity generated from biomass by plants up to a size of 20 MW_{th}, is now rewarded with guaranteed remuneration rates that are set according to various criteria. The ordinance, which finally closes a gap that has persisted in the legislation, should help to tap the considerable CO_2 reduction potential offered by biomass combustion.

In addition to the regulations already referred to above, other measures have now entered the implementation stage. These are, for instance, the Federal Government's "program of investment in the future", the information campaign on climate change and, in the transport sector, the distance-based motorway toll for heavy goods vehicles (heavy goods toll). With regard to transport, a remarkable development is that for the first time the rises in the price of petrol and high-octane fuels at the pump due to the oil market and the price effects of the government's Ecological Tax Reform have combined to cause a significant decline in the use of the respective energy sources that is likely to be sustained over the medium term. It used to be generally argued, with reference to the lack of price elasticity in this market segment, that a development of this kind was impossible in the medium and long-term.

3.5 Consequences of changes in energy mix

The Federal Government has decided to phase out nuclear power. The restructuring of energy supplies required will have to take into account technological, ecological and energy-management imperatives.

Nuclear power stations with a combined output of about 8 billion kWh/a of electricity must be replaced by 2005. Depending on how this substitution takes place – greater use of existing plants or deployment of new gas-steam turbine units (run on natural gas), whether hard coal is burned or lignite – this phase out will lead to additional CO_2 emissions varying between 3 and 7 million tons.

The phase-out schedule for 2006 to 2010 envisages the replacement of nuclear power stations with a total output of around 19 billion kWh/a (creating an additional 7 to 17 million tons of CO_2), with further closures from 2011 to 2020 which may demand another 87 billion kWh/a (or an additional 33 to 74 million tons of CO_2). As part of a consistent policy to combat climate change, the phasing out of nuclear power demands a comprehensive strategy to make the process CO_2-neutral in the medium term and even CO_2-negative in the long term. In the short to medium term the measures adopted in the framework of this climate protection program will help to prevent negative climate policy outcomes from the phasing out of nuclear energy.

This path is technically feasible and its macroeconomic consequences can be modeled, as studies commissioned by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety demonstrate. A crucial factor in determining the outcome of projections is the time-scale chosen for the phase out.

The study conducted by the Wuppertal Institute (*Bewertung eines Ausstiegs aus der Kernenergie aus klimapolitischer Sicht*) in 2000, the study entitled *Politikszenarien I und II* already referred to, and the PROGNOS Institute's study of the effects on employment (*Arbeitsplätze durch Klimaschutz*) have all demonstrated that a total phase out of nuclear power in Germany even before 2020 is possible without negative climate effects.

3.6 The coalition agreement of 16 October 2002

Following the federal election on 22 September 2002, in which the incumbent Red-Green coalition was re-elected for a second term in office, the coalition partners agreed on further measures to mitigate climate change world-wide. Specifically, these are:

- launch of an EU-wide emissions trading system,
- modification of the Eco Tax and development of the Ecological Tax Reform into an ecological financial reform (e.g. dismantling ecologically counterproductive subsidies),

- support for cost-efficient "passive houses" with 30,000 homes,
- investment grants and tax relief for energy-efficient upgrading of existing buildings,
- improvement of the Renewable Energy Sources Act,
- expansion of cogeneration (CHP),
- off-shore strategy for the use of wind energy,
- conversion of motor vehicle tax to a CO_2-based schedule,
- reduced value added tax for German railways (long-distance journeys),
- removal of VAT exemption for flights to other EU countries,
- promotion of natural gas as a fuel in the transport sector as a transitional technology on the path to hydrogen engine technologies (tax relief for natural gas to be continued until 2020),
- continuation of the restructuring program for the German coalmining industry.

B. Trends in Brussels – the EU climate strategy

The activities of the European Commission in the last two years were shaped by the insight that in the case of "business as usual" the EU as a whole would fall far short of its commitments undertaken in Kyoto in 1997. This was the conclusion of scientific studies presented at the beginning of 2000. Their finding was alarming: instead of coming very close to the target agreed in Kyoto of "reducing greenhouse gases by 8 % in the period 2008 – 2012 (base year: 1990)", the volume of greenhouse gases emitted from the territory of the European Union would be about 1 % higher in 2012 than the emissions recorded in base year 1990 (cf. table below).

The European Commission's conclusion: since the EU member countries were obviously not in a position to realize the required reduction targets (see table be low) by means of national policies and measures, further steps at Community level were essential.

Table 4: Greenhouse gas reduction potential within the European Union under cost-efficiency criteria for all relevant sectors until 2012 (including implementation of the voluntary commitment of the European motor industry)

Marginal cost 20 $/t CO2 equivalents	GHG emissions 1990 or 1995 in megaton CO2 equivalents	Baseline emissions 2010 according to "business as usual"	Cost-efficiency potential beyond the "business as usual" case
Energy supply	1.422	minus 6 %	minus 13 %
Industry	757	minus 9 %	minus 12 %
Transport	753	plus 31 %	minus 4 %
Households	447	plus/minus 0 %	minus 6 %
Small-scale consumption	176	plus 14 %	minus 15 %
Agriculture	417	minus 5 %	minus 4 %
Waste management	166	minus 18 %	minus 13 %
EU as a whole	4138	plus 1 %	minus 9 %

This was the starting signal for the European Climate Change Program (ECCP). Recommendations were formulated within the framework of an extensive consultation process involving not only officials of the governments of the EU Member States but also representatives of industry and environmental groups, which lasted from the spring of 2000 to July 2001. The results of this process focus on the sectors "Flexible Mechanisms", "demand-related measures", "energy supply", "industry", '"transport" and "fluoridated gases".

The outcome of the year-long and at times extremely contentious discussion process was the identification of 40 cost-efficient measures. With a greenhouse gas reduction potential of 664-765 megatons CO_2 equivalents, these measures would facilitate a reduction potential doubling that required for the target agreed by the EU in Kyoto. The European Commission calculated that the total costs of realizing the EU target with the most cost-efficient measures would stand at 3.7 billion euros in 2010, or 0.06 % of the EU's gross domestic product.

The measures focus on the following sectors:

- introduction of EU-wide emissions trading,
- greater use of renewable energy sources,
- improving energy efficiency in buildings,

- tightening energy-saving standards for domestic appliances as well as communications and entertainment technology devices,
- energy consumption management,
- more intensive use of cogeneration (CHP),
- better control of fluoridated greenhouse gases by maintenance, leak tests and monitoring,
- a more climate-efficient "modal split" in the transport sector by improving infrastructure and levying duties and charges.

Table 5: EU burden-sharing, emissions development 1990 to 1999, and target achievement levels of the individual EU Member States

EU Member State	Targets for the commitment period 2008–2012 under the 1998 burden-sharing scheme	Emissions trends between 1990 and 1999	Emissions reduction target to 2008-2012
Belgium	minus 7.5 %	plus 2.6 %	minus 10.1 %
Denmark	minus 21 %	plus 4 %	minus 25 %
Finland	plus/minus 0 %	minus 1.1 %	Target achieved
France	plus/minus 0 %	minus 0.2 %	Target achieved
Germany	minus 21 %	minus 18,7 %	minus 2.3 %
Greece	plus 25 %	plus 16.9 %	Target achieved, but continuing upward trend
Ireland	plus 13 %	plus 22.1 %	minus 9.1 %
Italy	minus 6.5 %	plus 4.4 %	minus 10.9 %
Luxembourg	minus 28 %	minus 43.3 %	Target achieved
Netherlands	minus 6 %	plus 6.1 %	minus 12.1 %
Austria	minus 13 %	plus 2.6 %	minus 15.6 %
Portugal	plus 27 %	plus 22.4 %	Target achieved, but continuing upward trend
Spain	plus 15 %	plus 23.2 %	minus 8.2 %
Sweden	plus 4 %	plus 1.5 %	Target achieved
United Kingdom	minus 12.5 %	minus 14 %	Target achieved
EU as a whole	minus 8 %	minus 4 %	minus 4 %

Source: European Commission, 2001

C. The status of international climate change negotiations

The Seventh Conference of the Parties (COP7) to the UN Framework Convention on Climate Change, held in Marrakech, Morocco, from 19 October to 10 November 2001, achieved a major advance in the international negotiations on climate policy after an extremely difficult and lengthy process with conference convened in Rio de Janeiro in 1992, Berlin in 1995 (COP1), Geneva in 1996 (COP2), Kyoto in 1997 (COP3), Buenos Aires in 1998 (COP4), Bonn in 1999 (COP5), The Hague in 2000 (COP6), and again Bonn in 2001 (continuation of COP6). On 10 November, the Morocco conference adopted the Marrakech Accords[1] which meant that the Bonn Agreement of 2001[2] had been elaborated in operational terms in such a way that the Kyoto Protocol could now be implemented.

With the Marrakech breakthrough, the international community has the principles, modalities, procedures, rules and guidelines needed to make the Kyoto Protocol workable and enforceable. All necessary detailed regulations are in place, and the national measures to deliver the commitments of individual parties on emission reduction and emission limitation are now discernible. The Eighth Conference of the Parties in New Delhi has further improved the technical requirements for implementing the Kyoto Protocol. From a political perspective, however, the New Delhi climate conference will not leave much of a mark on the final shape of an international climate change regime.

On the whole, the international climate protection policy-making is pushed by scientific warnings, on the one hand, and pulled back by a growing attitude of political refusal, on the other:

[1] Available via the homepage of the UN Climate Secretariat in Bonn at http://www.unfccc.de/index.html

[2] Available in German via the homepage of the Federal Environment Ministry at: http://www.bmu.de/download/dateien/kyoto Bonn.pdf

- the IPCC points out expressly that the upward trend in greenhouse gas emissions is all too clear and undeniably man-made;
- yet the activities so far initiated by the industrialized countries are far from sufficient to reverse the trend and decouple economic growth from increases in GHG emissions.

In this situation, the gap between technical and economic possibilities must be closed – at the international, regional and national level. This imperative lay behind the efforts made to flesh out rules for the Kyoto Protocol. The goal – and this is not always recognized by all parties to the negotiations – is to reconcile economic policy requirements with environmental policy concerns. The attempt to achieve a symbiosis between ecology and economics – at a time when world economic conditions are worsening – has become increasingly evident as we move further away in time from Kyoto. All the safety valves available under the Protocol have been opened:

- application of the rules on sinks;
- the so-called "flexible" mechanisms: Joint Implementation (Art. 6 KP), Clean Development Mechanism (Art. 12 KP) and Emissions Trading (Art. 17 KP),
- reporting and monitoring (Art. 5, 7, 8 KP),
- the compliance system (Art.18 KP).

It is now to be seen whether these rules will prove successful in practice. However, before they can be put to the test, the Kyoto process faces another obstacle. The rules recommended by COP7 cannot be adopted until the First Meeting of the Parties to the Kyoto Protocol (the so-called MOP1). The result is that we shall not finally know what the rules for the Kyoto Protocol's first commitment period (2008-2012) look like until 2003.

Nevertheless, the decisions taken in Bonn and Marrakech have brought clarity and legal certainty. They have also made clear that the great majority of the industrial nations are meeting their responsibility, although the world's greatest emitter of greenhouse gases – the USA – continues to run away from this responsibility and is prepared, at best, to implement only a little more than "business as usual". That means there is now a reliable foundation on which both the industrialized and the developing countries can frame their policies. It is a foundation which, in the final analysis, industry also needs to operate the instruments offered under the Kyoto Protocol and to take advantage of the business opportunities. And German industry, in particular, can see chances arising from an internationally agreed climate protection strategy.

The positive general mood of the developing countries proved to be a decisive factor behind the breakthrough in Bonn and Marrakech. But affirmation also had to be bought with concessions by the industrialized nations – especially the EU. The arrangements for national reporting by the developing countries were finalized in Marrakech. In addition, a framework of action, with further individual measures, was laid down for the transfer of environmentally sound technologies to developing countries.

Compliance is, of course, a core element of the international climate protection regime. The Parties succeeded in adopting a relatively robust compliance concept in Marrakech. The system provides for binding consequences in the event of failure to meet commitments that have been entered into and contains detailed procedural rules for reaching decisions.

Straight after COP7 in Marrakech the newly-formed Executive Board of the Clean Development Mechanism met for the first time. The chief task of this body is to register and review CDM projects. Its members include two representatives of the EU. The CDM Executive Board had already completed a great deal of work before New Delhi came around. This included the formulation of important technical rules and the initiation of consultations on other matters requiring technical solutions.

The Parties can only make use of the flexible mechanisms if they fulfill the following conditions:

- ratification of the Kyoto Protocol,
- commitment to the compliance system adopted in Marrakech, although participation in mechanisms cannot be withdrawn retroactively by the establishment of a system with internationally binding consequences,
- establishment of a national system to register emissions,
- punctual and correct presentation of annual greenhouse gas balances and submission of sinks inventories,
- punctual and correct reporting of the carbon stored in sinks from the second commitment period (2013–2017). During the first commitment period (2008– 2012) a qualitatively incorrect report will result only in the respective sinks being disqualified for emission credits.

When will the Kyoto Protocol enter into force?

The quorum requirements for the Kyoto Protocol contain two points, both of which must be fulfilled:

- it must be ratified by 55 Parties to the Convention; and
- these Parties must include developed countries responsible for at least 55 per cent of the CO_2 emissions of the Annex I nations in 1990.

At present, about 90 countries have ratified the Kyoto Protocol. Over the last year we have seen a marked increase in the number of industrial nations among the ratifiers. These include the EU Member States and the European Commission, who deposited their ratification documents in New York even before Johannesburg, thus making a contribution of 24.1 per cent to fulfillment of the quorum. Japan, Canada, New Zealand, the Peoples Republic of China, and India – to name but a few of the major candidates – have also reaffirmed their intention to ratify the Kyoto Protocol.

With regard to achieving the quorum of 55 per cent, Russia in particular (17.4 per cent) remains a 'shaky' candidate, but holds the key to the Kyoto Protocol's entry into force. Various actors in Russia still seem intent on trying to bargain for even more benefits for their country. So we must expect to wait several months yet before the various actors in Russia (government, Duma, etc.) finally managed to agree on a positive answer. Ultimately, however, the economic incentives offered by the Kyoto mechanisms are so great for Russia that the country is bound to ratify the protocol in the end. This view is now being affirmed by the relevant government departments in Moscow.

D. Consequences of the international climate protection process for German industry

The first thing to note is that predictions about the consequences for the German economy of the international climate protection process are not easy to make in view of the complexity of the factors and causal connections involved. Anyone who pretends – as some "scientific" studies do – to know exactly how things will develop is either naive and ignoring the complex interrelationships or has decided in advance on his preferred conclusions.

A sober analysis will conclude that the effects will be partly determined at least by the following factors:

- the starting situation for industry, the associated technical and economic reduction potentials and the historically evolved supply structures,
- the climate policy objectives,
- the timeframe for implementation,
- the effective policies and measures,
- the objectives and programs in other countries, especially the major competitors.

If we now look at the German situation, first impressions might lead us to believe that Germany is in a particularly difficult position:

- A very large proportion of fossil fuels, especially lignite and hard coal, the comparatively high per capital emissions that result from this energy pattern, an extremely complex industrial structure, a very high level of prosperity by international comparison, and a nuclear phase-out policy that has been agreed with the energy industry – for the pessimists these are the features of Germany's current situation.
- However, the optimist can take a completely different view: Germany's position is characterized by big greenhouse gas reduction potentials and German industry's tradition of progressive know-how in the field of energy technology and CO_2 reduction technology.

As is so often the case, the truth will lie somewhere in the middle: a consistent climate protection policy has always meant difficult challenges for Germany as well as exciting opportunities for the future.

With regard to the objectives in Germany, and for that matter in other countries, we must take note of the conclusions of Kyoto, namely that the first step is for the industrial nations to meet their responsibilities as the countries that are primarily to blame for the anthropogenic greenhouse effect[1]. Although Kyoto was the result of a political compromise, the targets agreed there were negotiated on the basis of objectively verifiable data and predicted trends. The Protocol is based on the principle of common yet differentiated responsibility, and attempts to embody the aspects of

[1] Industrialised countries (= Annex I Countries under the Framework Convention on Climate Change) are currently responsible for more than two thirds of the world's greenhouse gas emissions, although only 25 % of the world's population live there. However, the developing countries' share of global greenhouse gas emissions is increasing in leaps and bounds, so that by 2020 we can expect to have a global GHG balance dominated by the developing countries.

both fairness and precaution. Admittedly this has not succeeded in every case[1].

Another attempt to set targets in a "fair" manner by taking account of the relevant historical, climatic, geographical, economic and social factors in each country is the system of "burden sharing" developed within the European Union. As Table 5 above shows, Germany holds some very good cards within the circle of EU Member States – and, indeed, beyond. Thus, whereas Germany, with its record of "early action", has only marginal improvements to make in order to perform its contribution to EU burden-sharing, other countries still have a very long way to go. This is good for Germany's competitive position and for the German economy. Policymakers must now make sure that this competitive advantage is not frittered away or taken over at no cost by our partner countries. On this point, emissions trading will help to turn Germany's pioneering achievements into valuable assets on company books.

In any case, our guiding principle here is that ecological targets require economically efficient implementation. Germany now has in place a broad and detailed package of measures, but – as numerous studies have indicated – there is still room for improvement in terms of its economic efficiency and in the way individual measures are coordinated. In this respect, emissions trading offers some extremely interesting prospects, not least through its linkages with the highly praised voluntary commitments of German industry on climate change prevention.

In the international and European context, it is now important to urge other countries to undertake efforts comparable to those in Germany and draw up and implement similarly ambitious climate protection programs. Indeed, we are moving in the right direction with the European Climate Change Program discussed above. Under the ECCP Community-wide policies and measures are being implemented that have been a matter of course in Germany for many years. Just one example of this is the planned EU-wide standards for the buildings sector. The German economy's competitive position is improved not only because the other countries are having to catch up, but also because we already have the technology and know-how they need for implementation. Insulation windows, gas condensing boilers, wind generators, photovoltaics, solar collectors, biomass combustion systems, biogas installations, gas-steam power plants, micro-turbines, block-type thermal power stations, clean coal technology, process measuring and control technology, speed- regulated motors, fuel-efficient vehicles – the list could be get much longer.

As scientific studies have been showing for years, the industries that offer climate protection technologies have growth rates well above average for the manufacturing sector and can also boast far superior export trends. A recent example: the electricity supply crisis in California has had a very positive impact on the order books of German companies manufacturing turbines or constructing power plants.

We can therefore conclude that a consistent, internationally integrated and in general sensibly designed climate protection policy

- gives incentives for enhancing know-how and for innovation,
- promotes growth and employment,
- improves the international competitiveness of German industry,
- lowers import dependency on oil and gas producers and thus improves Germany's balance of payments,
- removes environmental pressures and contributes to resource conservation,
- steers an economically efficient path towards climate policy targets and thus helps to minimize cost burdens (the use of emissions trading being an excellent example).

Such conclusions are not wishful thinking but grounded in scientific evidence. In one study the renowned Basle-based PROGNOS Institute has found that a 40 % reduction in CO_2 emissions is possible by 2020 at the same time as nuclear power stations are phased out. It estimates that 200,000 jobs will be created or secured over this period as a "side effects" of such a strategy. There could hardly be a better testimony for the coming together of ecological concerns and macroeconomic goals.

[1] Russia and Ukraine are cases where unjustifiably favourable targets have been set. One is reminded here of the discussion about "hot air" created with the Kyoto results).

Germany's climate protection programme – a step by step approach

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on the occasion of the CTI/BMU Seminars

Climate technology and energy efficiency – from best practice experiences to policy diffusion

16 to 20 November 2002
in Tutzing

Slide 1

Need for action – evidence that we have long been making our own climate

- The concentration of greenhouse gases greenhouse gases in the atmosphere has risen since the onset of industrialisation due to the apparently inexorable rise of emissions
- The tropospheric temperatures are rising with increasing speed
- Glaciers are melting – seal levels rising
- The world's precipitation zones are shifting
- The regional climates are changing
- Meteorological shocks occur more frequently
- **The need to act is ever more urgent!**

Slide 2

The factors determining action

- Decisive is not **where** reductions are made, but **that** reduction happens!
- Precautionary approach demands early action
  Acting too late can lead to irreversible developments
  Acting too late causes wastage through friction and sudden destruction of capital
- Unlike traditional environmental problems, an "end-of-the-pipe" approach does not help here
- Energy saving also means cost saving - cross-cutting solutions help cover cost of measures
- **This was the starting point for designing the climate protection programme in Germany, in Europe and world-wide!**

Slide 3

New policy always demands compromises in traditional policy spheres!

- The cake cannot only be divided up once!
- No illusion – new policy objectives cause additional costs – due to the goals **not** to the measures!
- So: go for objectives with a minimum use of resources!
- So: consideration of macroeconomic objectives
- So: Interministerial Working Group on "CO_2 Reduction"
- So: Integration of national policies in the European and international context! - Pioneer, yes; but no go-it-alone!
- So: consultation and coordination with all actors
- So: process approach – determining technical and economic potentials – identifying barriers – choosing and implementing measures – review and new rounds

Slide 4

The national climate protection programme

Slide 5

History

Background: discussions within and appeals from the academic sphere and the setting up of the Climate Study Commissions of the German Bundestag

Starting point: assignment from the Federal Chancellery to Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (letter dated 15 January 1990)

Decisions of the Federal Government

13 June 1990	Decision in principle
7 November 1990	First Report of IMA "CO_2-Reduction"
11 December 1991	Second Report of IMA "CO_2-Reduction"
29 September 1994	Third Report of IMA "CO_2-Reduction"
6 November 1997	Fourth Report of IMA "CO_2-Reduction"
26 July 2000	Interim Report of IMA "CO_2-Reduction"
18 October 2000	Fifth Report of IMA "CO_2-Reduction"

Slide 6

Aims of German climate protection policy

1. Reduction of CO_2 emissions by 25 % by 2005 (Base year 1990)
2. Reduction of the six Kyoto gases (CO_2, CH_4, N_2O, HFCs, PFCs and SF_6) by 21 % in the period 2008 – 2012 compared to 1990 and 1995 resp. as Germany's contribution to EU burden-sharing to fulfil Kyoto Protocol.
3. Reduction of greenhouse gas emissions by 40 % by 2020 on the condition that the EU agrees to a GHG reduction of 30 % by 2020 (base year 1990).
4. Doubling of the contribution by renewable energy sources by 2010 to primary energy consumption from 2.4 to 5 % and to electricity generation from 5 % to 10 %.
5. Maintaining, modernising and expanding cogeneration (combined heat and power) with the aim of reducing CO_2 by an additional 10 million tonnes by 2005 and 23 m t by 2010 (base year 1998).
6. Major improvement in energy productivity.

Slide 7

Sectoral targets

1. Private households and buildings sector: additionally minus 18 – 25 m t CO_2 (base year 1999; target year 2005)
2. Transport: additionally minus 15 – 20 m t CO_2 (base year 1999; target year 2005)
3. Energy sector and industry: additionally minus 20 – 25 m t CO_2 (base year 1999; target year 2005)

Should it become apparent during implementation of the climate protection programme that the reduction contribution of individual sectors cannot be achieved by certain measures, other measures shall be considered. Should the new measures still fail to bring about the required cuts, the reduction deficit must then be

compensated by enhanced efforts in other sectors.

Slide 8

The framework for action

- **Solutions to global problems demand internationally coordinated strategies – national attempts to got-it-alone are inadequate**
- **Impacts on macroeconomic objectives must be considered – employment, price stability, economic growth and balanced foreign trade**
- **Competitive distortions must be minimised**

Consequences

- **Pioneer, yes; but no go-it-alone**
- **Hierarchy of measures by cost efficiency criteria**
- **Outcome is central – instruments are not ends in themselves!**

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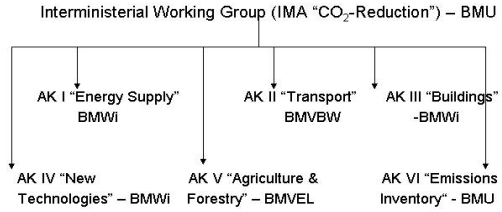
The organisation



Slide 10

The process cycle

- **Inventory, review of status quo**
- **Determining physical, technical and economic potentials and options**
- **Identifying obstacles and barriers**
- **Defining alternative policies and measures to remove the identified obstacles**
- **Selecting policies and measures – decision by the Federal Cabinet**
- **Step-by-step implementation of measures adopted**
- **Review and start of a new process cycle**

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Technical approach

1. **Rational and economical use of energy at all stages of energy supply**
2. **Source substitution**
   - **between fossil fuels**
   - **between nuclear and fossil as well as renewable energy sources**
3. **Reduction of the other greenhouse gases by specific measures**

Slide 12

Policies and measures

1. **No panacea – rather, a package of measures carefully designed for each situation**
2. **Regulatory requirements**
   Economic instruments and mechanisms
   Supporting measures
3. **Cross-cutting instruments as well as specific e.g. sectoral approaches**
4. **National as well as transboundary measures**

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Excerpt from the package of measures of 18.10.2000

- **Expansion of cogeneration (CHP)**
- **Adoption of the Energy Saving Ordinance**
- **Programme to promote CO_2 reduction in buildings**
- **Agreement between Federal Government and German industry on climate change prevention of 9 November 2000**
- **Package of measures for the transport sector (incl. distance-based motorway toll for HGVs; pledge on use of low-resistance tyres and oils)**
- **measures to reduce more greenhouse gas**
- **Voluntary commitment by the Federal Government**

Slide 14

New measures – the Coalition Agreement of 16 October 2002

- Launch of a European emissions trading system
- Modification of the Eco-Tax and development of the Ecological Tax Reform into an Ecological Finance Reform (e.g. dismantling of ecologically counterproductive subsidies)
- Promotion of cost-efficient "passive houses" with 30,000 homes·
- Investment grants and tax relief for energy-efficient upgrading of buildings,
- Improvement of the Renewable Energy Sources Act,
- Expansion of cogeneration (CHP),
- Off-shore strategy for the use of wind energy,
- Conversion of motor vehicle tax to a CO_2-based schedule,
- Reduced VAT for German railways (long-distance journeys),
- Removal of VAT exemption for flights to other EU countries,
- Promotion of natural gas as a fuel in the transport sector as a transitional technology on the path to hydrogen engine technologies (tax relief for natural gas to be continued until 2020),
- Continuation of restructuring of the German coalmining industry.

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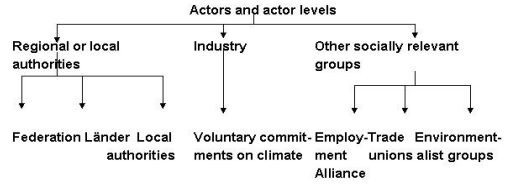
Actors and actor levels



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The European Climate Protection Strategy

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Burden-sharing between the EU Member States

EU Member States	Reduction contribution	Development of GHG emissions 1990 to 1999	Difference Kyoto target - 1999
Luxembourg	minus 28 %	minus 43.3 %	plus 15.3 %
Denmark, Germany	minus 21 %	plus 4.0 % / minus 18.7%	minus 25% / minus 2.3 %
Austria	minus 13 %	plus 3 %	minus 16 %
Great Britain	minus 12.5 %	minus 14.0 %	plus 1.5 %
Belgium	minus 7.5 %	plus 2.8 %	minus 10.3 %
Italy	minus 6.5 %	plus 4.4 %	minus 10.9 %
Netherlands	minus 6 %	plus 6.1 %	minus 12.1 %
Finland, France	plus/minus 0 %	minus 1.1 % / minus 0.2%	plus 1.1 % / plus 0.2 %
Sweden	plus 4 %	plus 1.5 %	plus 2.5 %
Ireland	plus 13 %	plus 22.1 %	minus 9.1 %
Spain	plus 14 %	plus 23.2 %	minus 8.2 %
Greece	plus 25 %	plus 16.9 %	plus 8.1 %
Portugal	plus 27 %	plus 22.4 %	plus 4.6 %
EU in total	minus 8 %	minus 4 %	minus 4.0 %

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Trends in Brussels

1. ECCP (European Climate Change Programme) 2000 – 2001

   Working Groups

WG I	"Flexible Mechanisms" – primarily emissions trading
WG II	Energy Supply
WG III	Transport
WG IV	F-Gases / Industry
WG V	Energy consumption
WG VI	Research

   Conclusion of the first phase on 2 and 3 July 2001 in Brussels

2. Implementation of ECCP

   EU-wide trading in greenhouse gas emissions
   "Buildings" Directive
   "Renewable Energies" Directive
   "CHP Generation" Directive
   Energy Consumption Labelling Directive
   CO_2 Monitoring System
   IVU/IPPC Directive
   CO_2 energy tax

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The European Commission's proposed directive on the introduction of EU-wide trading in greenhouse gases – "cap and trade"

- **Binding concept**
- **Installation approach (> 20 MW thermal power of furnace) or incorporation of energy-intensive sectors (Annex I)**
- **In principle all "Kyoto gases" – starting with CO_2 (Annex II)**
- **Absolute "caps"**
- **Launch phase 2005 – 2007**
- **Final phase 2008 – 2012 – after 2012 extendable by 5 years at a time**
- **Drawing up "National Allocation Plans" for all sectors**
- **Allocation method of "grandfathering"**
- **Allocation rules (Annex III) reflect technical possibilities, demand/growth, newcomers and early action**
- **"Burden-sharing" of 1998 remains untouched**
- **46 % of estimated CO_2 emissions from EU covered by 2010**

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Climate protection at international level

The international negotiations are about compulsory targets as well as instruments!

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Milestones of international policy on climate change

- 1992 United Nations Conference on Environment and Development (UNCED) Rio de Janeiro – signing of the Framework Convention on Climate Change
- 1995 First Conference of the Parties in Berlin
- 1996 Second Conference of the Parties in Geneva
- 1997 Third Conference of the Parties in Kyoto – adoption of the "Kyoto Protocol"
- 1998 Fourth Conference of the Parties in Buenos Aires – adoption of the "Buenos Aires Action Plan"
- 1999 Fifth Conference of the Parties in Bonn
- 2000 Sixth Conference of the Parties in The Hague
- 2001 Continuation of the Sixth Conference of the Parties in Bonn – adoption of the "Bonn Agreement"
- 2001 Seventh Conference of the Parties in Marrakech
- 2002 Eighth Conference of the Parties in New Delhi

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Structure of the international climate policy regime

- Framework Convention on Climate Change as an internationally binding regime (entered into force in March 1994)
- Kyoto Protocol as an internationally binding regulation to specify and operationalise the Framework Convention on Climate Change (not yet in force) – targets – timeframes – instruments -
- Buenos Aires Action Plan as a policy declaration
- Bonn Agreement on the basis of the Buenos Aires Action Plan to implement the Kyoto Protocol – financial matters – mechanisms – sinks – compliance systems –
- Marrakech Accords to implement the policy decisions in the Bonn Agreement– ratification of Kyoto Protocol now possible and very likely

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Responsibility and commitments

- **"Common, but differentiated responsibility" – thus the distinction between Annex I States (western and eastern industrialised countries) and Non-Annex I States (developing countries)**
- **Quantified obligations are only contained in the Kyoto Protocol for Annex I States (5.2 % reduction of six greenhouse gases – CO_2, CH_4, N_2O, HFCs, PFCs, SF_6 – in the first commitment period 2008-2012 against 1990 levels)**
- **In Marrakech and Bonn certain "safety valves" had to be opened to secure political acceptance**
- **Submission of reports on developments and activities at national level – also a prerequisite for the use of "Kyoto Mechanisms"**
- **Monitoring and verification**

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Time lines

Framework Convention on Climate Change

Stabilisation of greenhouse gas emissions by 2000 (base year 1990)

- **Kyoto Protocol**

  First commitment period 2008 – 2012
  Proof of "demonstrable progress" 2005

- **The long-term strategy**

  Continuation of international climate protection beyond the year 2012 – inclusion of developing countries

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Targets

Parties (Annex I States)	Reduction contribution
Belgium, Bulgaria, Denmark, Germany, Estonia, European Union, Finland, France, Greece, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg,Monaco, Netherlands, Austria, Portugal, Romania, Sweden, Switzerland, Slovakia, Slovenia, Spain, Czech Republic, United Kingdom	minus 8 per cent
USA	minus 7 per cent
Japan, Canada, Poland, Hungary	minus 6 per cent
Croatia	minus 5 per cent
New Zealand	plus/minus 0 per cent
Norway	plus 1 per cent
Australia	plus 8 per cent
Iceland	plus 10 per cent

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Instruments

- **Framework Convention on Climate Change – pilot phase "activities implemented jointly"**
- **Kyoto Protocol**

Art. 2	**Policies and measures**
Art. 6	**Joint Implementation (projects between industrialised countries)**
Art. 12	**Clean Development Mechanism (projects between industrialised countries and developing countries)**
Art. 17	**Emissions trading opened (between industrialised countries or in framework of the "Bonn Agreement" also for businesses)**

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Influencing factors

- Current situation - determining factors
  technical and economic reduction potentials
  historically evolved supply structures - energy mix
  industrial structure
  climatic factors
- Level of prosperity
- Objectives
- Timeframes
- Effective policies and measures
- Targets and programmes in other countries – integration in an internationally coordinated strategy

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Climate protection and structural change

- Structural change is immanent in market economies
- Innovations make the market economy dynamic, boosts wealth creation, secures jobs and creates economic growth
- Stimuli for structural change:
  autonomous and induced technical innovations
  changes in demand – changed consumption patterns and production practices
  factor availability – price trends
  political decisions
- Preventing structural change costs resources and welfare
  market imperfections
  political decisions

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The empirical evidence shows – climate protection stimulates growth

Average growth for the manufacturing of products for rational energy use

4.6 % p.a.

Average growth for the manufacturing industry as a whole

2.6 % p.a.

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The empirical evidence shows – climate protection is a motor for export

Average growth of products for rational and economical energy use

9.0 % p.a.

Average growth of all exports

3.9 % p.a.

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Climate protection also creates jobs

Premise: 40 % reduction in CO_2 emissions by 2020 (baseline 1990)
Phasing out of nuclear power under a non-replacement ordinance agreed in June 2001

Effects (on balance):
2005 55,300 additional jobs
2010 132,860 additional jobs
2020 194,030 additional jobs

Source: PROGNOS AG; Basle, Klimaschutz und Arbeitsplätze, Frankfurt am Main 2001

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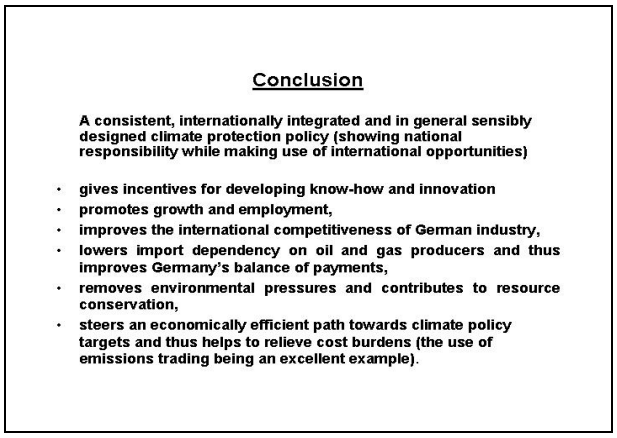

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The Renewable Energy Act in Germany

Renewable energy: the central building block for sustainable energy production

Hans-Josef Fell

Member of the German Bundestag, Berlin
Spokesman on Research and Technology of the
ALLIANCE 90/THE GREENS Parliamentary Group

Ladies and Gentlemen,

it is a great honor to speak to you today. I am very glad of this opportunity to inform you about our successful efforts with regard to renewable energy resources in Germany, and especially about the Renewable Energy Act.

As you know, we have major problems in the world due to the use of fossil and nuclear energies. The two main challenges we face are to ensure protection of the climate and safeguard peace.

The changes of the climate caused by humans are in my opinion the key problem for mankind, with global effects. Today, there is already more CO_2-gas in the atmosphere than at any time in the last 20,000 years. This high level of greenhouse gases is the cause of the heavy rainfalls, storms, desertification and other climate change problems. We already have an excessive level of greenhouse gases in the atmosphere. We must therefore stop the emissions as soon as possible, not just reduce emissions.

A scientific study commissioned by the Federal Environmental Agency confirmed statistically for the first time that man bears the main responsibility for the warming-up of the earth's atmosphere. 80% of greenhouse gas emissions are connected with energy consumption.

Renewable energy resources do not lead to an increase in levels of greenhouse gases. They therefore have a key role to play in the fight against climate changes.

The target for the world as a whole must be to satisfy energy consumption using renewable energies alone. Energy saving will help to accelerate the implementation of renewables. The development of renewable energy resources not only helps to economize natural resources, but, at the same time, in the long run, to avoid international conflicts over the possession of fossil raw materials for energy supply and the possibility of nuclear materials from nuclear power stations being used to develop nuclear weapons.

According to a study by the Office of Technology Assessment of the German Bundestag, the world depletion midpoint of oil production will be reached in the next five to ten years. Once this depletion midpoint has been reached, the world will not get the oil it needs. More and more wars will break out if we do not find a replacement. Natural gas, coal, or nuclear energy will not be able to serve as substitutes, because of nuclear waste problems, greenhouse gas emissions and limited resources. The best strategy is therefore to develop renewable energies.

Germany has already begun to promote more and more political instruments to encourage the use of renewables. The most successful instrument is the Renewable Energy Act. As a first step, we are hoping to double the proportion of renewable energy in Germany by 2010 through the implementation of our Renewable Energy Act.

How does our Renewable Energy Act work? To put it in a simplified way, there are four consecutive stages. I shall explain the functioning of the law using an example of a farmer who produces electric current from his biomass plant.

1. The Renewable Energy Act grants the farmer the right to connect his biomass plant to the closest power network and to feed current generated in his plant into this network.
2. The power network operator must pay the farmer for the electricity supplied from the biomass plant at the rate set out in the Renewable Energy Act of approximately 10 cents per KWh.
3. In view of the fact that, in Germany, electricity generation, power network operation and electricity supply are separate, the network operator is not compelled to keep or use the electricity himself. He instead passes the electricity to the power generators, who have to reimburse the network operator at the same rate of 10 cents.

4. The electricity generators can now either "mix" the biomass electricity from our farmer into the total energy which they generate, or sell it separately as electricity from renewable energy sources. In the first case, the electricity generator gets the 10 cents paid back to him proportionally by all electricity consumers, as part of the current price he is charging. In the second case, the customer who has opted to use electricity exclusively from renewable energy sources covers the cost.

This law applies to windmills, photovoltaic plants, geothermal plants, small hydroelectric plants and the gas gained in waste dumps and sewage treatment plants, as well extracted from mines. The law also applies to biomass plants with a power of up to 20 megawatts.

The payment rates for electricity supplied are differentiated. All rates are governed by the same principle: the price to be paid under the Renewable Energy Act is set at a level to allow viable operation of the plant in question. Naturally, the plant has to be a modern one, and sensibly operated. In other words: anybody who undertakes to invest money in a plant generating electric current from a renewable energy source, is able - if they take enough care in running the plant - to gain a modest return on the invested capital.

The most important aspect of the Renewable Energy Act is that the feed-in rates must be high enough to allow profitable investment.

Experience gained in Germany with wind power plants has shown that this perspective of achieving a profit is the critical factor for the development of renewable energy sources. The rate paid for electric current gained from plants run on gas from waste dumps, sewage treatment or mines and from hydroelectric plants is 7,7 cents for smaller plants generating up to 500 kilowatt of power. Larger plants get 6,6 cents. Power plants of more than 5 megawatts are not entitled to any such payment under the law. Electricity generated from biomass gas current is paid for - depending on the size of the plant -at a rate of 8 to 10 cents. This rate is to decrease each year by 1 percent, in order to encourage cost cutting. This only applies to newly constructed plants, however. Plants already operating continue to receive the same rate which applied at the time the plant was commissioned. Otherwise, the operators of such plants would not have a sufficiently secure basis to plan for the future. Electric current from geothermal sources is paid for - depending on the size of the plant - at a rate of 7 or 8.5 cents. The rates for power from wind power plants are slightly more complex. They depend on the wind strength, i.e. on the windiness of the location of the plant - whether it is located in a very windy place such as a coastal area, or inland. Very well-located plants get 9.1 cents for five years and then 6.2 cents. Plants situated in less windy places and offshore plants get 9.1 cents for longer periods, which can last up to 20 years depending on the location. As in the case of biomass plants, new wind power plants will have their rates reduced by 1.5% per year. Electric current produced from solar energy must be paid at a rate of 48 cents under the Renewable Energy Act. That rate will be reduced by 5 % yearly. This is a provisional regulation, which will apply until a total of 1000 megawatts of photovoltaic power has been installed in Germany. The law obliges the government to introduce a suitable follow-up regulation, however.

All payments for each individual plant will continue for 20 years. The amortization periods are generally of the same length.

The Renewable Energy Act also regulates various problems of power network usage. The cost of connecting plants to the network has to be paid by the plant operator. However, if it is necessary to increase the network capacity in order to absorb current from the plant, then the cost of such an expansion must be borne by the network operator. A clearing body settles any possible disputes in this regard.

The Renewable Energy Act also includes a procedure providing relative equality in the share of current from renewable energy sources allotted to all current suppliers in Germany. In this way, we avoid placing a heavier burden of wind power energy on coastal regions than on inland regions which have fewer wind power plants.

The Renewable Energy Act came into force on the first of April 2000. The law was drafted by Parliament, not by the Government. Cooperation between Parliament and the Environment Ministry was good, but often we had to work against the Ministry of Economics and Technology.

The successes are already visible. In the last two years, the level of renewables increased from about 5 % to more than 8 % in 2002. If this rate of increase continues, we will reach a level of 18% of renewable energy generation across Germany as a whole by 2010.

The annual German sale in the sector of photovoltaic energy generation has in 2001 already increased to six times

of the 1999 level, reaching about 80 megawatts. Let us compare: in 1999, the total sale of photovoltaic energy across the whole world was only around 200 megawatts.

The growth in the wind power sector is also constant. We can see how this sector has developed since 1990. In 1990, a new law on wind power was created in Germany . It was similar to the Renewable Energy Act, but only applied to wind. But you can see that the highest rate of increase for wind power is in 2001 and 2002. This is a result of the Renewable Energy Act.

Generation of electricity from biomass has also increased dramatically. In 1999, overall generating capacity was 50 MW of biogas. In 2001, it was already 135 MW. Newly installed generating capacity for biogas was 12 MW in 1999, in 2001 it was 70 MW.

The increase in the cost of electricity caused by the Renewable Energy Act is very low. The bill for a normal household is about 7 € per year higher than without the Renewable Energy Act.

Through this law, combined with other regulations for renewable energies, we could create a new industrial sector in Germany. Investments in renewables increased from 3.3 billion € in 1999 to 6 billion € in 2001.

A lot of new jobs have been created. We have doubled the number of jobs in this sector from 60,000 in 1999 to 120, 000 in 2001.

The success in Germany will also more than fulfill the requirements of the European Union directive on promoting electricity production from renewable energy sources. Thus Germany presents an example of how renewables can be introduced into the market.

Only in those countries with a feed-in system - Spain, Germany, and until 2000 also Denmark - there has been any real success in introducing renewables. Other countries like Great Britain, Ireland or France do not generate as much wind power as Germany or Spain or Denmark, even though they actually have a greater potential for harnessing wind energy. They tried quota systems, or other systems, but they were not successful. Last year France followed the German example and introduced a feed-in system. The first success can be seen.

Germany will increase the use of all renewables, even in the transport and heating sector, over the next few years.

Last summer, the Parliament voted for a tax exemption for all fuel produced from biomass. By the way, bio-ethanol, bio-methanol, vegetable oil and biogas are synthetic fuels produced from plants. We hope we will bring about a similar development in bio-fuels in the next years to that which we have already achieved in the electricity field.

We also want to create new laws and subsidies for developing renewables in the area of heating and cooling.

The new government is also planning a new program for energy research. This program will focus on renewables and energy saving. Nuclear power and perhaps also nuclear fusion will no longer be the subject of energy research.

All these political instruments will help to develop renewable energies in Germany.

This will help us to move on from the nuclear and fossil century. Our aim is to usher in a solar century. I believe that in a few decades we could reach a point where 100% of energy consumed comes from renewables. The most important way to achieve this is to create more and more political instruments like the Renewable Energy Act, tax exemptions for renewables, higher taxes on conventional energy (ecological tax) and subsidies for renewables.

This is the only real way to protect ourselves from climate change and from wars over energy resources.

Ladies and Gentlemen, thank you very much for your attention.

For further information on "Renewable Energies Act" see
http://www.hans-josef-fell.de
http://www.bmu.de/english/download/renewable/files/res-act.pdf

CTI's Activities for Technology Transfer on Climate Change

Prof. Morihiro Kurushima

Tokyo University of Agriculture and Technology, Tokyo
Faculty of Technology
Director-General of the Policy Planning Department,
New Energy and Industrial Technology Development Organization (NEDO), Tokyo

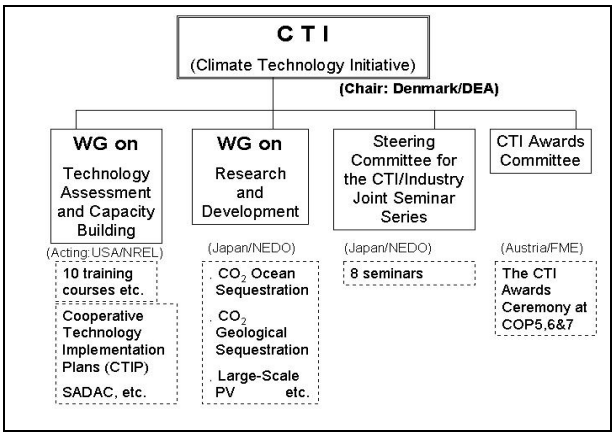
The Climate Technology Initiative (CTI) is a multinational initiative of the 23 countries of the International Energy Agency (IEA) and the Organization for Economic Cooperation and Development (OECD). Mr. T. Becker of the Danish Energy Agency currently chairs the Initiative. The IEA/OECD serves as the Secretariat for the CTI.

The CTI promotes the objectives of the United Nations Framework Convention on Climate Change (UNFCCC) by fostering international cooperation for accelerated development and diffusion of climate-friendly technologies. The CTI provides an important mechanism to help industrialized countries fulfill their commitment to the Convention to promote the transfer of climate-friendly technology to developing countries and those with economies in transition.

As one of the CTI activities, informative seminars are held in developing and transition countries. Each seminar caters to the needs of the region, and to those of the UNFCCC process. The location of the CTI/Industry Joint Seminars on Technology Diffusion rotates among four regions, with the objective of visiting each region once annually. For an illustration of this aspect of the joint industry seminar series, see the attached map .

As such, the CTI seminars provide (i) opportunity for the private sector to voice their policy recommendations to key decision-makers, helping to create a climate that attracts environmentally sound technologies; (ii) a platform to pave the way for project development; (iii) insight into financing opportunities for climate projects, including the Clean Development Mechanism (CDM), and risk management opportunities.

In addition, the CTI holds training courses in each developing region and in the countries with economies in transition. Two training courses have been held in Asia, and one each in Latin America, the Caribbean, Eastern Europe and North Africa. The training courses are designed to "train the trainers." Countries are asked to select participants who will be in a position to return to their organizations and share information and techniques that are disseminated at the events. The training course format allows for exploration of concepts in significant detail over a week long period.



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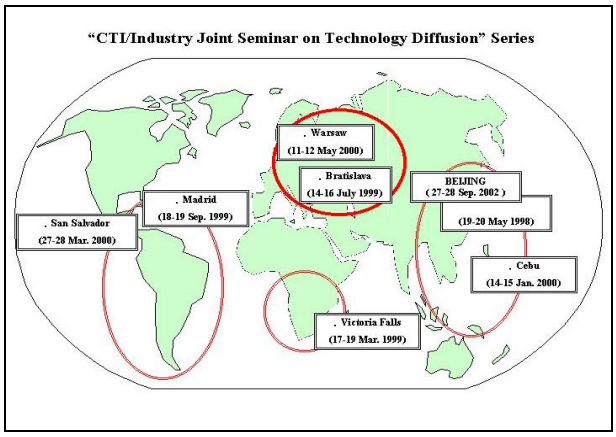

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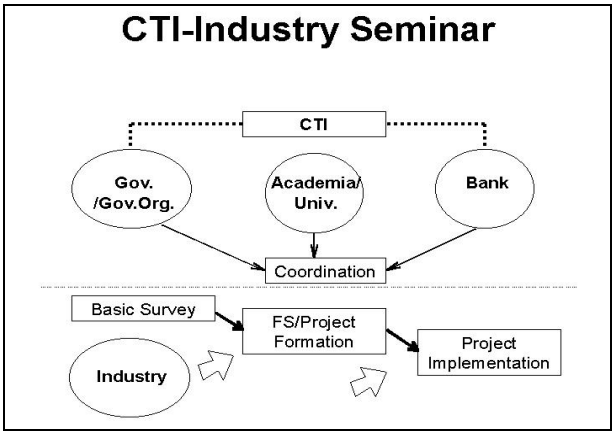

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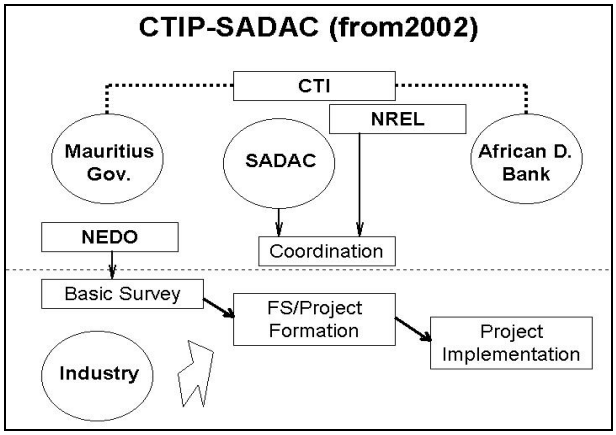

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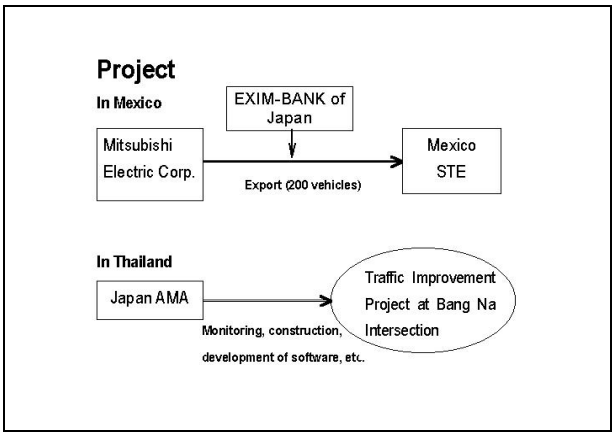

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Table 1: Feasibility Studies Selected for Implementation FY2001

No	Theme	Entrusted Organization	Host Country	Site	Outline of the Feasibility Study
1	Feasibility Study on AliBayramli Thermal Power Station Modernization Project	Tokyo Electric Power Services Co., Ltd.	Azerbaijan	AliBayramli Thermal Power Station	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by replacing the existing oil and gas-fired AliBayramli thermal power generation plants with a high-efficiency, 400MW-class, natural-gas-fired combined-cycle TPP.
2	Feasibility Study on Modernization (Energy Conservation and Environmental Protection Improvement) of Kizylqumcement Plant in Uzbekistan	Mitsubishi Materials Corporation	Uzbekistan	Kizylqumcement Plant of UZQURILISHMA-TERIALLARI	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions mainly by the following improvements at the existing cement plant: (1) Introduction of a high-performance clinker cooler and a calciner; (2) Improvement of a preheater and a rotary kiln; (3) Introduction of a high-efficiency, vertical roller raw mill; and (4) Introduction of a preliminary grinding system in the cement finish-grinding process.
3	Feasibility Study on GT Combined Heat and Power Plant Construction at Nukus City in Uzbekistan	JGC Corporation	Uzbekistan	Nukus City	This feasibility study intends to examine the prospects of saving energy and reducing greenhouse gas emissions by replacing the existing three old main boiler houses with a high-efficiency gas-turbine-combined heat and power plant GCHPP.
4	Feasibility Study on Thermal Efficiency Improvement at Garbadani Power Plant	The Kansai Electric Power Co., Inc.	Georgia	Garbadani Power Plant	This study intends to examine the prospects of improved plant-efficiency and the reduction of CO_2 emissions by introducing combined-cycle systems to the existing old steam turbine units (150MW x 3).
5	Feasibility Study on the Utilization of Methane (CH_4) and Municipal Wastes for Power Generation in Yerevan, Armenia	Shimizu Corporation	Armenia	Nubarashen Wastes Dumping Site, Department of Public Works, Yerevan	This study intends to examine the prospects of reducing greenhouse gases (CH_4 & CO_2) emissions and improving energy conservation by introducing a cogeneration system of methane gas and municipal wastes incineration for power generation and heat supply in Yerevan, Armenia.
6	Introduction of Co-generation System into District Heating System in Yerevan, Republic of Armenia	Shimizu Corporation	Armenia	Yerevan City	This study intends to examine the prospects of energy conservation, improved energy efficiency and the reduction of CO_2 emissions by introducing a high-efficiency gas turbine cogeneration system into the existing large district heating system for generating both electricity and heat.
7	Feasibility Study on Energy Conservation at Dunaferr Iron & Steel Company	Sumitomo Metal Industries,Ltd.	Hungary	Dunaferr Dunai Vasumu Rt	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by introducing major energy-conserving facilities to the blast furnace, lime kiln and converter processes at the steelworks.
8	Feasibility Study on Cogeneration of District Heat Supply System of Dobrich City, Republic of Bulgaria	Chubu Electric Power Co., Inc.	Bulgaria	Dobrich District Heat Supply Plant	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by improving thermal efficiency and fuel conversion of the gas turbine cogeneration system at district heat supply plant.
9	Feasibility Study on Energy Conservation in Dairy Industry in Poland	The Energy Conservation Center, Japan	Poland	Mlekovita S.A. Radomsku S.A. Kole S.A. Lapy S.A.	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by improving steam utilization at the multi-effect evaporators in the concentrating process, replacing the existing coal-fired boiler with a natural-gas-fired boiler and introducing a natural-gas-fired cogeneration system at the four powdered-milk factories.
10	Feasibility Study on Gas Fuel Conversion and Repowering for Ostroleka Heat & Power Plant	Electric Power Development Co.,Ltd.	Poland	Ostroleka Heat & Power Plant	This study intends to examine the prospects of higher energy conservation and the reduction of greenhouse gas emissions by replacing the existing coal-fired power plant with a high-efficiency gas turbine combined-cycle system and by increasing the consumption of biomass-fuel for the existing heat supply boiler.
11	Feasibility Study on Energy Conservation and Environmental Improvement of Fieni Cement Plant in Romania	Taiheiyo Engineering Corporation	Romania	ROMCIF S.A. FIENI	This study intends to examine the prospects of improved energy consumption and the reduction of CO_2 emissions by converting the existing conventional Suspension Preheater system to the latest New Suspension Preheater system with a calciner.

No	Theme	Entrusted Organization	Host Country	Site	Outline of the Feasibility Study
12	Blast Furnace Top-Pressure Recovery Turbine Plant for SIDEX in Romania	Kawasaki Heavy Industries, Ltd.	Romania	SIDEX S.A. Galati	This study intends to examine the prospects of energy-saving and the reduction of CO_2 emissions by introducing a Top-Pressure Recovery Turbine system using blast furnace gas at the steel-works.
13	Feasibility Study on Flue Gas Desulfurization and Zero-emission Targeting for a Refinery in China	Nippon Mitsubishi Oil Corporation	China	SINOPEC Zhenhai Refinery	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by introducing waste power generation and utilizing GTG flue gas for the CDU charge heater at the refinery. This study also intends to examine the effect of certain environmental protection measures, such as flue gas desulfurization, targeting zero-emission status of the refinery.
14	Feasibility Study on Industrial Waste Treatment and Exhaust Gas Heat Utilization at a Cement Plant in China	Hitachi Engineering Co., Ltd.	China	Shanghai	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by utilizing industrial waste as fuel for the cement rotary kilns and introducing an exhaust gas recovery power generation system at the cement plant.
15	Energy Conservation Study on the Steel and Cement Industries in Benxi City, China	NKK Corporation	China	Benxi Iron & Steel (Group) Co., Ltd. Liaoning Gongyuan Cement (Group) Inc.	The study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by introducing CDQ, TRT, and a material preheater at the steel-works and a waste heat power generation system at the cement plant.
16	Coal Mine Gas-based Acetic Acid Project in Western China	Japan Coal Energy Center	China	Han Cheng Coal Mines Administration Tong Chuan Coal Mines Administration	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by utilizing coal mine gas as the fuel and raw material for the acetic acid production process.
17	Feasibility Study on Environmental Protection Improvement and Energy Conservation of Coke Oven Batteries at Nanchang Iron and Steel Co., Ltd	Kawasaki Steel Corporation	China	Nanchang Iron and Steel Co., Ltd.	This study intends to examine the prospects of higher energy conservation, the reduction of greenhouse gas emissions and improvement in environmental conditions by introducing CDQ, dedusting equipment, and wastewater treatment facilities.
18	Feasibility Study on Introducing Natural Gas into the Residential Sector of the City of Lanzhou, Gansu Province, the People's Republic of China	The Institute of Energy Economics, Japan	China	City of Lanzhou	This study intends to examine the prospects of higher-energy conservation and the reduction of greenhouse gas emissions in the residential sector of the City of Lanzhou through fuel conversion and thermal efficiency improvement measures such as feedstock conversion of the city gas supply system from coal to natural gas, conversion of coal-fired boilers for district heating to natural-gas-fired boilers, and introduction of cogeneration systems into large buildings.
19	District Cogeneration System in Liaoyang City, China	Toshiba Corporation	China	Liaoyang First Thermal Power Plant Liaoyang Second Thermal Power Plant	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by replacing the existing outmoded, low-efficiency, small, hot water boilers dispersed throughout the city with boiler stations that incorporate energy conservation technologies, such as an optimum operating system and optimum combustion control system, at two locations in the city.
20	Feasibility Study on Energy Conservation of Clinker Pyrosection of PT. Semen Padang	Taiheiyo Engineering Corporation	Indonesia	PT. Semen Padang	This study intends to examine the prospects of improved energy consumption and the reduction of CO_2 emissions by utilizing the waste heat from a New Suspension Preheater and clinker cooler of the cement manufacturing process.
21	Feasibility Study on Modernization of Dumai Refinery, PERTAMINA in Indonesia	Idemitsu Engineering Co., Ltd.	Indonesia	PERTAMINA Dumai Refinery	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by introducing a flue gas O_2 control system, air preheaters, additional heat exchangers, and a reflux ratio/distribution control system.
22	Indonesia Tanjung Priok Thermal Power Station Repowering Project	Japan Consulting Institute	Indonesia	PT.Indonesia Power Tanjung Priok Thermal Power Station	This study intends to examine the prospects of higher energy efficiency and the reduction of CO_2 emissions by replacing the existing heavy-oil-fired boiler and steam turbine power plant with a gas-fired combined-cycle power plant utilizing a part of the existing equipment.

No	Theme	Entrusted Organization	Host Country	Site	Outline of the Feasibility Study
23	Comprehensive Feasibility Study on Utilizing Waste-derived Fuels at Siam Cement	Taiheiyo Cement Corporation	Thailand	The Siam Cement (Kaeng Khoi) Co., Ltd.	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions at the cement manufacturing plant by applying waste-derived fuels burning technologies such as waste oil blending and injecting, used tires conveying and feeding, waste plastics, etc., shredding and feeding, and chlorine bypassing.
24	Waste Gas Utilization Project in a Petrochemical Complex	International Center for Environmental Technology Transfer ICETT	Thailand	Bangkok Synthetics Company Limited	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions by utilizing waste gas and liquid as the fuel for the newly installed boiler at the petrochemical complex.
25	Bang Pakong #1 & 2 Power Plant Repowering Project	Mitsubishi Heavy Industries, Ltd.	Thailand	Electricity Generating Authority of Thailand (EGAT), Bang Pakong Power Plant	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions by modifying the existing oil- and gas-fired power plant to a gas turbine combined-cycle power plant.
26	Feasibility Study on Installation of Gas-fired Cogeneration Power Plant at Bien Hoa Industrial Park	Japan Energy Research Center Co, Ltd.	Vietnam	Cogeneration Power Plant at Bien Hoa Industrial Park	This study intends to examine the prospects of improved energy consumption and the reduction of greenhouse gas emissions by replacing the existing power and steam supply system with a high-efficiency gas turbine/steam turbine cogeneration plant.
27	Feasibility Study on Reduction of Gasoline Vapor Emissions from Oil Depots and Gas Stations in Vietnam	Japan Energy Research Center Co., Ltd.	Vietnam	Petrolimex Haiphong Oil Terminal Saigon Petro Cat Rai Refinery	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions of motor gasoline evaporating from oil depots and gas stations by modification of tank roofs from a cone-type to a floating-type .
28	Feasibility Study on Reduction of CO_2 Emissions by Introducing Energy-saving Equipment in a Pulp & Paper Mill in Myanmar	Mitsubishi Research Institute, Inc.	Myanmar	Myanmar Paper & Chemicals Enterprise, Sittoung Paper Mill	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by introducing a shoe press, remodeling with energy-saving type screens, replacement of main motors/main auxiliary motors with variable speed motors, and the use of high-efficiency motors in a pulp & paper mill.
29	Feasibility Study on Thanlyin Refinery Crude Oil Unloading System	Nippon Steel Corporation	Myanmar	Myanmar Petrochemical Enterprise, Thanlyin Refinery Plant	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions by renovating the crude oil loading and unloading system of Thanlyin Refinery Plant from transshipment by shuttle tankers to a new transport system using SPM (Single-Point Mooring) and an underwater pipeline system.
30	Project for Supplying Electricity and Heat Simultaneously to Twenty Complexes in Cambodia	JGC Corporation	Cambodia	EDC (ELECTRICITE DU CAMBODGE), Phnom Penh	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions by replacing the existing domestically produced diesel power generators with co-generation systems at hotel, hospital, and restaurants complexes.
31	Basic Feasibility Study on Energy Conservation at Bhilai Steel Plant of Steel Authority of India Ltd.	Nippon Steel Corporation	India	Steel Authority of India Ltd. Bhilai Steel Plant	This study intends to examine the prospects of improved energy conservation and the reduction of CO_2 emissions by introducing energy recovery equipment to reutilize heat and gas as steam and electricity in the steel-works.
32	Feasibility Study on Energy Conservation of Sinter Plant at TATA Steel	Kawasaki Steel Corporation	India	The Tata Iron and Steel Company Limited	This study intends to examine the prospects of higher energy conservation and the reduction of greenhouse gas emissions by introducing a waste heat recovery system, ignition furnace, and seals at the #2 sinter plant.
33	Feasibility Study on Energy Conservation at RINL Visak Steel Plant	Sumitomo Metal Industries,Ltd.	India	RINL(Rashtria Ispat Nigam Limited) Visakhapatnam Steel Plant	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by introducing major energy-conserving facilities for blast furnace at the steel-works.
34	Feasibility Study on Modernization of Eastern Refinery Ltd. in Bangladesh	Mitsubishi Heavy Industries, Ltd.	Bangladesh	Eastern Refinery Ltd.	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions by introducing heat recovery equipment and improving heat efficiency through the latest technology such as utilization of an air preheater with a furnace.

No	Theme	Entrusted Organization	Host Country	Site	Outline of the Feasibility Study
35	Feasibility Study on Energy Saving and Reduction of CO_2 Emissions at Esfahan Refinery of Iran	Niigata Engineering Co., Ltd.	Iran	National Iranian Oil Refining & Distribution Company Esfahan Oil Refining Company	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by adopting a high-efficiency waste heat recovery system, cogeneration boiler system, and so forth at the Esfahan Refinery.
36	Feasibility Study on Improving Energy Conservation in the Petrochemical Industry in the Islamic Republic of Iran	The Institute of Energy Economics, Japan	Iran	Razi Petrochemical Complex	This study intends to examine the prospects of higher energy conservation and the reduction of greenhouse gas emissions by replacing the existing energy management and monitoring system with an advanced system, and introducing waste heat boilers into the existing sulfur recovery system and gas turbine power plant within the production and utility facilities of the petrochemical plant.
37	Feasibility Study on Rehabilitation and Efficiency/Output Improvement of FEWA Gas Turbine Power Plant	Hitachi, Ltd.	United Arab Emirates (UAE)	FEWA / Quidfa Power Station	This study intends to examine the prospects of higher energy conservation and the reduction of greenhouse gas emissions by replacing the existing gas turbine power plant (total 72MW consisting of F5 x 4 units) with a higher efficiency gas turbine power plant.
38	Feasibility Study on a Residue-fired Combined Heat and Power Plant in Kuwait.	Chiyoda Corporation	Kuwait	Adjacent to Shuaiba Refinery of Kuwait National Petroleum Company (KNPC)	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by installation of a new combined heat and power plant utilizing by-produced cracked residue at the adjacencies to Shuaiba Refinery
39	Feasibility Study on Energy Conservation and Modernization of Arabian Cement	Engineering Advancement Association of Japan	Saudi Arabia	Arabian Cement Co. Ltd.	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by converting the existing four, long, dry kilns to the latest NSP (New Suspension Preheater) kiln with a bypass system.
40	Feasibility Study on Energy Conservation in the Hotel Industry of Hurghada, Arab Republic of Egypt	Electric Power Development Co., Ltd.	Egypt	Hotel facilities in the Hurghada area (ARABYA Hotel, etc.)	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by introducing high-efficiency lighting systems, demand control systems, inverter systems for motors, and so on into related facilities in hotels in the Hurghada area, together withpower supply.
41	Feasibility Study on Heat Recovery System at Fertilizer Plant in Morocco	Mitsui Engineering & Shipbuilding Co., Ltd.	Morocco	Maroc Phosphore III & IV Complexes, Jorf Lasfer, Morocco	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by introducing a heat recovery system in the fertilizer plant that would result in the utilization of waste energy, currently discharged into the sea, and consequently contribute to independent power production.
42	Feasibility Study on Energy Saving by Introducing the Regenerative Burner System into Industrial Furnaces in Brazil	NKK Corporation	Brazil	Belgo Mineira Steel Works	This study intends to examine the prospects of increased energy conservation and the reduction of CO_2 emissions by adopting the regenerative burner system for the bar mill reheating furnaces and other industrial furnaces in the steel works.
43	Promotion of High-efficiency Lighting in Rio de Janeiro, Brazil	Mitsubishi Electric Corporation	Brazil	Public facilities of the city center, for example city offices, post offices, hospitals, libraries and mid-sized office buildings, and residences	This study intends to examine the prospects of higher energy conservation and the reduction of CO_2 emissions by replacing white lamps with energy-saving lighting in urban residences of the city center, and installing inverter-type lightings in public facilities, such as city offices, post offices and mid-sized office buildings.
44	Feasibility Study on Rehabilitation of Ironmaking and Steelmaking in Paz Del Rio Steel Works	Kobe Steel, Ltd.	Colombia	Paz Del Rio Steel Works	This study intends to examine the prospects of energy conservation and the reduction of CO_2 emissions through the decrease of unit consumption of coke breeze and electric power in the sinter plant and that of coke consumption in the blast furnace by means of energy saving technology, heat recovery from exhaust gas and increased productivity.
45	Feasibility Study on Energy Conservation for Direct Reduction Plant	Japan Consulting Institute	Venezuela	MINORCA/OPCO	This study intends to examine the prospects of energy conservation and the reduction of greenhouse gas emissions by replacing the existing steam reformer with a high-efficiency Midrex-type reformer utilizing recycled gas from the shaft furnace.

The Climate Protection Programs of the Länder (Federal States): The Example of Bavaria

Gotthard Gietl

Bavarian State Ministry for Regional Development and Environmental Affairs, Munich

Never before we are going through an anthropogenic climate change as in this year world-wide: Particularly in Germany and in the Czech Republic, the countries were “under water". Also in China they had disastrous high waters; in India, in the southern part of Africa and in the USA there were unusual dry periods.

We have to take care that these extreme climatic events do not become normal conditions. The climate change and its consequences for our ecological systems do not know any borders!

For the Bavarian state government, climate protection is a central task of a foresighted and future-arranged environmental policy.

Though we have a good climate balance - each citizen produces in average about 7 tons of CO_2 per year (In comparison to Germany 11 t, and the USA 22 t) - Bavaria enforces its climate protection activities.

Target of our climate protection plan of October 2000 is, to reduce the total CO_2-emissions by ten million tons from 90 million tons in 1999 to only 80 million tons per year until 2010. That will correspond with 6.4 tons of CO_2 for each inhabitant and year.

The Bavarian climate protection plan is accompanied by the environmental pacts I and II (Umweltpakt I and II). Within the environmental pact I of 1995, the Bavarian economy engaged itself on voluntary climate protection achievements - successfully. In the sectors of industry and business the CO_2-output could be reduced between 1994 and 1999 by nearly 3.4 million tons per year, which corresponds to an emission reduction of 23 %.

Also in the environmental pact II, which was updated in autumn 2000, the topic “climate protection is "on the top". Only with the engaged cooperation of the economy, the climate problem is to be solved. For the energy turn, we need the inventiveness, the daring, and above all, the responsibility of industry and the trade.

After all, a more efficient handling of energy is of interest for the economy – by reduction of costs.

"Recent product" is the climate dialogue in Bavaria, which deals with the harmonic cooperation between industry and government, concerning climate items. On this common platform, pilot projects are coordinated and incentives are developed for CO_2-reduction measures in enterprises, plants a.s.o. - in particular for small and medium enterprises.

One result is the CO_2-Monitoring-System, which is offered to the enterprises free of charge.

A CO_2-registration-software was developed, which helps the enterprises

- to provide a CO_2-inventory in regular intervals,
- to evaluate the emission development by simple time series,
- to give information over the effectiveness of emission-reducing measures in the future,
- to supply a prognosis of the operational emission development.

The large demand shows that we hit the correct way. A study of the University of Stuttgart from the year 2000 estimates that in the sectors industry and power plants about 8 million tons of CO_2 in relation to the base year 1990 can be saved in Bavaria up to the year 2010.

The CO_2-output of the private households has to be reduced, too. Therefore, we plan a free CO_2-monitoring for private households, which diagnoses the personal energy and CO_2-balance and help to save energy. A further step of the environmental precaution and an example for the fact that we all stand in duty!

Bavaria is ready to bring its know-how into the discussion of the sustainable climate protection and the realization of CO_2-savings. UNEP leader Klaus Toepfer asked recently the question: "How expensive will it be, if we do not protect the climate?

The climate protection programmes of the Länder (Federal States)

The example of Bavaria

Gotthard Gietl

Tutzing, Nov. 18th, 2002

Bayerisches Staatsministerium für Landesentwicklung und Umweltfragen

Slide 1

Bavarian Climate Protection Program Agenda

- Actual Situation
- CO_2 Emissions
- Environmental Pacts I and II
- Climate Dialogue
- CO_2 Monitoring System
- Bavarian Targets

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Slide 2

Flooding in August 2002

Damages about 80 b€

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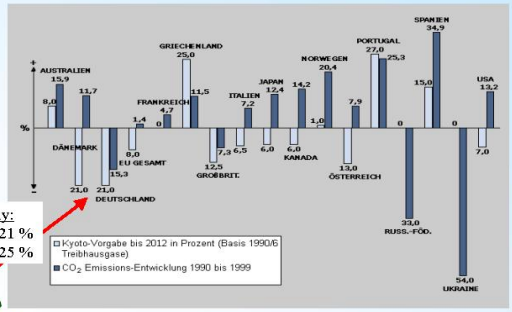
Slide 3

Reduction of Greenhouse Gases (GHG)



Germany:
GHG - 21 %
CO_2 - 25 %

Kyoto-Vorgabe bis 2012 in Prozent (Basis 1990/6 Treibhausgase)
CO_2 Emissions-Entwicklung 1990 bis 1999

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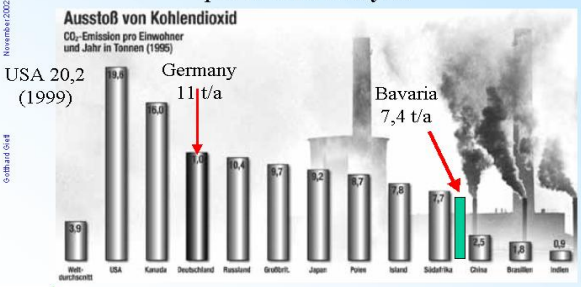
Slide 4

Specific CO_2-Emissions per citizen and year



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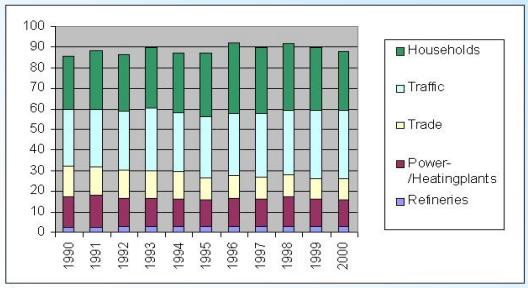
Slide 5

CO_2-Emissions in Bavaria (in Mt/year)



Powerplants, Trade –23 %, Traffic + 20 %, Households + 11%

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Slide 6

Environmental Pact I (1995) Environmental Pact II (2000)

- Agreement between trade/industry and government
- Self commitment for energy saving including controlling (> 30 % from 1990 to 2005)

CO_2 Reduction from 1990 to 2005 (> 20 %)
Examples:

- Paper industry: energy per ton of paper - 22 %
- Chalk industry: energy per ton of chalk - 15 %

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Slide 7

Climate Protection Concept 2000

- Energy production
- Industry
- Traffic
- Buildings
- Agriculture and Forestry
- Public Relations

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Slide 8

Energy production

- Use of renewable energy
  Increase from 9% to 13 % (5 % biomass)
  1991-1997: 300 Mio. €
  - sun collectors (500.000 m²), photovoltaic, heat pumps (12.000 installations)
- Use of nuclear power (electric power generation in Bavaria 67 %)
  each kWh saves 1 kg of CO_2 (coal), avoiding 45 Mio. tons of CO_2 (Germany 160 Mio. tons)
- Developing hydrogen technology

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Slide 9

Industry

- Environmental Pact I and II
- Consultation, expertise by LfU
  - guides for CO_2 savings
  - by law: duty to energy saving, energy recovery
  - reducing the consumption of primary energy

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Slide 10

Traffic

- Public transport (Sponsoring)
- Traffic management systems
- Improving vehicles (Hydrogen technology)
- Car sharing
- Bikeways
- Driving training

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Buildings

- Renovation and improving of old buildings
  Heating, warmwater, heat protection
  (10 Mio. t/a, costs: 200 Mrd. 40 €/m²)
  100 Mio. € since 1998 (8.000 flats)
- Sponsoring projects of the communities

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Slide 12

Public Relation

- Schools „children educate parents“
  e.g. Interactive calcution of personal energy and CO_2 bilance
- Trade, commerce
- Internet

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Slide 13

Voluntary CO_2-Monitoring-System for enterprises

A joint initiative of the Bavarian industry and trade associations and the Ministries of Environment and Economy

Slide 14

Project Objectives

- Prepare companies for national and international climate change policy requirements
- Develop instrument to monitor greenhouse gas emissions of enterprises
- Structured gathering of greenhouse gas emission data and emission reduction measures
- Design tool for company needs

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Slide 15

Functions of the Monitoring-System

- Input of company data (Betriebserfassung)
  - Hierarchical structure (admin. Units, installations)
- Input of product data (Produkterfassung)
  - Products on each level
- Emission units (Einheiten)
  - Company specific units (specific emissions)
- Types of emissions (Emissionsarten)
  - Energy transformation processes (calculated via energy quantity, mass and volume of combustible), measured emissions, process emissions, indirect and direct emissions

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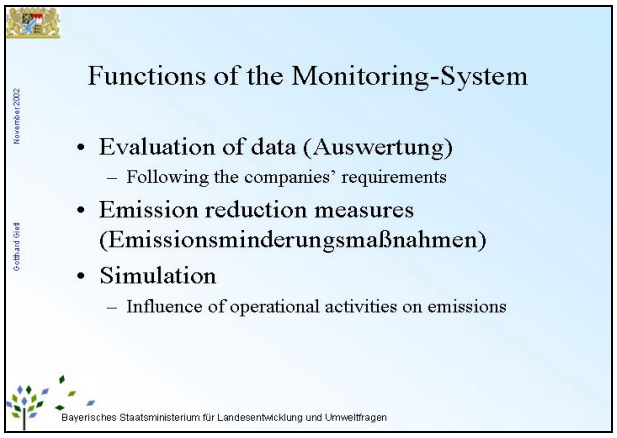

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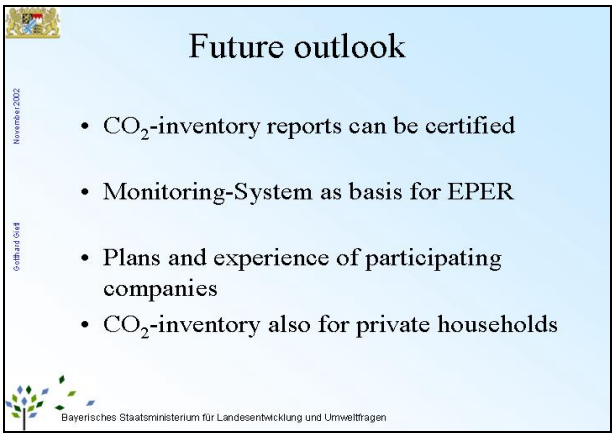

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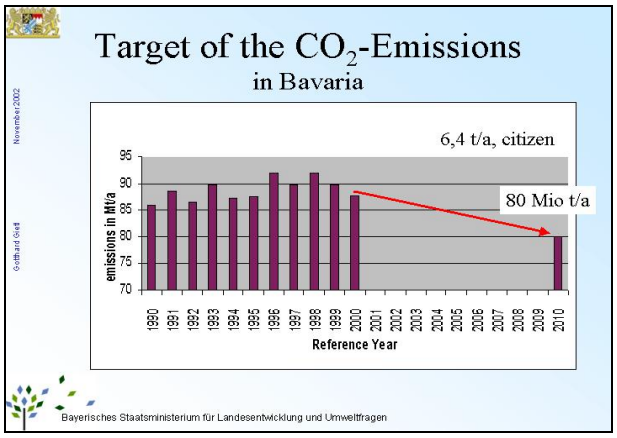

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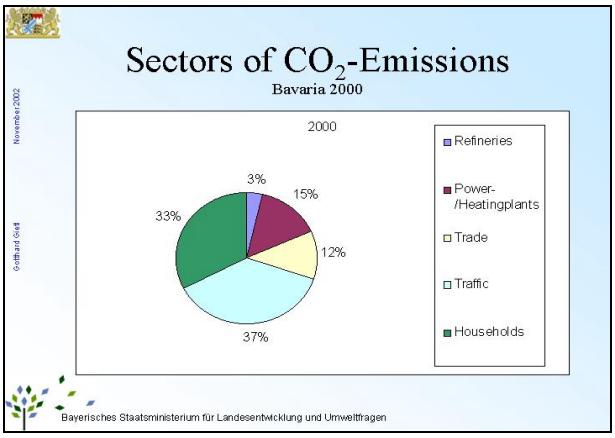

Slide 20

UNECE Energy Efficiency Market Formation Activities and Investment Project Development to Reduce GHG Emissions in Economies in Transition

Dr. Sead Vilogorac • Frederic Romig

UNECE, Geneva
Industrial Restructuring, Energy and Enterprise Development Division
United Nations Economic Commission for Europe

1. Energy Efficiency 21 Project

The Energy Efficiency 21 project is a region-wide project to enhance trade and co-operation in energy efficient, environmentally-sound techniques and management practices in order to help close the energy efficiency gap between actual practice and best technologies, and between ECE countries, in particular market developed countries and economies in transition. It is the successor of the Energy Efficiency 2000 Project that was launched in 1991.

The objectives of the current three year program (2000–03) are to: enhance the dissemination and exchange of information, analyses and experiences on energy efficient, environmentally-sound technologies; improve the networking of institutions, organizations and individuals working in the area of energy efficiency; provide institutional capacity development and training in business planning, financial engineering and project development; promote the implementation of energy efficiency legislation; and identify energy efficiency investment projects and potential sources of financing.

Extra budgetary resources for this project are contributed by a variety of sources, notably governments, development agencies and UN organizations, such as the Global Environment Facility (GEF). Over the last ten years, cash contributions to the Trust Fund have averaged about US$ 200,000 per year. In addition, significant financial and 'in-kind' contributions are directly provided to support the activities of the project. For example, the Commission of the European Union provided about 400,000 € to support a joint project on energy efficiency labeling and standards in a number of transition countries under the auspices of the EE 2000 Project and the EU SAVE Program. This study has been issued as an e-book publication by the United Nations, with a CD-ROM containing 500 pages of text and graphical illustrations.

The EE21 project is guided and monitored by a Steering Committee composed of delegates from national participating ministries and institutions, international organizations and donor agencies. The Steering Committee determines the activities, results, work methods, participation, procedures, budget, calendar of events and timetable of the project, and secures cooperation from other interested parties. In addition, the Steering Committee provides general guidance and oversight to the other operational activities of the Sustainable Energy Division in the field of energy efficiency, such as the UNFIP/UNF project described below.

2. Energy Efficiency Investment Project Development for Climate Change Mitigation (UNF/UNFIP)

In 1999, the United Nations Foundation (UNF) approved a US $ 2 million project on energy efficiency for climate change mitigation within the framework of the then EE 2000 Project. The funding was provided to support market formation activities in economies in transition aimed at improving the investment climate for energy efficiency investments so that these could take place in a market environment, that is, on the basis of market criteria. It was also to encourage local and regional authorities to participate in the objectives of the United Nations Framework Convention on Climate Change and UN ECE environmental accords.

The project covers five east European and CIS countries - Belarus, Bulgaria, Kazakhstan, Russian Federation and Ukraine. It focuses specifically on three areas - municipal lighting, hospitals and district heating. Activities include capacity development and training for private and public officials at the local level to identify, develop and implement energy efficiency investment projects; assistance to municipal authorities and national administrations to introduce economic, institutional and regulatory reforms needed to support investment projects; and the development of energy efficiency investment proposals, with the help of consultants and trainers, for potential investment by commercial banks, private companies and financial service companies.

The United Nations Foundation, through the United Nations Fund for International Partnerships (UNFIP), provided US$ 1.250 million to the project while co-financing partners, such as development agencies and private sector companies and institutions, provided the remainder, US $ 750,000. The ECE, as the executing agency, manages and disburses the funds.

An Ad Hoc Group of Experts guides the implementation of the activities and deals with operational issues. General oversight is provided by the Steering Committee of the EE 21 Project. Because of co-financing arrangements, new modalities and mechanisms to expedite the implementation of activities and disbursement of funds were implemented.

The project is now more than halfway through its implementation phase, with project completion anticipated by the end of 2003.

3. Rational Network for Efficient Use of Energy Resources (RENEUER)

This project is primarily intended for countries with economies in transition in southeast Europe - Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Republic of Moldova, Romania, the former Yugoslav Republic of Macedonia and Yugoslavia. The project's strategic goal is to promote conditions for sustainable development in the region by overcoming regional barriers and creating favorable conditions for the penetration of advanced technologies for the efficient use of local energy resources.

More specifically, the project is intended to:

a. provide technical assistance to improve the capacity at the municipal and local level for the identification, development and implementation of bankable projects for the efficient use of energy resources;
b. designate new energy efficiency investment zones and identify pilot investment projects in each of the participating countries;
c. develop and maintain a pipeline of bankable projects;
d. and develop an information pool to meet the information needs of project owners, project developers, financing institutions, companies and experts.

Secretariat support to the project is provided by the Center for Energy Efficiency (EnEffect) in Sofia and the Black Sea Regional Energy Centre in Bucharest. The Executive Director of EnEffect, who is also Vice-Chairman of the Steering Committee of the EE 21 Project, is the Regional Coordinator of the project. The ECE via the Steering Committee of the EE 21 Project and the Sustainable Energy Division provides overall coordination. The project is under the auspices of the Southeast European Cooperative Initiative (SECI) and the Stability Pact. Funding is provided by a number of donor agencies, and most notably by the US Agency for International Development.

Energy Efficiency 21 Project

Dr. Sead Vilogorac

UNITED NATIONS
Economic Commission for Europe

Slide 1

General Objective

Enhance Regional Co-operation on Energy Efficiency Market Formation and Investment Project Development to Reduce Greenhouse Gas Emissions in Economies in Transition

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Slide 2

Immediate Objectives

- **Accelerate Regional Networking**
- **Energy Efficiency Investment Zones**
- **Regional Policies and Standards**

3

Slide 3

Objective One: Networking

- Enhanced Internet Communications
- Value Added Information Transfers
- Financing Energy Efficiency Investments
- Training on UN FCCC Kyoto Protocol Mechanisms and Joint Implementation

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Objective One: Outputs

- Energy Efficiency 21 WebSite www.ee-21.net
- Multilingual English and Russian Texts
- Expanded Links to Other Websites
- Permanent Webmaster
- On-line Distance Learning

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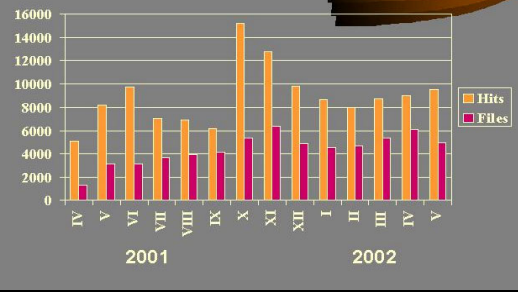
Monthly Totals for Usage of the EE-21 Website



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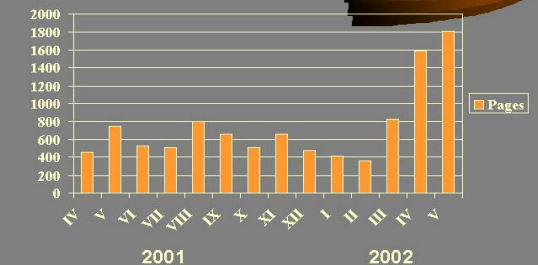

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Objective Two: Investment Zones

- Develop Reforms, Skills and Capacities
- Support Energy Efficiency Investments
- Reduce Greenhouse Gas Emissions
- Kyoto Protocol Mechanisms
- Emissions Trading Instruments

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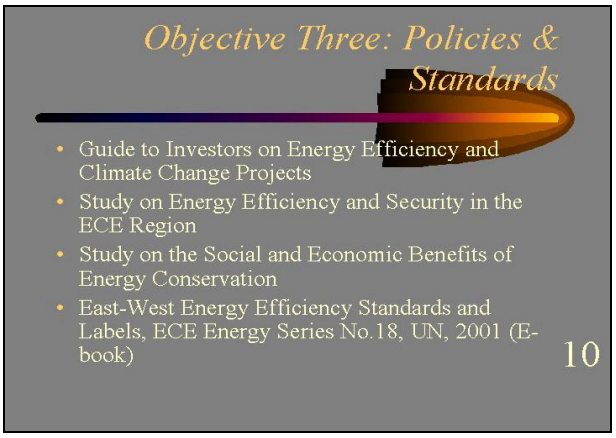

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Energy Efficiency – Policy Design and Implementation in PEEREA Countries

Dr. Tudor Constantinescu

Energy Charter Secretariat, Brussels

1. Generic issues

The concept of energy efficiency has become one of great importance. It is equally important for countries in transition towards a market economy, for countries in the process of development or for industrialized countries concerned with changes in the world's climate systems. It is particular important for countries undertaking a strong reconstruction process, where there is a historical moment to decouple fast growing economy perspectives from a growth in environmental emissions. Instruments developed to improve energy efficiency are associated with and support actions oriented towards a cleaner environment, restructuring the economies and a higher standard of living.

These driving forces have created an appropriate climate to develop and enforce specific mechanisms directed at improving energy efficiency. Such mechanisms supplement efficiency improvements resulting from reforms, notably developments such as market oriented prices and behavior. Specific energy efficiency mechanisms will also support and become part of the restructuring process. Any mechanisms should take into account particular national or regional needs and stages and trends of development.

This is the context in which the Energy Charter Process agreed on the energy efficiency provisions of the Energy Charter Treaty (ECT) and on the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). The Treaty requires that each Contracting Party strives to minimize, in an economically efficient manner, harmful environmental impacts coming from all operations within the energy cycle in its area. Therefore, basic principles with strong influence on the energy efficient behavior in an economy, such as regarding price formation, liberal trading relations, public awareness and international co-operation are already anchored within the Treaty.

2. The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)

The Protocol, negotiated, opened for signature and entered into force at the same time with the Treaty, is a clear expression by all participating Governments that they are serious in making efforts to tap the potential of energy efficiency by tackling its problems. It is the channel through which the countries with more than twenty years of experience in the field of energy efficiency and those with economies in transition recognize the necessity and the value of a binding document to deal with these matters and to offer an effective tool for international co-operation.

The Protocol is promoting Full-Cost and Cost-Effectiveness principles, which should be incorporated into energy efficiency policies, which in turn have to be consistent with sustainable development. It creates conditions for energy efficiency and stimulates co-operation. The Protocol is also reinforcing the principles that will support greater energy efficiency: the introduction of market mechanisms, price formation based on reflection of real energy and environmental costs, cost-effective energy policies, transparency of regulatory frameworks, dissemination and transfer of technologies, stimulating investments etc. The Protocol is structured in five parts including basic policy principles, strategies, international co-operation and legal arrangements. Effectively, the Protocol:

- defines policy principles for the promotion of energy efficiency
- provides a framework for the development of co-operative and co-coordinated action
- provides guidance on the development of energy efficiency

- indicates areas of co-operation.

The Protocol includes specific commitments which are essential in improving energy efficiency and reducing harmful environmental impacts. In this context, the Protocol clearly stipulates that Governments shall:

- formulate aims and strategies (art. 5)
- establish policies (art 3.2)
- develop, implement, update programs (art 8.1)
- create the legal (art 3.2) regulatory (art 3.2) institutional (art 8.3) environment necessary
- cooperate/assist internationally (art 3.1).

It is of vital importance for countries, notably for those with economies in transition, to implement the principles and commitments laid out in the Protocol. Without application of principles through which market signals will create incentives for participants in the economy to behave energy consciously and efficiently, government-funded activities and will not reach their objectives. Scarce Government resources may be wasted as energy efficiency will not improve.

PEEREA entered into force in April 1998. Its entry into force almost coincided with the Aarhus Ministerial Conference on Environment in Europe. Therefore the commitments made by the ministers in Aarhus in the area of energy efficiency are very much in line with the provisions of PEERA, which implementation they support.

The Energy Charter Secretariat together with International Energy Agency and the Danish Energy Agency were invited to prepare the Energy Conservation Initiative developed for the Aarhus Ministerial Conference organized by UN – ECE. The Energy Conservation Initiative included an Energy Efficiency report, which provides the first survey of the energy efficiency policies and programs of the more than 50 participating states. It is the first comprehensive review of Central and East European (CEE) and CIS countries, matched with those of OECD countries.

3. Implementation of the Protocol – policy aspects

The Protocol will support energy efficiency in the countries concerned by creating a legal framework to achieve increased energy efficiency and reduce the negative impact on our common environment. It is the first time that all the well-known principles of energy efficiency have been incorporated into a legally-binding document supported by so many countries. This in itself is a major achievement as all participating countries aiming at higher levels of energy efficiency are thus provided with a legal instrument supporting them in developing and implementing national legislation, policies and .

It is good timing for concentrated and coordinated action in implementing these obligations due not only to the entry into force of the Protocol (on 16 April 1998) but also because:

- Countries with economies in transition are in general in a key point of the process of restructuring their economies, with energy consumption down and economics taking off on a new, market oriented basis; sustainable development is based on present cost-effective supply and demand energy policies;
- Volatility of the oil prices during last years are a clear indication that the issue of security of supply has to be a continuous component of the energy policies; energy efficiency measures have to be judged also against their contribution to securing security of supply;
- Instruments developed to improve energy efficiency are associated with and support actions oriented towards a cleaner environment. After Kyoto, the emphasis on energy efficiency as a major tool in achieving the assumed obligations is higher than before, mainly in the OECD countries;
- Governments have to play an important role in creating instruments for improving energy efficiency in parallel with market mechanisms being in place and able to lead energy efficiency improvements;
- Recent experience of the countries with economies in transition indicate that in the absence of appropriate legislation and domestic programs, the results of technical and financial assistance provided by International Organizations are limited;
- Globalization brings more competition and fewer opportunities for protectionism of domestic industries, which need to adapt to high standards of efficiency in order to be able to survive and to contribute to the national GDP in this new international economic environment.

It is in the context of the general market reform and under the circumstances described above that now the Protocol

can play an important role in addressing energy efficiency aspects which are of major importance in the process of developing and restructuring the economy and improving the standard of living. In countries undertaking strong reconstruction programs the role and opportunities offered by energy efficiency policies and measures are even more important. In accordance with the provisions of the Protocol, important aspects to be considered in developing and implementing cost-effective energy efficiency policies include:

3.1 Developing energy efficiency strategies and legislation as well as monitoring their implementation.

It is one of the basic commitments under PEEREA that countries should develop such strategies, laws and regulations as appropriate to the improvement of energy efficiency. Definition of standards designed to improve the efficiency of energy using equipment, and efforts to harmonize these internationally are also considered important and required by the Protocol. At the same time, the Protocol calls for member countries to co-operate and assist each other in this respect, making effective use of the work and expertise developed internationally.

It is also important to develop/adapt institutions in such a way as to ensure proper implementation of the strategies and legislation developed. The experience of some countries with economies in transition indicates that the efforts to develop legislation are not really rewarded without ensuring adequate enforcement mechanisms and institutions.

The role of Government, Municipalities, Utilities, Equipment manufacturers and Non Governmental Organizations has to be carefully defined and understood in practice. The Protocol specifically requires the establishment of specialized energy efficiency bodies at appropriate levels that are sufficiently funded and staffed to develop and implement policies.

3.2 Encouraging the introduction of market oriented prices, mechanisms and programs.

Pricing is the first and vital incentive for energy efficiency. Price structure and price level induce cost-effective energy efficiency programs which are the starting points from which to define national energy efficiency strategies.

It is worth mentioning that under the Protocol, countries are required to formulate strategies and policy aims to improve Energy Efficiency and thereby reduce environmental impact of the energy cycle as appropriate in relation to their own specific energy conditions. In order to achieve the above mentioned policy aims, the countries are required to develop, implement and regularly update energy efficiency programs best suited to their circumstances.

In transition and developing economies, there is a historic opportunity to couple the foreseen economic growth with a low rate of increase in energy consumption and emissions. Recognizing the challenges connected with the introduction of energy efficiency, time is anyhow ripe to implement cost-effective policies for the supply and demand of energy.

Energy efficiency should also be integrated as an underlying principle shaping general development and restructuring policies. Sectoral policies, such as housing, industrial and transport and infrastructure policies should integrate energy efficiency issues. The efficient use of energy has to be seen as the norm in the operation of all sectors.

3.3 Adopting policies that encourage the development of appropriate regulations and standards, financial measures and incentives.

Striking the right **balance** between governmental intervention and the introduction of market mechanisms is key in improving energy efficiency. For countries in a process of economic reform, the Government should play an active role before the market forces will be able to solve most of the problems regarding the improvement of the use of energy resources. The Protocol can offer a legal basis for the development of specific energy efficiency regulations and programs.

Development of financing mechanisms for energy efficiency is also one of the key provisions of the Protocol. Third Party Financing, access to private capital markets and the use of fiscal and financial incentives to energy users are explicitly requested by the Protocol. These aspects are notably relevant for a large country, where demonstrative projects can play a certain role. However, Governmental resources are limited and the real input has to come from industry and the private sector. At the same time, international banks may support a limited number of actions.

Domestic commercial banks should learn what energy efficiency investments mean, how special investment instruments could operate and specific risk factors per sector. Without creating **internal financing mechanisms** for energy efficiency, there is limited chance of energy efficiency investments being properly considered in the multitude of restructuring/development projects.

Efficient use of energy is also important due to the need to address problems such as low purchasing power and employment. Often, despite the high level of education and strong theoretical skills, transition and developing countries suffer from limited experience in undertaking energy efficiency projects in a market economy environment. Lack of funds and financing mechanisms make the situation even more difficult. Co-operation and strong commitment at political level, for which the Protocol offers an unique legal basis, is thus very important.

3.4 Introduce energy efficient technologies and encourage cogeneration.

This is another area of great interest covered by the Protocol (and also by the Treaty). Contracting Parties are requested to promote the use of energy efficient and environmentally sound technologies, services and management practices throughout the Energy Cycle.

The employment of efficient and environmentally sound technologies, including cogeneration, is important for the increase of economic efficiency and reduction of local and global harmful environmental impacts. Due to the global high efficiency and to the major contribution to reducing the emission level, cogeneration deserves adequate legal and regulatory provisions in the new context of liberalized markets. Fiscal and financial incentives have a major role in facilitating their penetration. Investments on the supply or demand side should then be judged for their comparative effectiveness. Technologies have at the same time to be accompanied by service and management programs, on both the production and consumption side. In promoting these technologies, public or governmental agencies should firstly understand and subsequently create correct awareness of the role of grants and demonstrative projects. Otherwise this will lead to a continuous form of subsidization providing incorrect signals on the market penetration of various technologies.

3.5 Intensify international co-operation.

Currently, numerous international organizations and are already focusing their activities on regions characterized by high energy intensities. Their aim is to support legislative and institutional development and to encourage the transfer of technology. Consequently, seminars, training courses, awareness campaigns, studies and demonstrative projects have been developed in these countries. Despite these actions and the numerous internal measures taken by the countries concerned, only modest results have been recorded towards a lower energy intensity and a better environmental quality.

Building a new type of **platform** for international co-operation is at the same time an objective and an instrument of the Protocol in bringing countries to a similar operational level in the area of energy efficiency. It is for this reason that the Protocol contains a relevant but not exhaustive list of areas where direct co-operation between countries is encouraged. The Protocol specifically requires countries to improve co-operation in order to make efficient use of their expertise and programs. Harmonization of efforts is therefore an immediate and very constructive consequence of the Protocol. And this harmonization should cover among other topics pricing mechanisms, financial incentives, information and institutional arrangements, transfer of technologies and cogeneration.

4. The actual status

After the Protocol became operational a Working Group on Energy Efficiency and related Environmental Aspects was established. The Working Group meets regularly, also to address priorities, review progress and discuss possible plans for action.

The Working Group has developed its activities into two areas:

a. Reviewing progress in implementing the PEEREA and in improving energy efficiency, and

b. Developing activities that support dialogue between member countries and facilitate the implementation of the Protocol.

The review process relies on two complementary activities: regular reviews and in-depth energy efficiency reviews.

- Regular reviews are based on an agreed format (comprising both quantitative and qualitative information) and they serve the purpose of monitoring the implementation of PEEREA; at the same time they will serve to preparing the reporting on the implementation of 1998 Aarhus energy efficiency related commitments to the Kiev Environmental Ministers Conference in 2003, according to an invitation from UN-ECE.
- In-depth energy efficiency reviews are completed on a peer basis, following a mission including representatives of several countries in the host country. Such in-depth reviews result in recommendations to the host government that are endorsed by the Charter Conference. So far, the **Slovak Republic**, **Lithuania**, **Poland, Hungary, Bulgaria, Romania, Estonia and Turkey** have hosted such reviews. In 2002 Denmark and Czech Republic have volunteered.

Activities supporting dialogue and facilitating implementation of the Protocol include:

- a brochure on Developing an Energy Efficiency Strategy
- a Financing Mechanisms Manual
- a report on Fiscal and Taxation Policies for improving Energy Efficiency
- a report on Effects of Market Liberalization on Energy Efficiency
- a report on the Evolution and role of Energy Efficiency Institutions.

Currently, in addition to the progress report for the Kiev Ministerial Conference, a report on **Third Party Financing** and one on **Cogeneration / District Heating** are to be finalized. In both cases the focus is on helping Governments in using TPF and cogeneration promotion in defining and achieving their objectives in relation to the market liberalization and climate change policies. Legal investment issues, role of various institutions, importance of national energy policies, barriers in making and operating an investment are some of the priority areas to be investigated and on which to support a better bridge between Governments and industry.

Under these circumstances, the Protocol establishes a forum for the exchange of ideas and policies, successes and failures in the energy efficiency field and supporting Governments in establishing new targets and . The Protocol plays a useful role in Governments' efforts to lower energy intensity, achieve a cleaner environment and increase the security of supply

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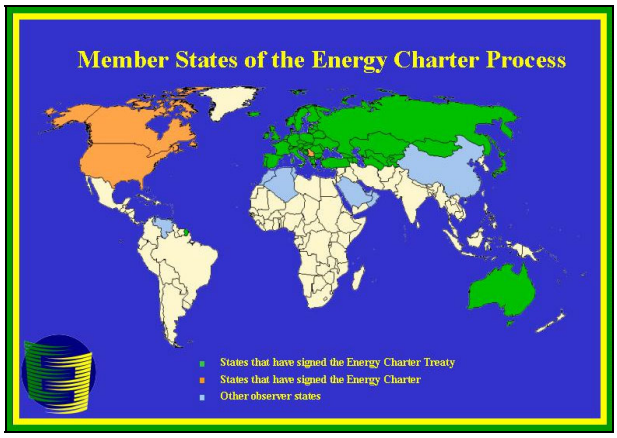

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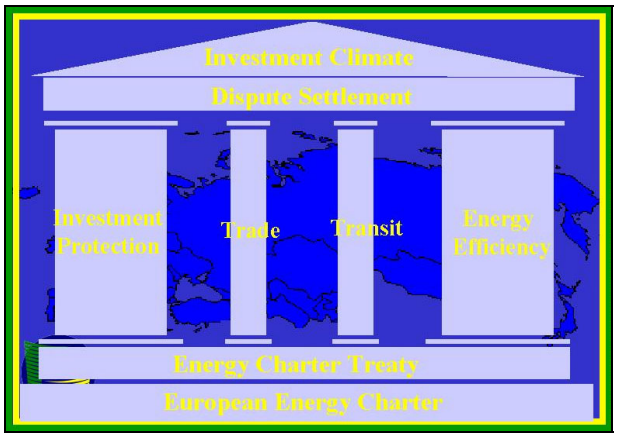

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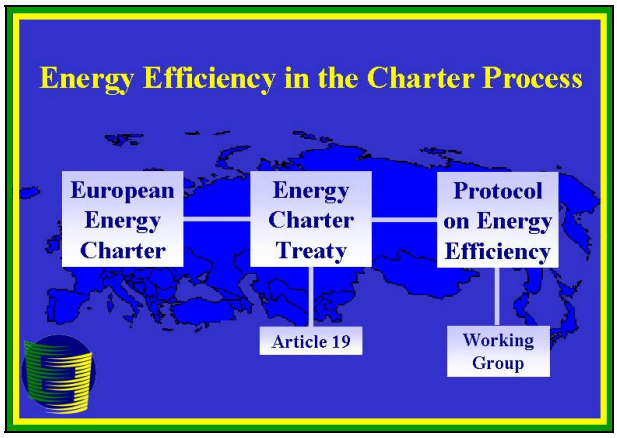

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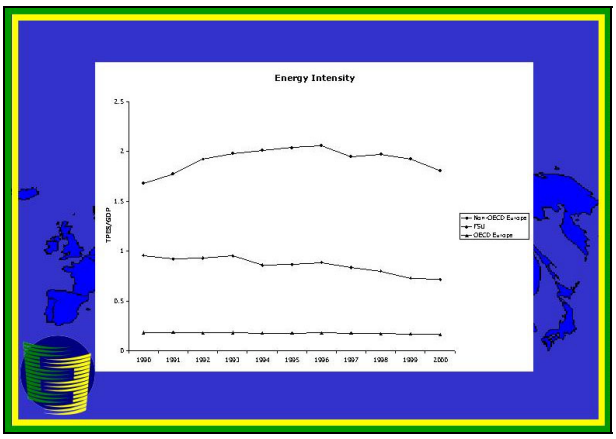

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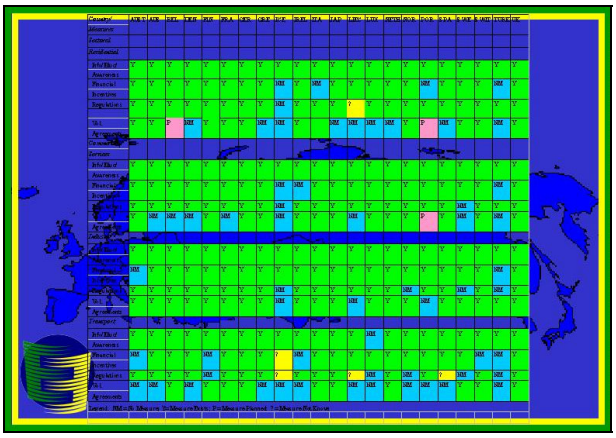

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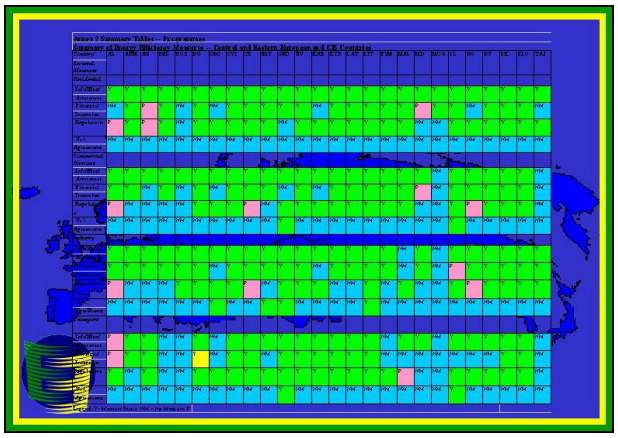

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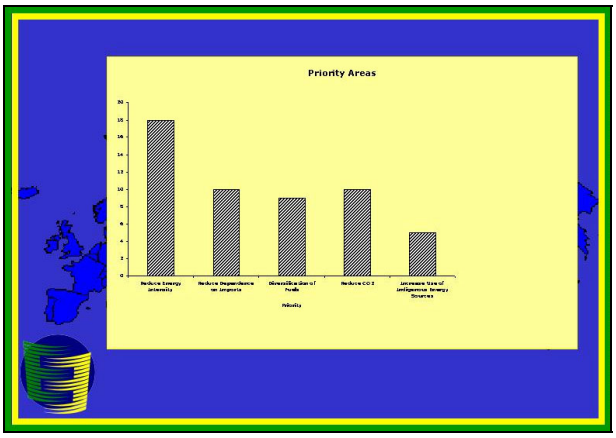

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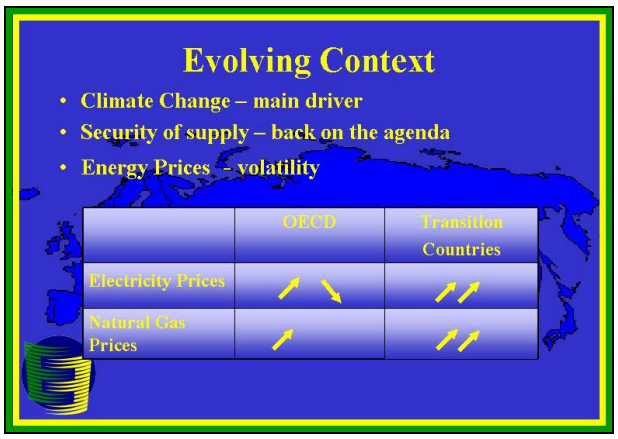

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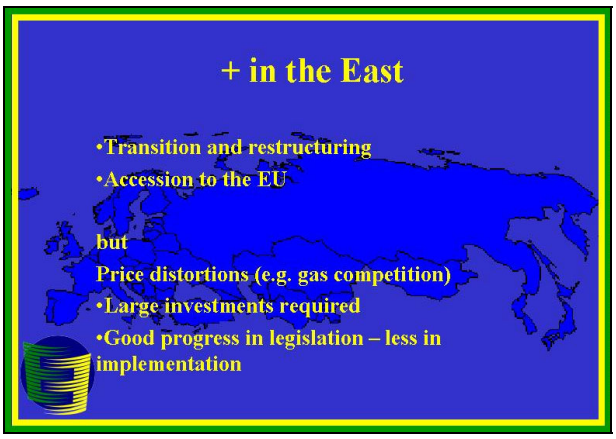

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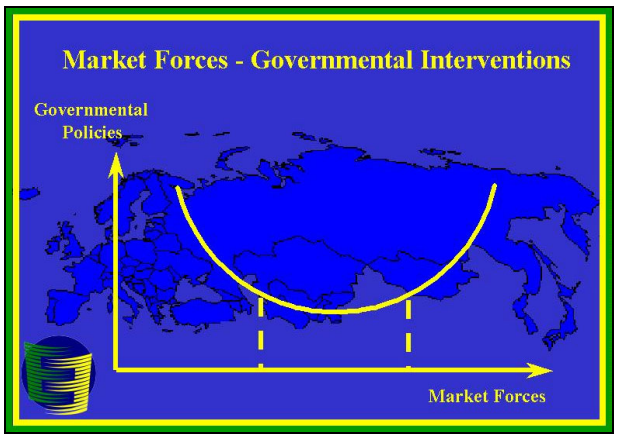

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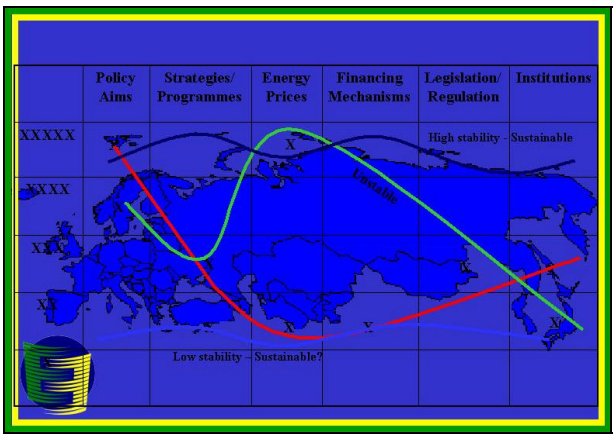

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Environmental Fiscal Reform in Germany

Kai Schlegelmilch

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Berlin

1. Overview of the presentation

My presentation is structured along the following items:

- Climate Protections Program in D and EU – Targets, Scenarios and Measures in D and EU
- Features and Experiences with the Ecological Tax Reform (ETR) in D and European Countries
- Requirements for Design and Promotion of ETR
- Conclusions
- Prospects for Environmental Fiscal Reforms in Germany

2. Targets and reductions in EU

In the EU, the following targets have been agreed and the respective achievements have been made: The overall EU target is a reduction of all the six greenhouse gas emissions agreed in the Kyoto Protocol by 8% between 1990 and the first so-called budget period 2008-2012. Within the EU the target sharing is as follows:

- Reductions: Lux: -28 %, **D** and DK: **-21%,** A: -13%, UK: -12,5 %, B: -7,5 %, IT: -6,5%, NL: -6%;
- Stabilization: F und FIN;
- Increase limitations: SWE: +4%, IRL: +13%, ES: +15%, GR: +25%, P: +27%.

The target sharing shall take into account differing geographic, climatic, economic and social points of departure.

Measures on EU level

The measures taken at EU level are several, they are basically laid down in the European Climate Change Program (ECCP). The 6. Environmental Action Program (6. EAP) makes reference to it. The ECCP comprises e.g.:

- EU-wide Emissions Trading
- Energy Taxation
- Eco-labeling for CO_2-emissions of cars
- Several other Directives and Measures such as for heating/insulation requirements for housing and equipments.

Greenhouse Gas Targets of Germany

The most important target of Germany is the internationally binding reduction of 6 Kyoto Greenhouse Gases:

- Target (1990-2008/12): -21%
- Achieved (1990-2000): -18,7%

The only voluntary reduction target of CO_2-Emissions only from the former government is:

- Target (1990-2005): - 25%
- Achieved (1990-2000) -15,3%

Measures in Germany (1998-2000)

These targets have led to the development of the national Climate Protection Program in which the ample number of instruments to be applied has been laid down:

- Measures 1998-2000 i.a.:
  - Ecological Tax Reform,
  - Renewable Energy Act (EEG),
  - 100.000 Roofs Photovoltaic-Program (350 MW),
  - 190 mln €-Promotion Program for Renewable Energy (basically for heating/warm water)
- Result: Likely Reduction by 18-20% until 2005/1990
- Target: -25% until 2005/1990.

National Climate Protection Program (I) - Scenarios/Targets:

- Against the national climate protection target 5-7%-points (= 50-70 mln t CO_2) will likely be missing until 2005
- National Climate Protection Program (10/2000) thus sets sector-specific targets for 1998-2005, not at least to attribute the responsibilities of the various ministries for their fields of action more precisely:
- Private households/buildings: -1,8-2,5%-points
- Energy/industry: -2,0-2,5%-points
- Transport: 1,5-2,0%-points.

National Climate Protection Program (II) - Measures

The measures adopted in general by the government are:

- Extension of combined heat-and-power
  Target: additional CO_2–reduction by 10 mln tons until 2005, and by 23 mln tons until 2010
- Energy savings ordinance
  Target: Reduction of energy consumption of new buildings by 30% against the current standard, now based on a primary energy approach
- Program for the renovation of building stock
  Target: Reduction of CO_2-emissions by 5-7 mln t until 2005.
- Commitment of German Industry:
  Target: Reduction of specific CO_2-emissions by 28% until 2005/1990, of greenhouse gases by 35% until 2012/1990.
- Promotion of rail transport:
  Investment of 1 bln € p.a. in infrastructure
- Transport-related measures such as the heavy vehicle charge on motorways
- Commitment of Federal Government:
  Target: Reduction of CO_2-Emissions in its own activities and stocks by 25 % until 2005/1990 und by 30 % until 2012/1990
- The Ecological Tax Reform:
  Target: Reduction of CO_2-Emissions by 20 mln tons (2%-points) until 2010.

I will thus now turn to the most economic instrument of the national climate protection program and further focus on that instrument:

3. Ecological Tax Reform

- The Objectives are to reduce energy consumption and unemployment, not at least by stimulating innovations
- Increase and broadening of energy taxes and reduction of social security contributions
- Steady increase of several energy taxes in 5 small steps between 1999-2003
- Steady decreases of social security contributions (here: pensions fund).

Features of ETR in Germany (I) - Regular Rates

In 1999, overall 5 small and predictable steps had been adopted for the time span 1999-2003:

- Electricity tax 1.02 cents/kWh in 99 (+0.26 cents/kWh p.a. between 2000-2003)
- Mineral oil taxes on transport fuels: (+3,07 cents/liter p.a. between 1999-2003)

A single increase in 1999 only was adopted for heating fuels as social concerns were considered to be potentially relevant in the housing sector:

- Tax on natural gas + 0.16 cents/kWh
- Tax on light heating fuel: + 2,05 cents/liter

Features of ETR in Germany (II) - Reduced Rates

- To take into account industry's concerns about competitiveness
- To promote environmental measures:
  - local public transport
  - track transport
  - natural gas in the transport sector
  - low-/no sulfur containing fuels
  - cogeneration plants (=>20% of total revenues for environmental purposes)
- To take social concerns into account:
  - reduced rates for old night storage heating
- To ensure revenue neutrality:
  Reduction of employers' and employees' social security contribution by overall 1.7%-points

ETR in Germany - Experiences

Several quite mixed experiences were made in Germany with the ETR:

- There was a coincidence with (a) a drastic increase of world oil prices and strengthening of USD; thus supporting the price incentive by the eco-tax with respective impacts (b) a decrease of electricity prices due to liberalization, thus counteracting the price incentive by the eco-tax so that the latter was hardly recognized, let alone triggered concerns.
- The use of revenues for non-environmental purposes is neither really understood nor appreciated as people often wish to see revenues used for environmental purposes as they seem to believe in the good government able to decide on the best use of revenues, though with the eco-tax a market-based instrument had been intro-

duced to leave up this major decision making to every individual.

- Though business is treated generously, opposition continues due to pretended non-agreement with principles
- Equity concerns of population are very dominant
- Protests in autumn 2000 made the government stand firm on the continuation – revenue-raising function turned out to be crucial
- However, a single heating cost grant for low-income households and a tax level playing field for all commuters was provided.
- In 2000 transport fuel sales decreased by 1.1% and in 2001 by another 1.5% (for the first time in two subsequent years against an upward trend). In 2002, it seems likely that fuel sales will be reduced further in a third year in a row.
- The demand for car pooling increased by 25% in the first half year of 2000.
- The number of passengers in the public transport system increased in 1999 for the first time (+0.4%), additional 0.8% in 2000 and another 0.8% in 2001 – against a stable/downward trend.
- A macroeconomic Study confirms that a double dividend is achieved: Job increase predicted of up to 250,000 until 2003, due to reduced labor costs, but also due to increased investment in energy savings. CO_2-emissions and energy consumption will be reduced by 2-3% until 2003.

ETR – Campaign by the German Environment Ministry 2000-01

In order to better inform the public and make understood the concept of ETR several campaigns were initiated comprising various means of communication and promotion:

- Posters (in Berlin): 4 images: What are the benefits of the eco-tax (a) more salary, b) my job, c) better climate and d) more sex [the reason being that this relationship can prevent you from other forms of use of energy such as TV etc.] see http://www.bmu.de → Climate Policy)
- Advertisements (in D) – similar 4 images
- Postcards for a competition about the best eco-tax-justification (Winner: More candlelight dinners – I will switch off the light for dinner to save energy) – price: three-day trip on an organic farm
- Flyer „The ETR" (2nd edition)
- Advertisement of the flyer
- Cinema/video-spot „Save fuel / Climate Protection" (though not mentioning the ETR directly) – it won the Global Media Award in Gold: since August 2001 in entire D in 640 cinemas from December 2001 also in Turkish translation on TV (Turkish channel)
- Internet-Supply
- Press Releases, Background information, Advertisement/images (also as download), cinema spot, ETR-calculator, Links, many presentations at conferences/ workshops
- Joint BMU/OECD-conference on Environmental Fiscal Reform on 27 June 2002 in Berlin**:** http://www1.oecd.org/env/fiscalreformconference/ and http://www.bmu.de → Reden.

Barriers to the adoption of EU-proposals

On EU-level, the debate on energy taxation is lasting more than a decade: starting in 1992 with a proposal for a CO_2-/energy tax on top of existing energy taxes, slightly modified in 1995. As no consensus was reached, it was withdrawn recently, while a new proposal from 1997 is discussed, asking only for a certain harmonization of minimum tax rates taking into account national rates.

- Unanimity voting required of all 15 EU-Member States
- Until recently Spain, and now still other cohesion countries (Ireland, Portugal, Greece), but also UK (+LUX) oppose. However, a consensus appears to be very close and possibly to be found around the turn of 2002/2003, still only on the basis of the smallest common nominator.
- Impacts on competitiveness, economic growth, equity, inflation, environment and loss of fiscal sovereignty are mentioned as major reasons
- Given the failure for more than a decade, several MS went ahead due to no progress on EU-level

Features of ETR in Europe

The features of ETRs in Europe are as follows:

- Announced and predictable for 2+ years
- Small steps, no sudden changes with a shock-effect to allow for adaptation
- Mostly revenue-neutral by introducing /increasing energy/CO_2-taxes as the major element
- Sometimes complemented by other environmental taxes such as on waste, chemicals and land use
- Almost always accompanied by reducing social security contributions (SSC) or direct taxes.

European countries at the forefront

- Comprehensive ETR:

Denmark	1992/1993/1996/2000-2002
Netherlands	1991/1996/2001
Norway	1991/1997/1999
Sweden	1991/1993/1997/2000/2001
United Kingdom	1993/1996/2001

- Elements of an ETR:

Finland	1990/1997 (introduced the first CO_2-tax in 1990 worldwide!)
France	2000/2001
Germany	1999-2003
Italy	1999-2005
Switzerland	1997/2004

- Modest approaches to an ETR:

Austria	1996
Belgium	1993
Slovenia	1997/1998 (the first CEEC to introduce a CO_2-tax)

4. Requirements for the design of ETR

Given the barriers and experiences in many European countries, the subsequent requirements for the design of an ETR are in many cases very important elements for its implementation:

1. Strong and societal attractive and fiscally motivated alliance (e.g. job creation)
2. Small, predictable steps for several years which are fixed in the law from the very beginning. A single increase every few years and the abolition of environmentally harmful subsidies becomes more attractive after the 'autumn 2000'-experiences
3. Revenue neutrality - including tax expenditures for the environment – tends to be less urgent as the double dividend approach is not always understood
4. First environmental impacts should already be reached in a short term (due to public expectations)
5. Take equity and competitiveness concerns into account.

Requirement for the Promotion of an ETR

Given the barriers and experiences in many European countries, the subsequent requirements for the promotion of an ETR are in many cases very important elements for its implementation:

- ETR should be part of a fiscal policy package and communicated as an important element, not as a stand-alone tax measure.
- Tax expenditures for the environment should be communicated as environmental promotion programs and as a way of revenue spending
- Environmental impacts should be examined and communicated broadly as a major success
- Winners should be identified and asked to support ETR publicly and demonstrate the benefits it brings in terms of innovation, job creation
- Use those elements to form an acceptance buildings/ information/ image campaign on ETR
- A Green Budget Reform Commission including stakeholders could be a means to enhance acceptance.

5. Conclusions

- Positive environmental impacts, economic benefits and innovations could be achieved
- Environmental taxes work best when part of a policy package, e.g. some grants for energy efficiency should also be considered
- Perceived competitiveness and equity barriers can be overcome – even if a country goes ahead alone
- Low, rather positive impact on the employment, but no strong evidence is yet available. No cure-all for unemployment, but at least no exodus of industry occurs, if ETR is designed appropriately.

6. Prospects for ETR

- More countries in Europe will follow – now that the Kyoto Protocol is being ratified by the EU (and others) since it is – apart from emissions trading – a very effective and cost-efficient tool to combat climate change
- This will tend to increase chances for harmonization and further tax increases
- Increased taxation of industry, e.g. linked to energy audits or emission trading schemes, particularly for energy-intensive industries. UK's climate change levy and DK's long experiences offer room for maneuver
- Increased use of revenues for the promotion o environmental measures
- Better embodiment of ETR in a policy package to overcome non-fiscal/-price barriers and generally broadening the scope to an Ecological Fiscal Reform.

General Prospects for Environmental Fiscal Reform

- In addition to energy as a major environmental tax base, land use, waste and fertilizers and pesticides, raw materials, appear to be the next favorite bases.
- Emissions based annual road tax, favoring also low-consuming cars.
- Proposal for modification of the land tax according to the land use.
- Shifting focus to environmentally damaging subsidies and other environmentally distorting tax provisions.
- More sustainable support for buildings and commuting.

ETR in Germany from 2003 on – new legislation in 2002

- Reduction of environmentally damaging tax reductions
  - for industry (positive marginal tax rate)
  - for night storage heating.
- Adaptation of the gas tax to the level of the light heating oil based on CO_2/energy content.
- Increased use of revenues for building stocks renovation and shift away from night storage heating; prolonged tax reduction for natural gas used in the transport sector.

Extension to an Environmental Fiscal Reform in the coalition agreement 16.10.2002 – in general

- ETR is embedded in a green budget reform which comprises:
- structural adaptations of existing taxes
- the reduction of environmentally damaging and macro-economically questionable subsidies, including tax expenditures,
- the increase of spending for environmental purposes.
- For the year 2004 a review is foreseen in order to assess if and how energy taxation will be further developed according to environmental aspects, given the environmental impacts, the oil price, the macro-economic development, the competitiveness of German industry and the social impacts.

Environmental Fiscal Reform in the coalition agreement 2002 – in detail:

- VAT-exemption for flights into EU-MS (in the meantime for all international flights) will be abolished by 1.4.2003.
- Support for building new houses will be reduced to the level of that for buying existing houses and concentrated on families. A supplement shall be further available for environmentally advanced measures.
- The annual car tax will be based on CO_2-emissions.
- On EU-scale D will push for a kerosene tax for aviation.
- Restructuring of the German hard coal mining sector will be continued. Subsidization of the German hard coal sector will be ensured for the period 2006-2010. The contribution from the federal budget – which is at 3.05 billion € nowadays and which will be reduced to 2.17 billion € by 2005 – will be developed further in a degressive manner.
- 2005: VAT on passenger rail transport for long-distances will be reduced from 16 to 7%.
- More revenues will be spent on renovating buildings and promoting renewables.

Environmental Fiscal Reform in Germany

CTI Capacity Building Seminar for CEE/FSU Countries
Climate Technology and Energy Efficiency –
From "Best Practice" Experiences to Policy Diffusion

November 16 – 20, 2002
Evangelische Akademie
Tutzing, Germany

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*Though views expressed here represent government positions in general, they are made on a personal capacity.

Slide 1

Overview of Presentation

- National Climate Protections Programme in D – Targets, Scenarios and Measures in D
- Features and Experiences with the Ecological Tax Reform (ETR) in D
- Requirements for Design and Promotion of ETR
- Conclusions
- Prospects for Environmental Fiscal Reforms in Germany

Slide 2

Targets and Reductions in EU

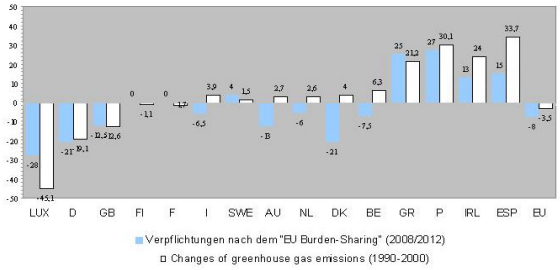
EU Target: -8% (1990-2008/12)

EU Target sharing:

- Reductions: Lux: -28 %, **D** and DK: **-21%,** A: -13%, UK: -12,5 %, B: -7,5 %, IT: -6,5%, NL: -6%;
- Stabilisation: F und FIN;
- Increase limitations: SWE: +4%, IRL: +13%, **ES: +15%,** GR: +25%, P: +27%.
- The target sharing shall take into account differing geographic, climatic, economic and social points of departure.

Slide 3

Development of Greenhouse Gases in the EU (in %)



Slide 4

Measures on EU level

- European Climate Change Programme (ECCP)
- 6. Environmental Action Programme (6. EAP)
- EU-wide Emissions Trading
- Energy Taxation
- Ecolabelling for CO2-emissions of cars
- Several other Directives and Measures

Slide 5

Greenhouse Gas Targets of Germany

- Internationally Binding Reduction of 6 Kyoto Greenhouse Gases:
- Target (1990-2008/12): -21%
- Achieved (1990-2000): -18,7%

- National Voluntary Reduction of CO_2-Emissions
- Target (1990-2005): - 25%
- Achieved (1990-2000) -15,3%

→ National Climate Protection Programme – (ETR)

Slide 6

Measures in Germany (1998-2000)

- Measures 1998-2000 i.a.:
  - Ecological Tax Reform,
  - Renewable Energy Act (EEG),
  - 100.000 Roofs Photovoltaics-Programme (350 MW),
  - 190 mio.-€-Promotion Programme for Renewable Energy
- Result: Likely Reduction by 18-20% until 2005/1990
- (Target: -25% until 2005/1990)

Slide 7

National Climate Protection Programme (I) – Scenarios/Targets:

- Against the national climate protection target 5-7% (= 50-70 mio. t CO2) will likely be missing until 2005
- National Climate Protection Programme (10/2000) thus sets sector-specific targets for 1998-2005:
- Private households/buildings: -1,8-2,5%-points
- Energy/industry: -2,0-2,5%-points
- Transport: 1,5-2,0%-points

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National Climate Protection Programme (II) - Measures

- Extension of combined heat-and-power
  Target: additional CO2–reduction by 10 mio. t until 2005, and by 23 mio. t until 2010
- Energy savings ordinance
  Target: Reduction of energy consumption of new buildings by 30% against the current standard, now based on a primary energy approach.
- Programme for the renovation of building stock:
  Target: Reduction of CO2-emissions by 5-7 mio. t until 2005.

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National Climate Protection Programme (III) - Measures

- Commitment of German Industry:
  Target: Reduction of specific CO2-emissions by 28% until 2005/1990, of greenhouse gases by 35% until 2012/1990.
- Promotion of rail transport:
  Investment of 1 bn. € p.a. in infrastructure
- Transport-related measures such as the heavy vehicle charge on motorways
- Commitment of Federal Government:
  Target: Reduction of CO2-Emissions in its own activities and stocks by 25 % until 2005/1990 und by 30 % until 2012/1990

Slide 10

Central and most economic instrument of the National Climate Protection Programme: Ecological Tax Reform

- The Objectives: reduce energy consumption and unemployment, not at least stimulate innovations
- Increase and broadening of energy taxes and reduction of social security contributions
- Steady increase of several energy taxes in 5 small steps between 1999-2003
- Steady decreases of social security contributions (here: pensions fund)

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Features of ETR in Germany (I) - Regular Rates

Steady increases in 1999-2003:

- Electricity tax 1.02 cents/kWh in 99 (+0.26 cents/kWh p.a. between 2000-2003)
- Mineral oil taxes on transport fuels: + 3,07 cents/litre p.a. between 1999-2003)

Single increase in 1999 only:

- Tax on natural gas + 0.16 cents/kWh
- Tax on light heating fuel: + 2,05 cents/litre

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Features of ETR in Germany (II) – Reduced Rates

- To take into account industry's concerns about competitiveness
- To promote environmental measures:
  - local public transport
  - track transport
  - natural gas in the transport sector
  - low-/no sulphur containing fuels
  - cogeneration plants (=>20% of total revenues for environmental purposes)
- To ensure revenue neutrality:
  Reduction of employers' and employees' social security contribution by overall 1.7%-points

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ETR in Germany - Experiences (I)

- Coincidence with
  a) a drastic increase of world oil prices and strengthening of USD;
  b) a decrease of electricity prices due to liberalisation
- Use of revenues for non-environmental purposes is neither really understood nor appreciated
- Though business is treated generously, opposition continues due to pretended non-agreement with principles.
- Equity concerns of population are very dominant
- Protests in autumn 2000 made government stand firm on the continuation – revenue-raising function turned out to be crucial.
- However, a single heating cost grant for low-income households and a tax level playing field for all commuters was provided.

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ETR in Germany - Experiences (II)

- In 2000 transport fuel sales decreased by 1.1% and in 2001 by another 1.5% (for the first time in two subsequent years against an upward trend).
- The demand for car pooling increased by 25% in the first half year of 2000.
- The number of passengers in the public transport system increased in 1999 for the first time (+0.4%), additional 0.8% in 2000 and another 0.8% in 2001 – against a stable/downward trend.
- Macroeconomic Study:
  Job increase predicted of up to 250,000 until 2003, due to reduced labour costs, but also due to increased investment in energy savings.
  CO2-emissions and energy consumption will be reduced by 2-3% until 2003

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ETR – Campaign by the German Environment Ministry 2000-01 (I)

Posters (in Berlin): 4 images: What are the benefits of the ecotax (see http://www.bmu.de → Climate Policy)

Advertisements (in D) – similar 4 images

Postcards for a competition about the best ecotax-justification (Winner: More candlelight dinners – I will switch off the light for dinner to save energy) – price: three-day trip on an organic farm

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ETR – Campaign by the German Environment Ministry 2000-01 (II)

Flyer „The ETR" (2nd edition)

Advertisement of the flyer

Cinema/video-spot „Save fuel / Climate Protection" – it won the Global Media Award in Gold

since August 2001 in entire D in 640 cinemas from December 2001 also in turkish translation on TV (turkish channel)

Internet-Supply

Press Releases, Background information, Advertisement-images (also as download), cinemaspot, ETR-calculator, Links, many presentations at conferences/workshops

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Barriers to the adoption of EU-proposals

- Unanimity voting required of all 15 EU-Member States
- Until recently Spain, and now still other cohesion countries (Ireland, Portugal, Greece), but also UK (+LUX) oppose
- Impacts on competitiveness, economic growth, equity, inflation, environment and loss of fiscal sovereignty are mentioned as major reasons
- Attempt to change unanimity voting into qualified majority voting (3/4) at Nice Summit in December 2000 failed. Still this or the adoption of the proposal is crucial before the accession of about 12 candidates countries as it would then become part of the acquis communitaire which the accession countries would have to comply with
- → Several MS went ahead due to no progress on EU-level

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Features of ETR in Europe

- **Announced and predictable for 2+ years**
- **Small steps, no sudden changes with a shock-effect to allow for adaptation**
- **Mostly revenue-neutral by introducing /increasing energy/CO_2-taxes as the major element**
- **Sometimes complemented by other environmental taxes such as on waste, chemicals and land use**
- **Almost always accompanied by reducing social security contributions (SSC) or direct taxes.**

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European countries at the forefront

- Comprehensive ETR:
  - Denmark 1992/3/6/2000-2
  - Netherlands 1991/96/2001
  - Norway 1991/1997/9
  - Sweden 1991/3/7/2000/1
  - United Kingdom 1993/5/2001
- Elements of an ETR:
  - Finland 1990/7 (introduced the first CO_2-tax in 1990 worldwide!)
  - France 2000/1
  - Germany 1999-2003
  - Italy 1999-2005
  - Switzerland 1997/2004
- Modest approaches to an ETR:
  - Austria 1996
  - Belgium 1993
  - Slovenia 1997/1998

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Requirements for the Design of ETR

1. Strong and societally attractive and fiscally motivated alliance (e.g. job creation)

2. Small, predictable steps for several years which are fixed in the law from the very beginning. A single increase every few years and the abolition of environmentally harmful subsidies becomes more attractive after the 'autumn 2000'-experiences.

3. Revenue neutrality - including tax expenditures for the environment – tends to be less urgent as the double dividend approach is not always understood

4. First environmental impacts should already be reached in a short term (due to public expectations)

5. Take equity and competitiveness concerns into account

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Requirement for the Promotion of an ETR

- ETR should be part of a fiscal policy package and communicated as an important element, not as a stand-alone tax measure.
- Tax expenditures for the environment should be communicated as environmental promotion programmes and as a way of revenue spending
- Environmental impacts should be examined and communicated broadly as a major success.
- Winners should be identified and asked to support ETR publically and demonstrate the benefits it brings in terms of innovation, job creation
- Use those elements to form an acceptance buildings/information/image campaign on ETR

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Conclusions

- Positive environmental impacts, economic benefits and innovations could be achieved.
- Environmental taxes work best when part of a policy package, e.g. some grants for energy efficiency should also be considered.
- Perceived competitiveness and equity barriers can be overcome – even if a country goes ahead alone
- Low, rather positive impact on the employment, but no strong evidence is yet available. No cure-all for unemployment, but at least no exodus of industry occurs, if ETR is designed appropriately.

Slide 23

Prospects for ETR

- More countries in Europe will follow – now that the Kyoto Protocol is being ratified by the EU (and others) since it is – apart from emissions trading – a very effective and cost-efficient tool to combat climate change.
- This will tend to increase chances for harmonisation and further tax increases
- Increased taxation of industry, e.g. linked to energy audits or emission trading schemes, particularly for energy-intensive industries. UK's climate change levy and DK's long experiences offer room for manoeuvre.
- Increased use of revenues for the promotion of environmental measures
- Better embodiment of ETR in a policy package to overcome non-fiscal/-price barriers and generally broadening the scope to an Ecological Fiscal Reform.

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General Prospects for Environmental Fiscal Reform

- In addition to energy as a major environmental tax base, land use, waste and fertilisers and pesticides, raw materials, appear to be the next favourite bases
- Emissions based annual road tax, favouring also low-consuming cars
- Proposal for modification of the land tax according to the land use.
- Shifting focus to environmentally damaging subsidies and other environmentally distorting tax provisions
- More sustainable support for buildings and commuting

OECD/Germany conference on 27 June 2002 in Berlin on EFR: http://www1.oecd.org/env/fiscalreformconference/ and

http://www.bmu.de → Reden

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ETR in Germany from 2003 on – new legislation in 2002

Reduction of environmentally damaging tax reductions for

- industry (positive marginal tax rate)
- night storage heatings

Adaptation of the gas tax to the level of the light heating oil based on CO2/ energy content

Increased use of revenues for building stocks renovation and shift away from night storage heatings; prolonged tax reduction for natural gas used in the transport sector.

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Environmental Fiscal Reform in the coalition agreement 2002 – in general

ETR is embedded in a green budget reform which comprises:

structural adaptations of existing taxes

the reduction of environmentally damaging and macro-economically questionable subsidies, including tax expenditures,

the increase of spending for environmental purposes.

For the year 2004 a review is foreseen in order to assess if and how energy taxation will be further developed according to environmental aspects, given the environmental impacts, the oil price, the macro-economic development, the competitiveness of German industry and the social impacts.

Slide 27

Environmental Fiscal Reform in the coalition agreement 2002 – in detail:

VAT-exemption for flights into EU-MS will be abolished.

Support for building new houses will be reduced to the level of that for buying existing houses and concentrated on families. A supplement shall be further available for environmentally advanced measures.

The annual car tax will be based on CO2-emissions

On EU-scale D will push for a kerosene tax for aviation.

Restructuring of the German hard coal mining sector will be continued. Subsidisation of the German hard coal sector will be ensured for the period 2006-2010. The contribution from the federal budget – which is at 3.05 billion € nowadays and which will be reduced to 2.17 billion € by 2005 – will be developed further in a degressive manner.

2005: VAT-rate on public passenger transport for long-distances will be reduced from 16 per cent to 7 per cent.

More revenues will be spent on renovating buildings and promoting renwables.

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Instruments to Overcome Existing Barriers to Energy Efficiency Projects in Bulgaria

Dr. Zdravko Genchev

EnEffect, Sofia

Energy efficiency is an important priority of the energy strategy of the Government of Bulgaria. As part of the national efforts to improve the efficiency of utilization of energy resources, local authorities (municipalities) use various policy instruments to overcome existing barriers to energy efficiency projects and to achieve sustainable reduction of energy consumption. Two of those instruments are subject of this case study – local energy planning and networking.

1. Part one: local (municipal) energy planning

Municipal energy planning is one of the most powerful instruments for effective management of energy on the local level. The changing functions of the municipalities bring about a change in the essence and objectives of the energy programs. They often evolve from purely energy efficiency programs into integrated programs for energy production, transportation, distribution and end-use. This option usually follows the provisions of the national energy policy and complies with the municipal development strategies. An important lesson learned from the experience of Western Europe and the USA in the recent decades is the gradual exhaustion of the demand-side energy efficiency potential. Instead, orientation towards more effective and more flexible combined systems for heat and power generation and considerably broader use of renewable energy sources is clearly observed.

1.1 Functions of local authorities in the field of energy management

Only a few decades ago municipalities in Bulgaria did not have any significant function in the field of energy management. While energy generation, transportation and distribution were mainly the responsibility of the state, local authorities' role was confined to that of heat an electricity consumers. As a consequence of the processes of privatization and decentralization in the energy sector municipalities began to acquire new functions.

These changes progress actively and take shape in line with the advance of political reforms. Similar to the practice in Europe, the functions performed by municipalities with respect to energy place them in different roles. The roles currently played by the European municipalities are those of energy consumers, heat and electricity producers, regulators and investors in the local energy sector and sources of motivation for raising demand- and supply-side energy efficiency and protection of the environment.

The municipality as energy consumer. The most typical role of every municipality is that of energy consumer. This is the function, which is most often connected with the responsibilities of the local authority and therefore with expectations for its initiative and intervention. The municipality consumes energy above all in municipal buildings and through the services, which it provides to the inhabitants. Parallel with its efforts to expand the range of services and to improve their quality, the local authority tries to reduce the costs for their provision. Since energy represents a significant component of the price of the majority of the services provided by the municipality – transport, medical care, education etc. – reduction of energy consumption is the main tool for reduce the costs of services.

The function of Bulgarian municipalities as energy consumer is the best developed. Municipalities in Bulgaria manage all types of public buildings, which are as a rule managed by the local authorities in the other European countries as well, and perform the major range of energy services. Energy conservation in the energy end-use in municipal sites may considerably alleviate municipal budgets and become a prerequisite for reduction of the prices and improvement of the quality of services provided by the municipality to the local inhabitants.

Table 1: The most common activities for increasing the efficiency of energy end-use in implementation of the function of the municipality as energy consumer

Spheres of impact	Possible actions
Municipal buildings	Developments of programs for rehabilitation of municipal building stock
	Energy audits of municipal buildings and design of projects for improvement of energy efficiency
	Implementation of energy efficiency measures in municipal buildings
	Energy management in municipal buildings
Street lighting	Energy audit of public lighting systems – streets, squares and open public spaces (parks and gardens, public garages)
	Preventive maintenance of street lighting systems and facilities
	Implementation of energy efficiency measures
Municipal transport	Monitoring of fuel consumption by public transport
	Preventive maintenance of transport vehicles
	Renewal of the vehicle fleet

In implementation of their function of energy consumer a number of municipalities in Bulgaria perform energy audits of municipal sites and implement energy efficiency measures in the street lighting systems (Gabrovo, Pazardjik, Pernik, Razgrad), in hospitals (Stara Zagora, Gabrovo, Gorna Oryahovitsa), in school buildings (Gabrovo, Pernik), kindergartens (Dobrich, Pernik) and in other sites. The municipality as energy producer and supplier. The role of the municipality as energy producer and supplier consists in provision of the energy to meet the demand of the inhabitants and the business entities on its area. Considerable differences have been observed in the developed West European countries with respect to the implementation of this function. Some municipalities exercise significant influence on energy production, transportation and distribution, others have only limited or no possibilities in this respect. In certain countries this function of municipalities is rapidly developing in recent years. This fact gives some authors grounds to view energy production and energy supply as two independent functions.

In Bulgaria the function of the municipality as energy producer and energy supplier is relatively restricted. With the exception of the city of Sofia, which is the owner of the local district heating company, the rest of the municipalities cannot exercise any influence on the enterprises producing and supplying heat and electricity. The forthcoming restructuring of the ownership rights on the district heating companies in this country will lead to changes in the role of local authorities in their management and control. For the time being, however, the function of municipalities is limited to energy production in the local boiler houses in some municipal buildings. The use of renewable energy sources (solar energy, wind, water and biomass), combustion of waste for energy generation, as well as construction of mini co-generation plants are still underdeveloped. The most common supply-side municipal projects are those of fuel shift. Usually, it involves fuel shift from liquid or solid fuel to natural gas (Pazardjik, Dobrich, Stara Zagora, Yambol, Botevgrad). In some municipalities assessments have been conducted of the local capacity for use of renewable energy sources (Omurtag, Gabrovo).

Worth noting is the experience of the Municipality of Stamboliyski, which has created a public-private company for implementation of an energy efficiency project. The company has worked out the project and has ensured a bank loan for construction of a small co-generation district heating plant for the needs of the city.

The municipality as regulator and investor. The municipality plays the role of regulator and investor through a number of its activities. Thus, for instance, land use planning and the organization of the transport systems are responsibility of the local authority. A number of strategic decisions related to public works, as well as numerous other daily decisions, affect directly the energy consumption by the inhabitants and by the different business entities on the area of the municipality. A considerable portion of the investments in the infrastructure is effected by the municipalities. Thus they can have considerable influence on the energy demand, as well as on the efficiency of energy production, supply and consumption.

Table 2: The most common activities for increasing energy efficiency in implementation of the function of the municipality as energy producer and energy supplier

Spheres of impact	Possible actions
Heat and power generation	Energy audits of the systems
	Increasing the efficiency of heat and power generation
	Introduction of combined heat and power generation (co-generation)
Energy transmission and distribution	Optimization of the energy distribution systems
	Diminishing of the losses in energy transmission and distribution and increasing of the energy efficiency of the systems
Use of renewable energy sources (RES)	Identification of the potential for use of RES
	Construction of systems for energy generation from RES

Table 3: The most common activities for increasing the efficiency of energy end-use in implementation of the function of the municipality as regulator and investor

Spheres of impact	Possible actions
Planning of the sustainable development of the municipality	Working out of municipal energy strategies as component part of the strategies for sustainable development of the regions and municipalities
	Working out of municipal energy programs and plans of action
Spatial and urban development plans	Working out of versions for development of the energy networks
	Impact assessment and selection of optimum versions of electricity distribution
	Optimization of the functional zoning in order to diminish the transport demand
	Optimization of the transport and communication schemes with a view to reduction of the intensity of traffic
	Pilot implementations of bio-climatic (nature-friendly) architectural projects on the area of the municipality
Local building regulations, norms and practices	Establishment of energy efficiency as a leading criterion in the evaluation of projects in the municipality
	Study of the opportunities for establishment of local building rules, norms and practices, which regulate and promote bio-climatic (nature-friendly) architecture and highly energy efficient architectural and construction solutions
Technical infrastructure	Rehabilitation of the existing technical infrastructure with the aim to reduce energy losses and increase energy efficiency
	Construction of new, energy efficient technical infrastructure

The function of regulator and investor is realized in every Bulgarian municipality mainly through the urban and spatial development plans. Although not yet properly recognized and heavily underestimated, urban and transport planning has a significant impact on energy consumption. Unfortunately, the energy and environmental components of the Master Plans of human settlements, of the programs for public works on their area and the transport and communication schemes are often not developed with sufficient care and profusion. Quite often important management decisions are made without due consideration of the consequences from them on the energy-related issues and their impact on the environment. In the majority of cases this is the result of lack of adequate information, the still scarce successful practices in this country or wrong ranking of the priorities of the municipal policy.

Nevertheless, some Bulgarian municipalities manage to realize with success their function as investors. The Municipality of Stara Zagora has made significant investments in the project for improvement of the energy efficiency of the district (the project has been implemented with the support of USAID under the leadership of the US consultancy company Electrotech Concepts, Inc.). The municipalities of Pernik and Pazardjik made considerable investments in energy efficiency projects in the street lighting systems and school buildings (the projects have been implemented in

the framework of an USAID program for introduction of a mechanism for partial guaranteeing of bank loans (DCA – Development Credit Authority). The Municipality of Stamboliyski invested in the construction of a small co-generation plant for the needs of the city (the project has been developed with consultancy assistance from EnEffect and will be implemented with a credit from a Bulgarian bank).

Some Bulgarian municipalities perform their function as regulator by setting local water prices. These are mainly municipalities, in which the water supply and sewerage companies are municipal property. In the near future similar practice shall probably be introduced with respect to the municipal district heating companies.

The municipality as a motivator. Households, companies, manufacturing enterprises and their administrations, including the municipal administration itself, are energy end-users. It is their behavior that predetermines the total energy efficiency in the municipality. At the same time, however, the decisions on these matters do not fall under the direct control on the part of the local authority (except those related to the municipal administration). The municipality has indirect opportunities for impact on the behavior of energy end-users. It may encourage or restrict, reward or punish, or most generally speaking it may motivate them towards a certain mode of behavior. There is a broad variety of forms and methods for motivation of end-users to consciously reduce their energy consumption. The modality most frequently used is provision of specific material or moral incentives either independently, or as part of comprehensive incentive programs for promotion of energy efficiency in different fields. Dissemination of information related to efficient energy use, development and implementation of educational programs and provision of consultancy services are used in many countries as effective tools to motivate consumers to use energy in a more rational and efficient way.

The function of motivator is the least developed function in Bulgarian municipalities as yet. It may be expected that in the coming years a steady and irreversible trend towards broadening of the power of local self-government will set in.

The capacity of the municipality to have an encouraging impact on certain activities in the field of energy production, transmission and consumption will also increase. The municipalities have at their disposal a variety of possibilities to encourage efficient energy consumption, reduction of harmful emissions and other actions of public benefit. Worth mention, among others, are the local taxes and charges, the price of services, properly organized information, educational and other campaigns, competitions, awards and incentives, labeling of products, buildings or end-users etc.

Table 4: The most common activities for increasing the efficiency of energy end-use in implementation of the function of the municipality as motivator

Spheres of impact	Possible actions
Investors and financing institutions	Dissemination of information on the advantages of investments in energy efficiency measures
	Dissemination of information on the incentive investment and fiscal policy of the municipality
Energy end-users	Dissemination of information on accessible opportunities for more efficient energy use
	Implementation of demonstration projects, which illustrate the advantages of energy efficiency and practical ways and means to achieve it
	Provision of consultancy support for implementation of energy efficiency projects
	Implementation of educational programs for provision of practical knowledge and skills for implementation of energy efficiency projects
	Introduction of moral and material incentives for improvement of the efficiency of energy end-use
	Promotion of the development and application of public transport for the account of individual transport
	Promotion of bio-climatic (nature-friendly) architecture
Local taxes and charges	Application of a fiscal policy of preferential treatment for efficient energy end-use
	Application of a fiscal policy of preferential treatment for investments in measures to increase energy efficiency

1.2 Preparatory work for municipal energy planning

The four major functions of municipalities in the field of energy determine different initiatives. The full range of these initiatives makes the substance of the municipal energy policy. For practical implementation of this policy the local authorities design energy programs and plans with specific objectives, tasks and deadlines. An ever-growing number of municipalities in Europe use municipal energy programs and plans as tools for application of their energy policy. The programs and plans are based on:

a. analysis of energy demand and the opportunities for meeting these needs from local and foreign energy resources;
b. analysis of the possibilities to diminish this demand through increased efficiency of energy end-use;
c. integration of the municipal energy efficiency with the policy for overall social and economic development of the municipality.

Prior to starting the elaboration of a long-term program or a short-term plan of action, the municipal decision-makers should carry out a certain preparatory work, which should create prerequisites for the planning effort. The focus is on determining the strategic and immediate objectives of the program, its scope and time period, as well as the main actors and stakeholders in its design and implementation.

Selection of objectives. Different approaches are applied to formulate the objectives of the municipal programs and plans. They may be clustered into two major groups – policy approaches and expert approaches.

When a *policy approach* is used, the objectives of the energy programs usually ensue from important national priorities or commitments undertaken under international agreements and protocols. Municipalities in Western Europe develop ever more often their programs on the basis of preliminary formulated policy objectives. Examples for such objectives are for instance reduction of CO_2 emissions, improvement of the quality of the environment or promotion of the local economy.

The expert approach is based on the objective analysis of the state of the energy sector in the respective municipality and the opportunities for impact on this state, including through energy efficiency measures. The expert approach is more accurate and more objective, however it requires a considerable preliminary preparatory work prior to resorting to the actual formulation of the tasks of the program. Some times the preliminary formulated policy objectives are combined with immediate actions defined by experts. This *combined approach* is broadly applied in the municipalities and is particularly appropriate for countries with economies in transition. The energy programs of Bulgarian municipalities are most often aimed at reduction of energy consumption in municipal sites and diminishing of the burden of energy costs on the local budgets, as well as improvement of the quality of services, reduction of GHG emissions etc.

Scope and spheres of impact. Some municipalities lay the focus of their programs on one sphere only. Others extend the scope of their programs to a large number of spheres and divide their activities among them. The energy efficiency programs of Bulgarian municipalities are usually oriented towards the municipal sector – buildings and services in which the municipality is performing its function of energy consumer. The measures are concentrated above all in school buildings, kindergartens and hospitals, as well as the street lighting systems.

Participants. In the process of elaboration and implementation of municipal energy programs in the majority of European countries the capacity of municipal officials is combined with the human potential of other national and local organizations. Most frequently the leading participants are existing structures of the local administration, specially set up new administrative structures, local utilities and agencies and external consultants. In the municipalities members of the Bulgarian network EcoEnergy the local technical universities, NGOs and specialized consultancy companies are frequently mobilized in the design and implementation of the municipal energy programs.

1.3 Design of the energy program

The design and implementation of the municipal energy program goes through a series of interrelated actions. The typical sequence is as follows:

a. determination of the baseline state of the municipality (state during the forecast period, provided no energy efficiency program is implemented);
b. selection of priority spheres, on which the impact of the program will focus;
c. selection, analysis and assessment of the possible actions (measures) for increasing energy efficiency;

d. implementation of the program;
e. survey, analysis and evaluation (monitoring) of the results from program implementation.

Approaches in the analysis of information. Different approaches are used in the design of the programs, depending on the specific conditions in the municipality, the capacity of the local administration and the level of preliminary preparatory work.

In the *expert approach* the selection of the sites for impact, the assessments of the baseline status and the selection of measures for impact are based on the available data and expert assessments. The reliability of this approach depends on the reliability of the available information, the qualification of the involved experts and the applied techniques. Sometimes the expert assessments may influence the political will of municipal decision-makers.

In the *systems approach* the assessments and decisions are based on complex analyses of a considerable amount of objective information. This approach is more reliable, however more time and effort consuming. It is connected with a more substantial preliminary preparatory work and presumes that the experts, who apply it, have specific capacity and qualification.

Baseline status. Defining the baseline status of the energy sector of one municipality and the different sites on its area means to identify and describe the following:

a. the status at a given point of time (the baseline) prior to the implementation of the energy efficiency program;
b. the anticipated change in this status for a selected forecast period, provided no energy efficiency program is implemented.

The baseline status is characterized by technical data for the state of the energy systems in the municipality and information about the regulatory, institutional, human and financial capacity of the municipality to implement energy efficiency programs. After the creation of the Municipal Energy Efficiency Network EcoEnergy, the member-municipalities began to collect systematically and purposefully such information.

Analyses and assessment of the available information. The creation of the energy database is only the first layer of the municipal energy information system. In order to perform the transition from the objective statistical information to the formulation of the policy objectives of the program and the selection of concrete management and technical actions, it is necessary to conduct analyses and assessment of the baseline information. They are objective in nature, since they use mainly technical and economic criteria and tools. They serve to determine the real potential for energy efficiency improvement in individual sites, target groups or entire sectors on the area of the municipality. The analyses and assessments become the connecting link between the objective information (the database) and the policy objectives and tasks on the compilation of the municipal energy efficiency programs. They usually contain model scenarios of the future energy consumption, analysis of the potential of selected target groups of sites or individual sites.

Most common measures. Three major groups of measures for energy efficiency improvement in municipalities are most frequently applied: technical, behavioral, organizational and motivating.

Technical measures are implemented in the field of energy generation, supply, distribution and end-use. Bulgarian municipalities apply technical measures mainly in the fields, in which they have the biggest opportunities for impact – municipal buildings and energy services.

The organizational and regulatory measures usually require lesser costs as compared to the technical measures, however they have a significant impact on energy consumption as well as on the energy awareness of end-users. Examples for such measures are the introduction of control and monitoring of energy consumption in municipal buildings, provision of information and consultancy services to industry, households and the private sector, establishment of definite rules and standards for energy efficiency.

Municipalities can *motivate* energy saving in their own sites as well as energy efficiency in residential buildings, local industry and the private sector. A variety of tools, which may be part of comprehensive incentive programs, are used for this purpose.

Selection and ranking of measures. Measures with the best economic indicators are not always the most direct road to full utilization of the available potential.

In the selection of *measures of the same type to be applied in a large number of sites* priority is given to specific types of technological or organizational measures, which are then replicated in a multitude of different sites. In this manner their implementation is greatly facilitated.

The complex intervention in a limited number of sites is based on a combination of different measures, which allow maximum utilization of the energy saving potential in several selected sites.

The selection of *sets of the most cost-effective measures* usually leads to rapid and maximal energy savings. This is very appropriate in the cases when municipalities are faced with grave financial difficulties for a short period of time.

The combination of measures, which are cost-effective, with more expansive, however urgently needed measures, may result in an acceptable average general level of effectiveness and ensure the long-term effect of the program.

It is possible also *to group the measures by sectors*, since this usually facilitates the organization of program implementation.

1.4 Financing of municipal energy programs

Procurement of appropriate forms for financing the programs is of decisive importance for their success. The opportunities for *participation of end-users* (including households) in the financing of the municipal energy programs deserve special mention. In some countries *stockholder participation* in the investments for the programs is offered.

In other cases *surcharges on energy prices* are introduced with the aim to ensure part of the required investments. *Performance contracting* is yet another popular and useful for municipalities form of procurement of external investments in the municipal infrastructure.

2. Part Two

2.1 Networking

Networking is another effective policy instrument, which is in use in Bulgaria. The Bulgarian Municipal Energy Efficiency Network EcoEnergy is a voluntary non-profit association of municipalities, founded in 1997, at the initiative of the mayors of 23 Bulgarian municipalities. Currently it covers more than 60% of the territory and the population of the country and continuously expands. The mission of the network is to contribute to the establishment of efficient use of energy and water as an important component of the sustainable development policy of municipalities in Bulgaria. In fulfillment of its mission the Network pursues three major objectives:

1. establishment of integrated planning of energy and water resources at the local level;
2. reduction of the burden of fuel, energy and water costs on municipal budgets and
3. reduction of fuel, energy and water costs of end-users in municipalities.

For attainment of these objectives the municipalities of EcoEnergy make permanent efforts for organizational strengthening and expansion of the Network. In this way it turns into a desired partner of the central and local authorities, of the private sector and NGOs, of the citizens.

2.2 Strategic Objective One: Planning of energy and water resources

The activities aimed at achieving the Objective One of EcoEnergy are the most closely related to the mission of the association and to the national policy for sustainable development. They comprise the backbone of the overall activity of the Network during the first five years of its operation. The most significant results of these activities are the computerized energy information system, the number of trained municipal experts, the worked out model of a municipal energy program and the pilot municipal energy programs.

Energy information system. An electronic energy information system for the Network member municipalities has been created. It compiles and systematizes information about the building stock, which is either municipal property or has been put under the care of the municipality, like for instance street lighting systems.

The database of the system is used in the elaboration of municipal energy programs and concrete energy efficiency projects, as well as in management of energy consumption in municipalities. The energy information system of the EcoEnergy member-municipalities is the first of its kind in the country. It allows to determine the real energy saving potential in the municipalities and to identify opportunities for its efficient utilization.

A model of municipal energy program. EnEffect has developed the first model of a municipal energy efficiency program in Bulgaria, based on the method of planning by target groups. Following this model, EnEffect and experts from Gabrovo and Stara Zagora worked out pilot energy programs for these two municipalities. With the help of the model and the pilot programs the first of its kind genuine Bulgarian methodology for development of municipal energy programs has been worked out, including a practical guidebook on municipal energy planning.

Specialized training on energy planning. An ambitious training program on municipal energy planning, designated for municipal decision-makers and experts, is underway. The training is provided by EnEffect and till the end of 2002 it has covered more than 100 representatives from about 40 municipalities and specialized energy agencies. As a result of the training, nuclei of influential local officials, who contribute to the establishment of a municipal policy for efficient use of resources, have been built. In the course of training the first concrete municipal energy efficiency programs in this country have been worked out (more than 30 by the end of 2002), part of which have already been endorsed by the municipal councils. In response to the great interest EnEffect has conducted similar training courses in Serbia and Moldova.

2.3 Strategic Objective Two; Diminishing of budgetary expenses

The activities aimed at implementation of this objective of EcoEnergy are extremely attractive for the municipalities, since they bring them economic benefits. The Network supports the development of concrete projects for energy efficiency improvement in the sites, the care for which is assigned to local authorities. The results from these efforts are demonstrated through the developed and partially implemented energy efficiency projects and the training and technical assistance rendered to the municipalities.

Projects in municipal sites. The energy efficiency demonstration zone in the city of Gabrovo offered a platform for implementation of energy efficiency projects in all major types of municipal sites – buildings, street lighting and district heating. These projects are in the process of completion and the results from them are being already actively disseminated and applied in practice in the rest of the municipalities of the Network. More than 40 projects in municipal sites, some of which have already been completed and others are underway, have been initiated in the remaining municipalities members of EnEffect. They have helped achieve real savings of energy and costs.

The demonstrations corroborate the significant opportunities for raising the efficiency in municipal sites and the favorable technical and economic indicators of the majority of projects. They raise public awareness on the benefits from energy efficiency and encourage many municipalities to develop their own projects. The interest in the demonstrations, however, concedes ever more often to the interest in investments in energy efficiency. There is a growing awareness of the additional benefits resulting from the energy efficiency projects – reduction of GHG emissions, improvement of the operational conditions in municipal sites, the achievement of the enforced norms for space heating and lighting of buildings and open spaces etc.

Training on business planning and technical assistance. A specialized training program for municipal experts provides introduction to the process of formulation, development and implementation of investment projects for increasing energy efficiency. Real projects are prepared in the course of the training process. The training on business planning helps create municipal teams of skilled experts, who are in the position to identify new projects and manage the process of their elaboration and implementation. A genuinely new attitude to the projects and the forms of financing, corresponding to the market conditions and the growing competition in attracting investments in the municipalities is formed. The success of the training of Bulgarian experts has become the reason for initiation of training of experts from other countries of Southeast Europe.

2.4 Strategic Objective Three: Reduction of the costs of end-users

The political importance of this objective does not concede in significance to the direct economic benefits gained by municipalities from the projects in municipal sites. Local authorities turn ever more often to projects and activities that help the inhabitants and local enterprises to save energy. These efforts are realized through implementation of concrete projects in sites on the area of the municipality, which are not municipal property, or through experimental appli-

cation of incentives for energy efficiency improvements, through publications and other means for raising public awareness and impact on public behavior.

Publications and information campaigns. EnEffect publishes a specialized quarterly newsletter and maintains a website in Internet. A specialized library keeps in store valuable Bulgarian and foreign publications. Information, experience and knowledge in the field of efficient energy use are disseminated through the events organized by the Network (annual conferences, thematic seminars), information campaigns, information brochures, posters, demonstration stands, information telephones, press conferences, consumer information centers etc. The adequately selected and appropriately disseminated information provides for broad public support for local authorities' activities to promote energy efficiency. Energy end-users are encouraged to implement energy conservation measures by themselves. Particularly useful are the appropriately conducted information campaigns among pupils and children.

Incentives for energy conservation. The incentives for energy conservation are welcomed with great interest. A program for encouragement of subscribers of the local district heating company to purchase and install thermostatic valves on the radiators in their flats was conducted in Gabrovo. The incentives for energy conservation in residential and public buildings are some of the most effective tools for promoting a change in public behavior with respect to energy consumption.

Municipalities turn ever more often towards energy efficiency projects in residential buildings and the district heating systems, which are not financed directly from municipal budgets. Such projects have been implemented in several municipalities of the Network, among them Gabrovo, Pleven and Botevgrad. The energy efficiency projects in residential buildings and district heating systems produce dual benefits – economic benefits for end-users and environmental benefits for the municipality. The projects in the residential sector have a broad public significance and impact.

Broadening of public influence. The cooperation of the Network with municipal leaderships and the Government is a permanent strategic task. Among the Network's partners are also private companies, NGOs and individuals. As a result of its interaction with its partners the Network may realize initiatives for upgrading of the regulatory framework on energy efficiency.

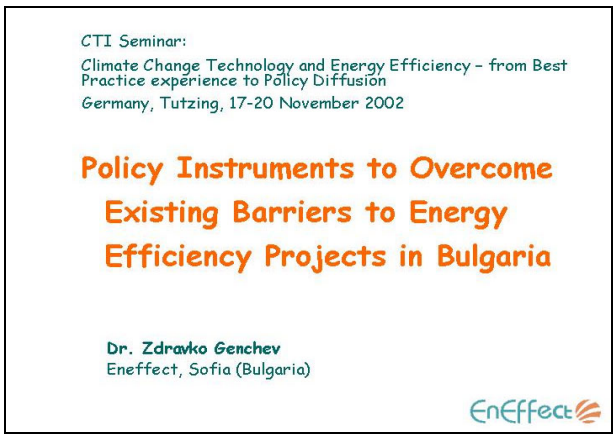
2.5 Development of the Municipal Network EcoEnergy

Joint actions with the authorities and partners. EcoEnergy analyzes and evaluates the investment climate in Bulgarian municipalities, studies the regulatory and financial barriers to municipal energy efficiency projects. Through joint initiatives with its partners the Network seek solutions to overcome the existing regulatory and technical barriers to municipal initiatives for increasing energy efficiency. The joint actions of EcoEnergy with the central and local authorities and its interaction with its partners are the most effective means to identify and overcome the existing barriers to energy efficiency in municipalities and to create regulatory, organizational and financial prerequisites for implementation of real projects. The interaction with a broad circle of partners contributes to confidence building among them and for the establishment of efficient public-private partnership for implementation of projects of great public significance.

Organizational consolidation of the Network. In the recent two years almost all the regional associations of municipalities in Bulgaria have become members of the Network. Thus EcoEnergy now covers about two thirds of the country's population and the interest in its activities continues to grow. Specialized energy efficiency offices have been set up in almost all member-municipalities and provided with the necessary equipment. They take an active part in the formulation of important management decisions. Through the set up of its local structures EcoEnergy has laid the foundations to institutionalization of the activities for energy efficiency improvement in Bulgarian municipalities. EcoEnergy is getting established as a reliable partner of the central and local authorities, NGOs, the private sector and foreign donors.

Influence of EnEffect beyond the boundaries of Bulgaria. EcoEnergy has won international respect and recognition. On the basis of its experience similar national and international networks are being set up in other countries and regions. Two international regional networks with similar goals were established within the last three years. The Regional Network for Efficient Use of Energy and Water Resources (RENEUER) in Southeast Europe was initiated and developed by Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Moldova, Romania and Yugo-

slavia. The network concept and its work plan provide for five main components: policy development and advocacy, capacity building, financial development, business promotion and information dissemination. The Municipal Energy Efficiency Network (MUNEE) covers a wider region – the entire Central and Eastern Europe and the countries of the former Soviet Union and has similar scope and objectives. These two networks serve as powerful promoters of energy policy reforms in the region.



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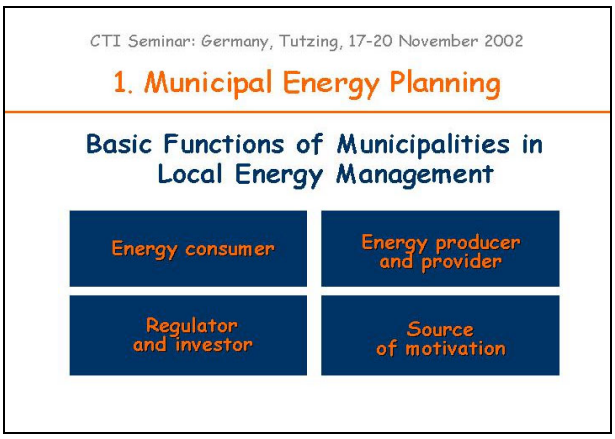

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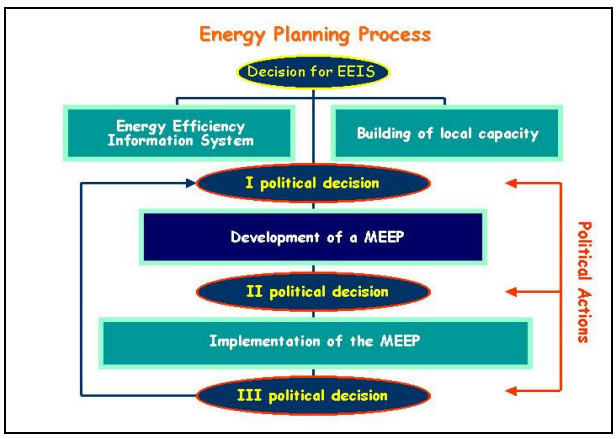

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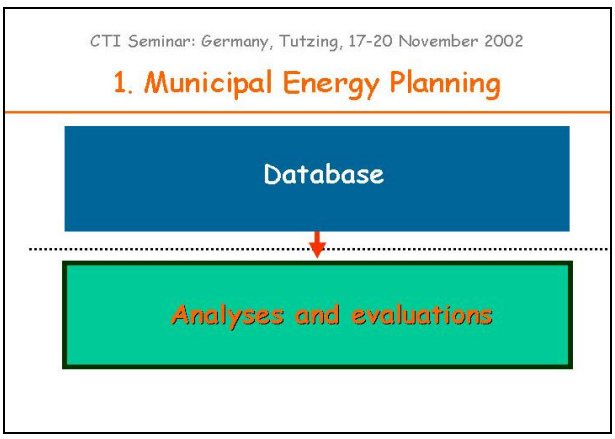

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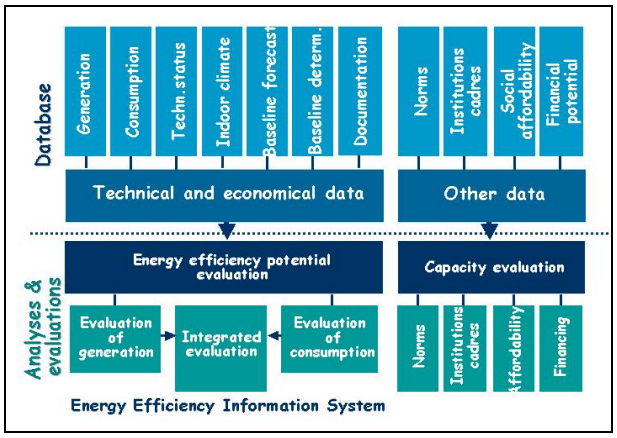

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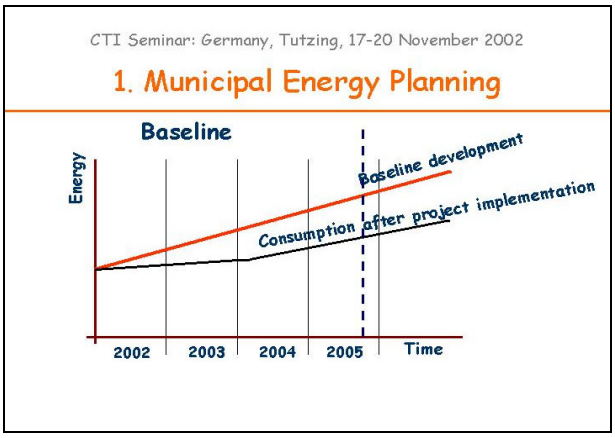

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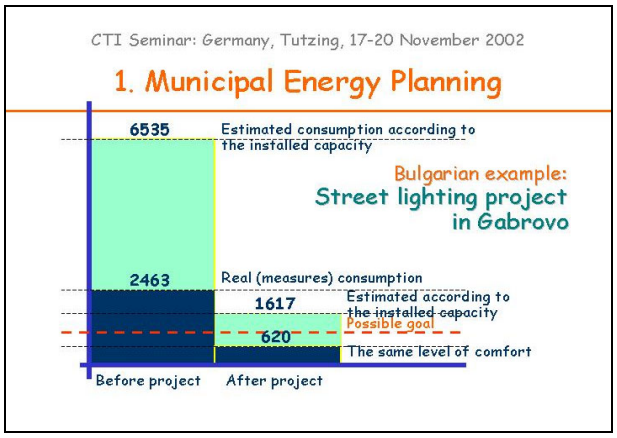

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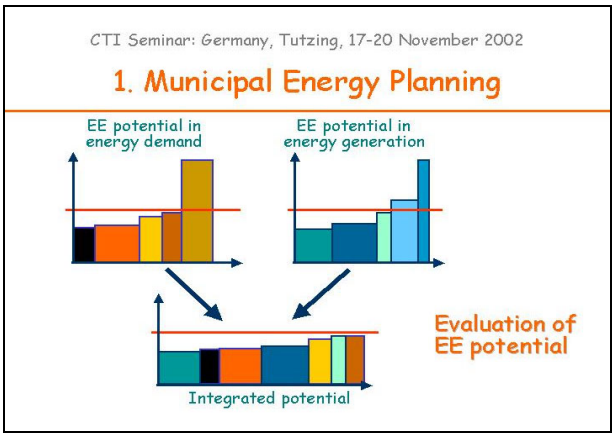

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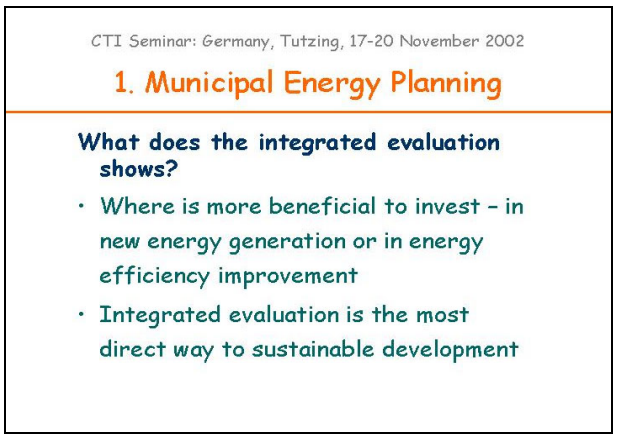

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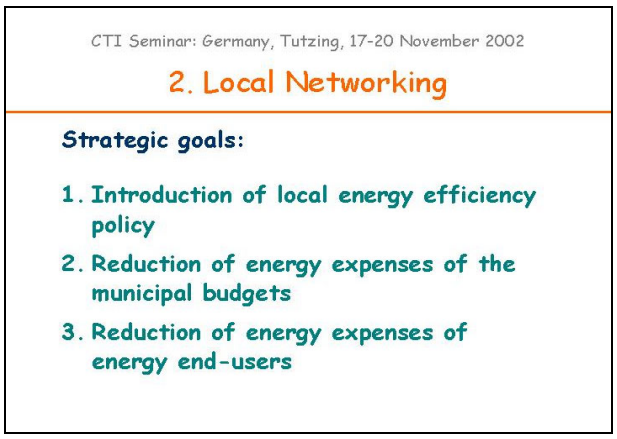

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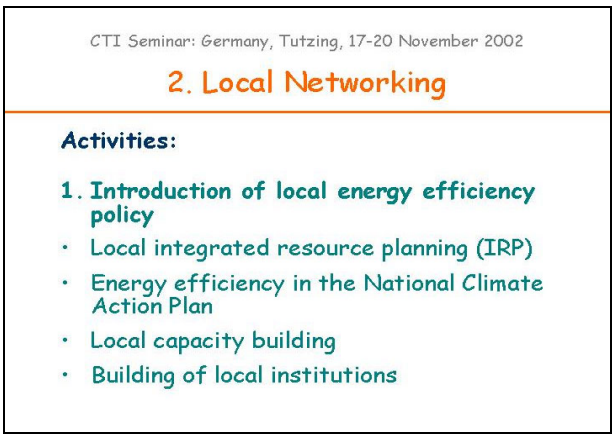

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2. Local Networking

Activities:

2. Reduction of energy expenses of the municipal budgets

- Demonstrations
- From demonstrations to investments
- Building of capacity to commercialize energy efficiency activities
- Locally applicable tools for micro-financing

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2. Local Networking

Activities:

3. Reduction of energy expenses of energy end-users

- Demonstrations
- Introduction of heat accounting (example: Gabrovo DH company approach)
- Incentive programmes
- Programmes for alleviation of energy expenses of low-income end-users

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2. Local Networking

Immediate tasks:

Better coordination of local and national priorities

Involvement of private sector on the base of public-private partnership

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3. Regional cooperation

RENEUER
www.reneuer.com

Regional Network for Efficient Use of Energy and Water Resources in Southeast Europe

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3. Regional cooperation

Strategic Goals of RENEUER:

Contribute to build favorable environment for cooperation **on the local level** in SE Europe

Contribute to encourage investments and partnership for efficient use of energy and water **in the municipalities**

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3. Regional cooperation

Main components of RENEUER Work Plan:

1. **Support to energy policy reforms**
2. **Local capacity building**
3. **Enrich financial practices**
4. **Promote energy efficiency businesses**
5. **Good practice dissemination and lobbing**

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3. Regional cooperation

Immediate tasks:

Create a Regional Clearinghouse

Build local cores & networks of RENEUER in each on the countries

Mobilize donors' and commercial financing for the network activities

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Thanks for your attention

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Proposal to Establish a Testing Ground Facility for JI Projects in the Baltic Sea Region Testing Ground

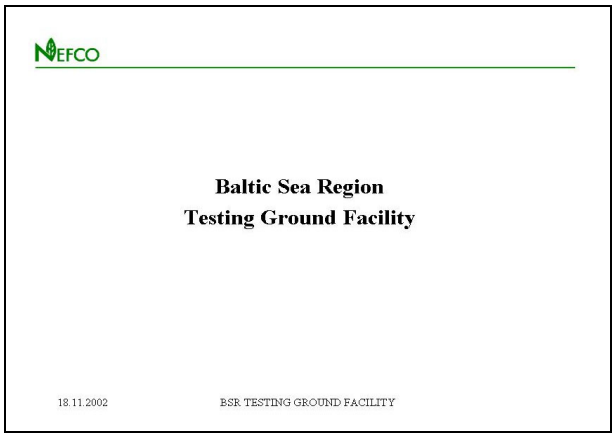
Harro Pitkänen

Nordic Environment Finance Corporation NEFCO, Helsinki

The proposal to set up a financing facility for JI projects is one of the elements of the inter-governmental cooperation to establish a Testing Ground for joint implementation in the Baltic Sea Region. The purpose of the Testing Ground Facility is to enable the implementation of a number of concrete pilot projects and in that context to develop the procedures for JI and prepare the authorities and the business community in the region for the implementation of the mechanisms under the Kyoto Protocol. The facility would be set up as a fund with its capital resources provided by a group of contributors.

In the initial phase it is perceived that these contributions have to come from public resources and it would be open for all interested governments in the region. The fund will, however, subsequently be open for private contributors as well. In order to benefit as much as possible from the Testing Ground cooperation it is desirable that the activities could be commenced in 2003.

The Testing Ground Facility will be established as an open trust fund owned by the contributors. Fund management services will be provided by the Nordic Environment Finance Corporation (NEFCO).



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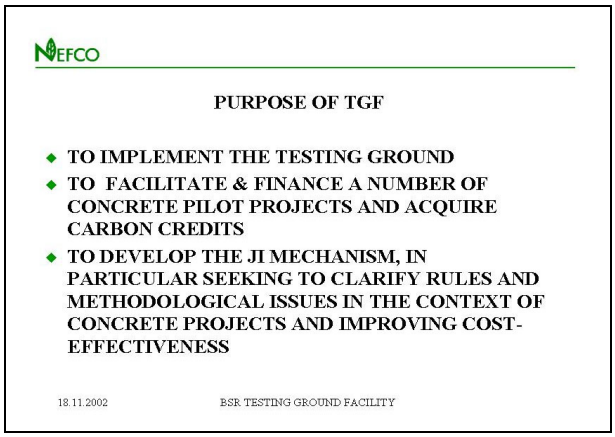

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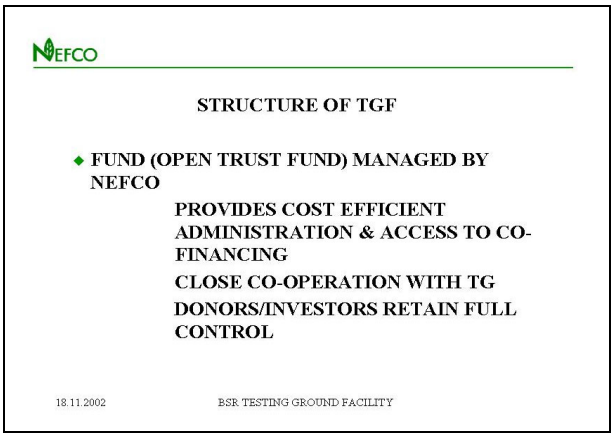

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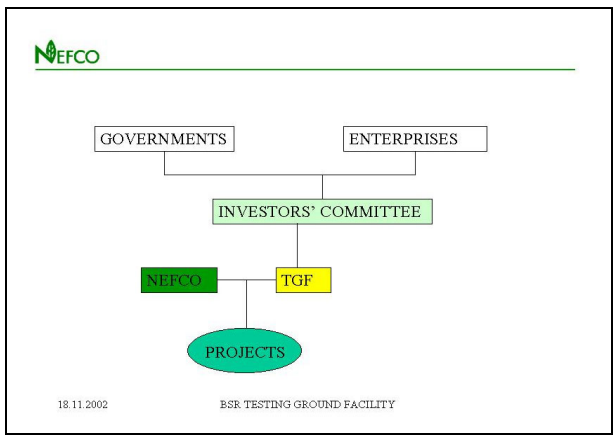


Slide 4

NEFCO

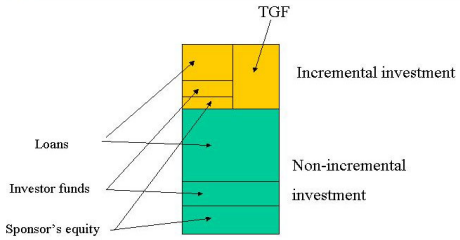
MODALITIES OF OPERATION

- TGF WOULD FINANCE INCREMENTAL INVESTMENTS THROUGH PURCHASE OF CREDITS
  - INVESTMENT FINANCING AND TECHNICAL ASSISTANCE (IN CO.ORDINATION WITH TG CAPACITY BUILDING)
  - CO-FINANCING WITH OTHER SOURCES (WHICH FUND THE "BASELINE" INVESTMENTS)

18.11.2002 BSR TESTING GROUND FACILITY

Slide 5

NEFCO



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Slide 6

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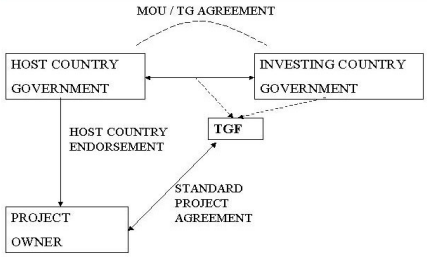

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Slide 7

NEFCO

RESOURCE BASE

- A "CRITICAL MASS" IS REQUIRED
  - TO GAIN RELEVANT EXPERIENCE THROUGH A SUFFICIENT NUMBER OF PROJECTS
  - TO BE A MEANINGFUL PARTNER TO PROJECT SPONSORS AND OTHER INVESTORS
  - TO BE ABLE TO MAINTAIN A REASONABLE BALANCE BETWEEN INVESTMENTS AND ADMINISTRATIVE COSTS
- INITIAL CAPITALIZATION FROM PUBLIC SOURCES (GOVERNMENTS)
  - IN A SECOND PHASE PRIVATE INVESTORS WILL BE INVITED

18.11.2002 BSR TESTING GROUND FACILITY

Slide 8

NEFCO

COMPLEMENTARY NATURE

- COMPLEMENTING BILATERAL AND OTHER MULTILATERAL PROGRAMS & FACILITIES
  - WORLD BANK PCF
  - BALTIC CHAIN
  - BILATERAL PROGRAMS OF DONOR COUNTRIES
- REGIONAL CHARACTER (TG), BUILDING ON REGIONAL NETWORKS, DIRECT REGIONAL INFLUENCE, SUPERVISION & CONTROL, FUND MECHANISM GIVES OPPORTUNITIES FOR INNOVATIVE SOLUTIONS

18.11.2002 BSR TESTING GROUND FACILITY

Slide 9

NEFCO

SHARING THE EXPERIENCE

- DISSEMINATION OF LESSONS LEARNT
  - SYSTEMATIC COMPILATION OF CONCLUSIONS & EXPERIENCE
  - ANALYTICAL AND COMPARATIVE DISCUSSION
- ACTIVE INFORMATION
  - DONORS
  - WITHIN THE REGION
  - THIRD PARTIES
- CO-ORDINATION WITH OTHER TG ACTIVITIES

18.11.2002 BSR TESTING GROUND FACILITY

Slide 10

NEFCO

THE ROLE/S OF THE PRIVATE SECTOR

- SUPPLIER OF EQUIPMENT
- SUPPLIER OF SERVICES
- PROJECT SPONSOR
- INVESTOR IN TGF
- BUYER OF AAUs / ERUs

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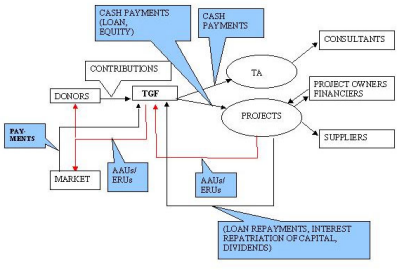
Slide 11

NEFCO

TGF CASH FLOW CHART



18.11.2002 BSR TESTING GROUND FACILITY

Slide 12

The Baltic Sea Region Joint Implementation Testing Ground. The Estonian Perspective

Dr. Tiit Kallaste

Stockholm Environment Institute Tallinn Centre (SEI), Tallinn

Estonia signed the United Nations Framework Convention on Climate Change during the UN Conference on Environment and Development in Rio de Janeiro in 1992. In May of 1994 the Estonian Parliament ratified the convention and it came into force in Oct 1994. Estonia signed the Kyoto Protocol in 1998 and ratified it on the 6th of Sept 2002. Estonia belongs to UN FCCC Annex I countries which means it has the fixed commitment (8%) for GHG emission reductions for the first commitment period, i.e. the period (2008-2012). Country is currently in transition to market economy which means it is classified as a host country to participate in implementation of two Kyoto flexible mechanisms – Joint Implementation (JI) and Emissions Trading (ET). Estonia also has been active in preparatory phase of JI Testing Ground to be launched in 2003 on the initiative of the BASREC Ad Hoc Group of Climate Change.

Estonia has one of the richest experience amongst EIT countries in implementation of JI pilot phase, Activities Implemented Jointly (AIJ) in co-operation with the first donor country Sweden. 21 fuel switch and energy efficiency projects in Estonia are officially registered in UN FCCC Secretariat in Bonn. Continuous monitoring of the projects is going on. Baseline for the heating sector has been developed. The CTI worldwide award in 2000 was nominated to Swedish National Energy Agency for the successful implementation of JI pilot phase projects in five countries around; Russia, Poland and three Baltic States, amongst whom Estonia has been one of the key-players. The Baltic projects have been thoroughly studied by SEI network (SEI-Boston, SEI-Tallinn and SEI Headquarters) some years ago.

The presentation will analyze and generalize Estonia's experience as host in implementation of Kyoto Protocol flexible mechanisms. There are certain ideas gained how to succeed high cost efficiency in international climate mitigation from the point of view of host country. Still, lack of the institutional basis, also capacity building issues could be mentioned as the main hindering factors. Estonian Government is doing a number of efforts at present to serve as well prepared host for the next JI projects in further international climate mitigation co-operation with various donor countries, and in particular, in the frame of the Baltic Sea Region JI Testing Ground. Government has taken steps to develop relevant policies in climate change mitigation sector. In Fall 2001 the governmental program for GHG emission mitigation up to 2012 has been launched. Implementation of Kyoto flexible mechanisms - ET and JI will form an axis in this program. SEI-Tallinn is the consulting R&D institution to carry out abovementioned chapter in Estonian climate program.

The presentation will give the overview of preparatory work for the JI Testing Ground done in Estonia.

The Baltic Sea Region Joint Implementation Testing Ground. The Estonian Perspective

Tiit Kallaste

Stockholm Environment Institute
Tallinn Centre

CTI Capacity Building Seminar in Tutzing
November 17-20, 2002

SEI

Slide 1

One possible definition of Joint Implementation

- Joint Implementation (JI) means that a country (the investor country) where the costs of reducing GHG are assumed to be high, invests in emission-reducing measures in a country with lower reduction costs (the host country) and is credited, in whole or in part, for emission reductions in its own GHG accounts. JI is one example of flexible mechanisms, which is implemented between the UN FCC Annex I Parties.

Slide 2

What is Joint Implementation? (I)

- Project based greenhouse gases (GHG) emission reduction mechanism under the Kyoto Protocol where the reduction is achieved in a most cost-effective way
- Allows for the transfer and acquisition of GHG emission reduction units (ERU)
- JI takes place between Annex I parties only and is directed towards mitigation of global warming

Slide 3

What is Joint Implementation?(II)

- It is a form of international climate co-operation which promotes investments by Annex I donor (investor) Parties in such projects within territory of host Annex I Parties
- Includes capacity building in host country
- Is based on favourable loans and grants
- Is an approach for mutually beneficial co-operation

Slide 4

What is the driving force for JI?

A. For an investor country:

- The investor country enterprises will have an opportunity to widen their scope of export of domestically developed climate mitigation oriented technology
- Practicing and exercising of implementation of Kyoto flexible mechanism
- The investor country or private entity will be able to use acquired ERUs resulting from project activities towards their own emission reduction targets

Slide 5

What is the driving force for JI?

B. For a host country

- The host country will have a good opportunity for acquisition of the most advanced technology in the sector
- Favourable loan conditions for the period of project lifetime
- Grants given by the donor country in the form of consultations on the particular JI project
- Capacity building in the process of implementation of the project – "learning by doing"

Slide 6

Three categories of donor country contributions

- Actual investment contributions in the form of grants
- Favourable loans for financing of the investment. Interest rate and payment conditions similar to loan from EBRD to Estonia (loans to EIT countries are often subject to greater risk than other loans)
- Contributions to project supporting activities beyond investments

Slide 7

Host country's contribution to the JI projects

- Host country's substantial contribution to the costs in some cases. Investment portfolio consisting of domestic and foreign lenders.
- Besides the economic contributions, areas and infrastructure are made available for the projects. In particular, for district heating projects where investments made by host country previously, make the project implementation possible
- Management of local supply issues (eg. in case of fuel-switch projects supply of fuel – wood chips)

Slide 8

JI pilot phase – Activities Implemented Jointly by NUTEK

- Estonia has 21 registered AIJ projects in the UN FCCC Secretariat registry
- It has been successful bilateral co-opeartion with the first JI donor country, Sweden via NUTEK/ STEM
- Has been a strong driving engine for a host country like Estonia
- Majority of performed AIJ projects have been of a good example to initiate next similar type projects
- Estonia gained valuable experience for Baltic Sea Joint Implementation Testing Ground

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Slide 9

What the host country, Estonia needs for being partner in JI projects in Baltic Sea Testing Ground

- The standardised Memorandum of Understanding of Baltic Sea Region governments for launching Testing Ground to be adopted by Estonian Gov-t
- The *"First Regional Handbook on Procedures for Joint Implementation in the Baltic Sea Region"* by the Ad Hoc Group on Climate Change must be interpreted to local language and adapted by Estonian Government

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Slide 10

What else the host country needs to do? (I)

- The national Climate Strategy and Programme must be in place to 2003
- System of monitoring, reporting and verification of GHG emission reductions available
- The priority list of sound and viable potential JI projects must be elaborated in the Ministry of Economics and Communication, MoEnvironment and MoFinance

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Slide 11

What else the host country needs to do? (II)

- The National GHG Registry established
- Host country energy and climate experts should be involved to preparations of JI projects; preliminary assessment of the cost-effectiveness, baselines construction, reporting, monitoring (and verification). This could be the fastest way to build up an appropriate expert capacity in host country

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Slide 12

What else the host country needs to do? (III)

- Engagement of local experts is also the significant potential to reduce the transaction costs
- Additional capacity building must be performed at governmental, also local and project owner's level
- Institutional enhancement. The Climate Secretariat must be built up to coordinate whole work
- Climate Secretariat will be based on experts from the Estonian MoEconomics and Communication, MoEnvironment, Eurointegration Bureau, MoFinance

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Slide 13

What is the JI Two Track?

- There are two sets of JI procedures – Twin Track
- Under both tracks Parties required to establish Designated Focal Point, develop guidelines and procedures for approving JI projects
- First or Second track have different eligibility requirements, documentation requirements, and ERU issuance procedures

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	JI First Track	JI Second Track
A. Process Requirements for a Host Party to participate	1. It is a Party to the Kyoto Protocol 2. Its Assigned Amounts (AA) have been calculated and recorded 3. It has in place a national system for the estimation of GHG emissions 4. It has in place a national registry 5. It has submitted annually a GHG inventory report 6. It submits the supplementary information on the Assigned Amounts	1. It is a Party to the Kyoto Protocol 2. Its Assigned Amounts (AA) have been calculated and recorded 3. It has in place a national registry

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Slide 15

	JI First Track	JI Second Track
B. Documentation Project requirements for generating and transferring ERUs	• The Host Party is free to decide upon and define the rules for verification of ERUs from a JI project, implemented on ist territory	• The Host Party has to follow the verification procedure under the Article 6 Supervisory Committee, which includes the development of a Project Design Document • The PDD needs to be validated by an Independent Entity accredited by the Article 6 Supervisory Committee

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Slide 16

	JI First Track	JI Second Track
C. Issuance of ERUs	• ERUs can be issued by Host Party, and no approval required from JI Supervisory Committee	• If JI Supervisory Committee does not call the Independent Entity's verification report into a review procedure then Host Party can issue ERUs

Baltic Sea Regional Handbook focus is the JI Second Track

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Slide 17

JI Second Track - Project Eligibility:

- **Approval by the host and investor countries**
- **Result in a reduction of GHG emissions that is additional to any that would have otherwise occurred**
- **Have an appropriate baseline and monitoring plan**
- **The environmental impacts have been assessed according to the requirements of the host government**

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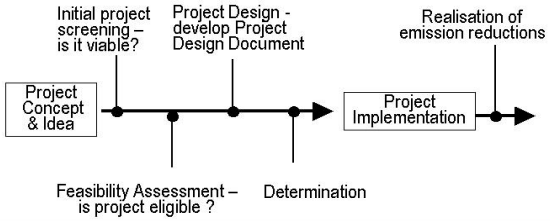
Slide 18

Project Cycle & Time Line



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Slide 19

Potentially BASREC eligible energy project categories

- Renewable energy sources based projects
- Fuel switch (for example in electricity and heat sector)
- Energy efficiency at energy production side
- Energy efficiency (including energy savings) at the demand side
- Cogeneration projects
- Methane emissions from landfills used in energy generation projects

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Slide 20

First steps towards the Baltic Sea JI Testing Ground

- Systematising the 10 years experience gained from running the AIJ projects with the first donor party – Sweden
- Accomplishing the Estonian Climate Programme
- First JI projects with the closest neighbour – Finland
- Preparing first Memorandums of Understanding with donor countries
- Compiling JI projects priority list

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Slide 21

Hope to meet you in the Baltic Sea JI Testing Ground project!

Thank you!

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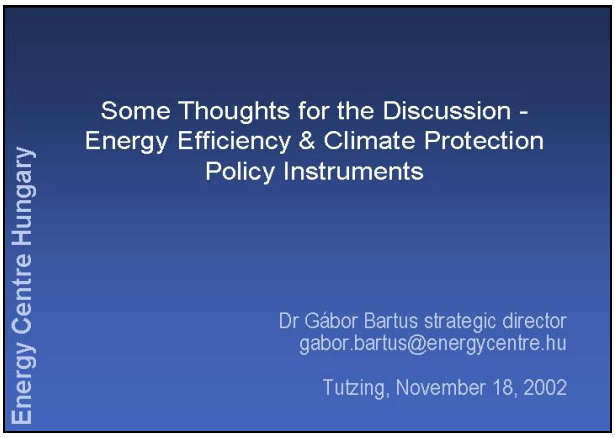
Slide 22

Discussant Notes • Session: Policy Instrumentation

Dr. Gábor Bartus

Hungary Energy Centre, Budapest

Slide 1



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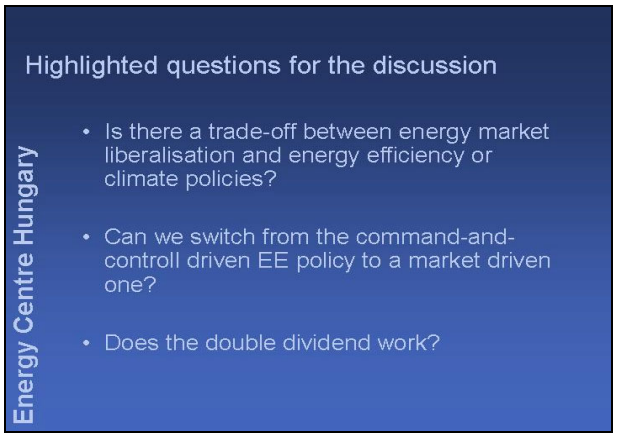

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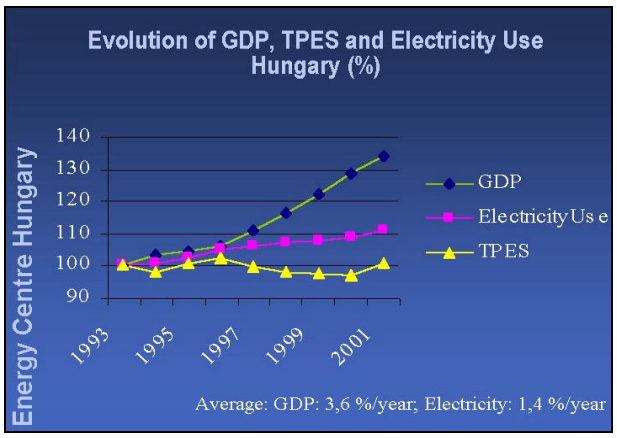

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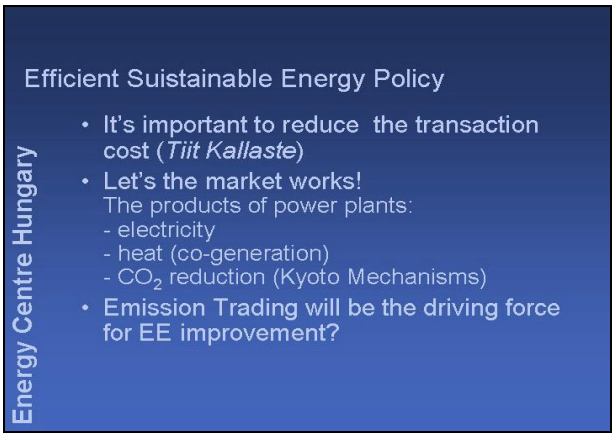

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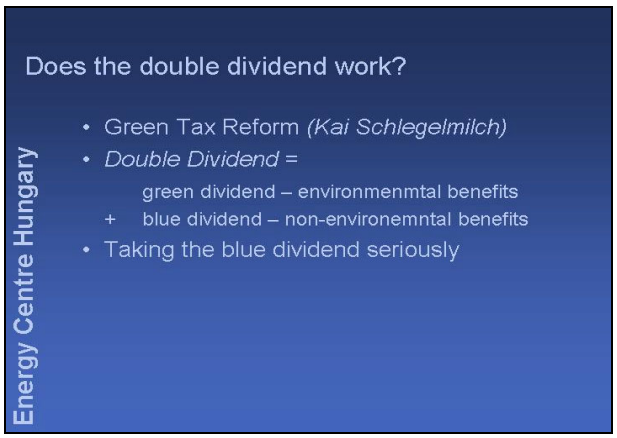

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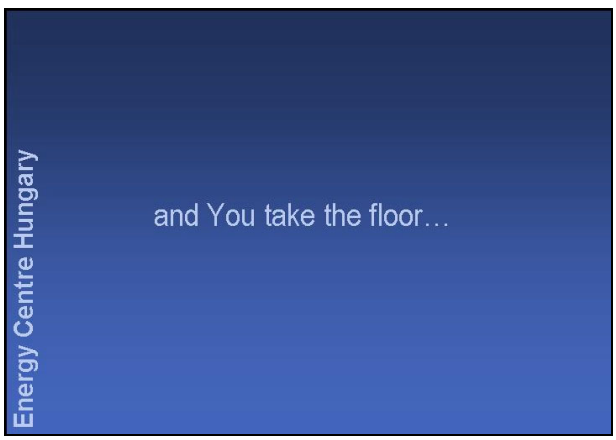


Slide 13

Financing International Market Penetration of Renewable Energies: A Report from the German Export Initiative for Renewable Energies

Dr. Petra Opitz

Deutsche Energie Agentur (dena), Berlin

Due to a favorable institutional framework for renewable energy technologies in Germany – market entrance program, electricity feed-in law for renewables, 100.000 roofs program for PV and the program "Solarthermie 2000 +" – led to a significant increase of production capacities for and installations of renewable energy technologies. These programs were developed taking into consideration the still lacking competitiveness of renewable energy technologies, which is especially the case in grid-connected power generation.

Analysis of German and other international experiences as well as EU policy on renewables allow for adjustment to conditions in other countries. Know how could be transferred into other regions worldwide in order to strengthen inter-national climate change activities. Renewable energies should become an economic option not only for industrialized countries in the North but also for many countries in the Southern regions.

The use of renewable energies, even more than conventional power generation, strongly depend on political and economic stability and on favorable institutional conditions. The crucial point is how to create a market for them. If introduction of renewables is affordable only via subsidization schemes, long term sustainable use of renewables could not be achieved.

The German export initiative for renewable energies aims at supporting creation of necessary institutional framework, providing informational, advisory and financial support for renewable energies. Information on market conditions and institutional framework will be provided by a website based database and by market studies. Evaluation of existing financing and risk insurance schemes was carried out, especially concerning project-financing and export-financing. As result of this analysis certain opportunities were identified to help financing renewable energies technologies.

dena

Deutsche Energie Agentur

Dr. Petra Opitz

"Financing international market penetration of renewable energies: A report from the German export initiative for renewable energies"

Presentation to the CTI Seminar, Tutzing, November 16-20, 2002

www.deutsche-energie-agentur.de

dena 1

Slide 1

Who is dena?

- First national Energy Agency in Germany
- Founded in autumn 2000
- Owned by

  The German Government (3 ministries: Economics, Environment, Buildings / Transportation)

  Kreditanstalt für Wiederaufbau (KfW)

dena 2

Slide 2

Ownership Structure of the German Energy Agency

50 Percent	**Federal Republic of Germany**
	represented by: Federal Ministry of Economics and Labour Federal Ministry Environment, Nature Conservancy and Nuclear Safety Federal Ministry for Transport, Building and Housing
50 Percent	**Kreditanstalt für Wiederaufbau (KfW)**
Managing Directors	**Stephan Kohler** **Kristina Steenbock**

dena 3

Slide 3

dena´s Board

Dr. Werner Müller
(former) Federal Minister for Economics and Labour (Chair)

Hans W. Reich
Company Spokesman for the Kreditanstalt für Wiederaufbau (Deputy Chair)

Kurt Bodewig
(former) Federal Minister for Transport, Building and Housing

Dr. Tessen von Heydebreck
Company Spokesman of the Deutsche Bank

Detlef Leinberger
board member of the Kreditanstalt für Wiederaufbau

Jürgen Trittin
Federal Minister for the Environment, Nature Conservancy and Nuclear Safety

dena 4

Slide 4

dena´s Task

Statute (Gesellschaftervertrag):

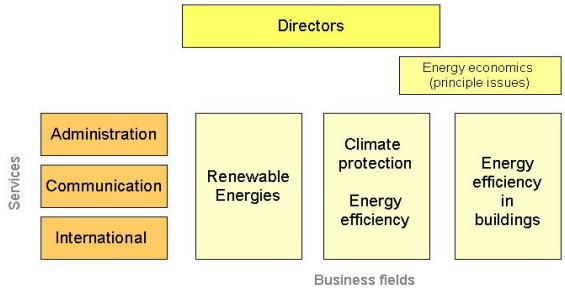
„Support for efficient and environmentally sound energy production and consumption, including renewable energy by

- Dissemination of information available for both the public and experts,
- Developing, implementing and evaluating programmes and projects,
- Providing advice for decision makers and the administration on the national and regional level as well as for the private business and scientific institutions,
- International cooperation".

dena 5

Slide 5

Organisational Structure of dena



dena 6

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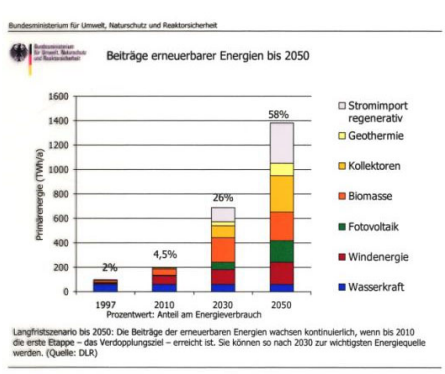

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Slide 7

Current Situation in German Renewable Energies Exports

As result of the favourable institutional framework in Germany – substantial rates of capacity increase, enormous accumulated technical potential and competitiveness in many areas

- Market entrance program (grants & soft loans)
- Renewable energy act (electricity feed-in law)
- 100.000 roofs program (soft loans for PV)
- „Solarthermie 2000 +" (grants for pilot systems solar heating)

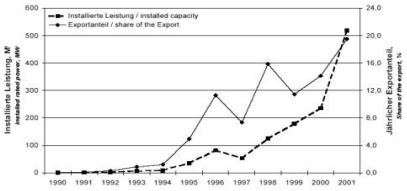
But, share of exports in total turn over (5 bn € in 2001) still very small, main exports in the wind sector (Main export markets at present: EU, CEE)

dena 8

Slide 8

Exports of German Wind Energy Companies

Growth of installed capacity in Germany and share of anual exports in total turnover



(Quelle: DEWI Magazin Nr. 20, Februar 2002)

dena 9

Slide 9

Export Initiative for Renewable Energies

July 2002 – decision of the German Bundestag to launch an export initiative for renewables

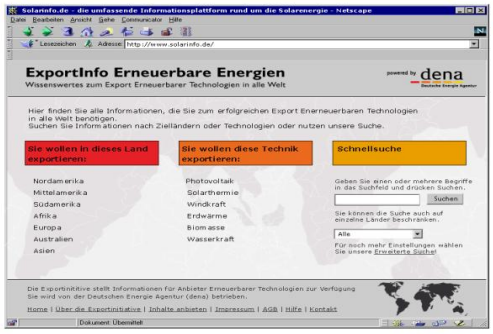
Activities:

- Setting up a network of all relevant institutions (ministries, financing and development institutions, companies) ⇒ improve coordination of activities
- Providing information services concerning external markets ⇒ website www.exportinfo-erneuerbare-energien.de
- Improvement of financing instruments
- Supporting market entrance ⇒ marketing tools
- Supporting improvement of institutional framework for renewable energies in international markets

dena 10

Slide 10

Internet Portal providing comprehensive and detailed information on export markets



dena 11

Slide 11

Financing (I)

Existing institutional network for public support of exports on the Federal level:

- Information on export markets
- German trade representations abroad
- Financial support for participation in fairs and business exhibitions
- Export risk insurance (Hermes) and investment guarantees

(These are classical instruments, not especially designed for renewables exports)

Additional support by

- Initiatives of the German Länder
- Initiatives organised by the companies themselves (networks) - Export Initiative of wind energy companies (DEWI) and Club of rural electrification (C.L.E.)

dena 12

Slide 12

Financing (II)

Main financing instruments:

- Project financing (cash flow oriented)
- Export financing (based on company's balance)
- Venture capital financing

Main Problem: at present, grid connected renewables are not competitive to conventional power generation ⇒ special framework is needed

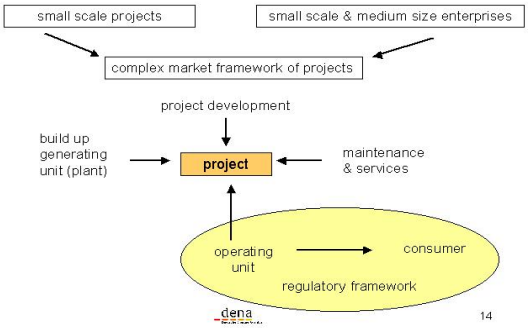
Classical instruments are not sufficient. We face:

- „market" conditions for renewable energies in force only in EU countries
- SME as main actors – export financing not realistic
- Small scale projects - High transaction costs for project financing

dena 13

Slide 13

Why is project finance not sufficient?



dena 14

Slide 14

Summary

Major problems – small size of the projects, high risks

➢ **Need for**

"Mixed" private - public financing

- participation of the Federal government – PPP-program, public financing of public goods (i.e. wind-cards, demo-systems), pre-financing market entrance activities)
- participation of local banks (reduction of currency risks, risk sharing, reduction of transaction costs)
- Investment funds (strategic investors needed, poling of projects)
- Kyoto flexible instruments (current problems: high transaction cost for small scale projects, standardisation and simplification of baselines as well as of monitoring methodologies

dena 15

Slide 15

The Dutch ERUPT and CERUPT Programs – Lessons and Outlook

Lennard de Klerk

Carboncredits, Senter Internationaal, The Hague

The Dutch government is committed to reduce the emissions of Greenhouse gasses with 5.2% as agreed in the Kyoto protocol. The Dutch government decided to achieve at least 50% of this reduction at home, while reducing the remainder in other countries abroad. The Kyoto protocol offers two mechanisms to achieve reductions in other countries: Joint Implementation (JI) and Clean Development Mechanism (CDM).

After implementing several pilot JI and CDM projects, the Dutch government launched in 2000 its first JI program called ERUPT. The program ERUPT gives investors to possibility to sell emission reduction to the Dutch government resulting from a JI-project. Project types range from wind parks and biomass to fuel switch or energy efficiency projects. The eligible countries are all Annex I countries of the Kyoto protocol and in practice mainly in Central and Eastern Europe. Five companies were contracted under ERUPT-1, which are now implementing their projects.

In the mean time CERUPT 1 was started for emissions saving projects in developing countries under the CDM mechanism. Twenty-six companies submitted a proposal, which are currently assessed. Under ERUPT-2 five companies offered their carbon credits. In October 2002, the third ERUPT was launched for which investors can submit their interest to participate until January 30th, 2003.

Besides the World bank, (C)ERUPT is currently the only program that is systematically purchasing carbon credits at the world market. Being the first in the field, the Dutch government encountered many barriers but also built up much experience in the area of additionality, price setting but also to what extent project types are feasible.

By starting early in JI and CDM investor but also Host country governments are triggered to develop a strategy for Kyoto. We see, after a slow start, the market picking up quickly, particular in CDM. Sooner than expected, the Dutch government will soon have acquired its JI/CDM target by (C)ERUPT whereas the remaining credits will be obtained by the World Bank or other development institutions.

SENTER Internationaal

ERUPT and CERUPT

implementing the Kyoto protocol

lessons and outlook

Lennard de Klerk
Tutzing, 18th November 2002

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The next 30 minutes...

- Kyoto and the Dutch climate policy
- CarbonCredits.nl and Joint Implementation
- Experience so far
- Outlook
- Launching of ERUPT 3.....

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Dutch climate policy

- Target of 5.2% (= 200 Mtonne CO_2e in 2008 - 2012)
- Domestic costs up to EUR 30 / tonne CO_2e
- JI and CDM up to EUR 5 / tonne CO_2e
- 50% realising abroad meaning 100 Mtonne
- Current budget is 500 million Euro (Netherlands only!)
- Start early:
  - develop the market and set the standard
  - accept some risk, but enjoy attractive prices

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CarbonCredits.nl

Purchase of Emission Reductions by the Dutch Government.....

- From Joint Implementation and Clean Development Mechanism projects
- Using a tender called ERUPT and CERUPT
- From any investor or project developer; private or state owned; local or foreign
- In any country that approves the project

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Typical Joint Implementation projects

- Biomass
- Wind parks
- Hydro power
- Energy efficiency
- Fuel switch from coal to gas
- Landfill gas recovery (methane)

Often project supplies electricity to the grid from renewable sources (wind, hydro or biomass). Reductions of 400 - 1200 gCO_2 per generated kWh.

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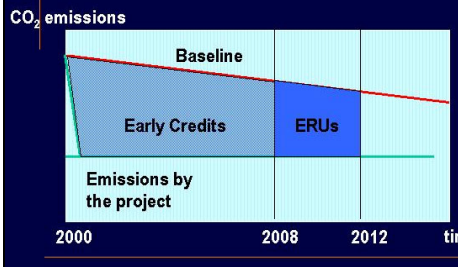
How does JI work (1)



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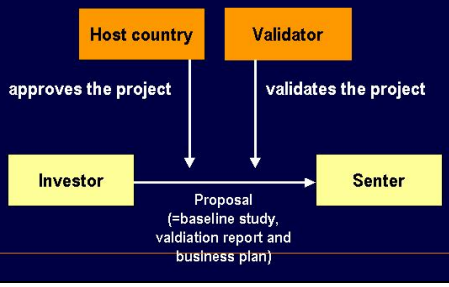
How does ERUPT work (2003)



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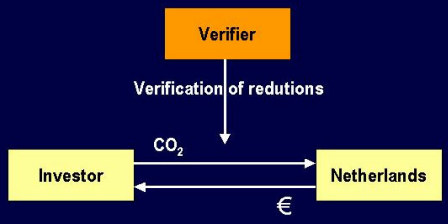
How is the CO_2 delivered (2008-2012)



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Benefits of Joint Implementation

Reduce the CO_2 emission where it is the easiest!

- Host government
  - improving investement climate
  - diversifying energy sources
  - decreasing local pollution
- Investor/project developer
  - higher return on investment
  - 50% down payment
- The Netherlands
  - easier achieving Kyoto target

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Typical contribution of ERUPT

Wind	5%
Biomass	15%
Energy efficiency	15%
Sinks	20-50%
Methane	50-100%
Nitrous oxide	>300%

Contribution to investment sum based on five year crediting period (2008 -2012) and price of 4,5 EUR/tonne. Early Crediting (before 2008) can increase contribution significantly!

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Pilot project in Nizhny Novgorod …

- Installation of two new boilers at Nizhpharm
- Reduction of 2,900 tonne CO_2/year
- Project costs approx. EUR 600,000

The carbon revenues would have been:
5 years * 2,900 * 4,5 Euro = 65,250 Euro

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ERUPT 1

4 projects, 3.25 million tonne CO_2, EUR 26 million:

- Romania - district heating
- Romania - hydro power
- Czech Republic - small biomass boilers
- Poland - wind

Currently in the pipeline:

- ERUPT 2: 6 projects in Central and Eastern Europe
- CERUPT 1: 26 projects in developing countries

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Timing ERUPT 3

Start ERUPT 3	October 2002
Closing first phase	30January 2003
Invitation for second phase	April 2003
Closing second phase	August 2003
Announcement results	November 2003

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What are our minimum requirements?

- Minimum of 250,000 million tonne CO_2e over five year period in 2008-2012
- Senter assess the offer on:
  - Certainty of delivery
  - Price
- Kyoto requirements:
  - Approval of Host country
  - Emission reductions should be additional

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How to be successful in ERUPT 3?

- Prove your project is feasible
- Offer your project when in an advanced development stage
- Construction of your project should start mid 2004
- Get approval from your host government
- Offer a good price (3 - 5 Euro per tonne)……

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Short term outlook

- Netherlands will soon reach its JI and CDM target
- The Dutch projects will be used as 'testing ground' for registration at UNFCCC
- Many EU government are pioneering with JI and will enter the market later

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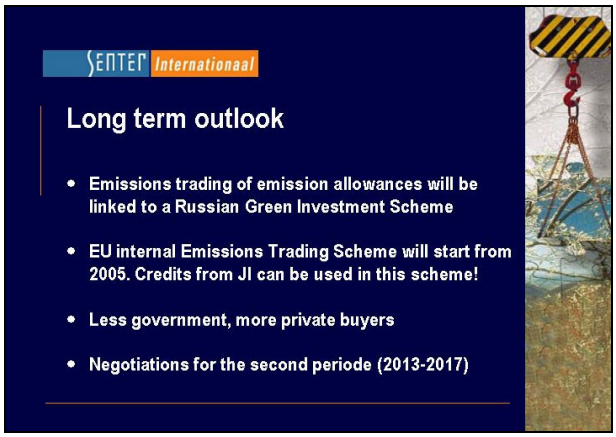

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Co-Operation between Austria and Central and Eastern Europe in the Field of Energy Efficiency and Renewable Energy – Selected Success Stories

Dr. Alois Geisslhofer

Energie Verwertungs Agentur, Vienna

The author presents examples of successful cooperation between Austrian providers of technology and services in the energy sector and partners in Central and Eastern European countries. The contributions were selected so as to show the widest possible range of technologies; all the projects presented have actually been realized.

This cooperation has two focal points: technologies for increased energy efficiency and technologies for the utilization of renewable energy sources.

It is for a good reason that these topics are at the centre of Austria's Energy Partnership Program with selected countries of Central and Eastern Europe: after all, Austria boasts a long tradition of using renewable sources of energy and of efficient energy use. The country covers about 70 % of its electricity requirement from hydropower, and about one quarter of its overall energy requirement is supplied by various renewable energy sources. Austria also enjoys excellent international standing in the field of developing energy efficient technologies; for example, the country plays a leading role in the development of energy efficient buildings. The so called "passive" building method now makes it possible to erect buildings with an annual heat energy requirement of less than 15 kWh/m^2 at no significant additional cost.

An additional motivation for developing the presented technologies was provided by the considerable volume of emissions and waste resulting from the use of fossil and nuclear energy carriers. Initially, the focus of attention was on "classic" air pollutants such as hydrocarbons, sulfur dioxide or nitrogen oxides, which were associated with forest dieback and the poisoning of rivers. Later on, this focus shifted to carbon dioxide, which is responsible for global climatic change. Finally, there was the nuclear accident at Chernobyl in 1986, which further reinforced Austria's policy of promoting alternatives to nuclear energy.

On the other hand, the rise in crude oil prices resulting from the two petroleum crises unleashed considerable innovative potential. Technologies for increased energy efficiency and for energy saving were developed and people became increasingly aware of the potential of renewable energy sources. In addition, the emission problems related to energy generation gave rise to the development of technologies reducing or altogether avoiding the production of pollutants.

So the crises of past decades can actually be said to have lead the way towards a reorientation of the entire energy sector. In fact, the new technologies which were developed as a reaction to these crises are turning out to be far more crisis resistant than the old ones.

Policymakers are beginning to react to these changed conditions at the international level, too. For example, the Kyoto Protocol can be seen as a step towards a kind of global environmental and energy policy by way of reducing carbon dioxide emissions across national borders. Furthermore, the very fact that the supply of fossil energy sources is limited – according to leading scientists, humanity will have used up about half the entire available petroleum reserves in the next few years – will soon draw increased attention to questions such as the regional distribution of resources and the security of energy supply. It is clear that realistic reactions to these global problems will include increased energy efficiency, i.e. the most efficient possible utilization of resources, on the one hand, and the increased use of renewable sources of energy on the other.

Naturally, this presentation can only present a fraction of the cooperation projects between Austrian providers of energy technology and services and their partners in Central and Eastern European countries. These projects should also be seen as regional, Central European contributions to meeting a global challenge, with many similar contributions still to follow.

A printed brochure with 20 case studies will be delivered to the participants.

Selected examples:

Biomass district heating project in Trhové Sviny, Czech Republic: A 2.5 MW boiler was installed which can be fired with wood waste, sawdust, woodchips and bark. The biomass plant has to be operated almost all year round. Plenty of fuel wood is available within an area of 20 km around the plant, and contracts with local suppliers were accordingly concluded.

There were only five months between the signing of the contracts and the first operation of the plant. The biomass boiler mainly supplies the heat which is needed all year round, while peak demand is covered by three gas boilers, which also provide reserve capacity. This combination of biomass and fossil fuels has been shown to be favorable in many cases.

The payback period of the investment of approximately € 670,000 is 8 years. The project was supported by a low interest loan provided under the PHARE program and a loan from the Czech Energy Agency CEA, amounting to € 100,000, an Austrian grant amounting to approximately € 85,000.The rest was covered by the Trhové Sviny District Heating company alone.

Biomass district heating project in Bystřice nad Pernštejnem, Czech Republic: together with Austrian companies and financial support from Austria and Czech Republic, it was possible to switch the fuel supply of the district heating plant of the 9,000 inhabitant town of Bystřice nad Pernštejnem from gas and brown coal to biomass.

Austrian solar thermal collectors in Bulgaria: The replacement of 78 individual boilers of a hotel at the Black Sea Cost by a single central heating installation with 126 m^2 solar thermal collectors which supply 78 flats with hot water, amounted to costs of € 42.000,. The benefits for the household were a gain of comfort, security of supply and energy savings of 30 40%. The investment had a PBP of 5 7 years.

Small hydro power project in Bosnia Hercegovina: The UNAKOSTELA hydropower plant has been operating continuously for 46 years. The four new Kaplan turbines from an Austrian producer could increase the discharge from 64 m^3/s to 88 m^3/s, i.e. by 37 %. But on account of the modern design and much greater efficiency, the output was increased by 54 %, from 6,120 kW to 9,500 kW. 70 % of the financing for this project was provided by the European Bank for Reconstruction and Development (EBRD).

The Cogeneration Centre in Bratislava, Slovak Republic in the framework of the Slovak – Austrian energy partnership program: The Austrian Federal Chancellery financed 75 % of the consultancy costs for establishing the CHP centre in the first year, 50 % in the second year and 25 % in the third year. The Slovakian partners agreed to cover the rest of the costs and to continue running the Centre after the end of the funding period. The consortium of Austrian consultants were the Austrian partners, E.V.A. and Kommunalkredit were members of the steering committee.

Between 1999 and 2001, about 27 projects with a capacity of about 260 MWel and an investment of about € 185 mill. were completed. This is equivalent to more than 30 % of the total market potential of CHP, assessed by E.V.A. at about 600 MWel in 1996. This was not only an important contribution to increasing energy efficiency in Slovakia but also an example of successful cooperation with Austrian suppliers and financial institutions. Many of the cogeneration Centre projects were supported by Kommunalkredit (up to 15 % of the investment costs), in addition to PHARE funds, which often provided additional funding of 25%.

A pilot project for the modernization of the district heating system of the 84,000inhabitant town of Banská Bystřica in Slovakia was carried out by a district heating company from Styria between 1995 to 2002 as contractor. The project involved the complete renovation of the town's largest, but outdated, district heating plant including a 7 km network of pipes for the supply of 23,000 households and companies with heat. The total investment was around € 10 million. This energy performance contracting project primarily finances itself from the day to day energy savings. The level of savings was agreed upon in the contracts and lies between 25 and 30 per cent.

District heating pilot project for the improvement of the district heating in Sofia, Bulgaria. Between October 1998 and the end of 1999, an Austrian company and its Bulgarian partner have equipped 1,340 flats with thermo valves and heating cost distributors. In a pilot project the required investment (the overall project costs amounted to approximately € 450,000) was financed by the Eastern Cooperation Funds of the Austrian Ministry of Foreign Affairs (originally of the Federal Chancellery).

The new technical conditions and the introduction of consumption based billing have resulted in savings of 30 % of the original heating costs, or a total of 370,000 MWh annually, which is equivalent to the heat requirement of another 30,000 flats. The average annual costs for district heat and hot water per household have thus been reduced from € 350 to € 250, saving each family almost a whole monthly salary in energy costs.

The Austrian Support Scheme for Environmental Projects Abroad financed a total of 199 projects, representing a subsidy volume of € 38.8 mill. and environmentally relevant investments worth € 231.1 mill., which were approved between 1993 and 2001. These projects, which are exclusively located in four of Austria's neighboring countries, the Czech Republic, Slovakia, Hungary and Slovenia, are subsidized at a rate of 10% to 15% of the investment costs.

In accordance with the amendment to the Environmental Protection Promotion Act, the Support Scheme for Environmental Projects Abroad is now also to support Austria's climate strategy. In future, funding of relevant measures to be implemented within the framework of the Flexible Instruments of the Kyoto Protocol, namely "Joint Implementation" and "Clean Development Mechanism", will be possible under the Support Scheme, in addition to a separate Federal JI/CDM program, which is currently being set up. The group of countries eligible to benefit from the Austrian Support Scheme for Environmental Projects Abroad has been extended for the purposes of such projects. The funding regulations are currently being adapted accordingly.

The Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management is planning **Austria's Joint Implementation Program**. It is expected that Austria has to reduce up to 17 ml tons of CO_2 – equivalent per year due to the Kyoto Protocol, of which 3 – 4 ml tons per year could be achieved by JI and CDM. The expected volume of the fund of up to 36 Mio. € per year could be used above all for renewable energy, CHP (including energetic use of landfill gases) and energy efficiency projects (e.g. in the rehabilitation of old buildings).

Outlook on E.V.A. activities:

Future joint projects between Austria and CEEC will aim at

- jointly combat climate change,
- increase of the share of renewable energy,
- increase of energy efficiency and – last but not least
- modernization of energy industry in the forthcoming common market.

We as E.V.A., the Austrian Energy Agency, will do our best to support and promote these activities, to disseminate experiences and to cooperate in joint projects on behalf of the Austrian government, the Austrian provinces and other members of E.V.A. as e.g. industrial companies and associations of energy producers, energy consumers, suppliers of energy efficient equipment and services. E.V.A. will use the instrument of energy partnership to prepare JI projects, and is open for new co-operations.

More information about E.V.A. and its activities, esp. in CEEC, is available on the homepage of E.V.A., see http://www.eva.ac.at/themen/ikooperation_index.htm.

This is the reason, why E.V.A. took the chair of the Working Group CEEC within the European Energy Network (EnR), an association of 15 European energy agencies, which is now open for new members from CEEC. For more see: http://www.enrnetwork.org/.

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IEA/CTI Capacity Building

Co-operation between Austria and Central and Eastern Europe in the field of energy efficiency and renewable energy

Alois Geisslhofer, The Austrian Energy Agency – Energieverwertungsagentur (E.V.A.)

Tutzing, 19. November 2002

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1. **A short information on E.V.A.- the Austrian Energy Agency**
2. **The status of renewable energy in Austria**
4. **Selected examples of co-operation projects between Austria and Central and Eastern Europe in the field of RES and RUE**
5. **Financing of projects, outlook for future co-operation in JI- and energy partnership projects: bilateral and within EnR and EU**

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E.V.A.: Background and Status

- E.V.A. is the abbreviation of EnergieVerwertungsAgentur, the Austrian Energy Agency
- E.V.A. was established in 1977 as a non-profit membership organisation (48 members, incl. state, state governments, energy industry, energy consultancy companies, ...)
- in the board of presidents: the federal minister charged with environmental affairs, the federal minister charged with energy affairs and the chairman of the conference of provincial governors

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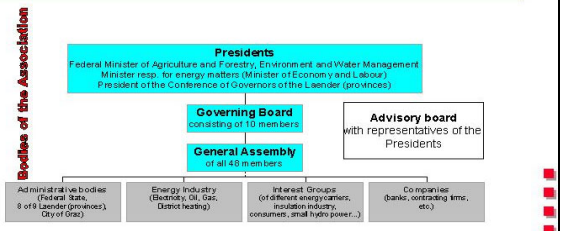
Statutory structure of the association



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E.V.A. Mission

- E.V.A. is the principal partner of the federal government in its effort to attain its energy policy objectives in the field of
  - rational use of energy,
  - stimulation of renewable energy sources and
  - of innovative energy technologies.
- E.V.A. has the main objective to make "energy savings" an energy source which can successfully compete with conventional sources of energy

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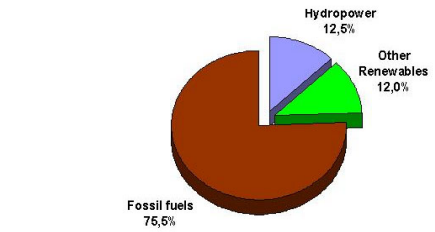
Primary Energy in Austria



Source: Energy Statistic Austria 1999

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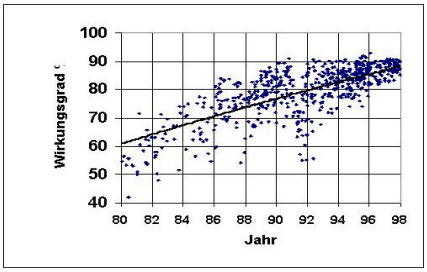
Efficiency of wood boilers for domestic use



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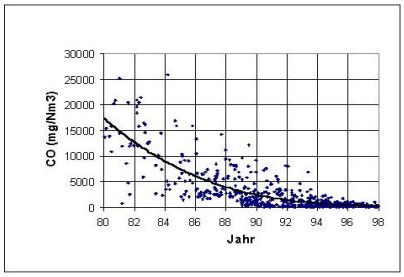
Emissions of biomass boilers for domestic use



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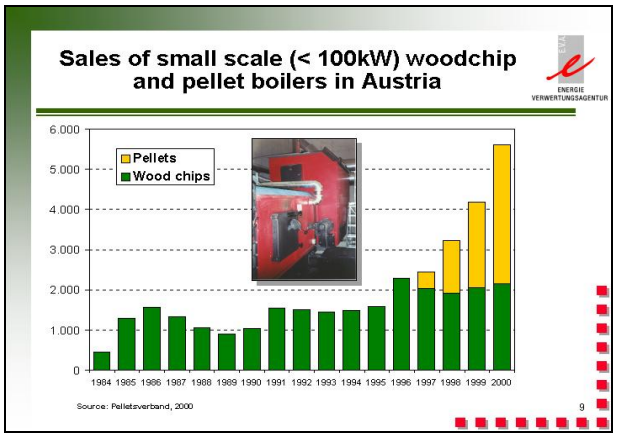

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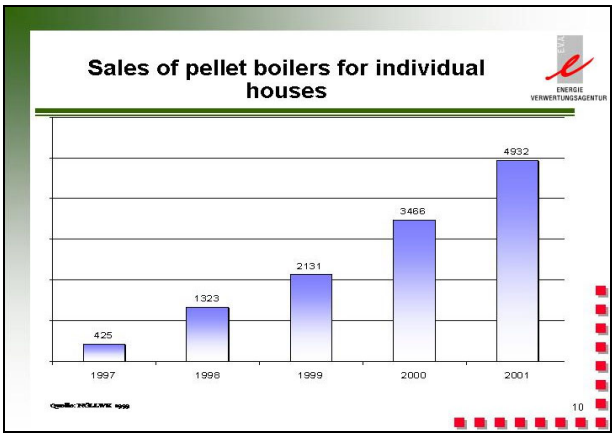

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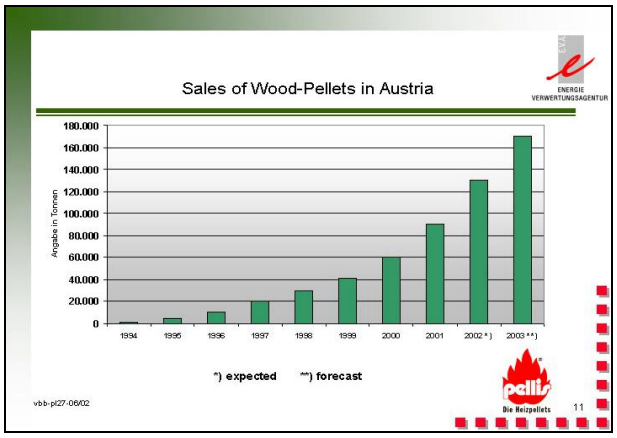

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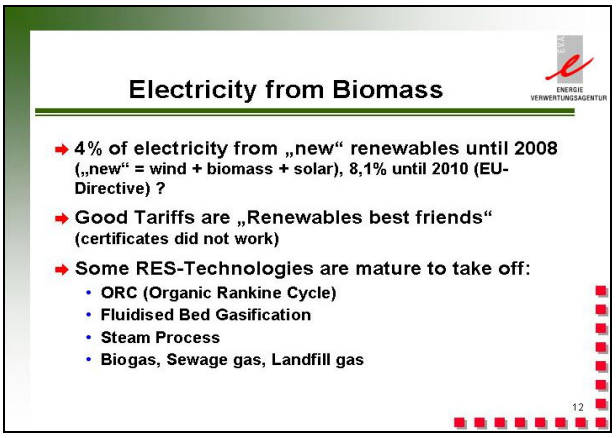

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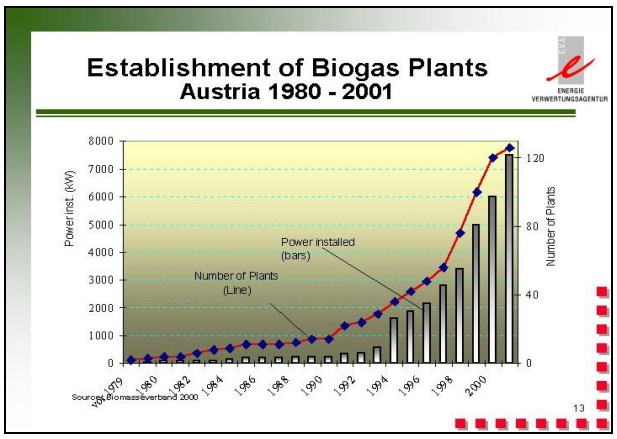

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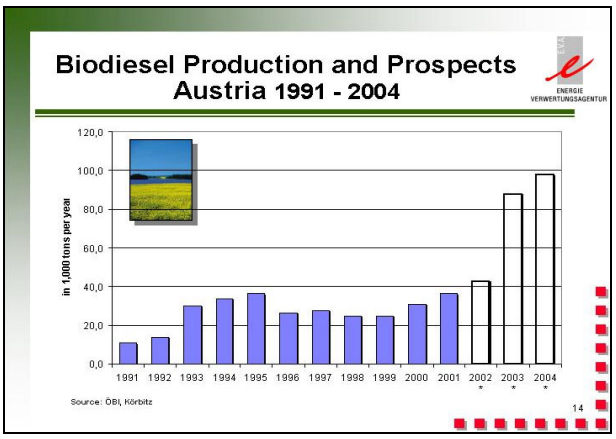

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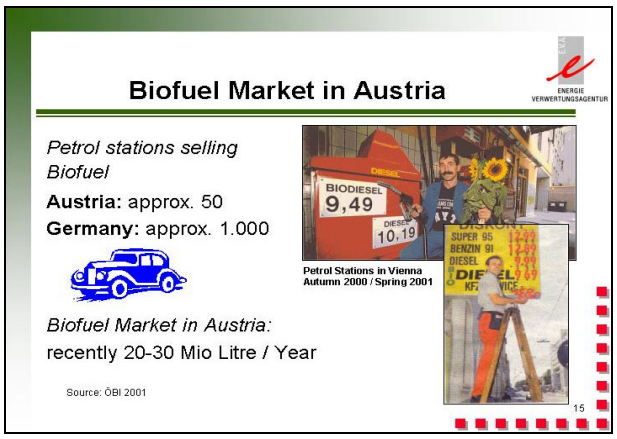

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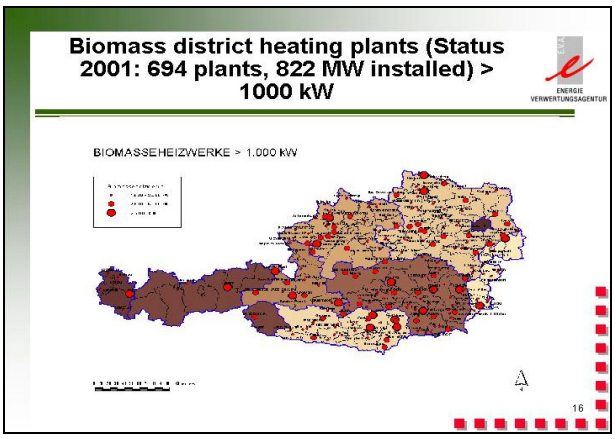

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Biomass District Heating Plant (BDHP) with solar collectors

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Success factors of BDH projects

- The length of the district heating grid (1.5 MWh per m grid)
- Overall technical performance (some 4,600 hours of full load per year), appropriate sizing (after 20ys experience)
- Training of the operators
- Considerable financial support scheme (up to 45% of initial investments)
- Co-operations between local utilities and farmers co-operatives to offer a kind of "full energy service" delivering both heat and electricity

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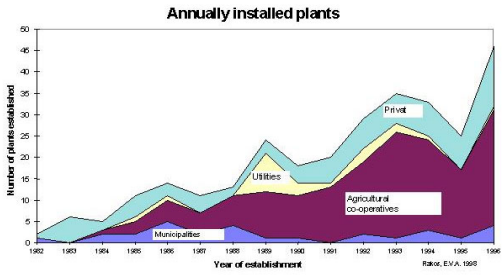
Ownership and number of annually installed biomass DH plants



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Preparation of woodchips (drying >6 moths)

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Production of woodchips

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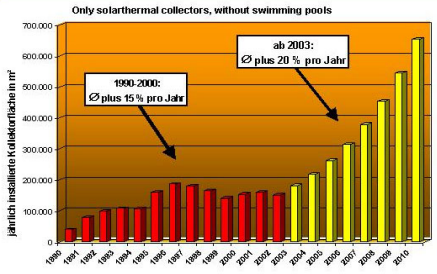
Solarthermal-Potential until 2010 in Austria



year 2010:

5 Mio m²
Collector area

- 82.391 t
CO_2 per year

30 mio liter
oil equivalent per year

Source: Faninger/BVS "Der Solarmarkt in Österreich 2001", Wien 2002, eigene Berechnungen

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Austria under the top 3

TOP 10 in EU

New installed collector area 2000

Position	country	installed m² per year
No. 1	Germany	618.095
No. 2	Greece	170.188
No. 3	**Austria**	**153.605**
No. 4	Spain	34.067
No. 5	Netherlands	33.209
No. 6	Switzerland	26.593
No. 7	Italy	23.040
No. 8	U.K.	13.222
No. 9	Denmark	12.783
No. 10	Finland	8.892

TOP 10 in the world

Total collector area per inhabitant 2000

Position	country	Pers. in mio (2000)	Total collector area m²/1000 pers.
No. 1	Greece	11	264,4
No. 2	**Austria**	**8**	**201,8**
No. 3	Turkey	67	112,6
No. 4	Japan	127	92,7
No. 5	Germany	82	33,9
No. 6	China	1.000	26,0
No. 7	Spain	40	10,1
No. 8	France	59	8,0
No. 9	United States	278	7,1
No. 10	India	800	6,0

Source:
Der europäische Solarthermie-Markt, DFS 2000/2001
Weiß, W., Faninger, G.: Solar Thermal Collector Market in the IEA-Member Countries, IEA Study - Draft, 2002 (OHNE ISRAEL)

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Biomass district heating project in Trhové Sviny, in Czech Republic

- Turn key solution at costs of 26 Mio CZK (0,86 Mio €)
- 2,5 MW – boiler including the complete equipment

Financing:

- Austrian Environmental Support Abroad Funding (KKA): 3 Mio CZK (ca. 0,10 Mio €)
- Czech support: 3 Mio CZK(ca. 0,10 Mio €)
- Equity: 20 Mio CZK(ca. 0,66 Mio €)

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District heating pilot project for the improvement of the district heating in Sofia

- 1,340 flats equipped with thermo-valves and heating cost distributors
- the required investment (the overall project costs amounted to approximately € 450,000) was financed by the Eastern Co-operation Funds of the Austrian Ministry of Foreign Affairs (originally of the Federal Chancellery)
- resulted in savings of 30 % of the original heating costs
- a total of 370,000 MWh annually, which is equivalent to the heat requirement of another 30,000 flats
- the average annual costs for district heat and hot water per household have thus been reduced from € 350 to € 250

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The Co-generation Centre in Bratislava, Slovak Republic

- The Austrian Federal Chancellery financed 75 % of the consultancy costs for establishing the CHP centre in the first year, 50 % in the second year and 25 % in the third year.
- Between 1999 and 2001, about 27 projects with a capacity of about 260 MWel and an investment of about € 185 mill. were completed.
- This is equivalent to more than 30 % of the total market potential of CHP, assessed by E.V.A. at about 600 MWel in 1996.
- Many of the cogeneration Centre projects were supported by Kommunalkredit (up to 15 % of the investment costs), in addition to PHARE funds, which often provided additional funding of 25%.

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Modernisation of the district heating system of Banská Bystrica

- The district heating company from Styria between 1995 to 2002 did as contractor:
- the complete renovation of the town's largest, but outdated, district heating plant including a 7 km network of pipes for the supply of 23,000 households and companies with heat.
- The total investment was around € 10 million.
- The level of savings was agreed upon in the contracts and lies between 25 and 30 per cent.

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All other projects

- See our brochure „Energy Technologies for a Sustainable Development- Co-operation between Austria and Central and Eastern Europe"
- http://www.eva.ac.at/publ/pdf/pollutec_brosch.pdf

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Environmental Support Abroad Funding from Austria

Grant with the following maximum percentages:

10% - no additional funding is given by any other international funding institution –maximum support is the amount of immaterial costs

15% - additional funding by at least one other international funding institution (World Bank, EBRD, EU-Phare / ISPA, ...)

Maximum funding for a project: EURO 1,5 Mio.

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Federal Environmental Support Abroad Management by Kommunalkredit since 1993

	Projects	Amount of investment in EUR	Amount of subsidies in EUR
Czech Republic	63	84.433.942	25.779.146
Slovakia	26	57.161.747	6.294.950
Hungary	13	6.596.653	2.385.841
Slovenia	17	83.920.112	4.298.128
SUM	119	232.112.454	38.758.065

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Austrias Kyoto-Scenario

- basic emissions in 1990 / 1995: 77.6 mio t CO_2-equivalent per year
- Kyoto-target (2008-2012): 67.6 mio. t CO_2-equ./a (- 13 %)
- „Business as usual" until 2010 (without add. measures): ~ 84 Mio. t CO_2-equ./a
- necessary reduction ~17 mio t CO_2-equ./a
- JI-projects could lead to 4 – 5 mio t CO_2-equ./a

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Draft law for a JI grant scheme

- Austria will buy EREs with public money
- Possibility of advance payment for JI- und CDM-specific costs
- Dotation of the program with about 36 Mio €/a
- prefered project categories : RES, CHP, energy efficiency projects, energetic use of landfill gas

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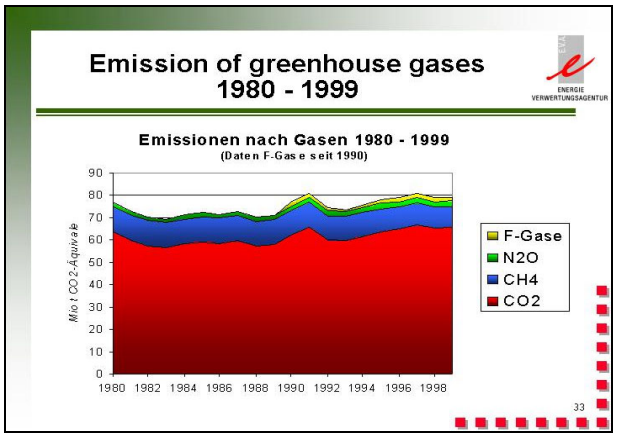

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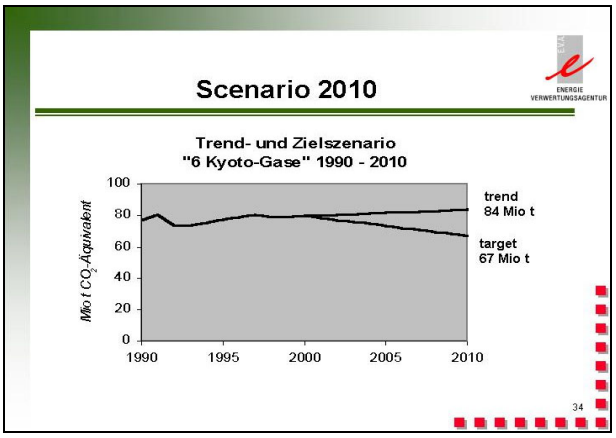

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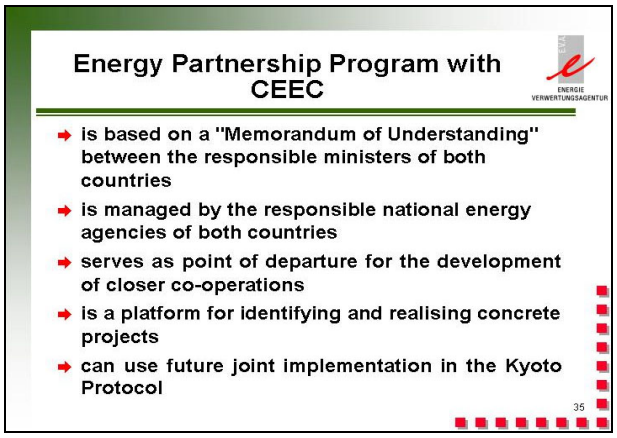

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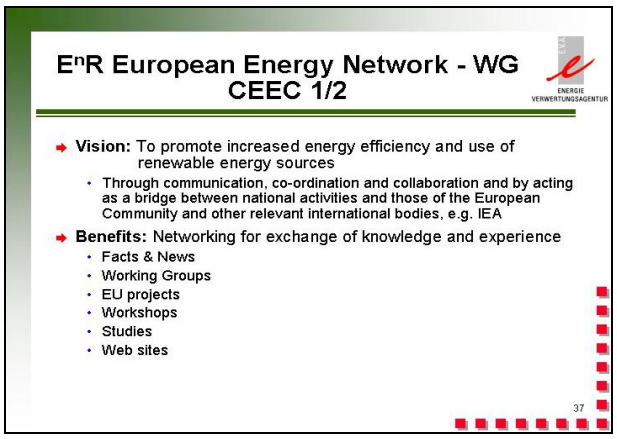

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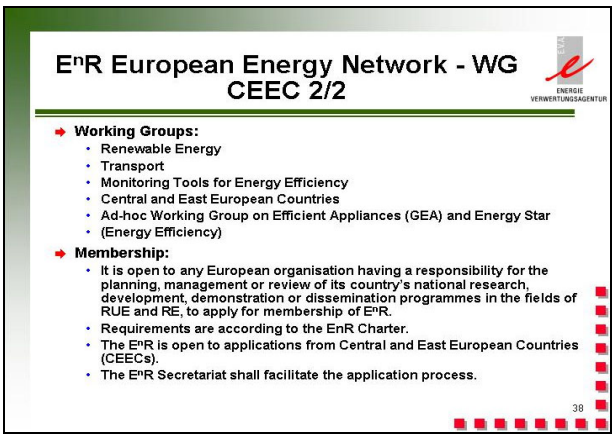

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Biomass and Pellet Market: Implementation Strategies in Slovakia

Vladimír Hecl

Energy Centre Bratislava

While final energy consumption per capita in the Slovak Republic is rather low in comparison with EU countries, it is expected to increase alongside an expected growth in GDP and improvements in living standards. The Slovak energy sector is characterized by a high level of energy intensity in comparison with the EU and some neighboring countries. This is mainly due to the high level of energy demand from heavy industry. The potential role of national renewable energy sources is highlighted by the fact that over 90% of primary energy sources are imported. This means that energy efficiency and increased use of renewable energy sources are of interest to the Slovak Republic from a political and economic perspective in particular regarding the balance of trade. While renewable energy sources are not currently used to a great extent in Slovakia there is great potential to develop this type of energy. By exploiting the current potential that is economically viable the Slovak Republic could more than double the present use of these resources. While significant changes are needed in the regulatory framework, the lack of access to finance and the general lack of awareness about existing technologies and best practice represent the greatest barriers.

Biomass is the renewable energy source with the greatest technical potential (46% of all RES). This is closely followed by geothermal energy (26%) and solar energy (21%). The technically exploitable potential for wind is less than 3% of total RES technical potential, and that of small hydropower plants is less than 5%. Biomass has also the highest degree of exploitation (almost a third of total biomass resources are exploited). This is followed by small hydropower plants (19.5%). The other renewable sources are exploited to a lesser extent: up to 5.4% of the identified technical potential of geothermal energy is currently used, while only negligible quantities of solar and wind energy sources are used. As a result, the potential available for further energy uses is still rather high, and corresponds to over 83% of the technically exploitable sources.

Biomass has the highest share of technical potential of RES (42%). This corresponds to an energy value of 40,453 TJ/year. Given the conditions prevailing in the Slovak Republic, it is realistic to use forest biomass, agricultural biomass and waste from wood processing and food industry, to develop energy plants and to use waste biomass from industry in the municipal sector for energy purposes. Considering the present use of biomass resources (12,683 TJ/year), the available potential is 27,770 TJ/year.

The installation of a biomass boiler in family houses can be seen as economically viable as the investment can be amortized within its lifetime. It can be estimated that about 15% of the family houses using oil or coal-based heating systems will opt for a biomass boiler, when deciding on the replacement of an existing heating system (it is unlikely that natural gas systems will be replaced with oil or coal-based ones).

The cost of biomass installations in family houses, without any subsidy, would be 35% higher than the cost of gas installations and approximately 62% higher than the cost of coal installations. Similar price levels could be reached only in the case of 50% subsidies, which is not realistic. With a funding level of 30% (which is the average level in some EU countries), the cost would still be 15% higher. In addition, as the acceptable payback period for households is 4 to 5 years and biomass installations have a payback period of 11 years, it is very unlikely that investors will opt for biomass installations. The under-developed fuel-supply chain for biomass and the low level of awareness among households about the performance, reliability and costs of biomass systems represent further major barriers to biomass utilization. As a result, the market potential for biomass for family houses can be estimated at only 2% of the economic potential, if no funding is available.

Technical potential

Biomass has the highest share of technical potential of RES (42%). This corresponds to an energy value of 40,453 TJ/year. Given the conditions prevailing in the Slovak Republic, it is realistic to use forest biomass, agricultural biomass and waste from wood processing and food industry, to develop energy plants and to use waste biomass from industry in the municipal sector for energy purposes. Con-

sidering the present use of biomass resources (12,683 TJ/year), the available potential is 27,770 TJ/year.

Economic potential

It is theoretically possible to install biomass installations in apartment buildings as well as for family houses. However under present conditions, it is most likely that biomass in the residential sector will be used more for single-family houses and district heating systems, including combined heat and power plants, than for large boilers in apartment buildings.

The installation of a biomass boiler in family houses can be seen as economically viable as the investment can be amortized within its lifetime. It can be estimated that about 15% of the family houses using oil or coal-based heating systems will opt for a biomass boiler, when deciding on the replacement of an existing heating system (it is unlikely that natural gas systems will be replaced with oil or coal-based ones).

The installation of a complete DH system based on biomass, is economically viable over its lifetime. What is more likely however is the upgrading of existing DH systems based on fossil fuels (e.g. oil, coal). In the case of a switch from fossil fuels to biomass, it can be estimated that about 15% of all households connected to DH systems would switch to biomass. For CHP, large installations (over 10 MW) can be regarded as more economically attractive than small units, and it can also be estimated that half of the technically available potential is viable, provided that sales of power to the grid can benefit from fair feed-in tariffs.

Waste incineration plants for domestic waste are characterized by high specific investment costs. Such plants can be run profitably over their lifetime (payback period approx. 16 years). Assuming an input of approximately 100,000 tons of domestic waste per year to new waste incineration plants, the total heat output generated is estimated at 65% of the available potential.

The economic potential represents approximately 20% of the available amount of waste wood used by the industry for their own energy consumption.

Under the short-term environmental requirements for accession to the European Union, all agglomerations with over 10,000 inhabitants should have waste water treatment plants (in the medium-term this requirement applies to agglomerations with over 2,000 inhabitants) This will certainly result in a drastic increase in the volume of sludge readily available. However, due to the high level of investment involved in building plants which can use the sludge to gain energy, the economic potential for the use of this resource is considered to be null.

Market potential

The cost of biomass installations in family houses, without any subsidy, would be 35% higher than the cost of gas installations and approximately 62% higher than the cost of coal installations. Similar price levels could be reached only in the case of 50% subsidies, which is not realistic. With a funding level of 30% (which is the average level in some EU countries), the cost would still be 15% higher. In addition, as the acceptable payback period for households is 4 to 5 years and biomass installations have a payback period of 11 years, it is very unlikely that investors will opt for biomass installations. The under-developed fuel supply chain for biomass and the low level of awareness among households about the performance, reliability and costs of biomass systems represent further major barriers to biomass utilization. As a result, the market potential for biomass for family houses can be estimated at only 2% of the economic potential, if no funding is available.

Biomass is much more competitive for district heating installations, and could reach about the same price level as oil DH systems without any funding. It would still be 17% more expensive than gas DH. Again, taking a realistic level of 30% funding into account, biomass DH would be able to reach the same price as gas, although it is unlikely that installations will switch from gas to biomass. Given the payback period (16 years) for new district heating networks, requiring the installation of the global system (including pipes), as well as the current large coverage of DH networks, the market potential lies more either in small networks, in rural areas, or in the substitution of fuels, especially for systems using fuel oil. As a results the potential for biomass for district heating installations is estimated at 20% of the economic potential. The market potential for cogeneration with biomass is rather limited, due to current high investment costs. A reasonable part of the potential (10% of the available resource) could be realized however, provided that operators use the existing support programs.

One barrier to building further large capacities for treating domestic waste is the long payback period - (16 years), assuming that operators will have to charge high prices for

taking over the waste for incineration. This price burden will then be transferred to households through increased fees for waste collection. Reducing these fees will make the plants unprofitable. Therefore, the market potential is estimated at 20% of the available potential.

The following table presents the economic and market potential for the different uses for biomass.

Table 1: Economic and market potential for biomass, in TJ

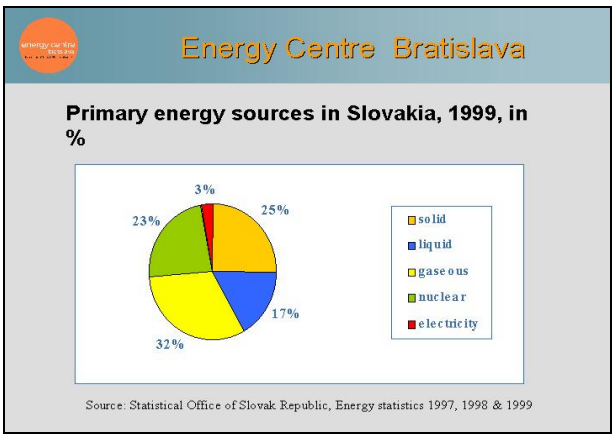
Uses	Economic potential	Market potential
Individual boilers	1,998	40
DH networks	6,156	1,242
Electricity through CHP	1,810	520
Wood processing industry	1,274	950
Domestic waste	630	187
Total	11,868	2,932
% of technically available potential	42.7%	10.6%

At the moment 13 briquettes, 5 pellets producers and 5 biomass boilers producers comprise a gradually growing biomass market in Slovakia. Most of the pellets production is nowadays exported to Austria, Denmark, Germany, Sweden, Italy, Czech Republic and Poland. Average price of transport costs is currently about 0.8 – 1 Euro/t. Comparison of fuels costs reveals that pellets price in local conditions is almost half lower than coke and at about 30% lower than coal, while they are both mostly imported. Benefits that pellet use generates include:

- Improvement of the local economies – creating new jobs
- Reduction of dependence on imported fuel sources
- Promotion of cross-border cooperation – simple in transportation across the border
- Cleaner source of energy
- Improvement of public health - decreased medical costs and increased productivity
- Effective solution of wood waste problem.

It can be stated at the moment that a clear market for bioenergy is still lacking in the Slovak Republic. However, biomass energy will become increasingly competitive in the coming years: prices for natural gas and electricity will rise to international market level. Moreover, fossil fuels, especially brown coal, will be soon significantly charged with environmental taxes.

Slide 1



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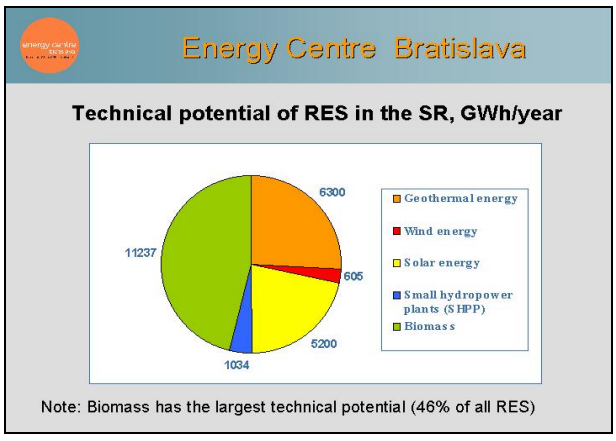

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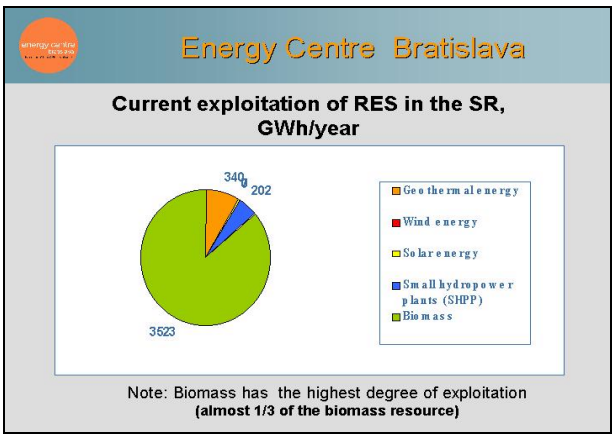

Slide 4

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Targets for the development of RES, 2012

	Low targets		High targets	
	Increase of RES use(TJ)	Realisa - tion of economic potential, %	Increase of RES use(TJ)	Realisa - tion of economic potential, %
Geothermal energy	8 100	96	8 424	100
Wind energy	11	5	18	8
Solar energy	400	9	900	20
Small hydropower	411	55	524	70
Biomass	**3 947**	**39**	**6 239**	**62**
Total	12 869	54	16 105	68

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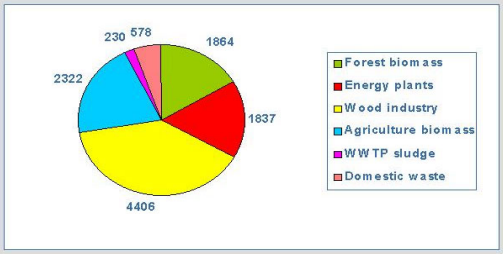
Technical potential of all biomass types, GWh/year



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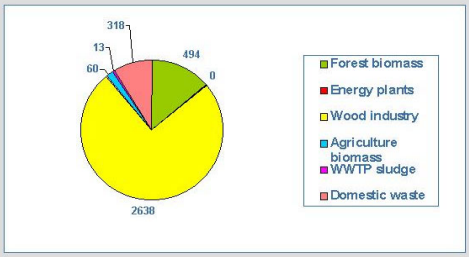
Current exploitation of biomass, according to its types, GWh/year



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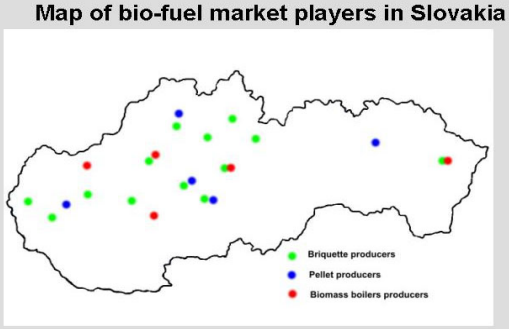
Map of bio-fuel market players in Slovakia



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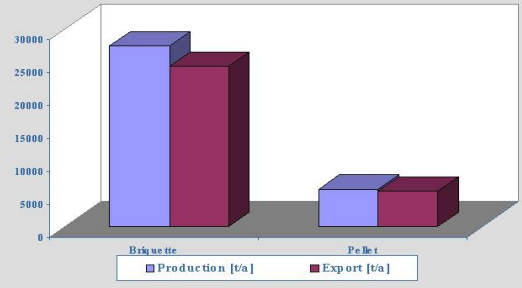
Trade balance of pellets and briquettes produced in Slovakia



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Main countries for bio-fuel import

Austria
Denmark
Germany
Sweden
Italy
Czech Republic
Poland

Transport costs: 0.8 – 1 Euro/t

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Use of Biomass in Klokocov Municipality, Slovakia

Location	Klokočov, district Čadca
Technology	Warm-water boiler Danstoker
Installed capacity	725 kW
Heat production	2885 GJ annually
Fuel	wood chips, pellets later
Use	Heating of the primary school, the post-office, municipality office, the health centre, the markets and services in the municipality
In operation from the year	2001
Operator	Primary school in Klokočov, district Čadca

Case studies

Note: more information on

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Use of Biomass and Luky Municipality, Slovakia

Location	Lúky, district Púchov
Technology	Warm-water boiler Danstoker
Installed capacity	130 kW
Heat production	395 GJ annually
Fuel	wood chips, pellets later
Use	Heating of the primary school
In operation from the year	2001
Operator	Primary school in Lúky, district Púchov

Case studies

Note: more information on www.biomasa.sk

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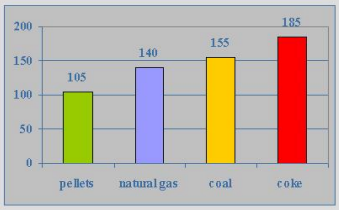
Characteristics of the pellets used in Luky and Klokocov

Form	Roller
Diameter	6 mm, 12 mm
Length	17,56 MJ/kg, (5 kWh/kg)
Efficiency	395 GJ annually
Specific gravity	1200 kg/m3
Moisture	8%
Ash content	0.5%

Fuel costs in SKK for heat production 1 GJ



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Benefits of pellet use

Sustainable energy use

- **Improvement of the local economies – creating new jobs**
- **Reduction of dependence on imported fuel sources**
- **Promotion of cross-border cooperation – simple in transportation across the border**
- **Cleaner source of energy**
- **Improvement of public health - decreased medical costs and increased productivity**
- **Effective solution of wood waste problem**

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Instruments for addressing barriers to biomass utilisati

Legal instruments

- The Energy Efficiency Law should, together with the Energy Law, provide the Legal framework for an EE policy and for promotion of RES

Institutional instruments

- Support for strengthening the fuel supply chain for biomass

Regulatory instruments

- Improving procurement rules to integrate RES equipment
- Establishment of a framework for regional and local energy strategies to be used as tools to foster the market penetration of RES
- Voluntary agreements with industry. One of the objectives is to support utilisation of RES

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Instruments for addressing barriers to biomass utilisati

Fiscal instruments

- Reduction of VAT level for RES technologies. The reduction of VAT from 23% to 10% on all RES equipment, including biomass boilers, should contribute substantially to encouraging demand without imposing too much of a strain on public finances
- Amendment of the Act on Income Taxes (366/1999) should provide additional support for the other RES, especially for the production of energy by RES. The act should be adopted in 2003
- Protection of air against pollution. Encourage switch to less pollutant fuels of RES

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Instruments for addressing barriers to biomass utilisati

Financial instruments

- Direct support for the pilot and demonstrational RES projects accompanied by a strong dissemination of the project results
- Subsidies to the investment cost of EE and RES projects, revolving fund. Objective is to provide direct incentive for the implementation of these projects
- Support programme for biomass district heating
- JI and Emission Trading. Encourage implementation of EE and RES projects

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Instruments for addressing barriers to biomass utilisati

Informational instruments

- National Energy Campaign
- Information platform for RES
- Training of installers for EE and RES equipment and co-operation with suppliers
- Network of RES business. To establish a network of companies active in the different sectors of RES with the aim to support their market activities.

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Financing of biomass projects

State programmes

EU programmes and funds
- PHARE
- ISPA
- SAPARD
- Inteligent Energy for Europe
- Structural funds

International Financing Institutions
- The World Bank Group
- Global Environment Fund
- European Investment Bank
- European Bank for Reconstruction and Development

Bilateral co-operation

Third party financing

Commercial banks

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Thank you for your attention

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Slide 20

Results of the Monitoring of the German Biomass Ordinance

Dr.-Ing. Joachim Fischer

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The results represented here are based on a study performed by the Institute for Energy and Environment, IE, Leipzig. The author would like to thank the Federal Ministry for Environment, Nature Conservation and Nuclear Safety and the German Environmental Agency, UBA, for financing this study and their ongoing support.

1. Introduction

According to the White Book of the European Commission contribution of renewable energies to the primary energy demand in the member states should be doubled until 2010. As electricity is the final energy carrier with constantly growing demand, an increased generation of electricity from renewables is vital for achieving this ambitious target. In this report, special focus is set on the situation in Germany.

2. Potential of renewables in Germany and current use

First, the question arises to which extent renewable energies may contribute to electricity generation in a high industrialized country with a high population density. As figure 1 illustrates, the technical potential of renewable energies is surprisingly high. Assuming that all available resources are only used for electricity generation by today's technical standards, it becomes evident that the actual electricity demand of about 570 TWh can be fulfilled by renewables alone. However, this is a theoretical approach, as some renewable energies, mostly biomass, are already being used to a certain extent in the heat sector and other demands, like the production of renewable fuels for transport are becoming more and more important.

Nevertheless, as figure 1 shows, biomass may contribute to more than 30% to a renewable electricity production as solid, gaseous or liquid fuel. So it can be concluded that an increased use of renewable energies is primarily not limited by resources.

Today's role of renewables in the electricity sector in Germany, however, is totally different to this bright perspective. From Fig. 2 it becomes evident, that only a small share of electricity is generated from renewables. Here, hydropower is the most important source, whereas bio energy carriers only play a minor role. Obviously, certain constraints must exist which prevent a higher dissemination of bio energy carriers in the electricity sector.

Figure 1: Technical potential of renewable energies for electricity generation in Germany, (BMWi, VDEW, BIZ)

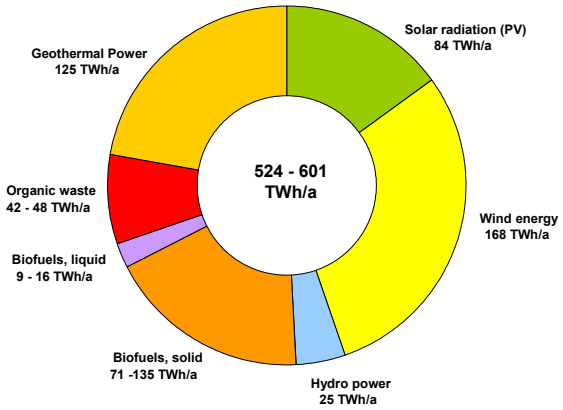
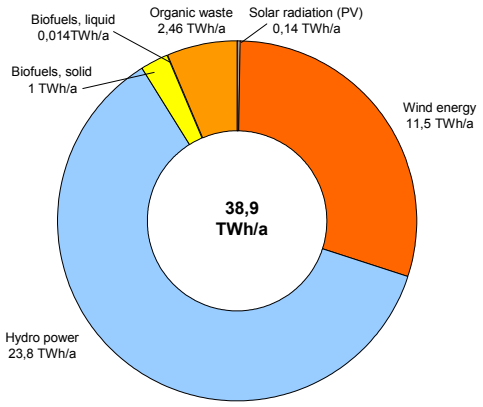


Figure 2: Actual contribution of renewable energies to the electricity demand, 2001, Source: BMU, IE, BIZ



The most important constraints can be summarized as follows:

- due to its dispersed nature and its lower energy content, compared to fossil fuels, electricity generation from biomass has to take place in relatively small plants
- in contrast to centralized power plants, electricity generation from biomass in decentralized plants leads to considerable higher electricity generation costs, so that from an economical point of view, bio energy is in many cases not competitive to its fossil or nuclear counterparts. Only in some favorable cases, by example in the wood processing industry, combined heat and power production from wood residues has been an interesting and economically feasible option.
- technologically, efficient electricity generation in small scale applications in the range below 5 MW electrical capacity still lacks appropriate solutions. Due to limited interest in bio-energy, technological development, by example with respect to gasification, was hindered during the last decade. So appropriate solutions are still missing on the market.

3. Changing markets – new approaches: EEG and Biomass Ordinance

Apart from these general constraints, the electricity market in the EU was changed profoundly at the end of nineties.

Due to the liberalization process of the German electricity market, electricity prices dropped significantly, imposing additional problem for a broader dissemination of renewable energies. So in order to achieve the targets set by the EU, new approaches became necessary. In 2000, the Renewable Energy Sources Act, EEG, was set into action, given fixed feed-in tariffs for electricity from renewable sources. Additionally, the biomass ordinance as assisting regulation was passed in 2001 by the government. Both instruments should lead to an increased share of electricity from renewables in general and biomass in special within the next decade.

To control the efficiency of these legal instruments, a comprehensive evaluation and monitoring program was set into action by the federal government. Part of this program is the monitoring of the biomass ordinance, performed by IE Leipzig gGmbH on behalf of the German Ministry of Environment, Nature Conservation and Nuclear Safety. Some of the most interesting aspects are summarized in this report. More information, although only in German, are available from the first mid term report. [1)]

3.1 How can the EEG stimulate electricity generation from renewables?

The EEG offers attractive reimbursement rates for electricity from renewable sources, fed into the public grid. As an example, these rates for bio energy are summarized in table 1.

Table 1: Reimbursement rates of the EEG for electricity from biomass

Installed electrical capacity (MW)	Reimbursement (€ ct / kWh) *Initial operation before 1.1.2002*	Reimbursement (€ ct / kWh) *Initial operation in 2002*
< 0,5	10,23	10,1
0,5 - 5	9,21	9,1
5 - 20	8,7	8,6

In contrast to other regulations, the EEG offers some distinctiveness:

- fixed rates are predefined by the EEG, making the feed-in tariffs independent from the average prizes of fossil or nuclear electricity.
- These rates are different for different renewable sources, taking the actual competitiveness of these energies in respect of the fossil counterparts into account.
- Furthermore, the EEG impose digressive rates, as a further technological development is assumed leading to cost digression
- The rates are paid by the grid operator and are guaranteed over a period of 20 years, thus offering reliable perspectives for investors.

Due to these very favorable conditions, it was expected that the EEG would stimulate the bio-energy sector intensely. However, in contrast to other renewable energy sources, bio-energy has to be regarded as a broad variety of different materials form various sources. As not all organic matter should benefit from the regulations of the EEG, a definition became necessary, which biomass

[1] A. Scheuermann: 1. Zwischenbericht Biomasseverordnung, Institut für Energetik u. Umwelt GmbH, Leipzig, Mai 2002

should be included under the terms of the EEG. So in 2001, the biomass ordinance was set into action. It defines

- what is biomass in the sense of the EEG (e.g. residues from forestry and agriculture, organic wastes, demolition wood)
- what is not accepted as biomass (e.g.: peat, sewage sludge, paper, landfill and sewage gas)
- Technologies for electricity generation from bioenergy and appropriate technical specifications (e.g. efficiency)
- Environmental standards.

4. Results of the monitoring

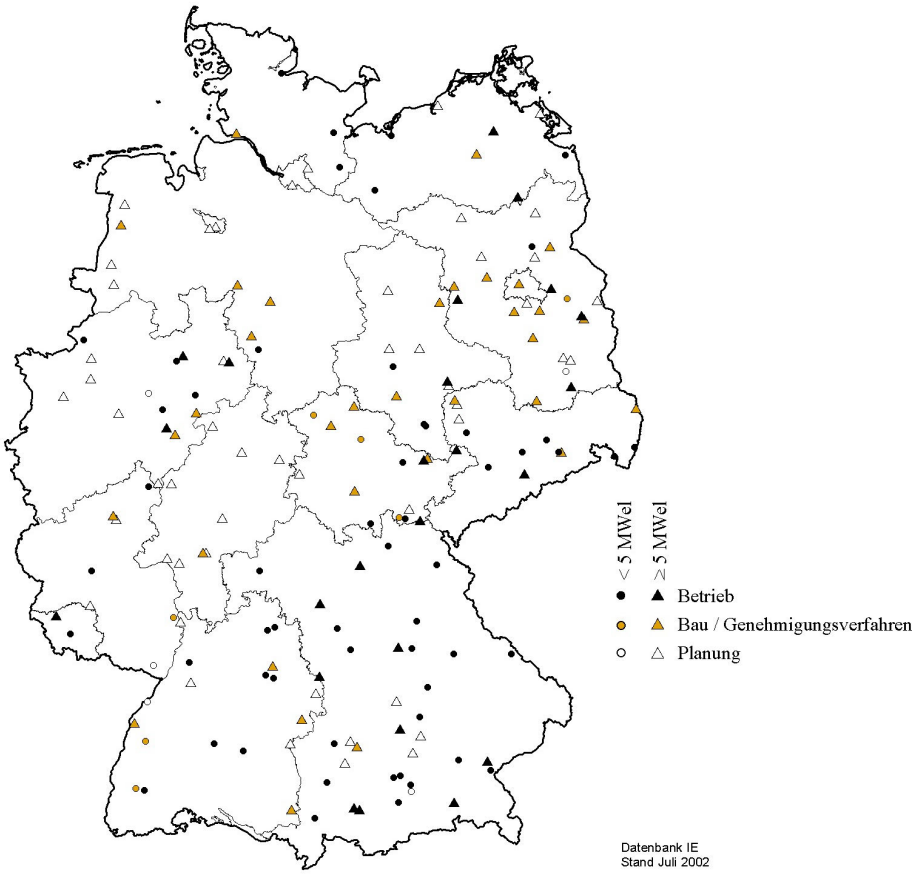
The monitoring of the biomass ordinance set in August 2001. Quite soon after the start of the project it became evident that EEG and biomass ordinance in fact have a stimulating effect on the bio energy market in Germany, these positive effects, however, did not affect all bio energy carriers to the same extent. The biggest impact was recognized on the use of waste wood or demolition wood and on biogas. So the results given here will also concentrate on these two sectors.

4.1 Waste wood

In Germany, each year approximately 7,5 Mio. Tons of waste wood are produced. To a certain extent, this material is used as recycling wood in the wood processing industry. Export of waste wood is of increasing importance, mainly from the southern regions of Germany. About 25% of the waste wood is still being deposited.

Before the EEG went into action, interest in using waste wood as energy carrier was relatively low. Fig. 3 shows a map of Germany. Here, the black symbols indicate those plants, where waste wood has been used before the year 2000 as main fuel. The symbols indicate, that most of theses plants are smaller ones in the range below 5 MW electrical capacity. The total number of sites sums up to 84.

Figure 3: Biomass plants using waste wood, status and perspectives



Since 2001, the situation changed dramatically. As the grey and white symbols indicate, more than 120 new power plants are in different stages of construction (grey) or planning all over Germany. Interestingly, most of these new projects will make use of the upper limit of the EEG regulations with installed electrical capacities of 20 MW. Unfortunately, most of these projects are mainly concentrating on an efficient generation of electivity as no external heat demand exists in most of these projects. If all of these projects will be realized until 2004, the number of installations from waste wood will rise significantly, as Fig. 4 illustrates.

However, due to local restrictions, by example obvious discrepancies between planned projects, the resulting fuel demand and the availability of waste wood in a given region, it is already evident that only part of these projects will come to live. In a conservative approach it was assumed that only 25% of the planned projects will be realized.

Even on this reduced basis, Fig. 5 shows that the electrical capacity of power plants operating on waste wood will rise significantly until 2004. Although this is a very encouraging development, the fact that in most cases an appropriate use of the process heat is neglected should be considered as a problem, so that changes to the existing regulations of the EEG are already being considered.

Figure 4: Number of waste wood based biomass plants

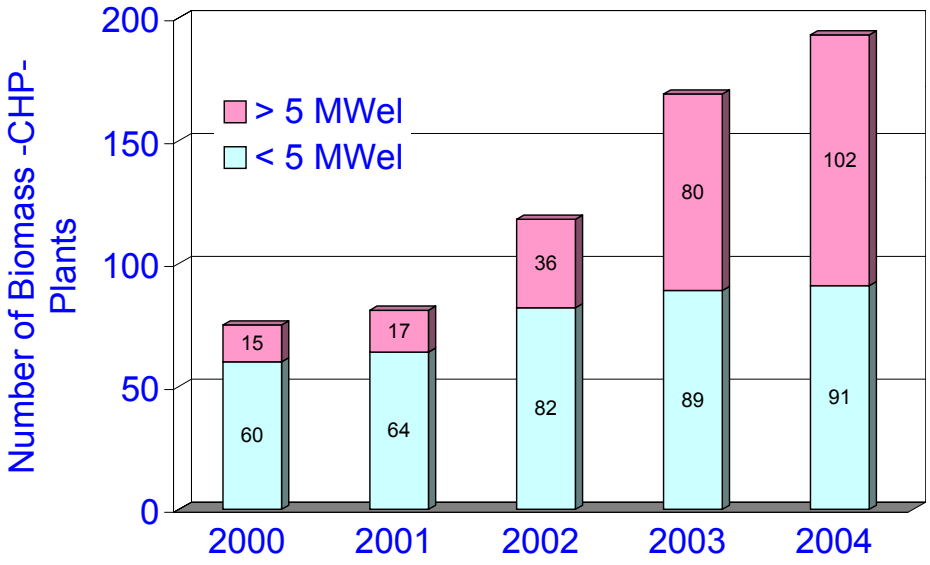
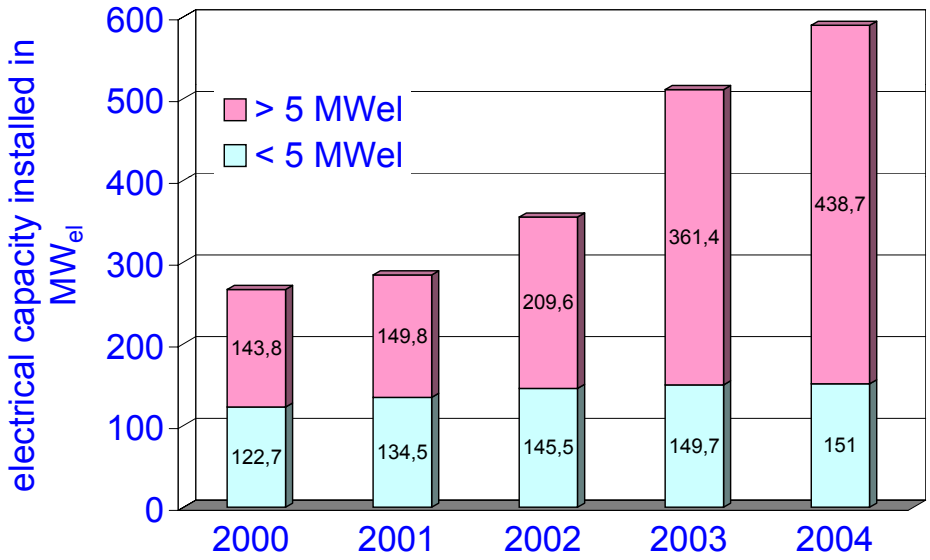


Figure 5: Increase in electrical capacity from waste wood on a 25% project realization basis



4.2 Biogas

Traditionally, biogas is produced and used in the agricultural sector. Due to the structure of this sector, most of the existing biogas plants are of a smaller size, making use of the residues (manure, organic by-products) of the usual farming activity. Only in the eastern German countries, due to the larger size of the farms, some big biogas plants exist.

Figure 6 indicates the development of the biogas sector since the 1990s. It becomes evident that there was a constant but slow increase in biogas plants during the 90s, then, in 2000 under terms of the EEG a dynamic development set in. According to the figures of the German biogas association, represented in Fig. 7, about 1.900 biogas plants are operated in Germany in 2002 (Fachverband Biogas: Biogaszahlen 2002, August 2002).

In the monitoring project, slightly different numbers are reported, as Fig. 8 indicates. It shows that most of the existing biogas plants have electrical capacities below 70 kW, but that a shift towards medium sized plants up to 500 kW electrical capacity can be recognized.

Figure 6: Number of biogas plants in Germany, Source: Biogas Association, 2002

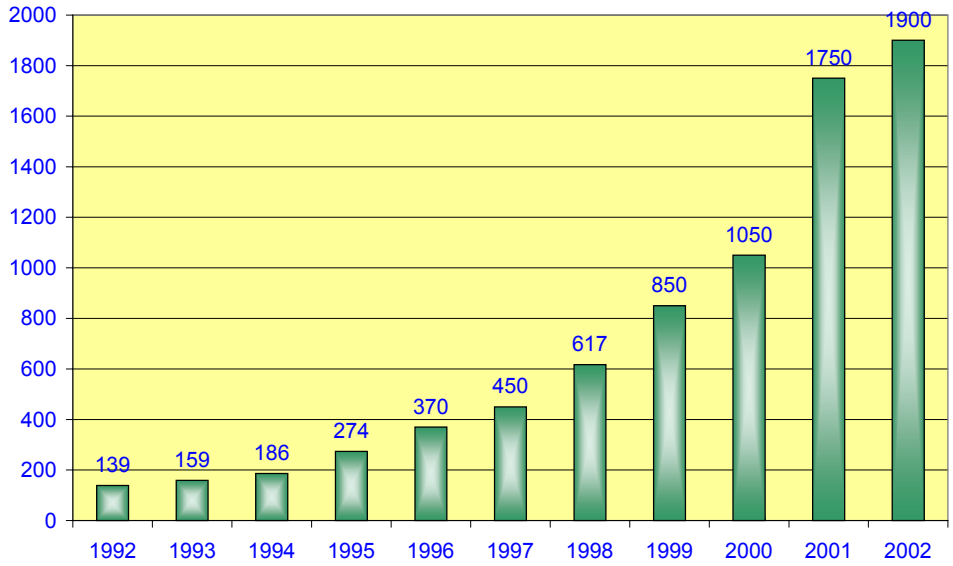
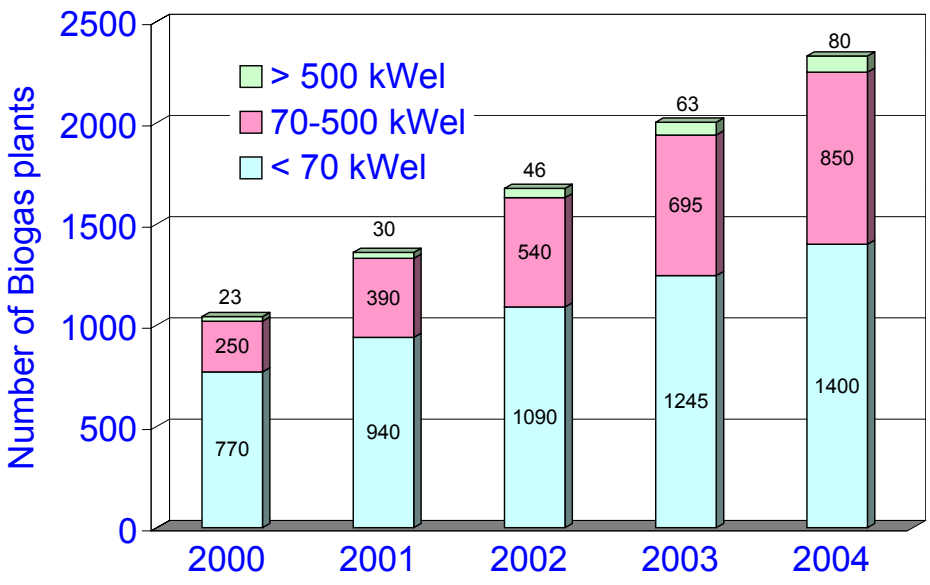


Figure 7: Increase in biogas plants until 2004

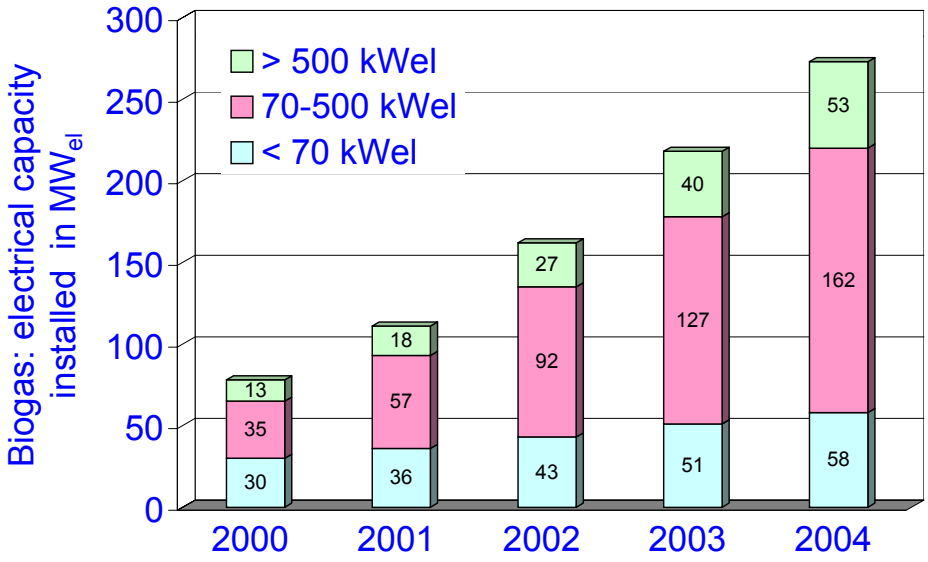


To a large extent these biogas plants will make use to the so-called co fermentation process, where extra organic matter, as surplus corn or crop or organic residues like old frying oils and fats from restaurants and fast-food chains are being used additionally to the existing feed material.

The role of centralized biogas plants operated by a farm cooperative and /or communities will at least on a short term view, not be as important as in other countries, like Denmark (compare Fig. 8).

Unfortunately, existing regulations in Germany impose additional problems, making the operation of cooperative biogas plants extremely difficult. However, figure 8 shows that the contribution of biogas to electricity production will increase significantly from 160 MW in 2002 to 270 in 2004.

Figure 8: Increase in electrical capacity from biogas until 2004



5. Summary

- The biomass ordinance was able to stimulate the bioenergy market in a very short period of time.
- The effectiveness of the ordinance in combination with the Renewable Energy Sources Act in general is evident and without doubt.
- The trend towards bigger plants in the case of demolition wood will have to be examined thoroughly.
- Reported problems and restraints are mainly related to the permission process. Due to increasing interest some inconsistencies in other acts become evident.

Developing a RES Strategy for the Czech Republic

RNDr. Martin Bursík

ecoCONSULTING s.r.o. energy and environment, Prague

The Czech Energy Act, Article 2) defines renewable sources of energy as water power plants up to 10 MW_e , solar energy, wind energy and geothermal energy, biomass and biogas since 2001. The distribution companies have got the duty to buy electricity from renewables for the feed-in tariff since 1.1.2002. Green electricity producers get 5 eurocents for small hydro, 10 eurocents for wind turbines, 8.3 eurocents for biomass or waste, 10 eurocents for heat pumps/geothermal and 20 eurocents for photovoltaic.

Renewables covered 1.9% of the primary sources of energy in 2001 and produced 832,8 GWh of the electricity in 2001. Surprisingly more than three times more, 2 900 GWh was produced and sold in 2002, when the feed-in tariffs came into force. That is nearly 4.5% of the gross electricity consumption at the level of 64 901 GWh. But no detailed data have been available yet.

The Governmental Program from June 2002 expects the preparation of a special Act on the Support of Energy Production from renewables to be given for the governmental decision until the end of the year 2003. Works on its preparation have started already. There are numerous arguments for adopting this law:

1. The Czech Republic needs to start a dynamic development of renewables due to a low share of only 1.9% renewables of the primary energy sources. The Ministry for the Environment projects the realistic figure at 5.9% share of renewables by the year 2010. *2. The National Program for Efficient Energy Management and Use of Renewable and Secondary Sources*, which was adopted by the Government, counts with 3 % share of green electricity production on brutto electricity consumption (without hydro above 10 MW) or 5.1 % share of green electricity production on brutto electricity consumption (together with hydro above 10 MW), 2.9 % renewables on total consumption of primary energy sources (without hydro above 10 MW) or 3.2 % renewables on total consumption of primary energy sources (with hydro above 10 MW) in the year 2005,2. $CO_{2\ eq.}$ emissions were reduced of 26.6% since 1990, so no problem with the Kyoto target, nevertheless they are on the level of 12.6 tons per person compared with 8.9 t/person in the EU-15,
3. 39% of $CO_{2\ eq.}$ emissions are due to the energy production, which is from 55% based on a solid fuels (37% brown coal, 18% hard coal),
4. the energy intensity of the economy is 71% higher then in the EU-15. Development renewables ought to be combined with mobilization of the potential of energy savings. But there is particularly no interest for the energy savings not only because of lack of investments but also due to a huge overcapacity of the electricity production. Czech Republic is the second largest exporter of the electricity in Europe with around 16 TWh/year, that is around 23% of the domestic net electricity production in 2002 (estimations),
5. the Act should increase business safety for the investors into renewables. Nowadays feed-in tariffs model could be changed any time by the decision of the Regulatory Office only,
6. it is expected that the Act should institutionally support the production of heat from renewables, specially from biomass, which covers the biggest potential of renewables in the Czech Republic,
7. the Act is going to enable an effective implementation of the 2001/77/EC directive on the support of electricity production from renewables.

Due to the starting debate about the energy policy in the Czech Republic, the Ministry for the Environment has been organizing a tender for study on an „Outlook of the future development of renewables in the Czech Republic in the period between 2005 – 2050“. First outputs are being expected in Autumn 2003.

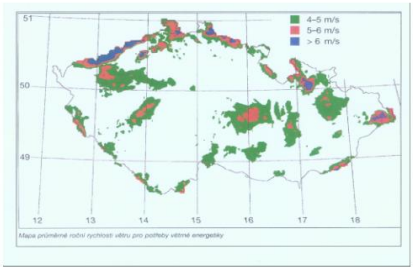
Besides the activities for preparation of a special act on the support of energy production from renewables, the works have started on two other related topics: an environmental tax reform and a national climate protection policy.

1. Czech Republic - Energy and Environment

10.3 mil. inhabitants
78 865 km²
54.3% agricultural land
33.4% forests

Energy Intensity (MJ/thousands EUR):

	Germany	France	Belgium	Denmark	CR
	18.9	20.5	24.6	15.8	39.0



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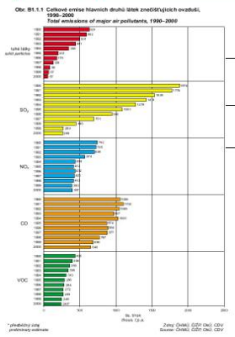
Slide 1

1a) Energy and Environment - Emission reduction 1990 - 00



solid part. 91% to 57 thous. t p.a.

SO_2 86% to 265 thous. t p.a.

NO_x 54% to 397 thous. t p.a.

Greenhouse gas emissions:

$CO_{2\,eq.}$ 26.6% to 137,7 mil t p.a.

= *energy production* 39%

= *industrial production* 30%

= *transpotration* 8%

= *comercial, housing civic infrastructure* 8%

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Slide 2

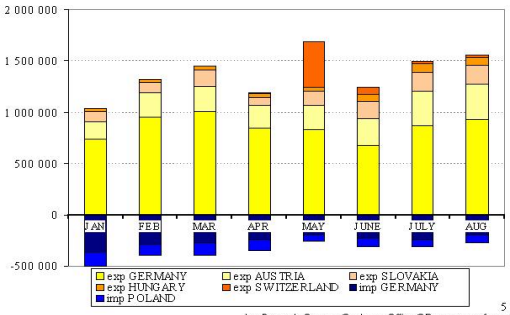
1b) Electricity balance 2001 (GWh)

	2001	%
Total Net Electricity Production	68780	100,0
of which: Combustible Fuels (excl. Gas)	50279	73,1
Gas and Gas Turbines	2265	3,3
Hydro	2458	3,6
Pumped Storage Production	413	0,6
Nuclear	13778	20,0
Other (wind, solar, geothermal, etc.)	0	0,0
Imports	2641	3,8
Exports	12180	17,7
Imports/Exports Balance	-9539	-13,9
Autoproducers Consumption	7186	
Net Domestic Consumption	53779	
Gross Domestic Consumption	65108	
Gross Production CEZ a.s.	52162	69,9
Gross Production of Other Producers	22485	30,1

4

Slide 3

1c) Electricity exports and imports in 2002 (MWh/months)



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Jan Beranek, Source: Customer Office CR, www.cs.mfcr.cz

Slide 4

1c) Electricity exports in 2002 – destination countries

Electricity exports January – August 2002 to:

GERMANY	6.8 TWh	= 62%
AUSTRIA	2,1 TWh	= 19%
SLOVAKIA	1,1 TWh	= 10%
SWITZERLAND	0,58 TWh	= 5%
HUNGARY	0,40 TWh	= 3%
Total 01-08/2002	10,98 TWh	= 100 %

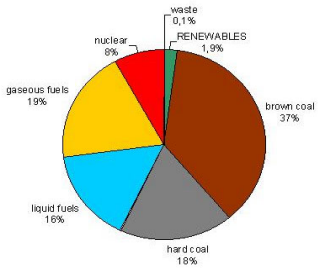
Estimation for 2002 16 TWh = cca 23% of the domestic net production

6

Jan Beranek, Source: Customer Office CR, www.cs.mfcr.cz

Slide 5

1d) Primary energy sources in 2001



Source: Association for Utilisation of RES, 2002

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Slide 6

1d) Primary energy sources in 2001

	E	H	E	H	total	total	total	total cor	total cor	total cor
Units	GWh	ktoe	PJ	PJ	GWh	ktoe	PJ	GWh	ktoe	PJ
Wind	5,00	0,00	0,02	0,00	5,00	0,43	0,02	5,00	0,43	0,02
Small Hydro	710,00	0,00	2,56	0,00	710,00	61,06	2,56	710,00	61,06	2,56
Large Hydro	1573,00	0,00	5,66	0,00	1573,00	135,28	5,66	1573,00	135,28	5,66
Photovoltaic	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Biomass Heat		502,00		21,02	5873,40	505,11	21,15	5873,40	505,11	21,15
Biomass El.	30,00		0,11	0,00	30,00	2,58	0,11	150,00	12,90	0,54
Ethanol/ Biodiesel	0,00	54,00	0,00	2,26	631,80	54,33	2,27	631,80	54,33	2,27
Geothermal Heat	0,00	2,50	0,00	0,10	29,25	2,52	0,11	29,25	2,52	0,11
Solar Thermal	0,00	8,50	0,00	0,36	99,45	8,55	0,36	99,45	8,55	0,36
RES	2318	567	8	24	8952	770	32	9072	780	33
TJ =	0,278	GWh		GWh =	3,6	TJ		ktoe =	11,7	GWh
TJ =	0,024	ktoe		GWh =	0,086	ktoe		ktoe =	41,87	TJ
PES										1726
RENEWABLES										1,9%

Source: Association for Utilisation of RES, 2002

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Slide 7

2. The National Program for Efficient Energy Management and Use of Renewable and Secondary Sources

Program Aims until 2005:

1) 3 % share of green electricity production on brutto electricity consumption (without hydro above 10 MW) or
2) 5.1 % share of green electricity production on brutto electricity consumption (together with hydro above 10 MW)
3) 2.9 % renewables on total consumption of primary energy sources (without hydro above 10 MW) or
4) 3.2 % renewables on total consumption of primary energy sources (with hydro above 10 MW).

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Slide 8

2. The National Program for Efficient Energy Management and Use of Renewable and Secondary Sources, 01/2002

	Available potential			Economical potential		
	Total Investments	Energy Production	Share in TCPES	Total Investments	Energy Production	Share in TCPES
	mil. EURO	TJ/year	%	mil. EURO	TJ/year	%
Biomass	3 137	83 700	4,50	1 288	50 960	2,91
Waste	195	3 700	0,20	0	1 520	0,09
Solar energy – thermal	2 190	11 500	0,62	0	140	0,01
Photovoltaic	248	100	0,00	0	0	0,00
Heat pumps/geothermal	605	8 800	0,47	175	2 540	0,15
Hydr Large	0	5 700	0,31	0	5 700	0,34
opow Small	465	4 100	0,22	172	2 930	0,18
er						
Wind	458	4 000	0,21	8	100	0,01
Total	7 299	121 600	6,53	1 643	63 890	3,69

Source: Association for utilisation of RES, Czech Environmental Institute, MoE

TCPES – total consumption of primary energy sources

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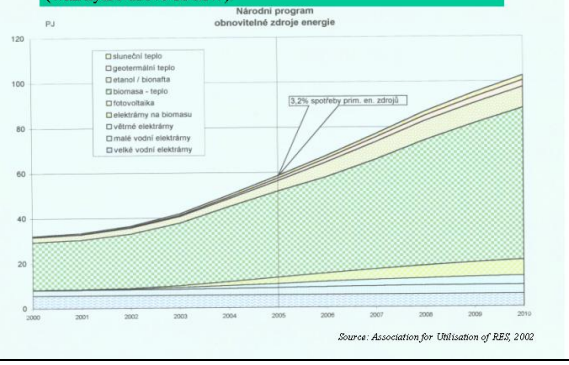
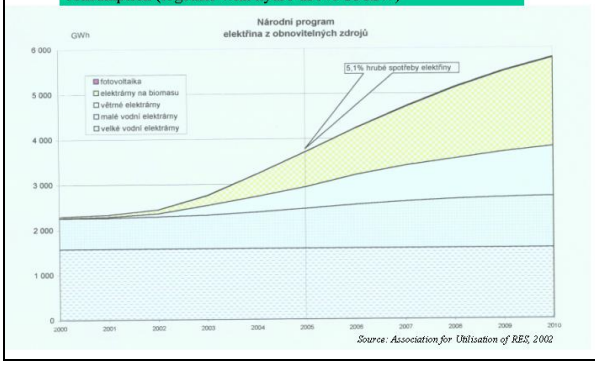
Slide 9

3.2 % renewables on total consumption of primary energy sources (with hydro above 10 MW).



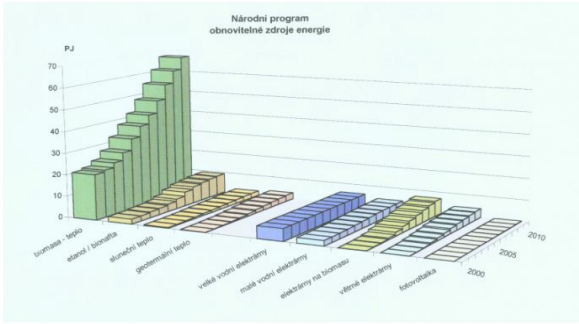
Slide 10

5.1 % share of green electricity production on brutto electricity consumption (together with hydro above 10 MW)



Slide 11

National Program – renewable sources of energy (heat)



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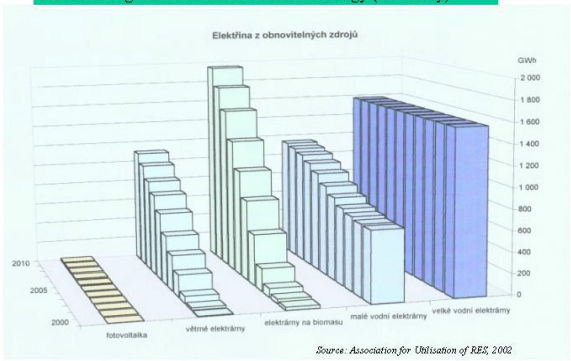
Slide 12

National Program – renewable sources of energy (electricity)



Slide 13

3a) State Program on Support of Renewables and Energy Savings (around 13 mil EURO/year) – year 2000

Name of measure	No. of projects	Costs of implementation (thous. EUR)	Support		Installed output		Production	
			Subsidies (thous. EUR)	Loans (thous. EUR)	Thermal (kWt)	Electrical (kWe)	Heat (GJ p.a.)	Electricity (MWh p.a.)
Local supply of heat and hot utility water (biomass)	6	17	5	-	135	-	792	-
Central supply of heat and hot utility water	4	5453	2181	1878	10 232	-	69 578	-
Renewable energy sources in buildings in the budgetary sphere	19	964	489	649	1 150	-	8 050	-
Heat pumps	68	906	257	46	1 290	-	9 843	-
Solar systems	8	46	11	0	160	-	376	-
Small hydro-electric plants	10	2183	164	712	-	1 850	-	8 280
Wind electric plants	1	17	5	0	-	7	-	8
CHP based on the biomass	4	980	212	512	1800	750	12 240	1 875
Solar systems and heat pumps.	6	1815	719	681	3 631	-	21 786	-
„Sun into schools"	16	289	289	0	-	20,4	-	18,5
Public awareness and consulting	6	193	149	0	-	-	-	-
Total	148	12863	4318	3895	16 598	2 607	122 665	10 163

Source: MoE, Evaluation of the State Program ...

Slide 14

3b) Feed-in Tariffs for Electricity from Renewables since 1.1.2002

Small Hydro	5 eurocents
Wind	10 eurocents
Biomass	8.3 eurocents
Waste	8.3 eurocents
Heat pumps/geotermal	10 eurocents
Photovoltaic	20 eurocents

Tax relieves:

4 + 1 years no income tax

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Slide 15

3c) Governmental Program, Sustainable Energy Policy?

1) Fiscally Neutral Environmental Tax Reform
   - electricity and hydrocarbon fuels,
   - social costs lowering compensation,
   - concept to be discussed under the strategical EIA procedure,
   - Act on ETR by 06/2005

1) Act on the Support of Energy from Renewable Sources of Energy
   - implementation of the 2001/77/EC directive,
   - identification of the national indicative targets,
   - to set up a feed-in tariffs fixed period safety.

3) The National Program to Mitigate the Earth Climate Changes
   - to identify concrete goals to reach in sectors of economics,
   - to increase national obligations of lowering the GHG emissions.

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Slide 16

Building Retrofit and Renewable Energy

Katarzyna Grecka • Izabela Kołacz

Bałtycka Agencja Poszanowania Energii S.A. (BAPE), Gdańsk

1. Introduction

The government document entitled "Strategy of renewable energy sources development" sets quantity aims for RES share in the national energy balance- 7,5% in 2010 and 14% in 2020. Reaching those goals will be difficult in many regions of the country, also due to unequal access to local renewable energy resources. Therefore, it is necessary to search areas with particularly high RES potential which will contribute to improving the energy balance on the national scale.

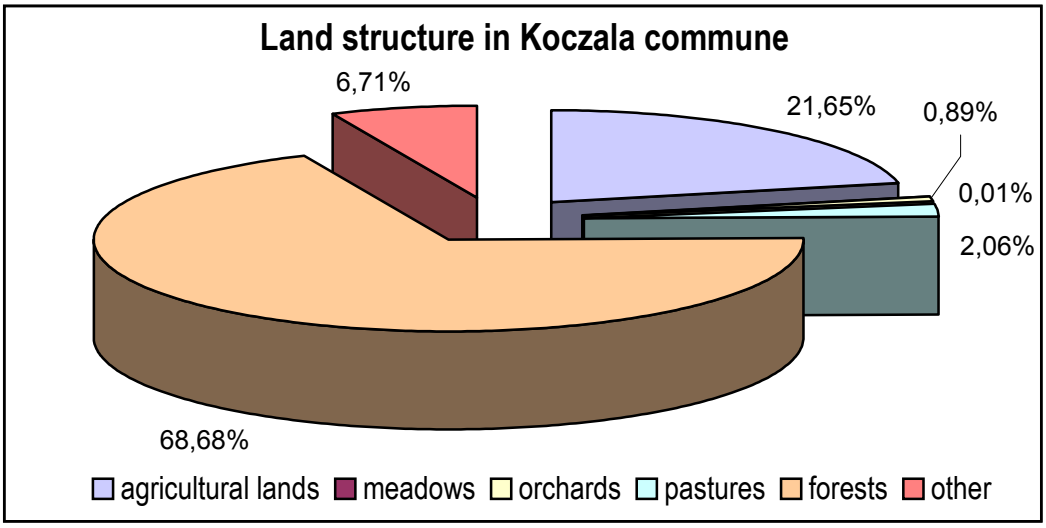
Koczala-a commune in the south of the Pomeranian region- commune characterizes with a very high bio-fuels potential, allowing for satisfying all the commune's energy needs. BAPE prepared a complex program covering activities aiming at lowering the energy demand as well as utilization of renewable energy sources. The program presented below is the first 100% renewable energy program in Poland.

The program was prepared on the basis of the energy supply plan prepared by BAPE, in accordance with local spatial plans, Polish energy and environment policies and with respect to natural conditions of the area. It will be realized for 20 years (2000-2020) but most of the activities will be undertaken by 2010.

2. Characteristics of the commune

The commune area is 222 km^2. Forests cover 145 km^2 (65%) and agricultural areas 60 km^2 (27%). Koczala commune has 3 889 inhabitants, who live in 29 villages. Agriculture and forestry are the main functions of the commune. An average farm is 8,9 ha and 12,8% farms are bigger than 15 ha. Nearly half of the agricultural lands (44,5%) is idle at present. There are three big companies in the commune:

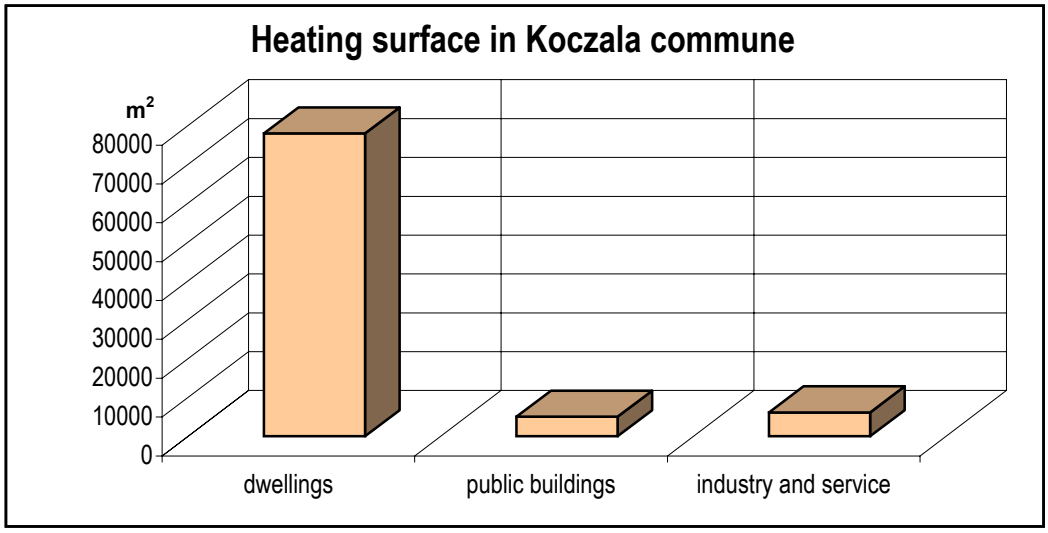
- pig farm,
- fodder manufacturer,
- wood processing company.

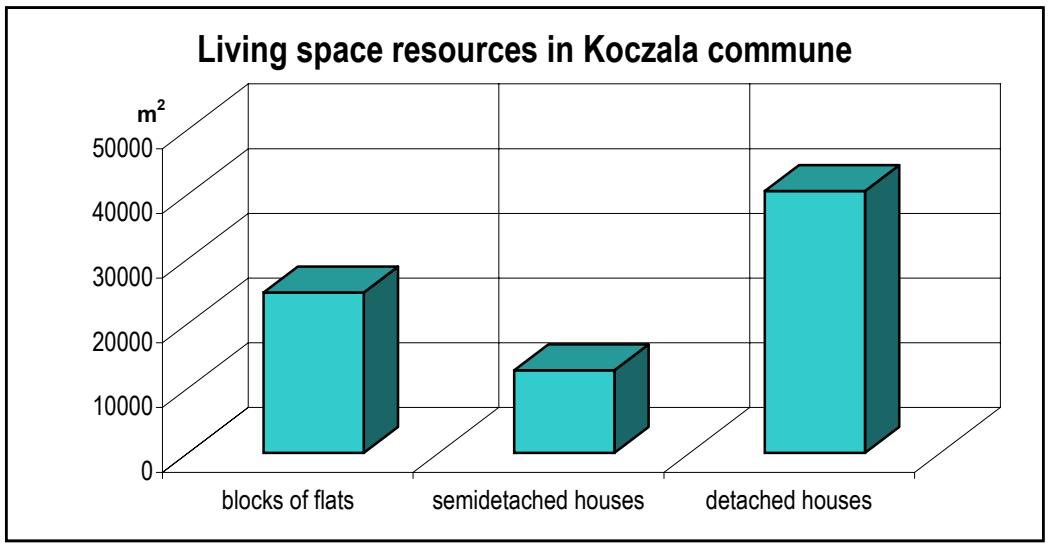


Source: the Communal Office

Dwellings constitute the major part of buildings in the commune. Schools and the kindergarten as well as the communal office and health center are the only public buildings in the commune. There are in total 1 046 dwellings in the commune and most of them are poorly insulated detached houses, heated by individual stoves and boilers.

In Koczala (village) there is a group of block of flats of the total dwelling surface equal 23238 m^2. It is supplied with heat by a local coal boiler house of the total installed capacity equal 5,5 MW, 62% efficiency and poor technical condition.



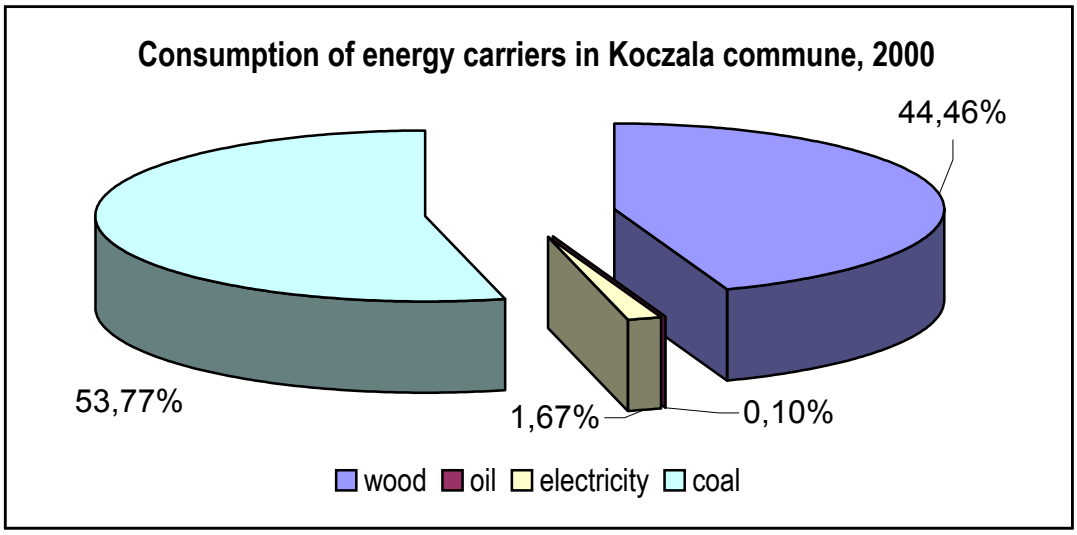


3. Energy needs in the commune before realization of the program

Energy demand in the commune in 2000 was ca. 83500 GJ. The living sector is the main consumer of energy: it consumes 68000 GJ energy, while industry consumes 11000 GJ and the public sector 4500 GJ.

Coal is the main energy carrier in the commune but wood is also a common fuel due to its significant potential in the area. There is no gas distribution line in the commune.

Electricity consumption is 8 500 MWh annually at present. All the electricity is bought from the grid. There are neither hydro power stations nor industrial electricity sources.



4. Program objectives

The program for Koczala commune is based on the following assumptions:

- Decreasing heat demand despite a slight increase in living surface –by undertaking thermo-renovation activities,
- Complete elimination of fossils fuels as energy carriers,
- 100% covering energy demand from renewable energy sources by utilization of wood waste from wood processing industry, organic waste from pig farms and wind energy.

The program will be realized in three stages to 2010.

4.1 Stage I

In the first stage a local boiler station supplying heat to Koczala blocks of flats and public buildings will be modernized. A 1,5 MW waste wood boiler will replace the coal boilers. It will be fired with waste wood from the local sawmill. The boilers will produce 21 000 GJ heat annually- enough to satisfy the energy demand in all the blocks of flats. The investment will also consist of exchanging the district heating network and heat substations in buildings. The stage will be closed by the end of 2002.

4.2 Stage II

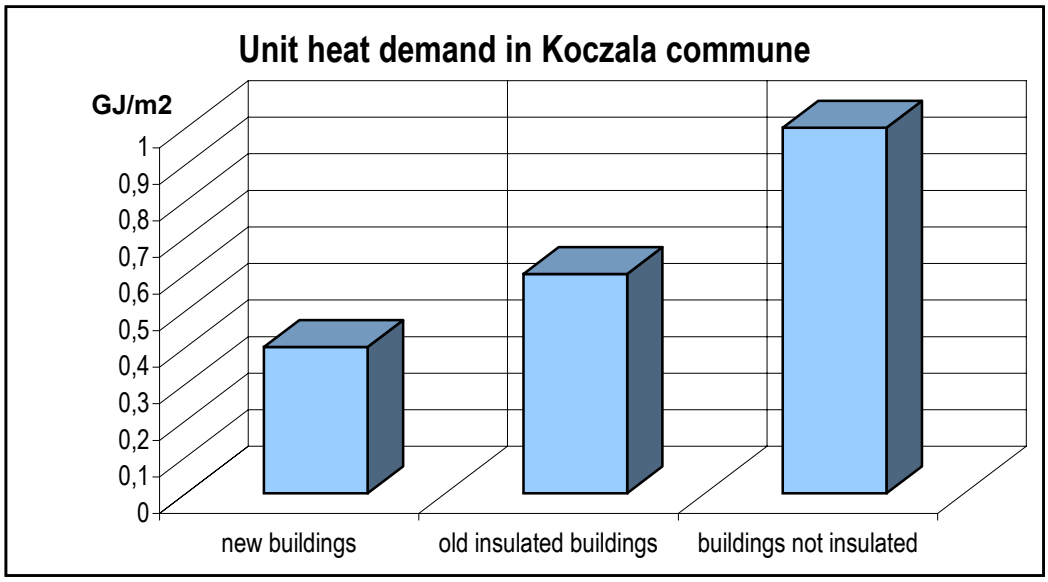
In this stage a biogas plant will be erected. The plant will produce 3 500 000 nm^3 biogas of calorific value 24 MJ/nm^3 from ca. 45 000 t/year animal manure (coming from a big pig farm) and other organic waste. The biogas will be then sent to gas engines connected to electricity generators and heat recovery systems where electricity and heat will be produced. The electrical capacity of the installation is planned to be 1 Mw and thermal capacity- 1,3 MW.

For full utilization of the heat produced in the CHP and the boiler house, ca. 30 detached houses, situated on the outskirts of the blocks of flats area and along the main street in the village, will be connected to the district-heating network. Heat consumption is assumed to be ca. 6600 GJ. The biogas will be also sent by a pipeline to the pig farm and the fodder manufacturer for satisfying thermal energy demand for industrial processes in summer (drying crops). The stage will be realized by 2005.

4.3 Stage III

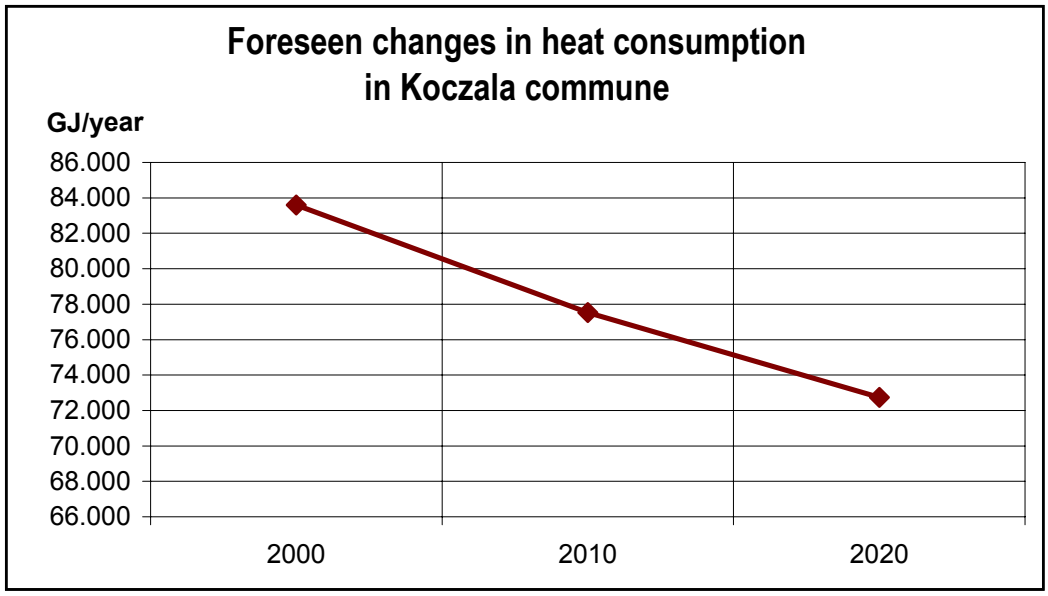
There is an open hill in the center of the commune where the average wind speed exceeds 5 m/s. If the planned wind measurements prove that wind speed is higher than 4 m/s, it will become economically feasible to erect a 3 MW wind turbine, able to produce 6 500 MWh electricity annually. Together with the biogas plant they will fully cover the electricity demand in the commune. The stage will be realized after 2005. It is also planned to gradually replace individual coal boilers with straw and wood boilers. Agricultural idle lands may be used for energy crops. High natural values of the area and its low industrialization make the Koczala commune a very attractive area for tourism development. It is possible to use solar energy for hot tap water production in tourist infrastructure.

Along with the program, thermo-renovation activities will take place: by 2010, 40% of houses that need thermo-renovation will be insulated and nearly 100% in 2020.



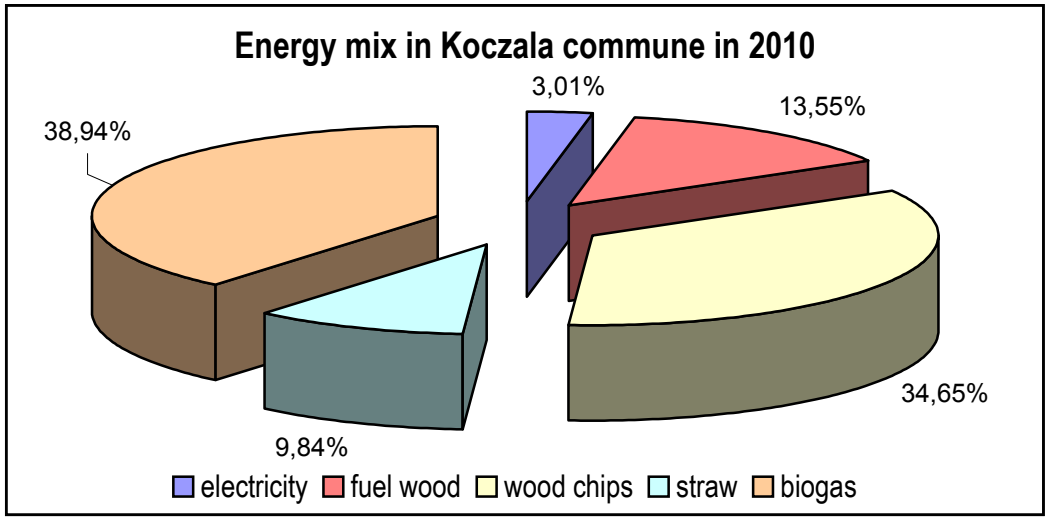
The commune population will hardly change. The living surface increase will be related mostly to increase in living standard and increase in living space per person related to it. Thermo-renovation activities will result in a significant decrease in heat demand:

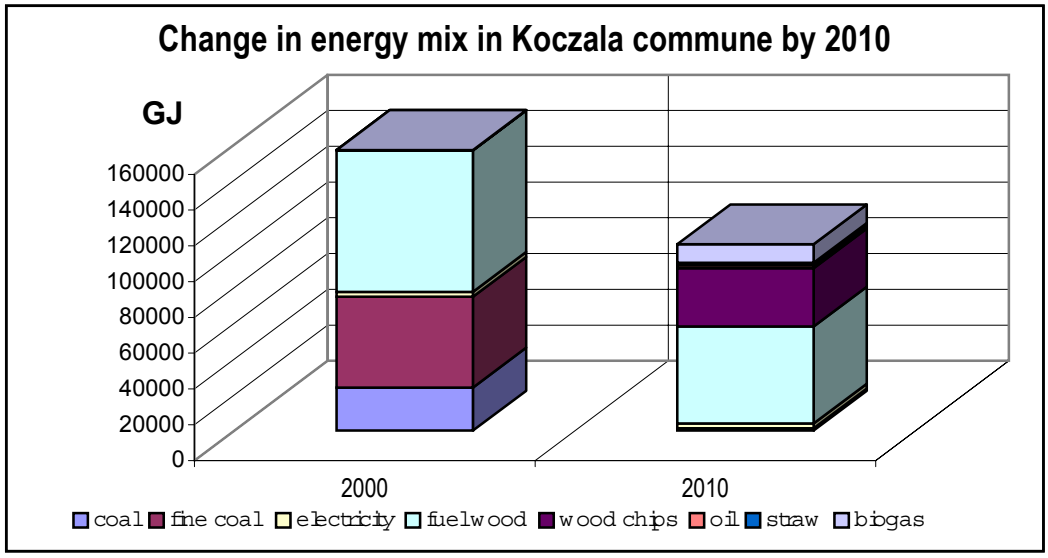
Foreseen change in heat consumption	
Heat consumption	GJ/year
in 2000	83 596
Foreseen for 2010	77 521
Foreseen for 2020	72 744

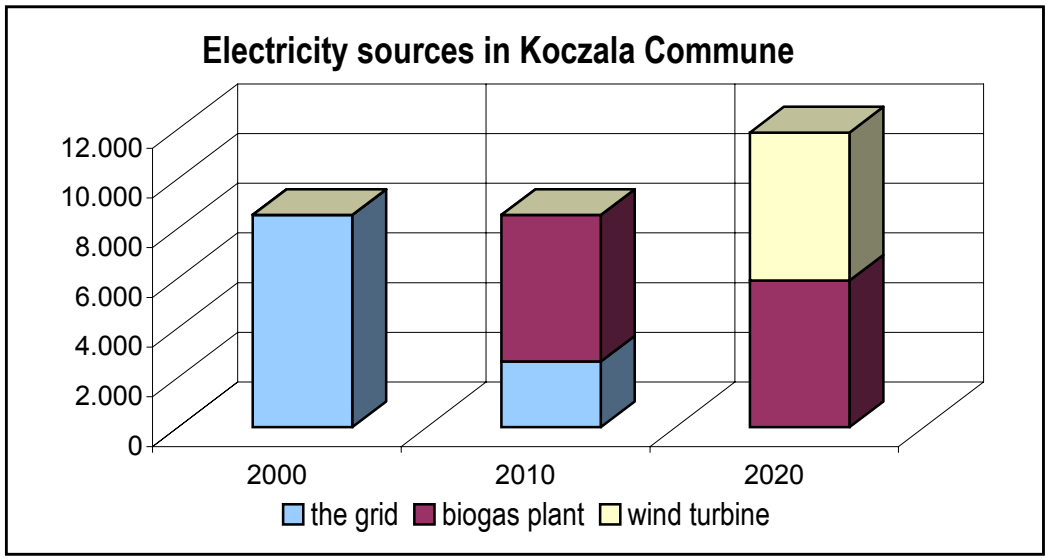


5. Foreseen state after the realization of the program

After realization of the program, all the fossil fuels will be completely eliminated from the commune's energy mix. It will result in lower emissions and increase in security of energy supply. The planned energy mix is presented in the picture below.



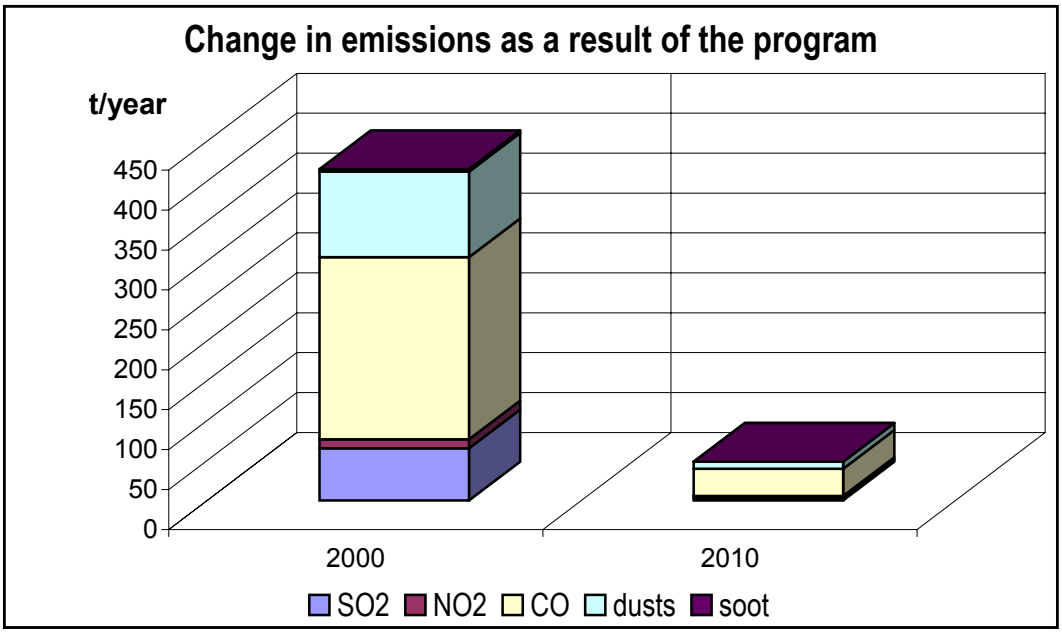


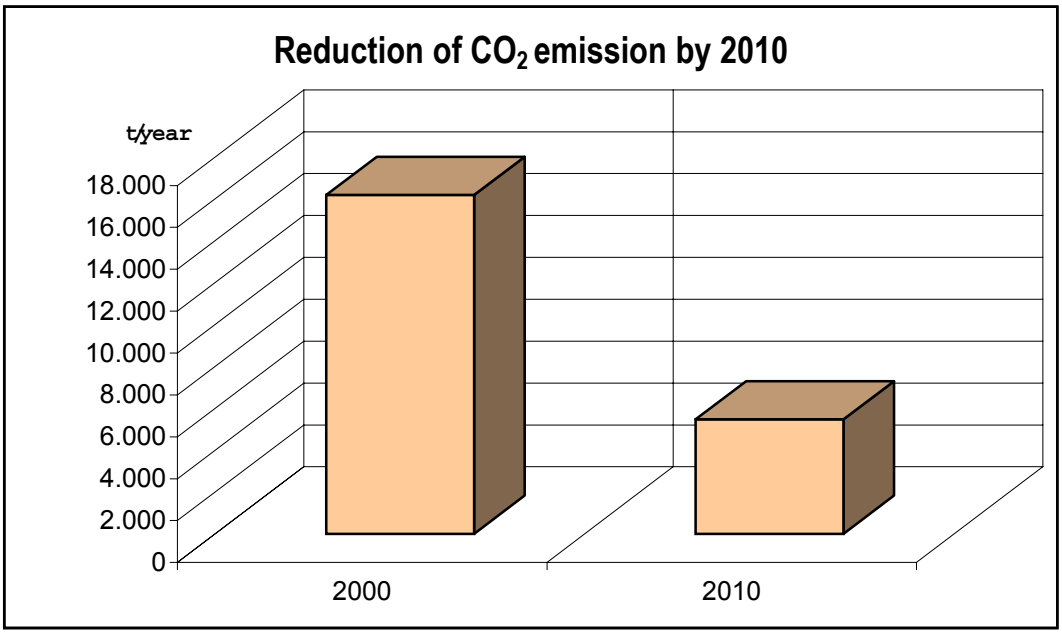


It is assumed that the electricity demand will be fully covered by the biogas plant and the wind turbine. The conversion process will take ca. 10 years.

The proposed changes in the energy mix lead to a significant decrease of emissions. The foreseen environmental effect is presented in the table below.

The environmental effect 2000-2010 low emission.					**Foreseen environmental effect after 2010 / CO_2**				
	Emission 2000 [t/year]	Emission 2010 [t/year]	Emission decrease [t/year]	Emission decrease [%]		Emission 2000 [t/year]	Emission 2010 [t/year]	Emission decrease [t/year]	Emission decrease [%]
	a	b	c =a-b	d=c/a					
SO_2	65,38	2,24	63,14	96,6 %	CO_2	16 177,5*	5 460,0	10 717,5	66,3 %
NO_2	10,93	3,14	7,79	71,3 %	7 637+8540 * * Electricity produced outside the commune area				
CO	228,40	34,15	194,25	85,0 %					
Dusts	107,10	8,94	98,16	91,7 %					
Soot	2,86	0,0	2,86	100 %					





6. Conclusions

It is possible to realize the scenario of complete elimination of fossil fuels due to high potential of renewable energy sources in the area.

Total elimination of fossil fuels will contribute to a significant decrease in emissions to the atmosphere.

Utilization of local fuels will ensure high security of energy supply in the commune.

Surplus bio-fuels and electricity produced in the commune will be sold to neighboring communes.

In case of agro-tourism development, it is possible to use solar energy for hot tap water production.

It is possible to prepare and realize similar program for many other Polish municipalities with high biomass potential.

7. Literature

Wach E., Bućko P., Piontek H., Anioł W., Kołacz I., Słowik J., (2000): Projekt założeń do planu zaopatrzenia w ciepło, energię elektryczną i paliwa gazowe dla gminy Koczała, BAPE S.A.

Grecka K., Wach E., (2000): Renewable energy sources in communal energy supply plans, 7 polsko- duńskie warsztaty „Biomass for Energy".

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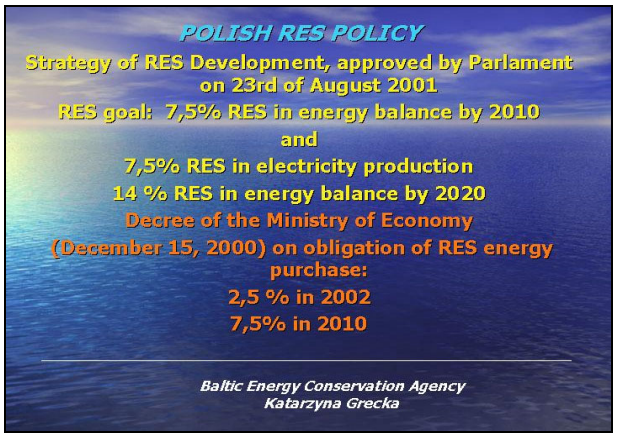

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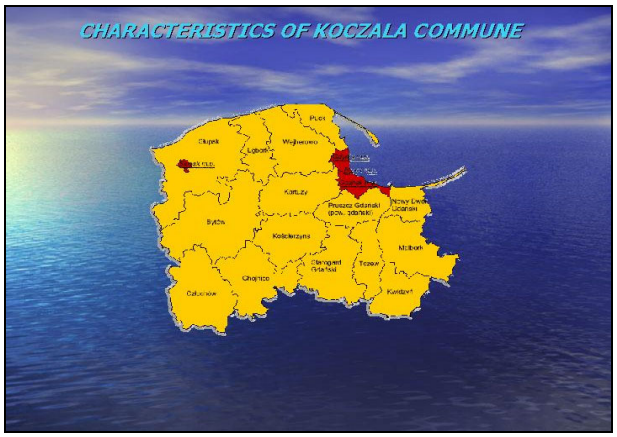

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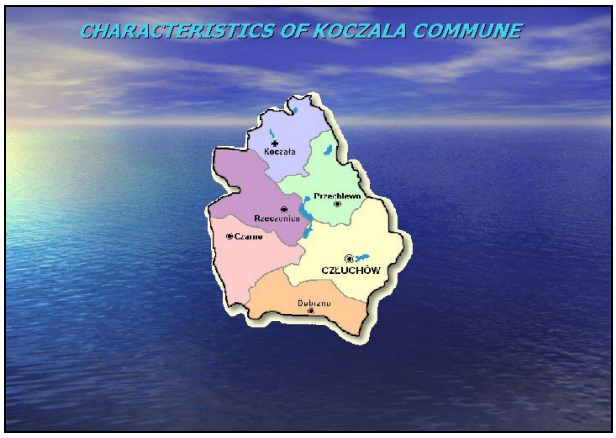

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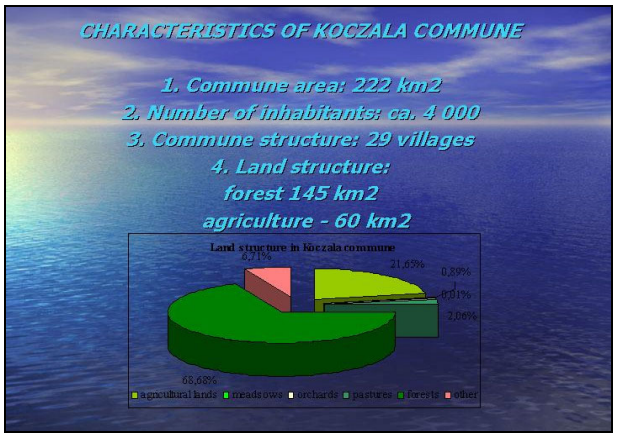

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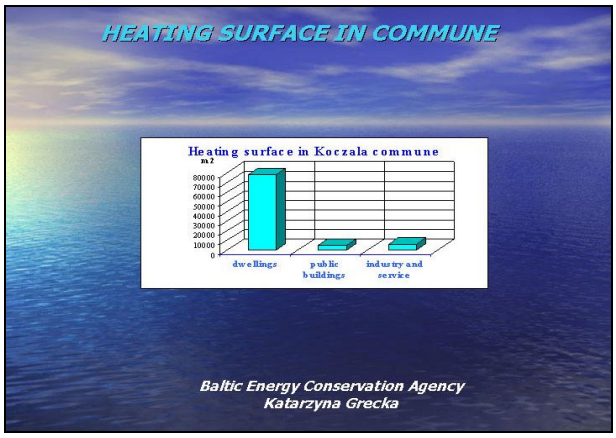

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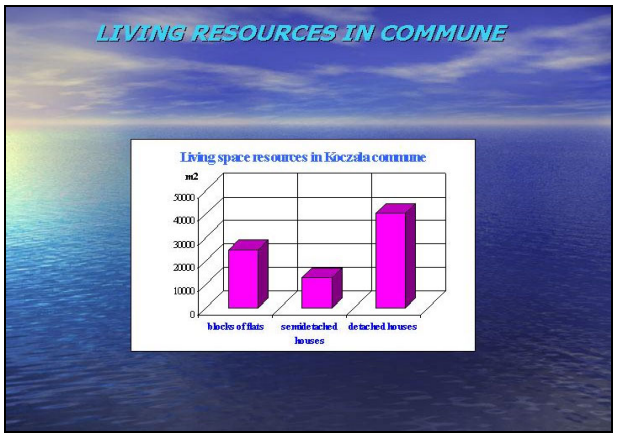

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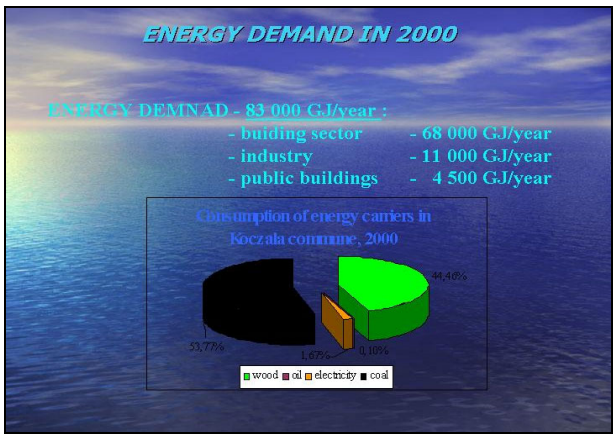

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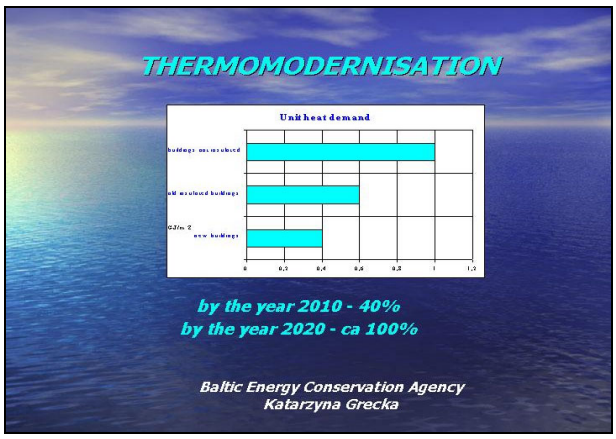

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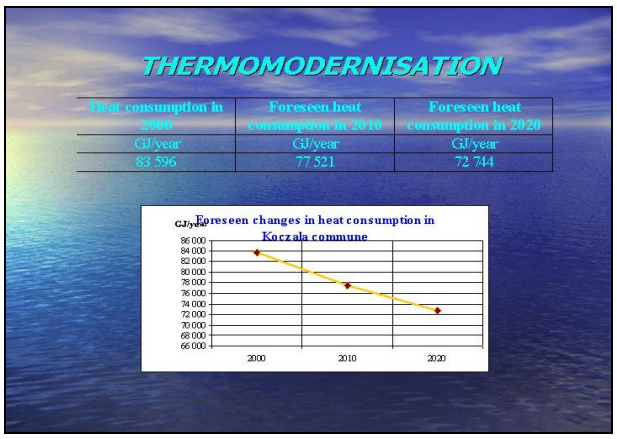

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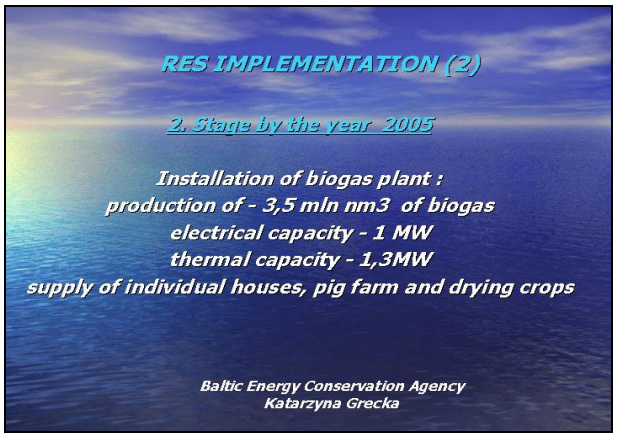

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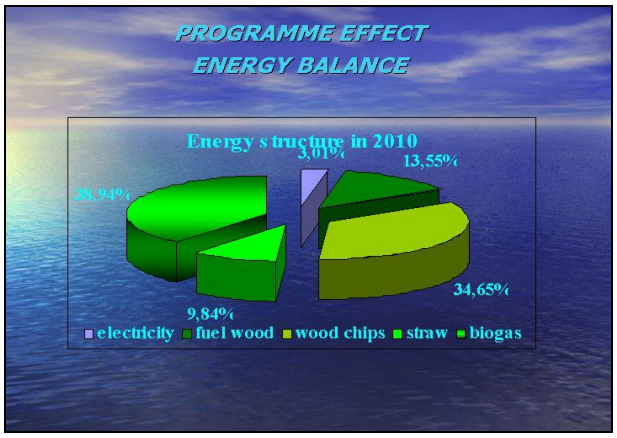

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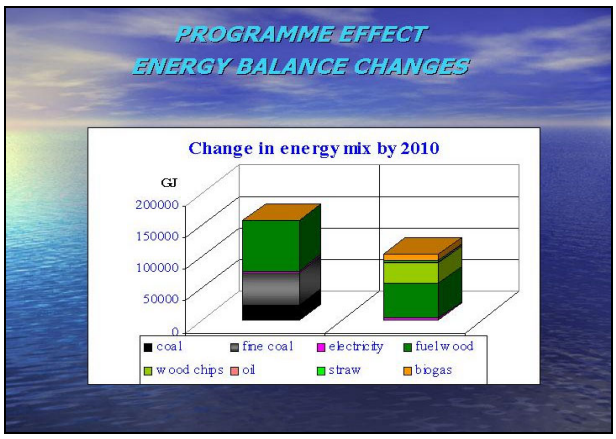

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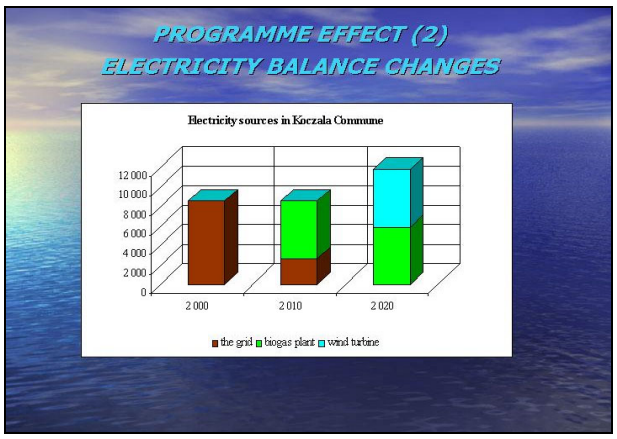

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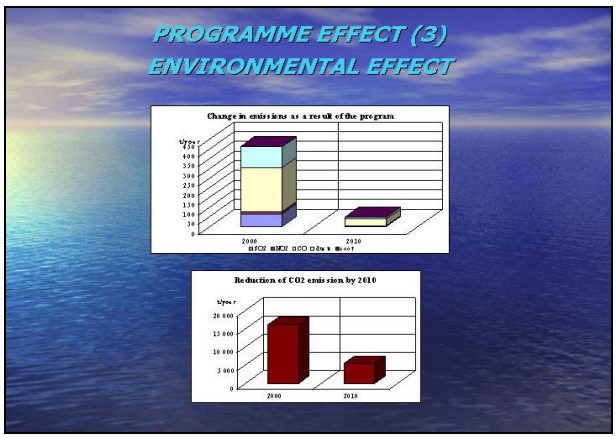

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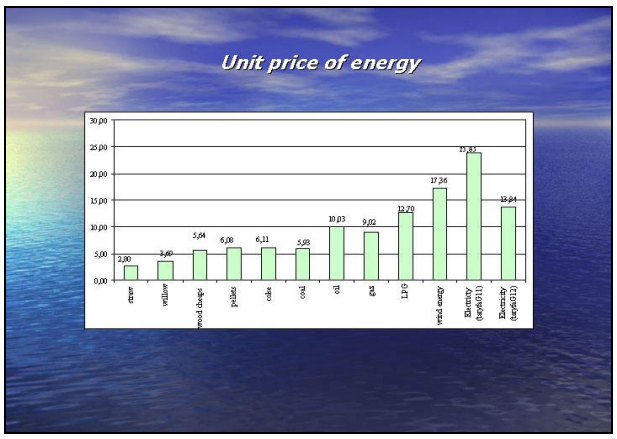

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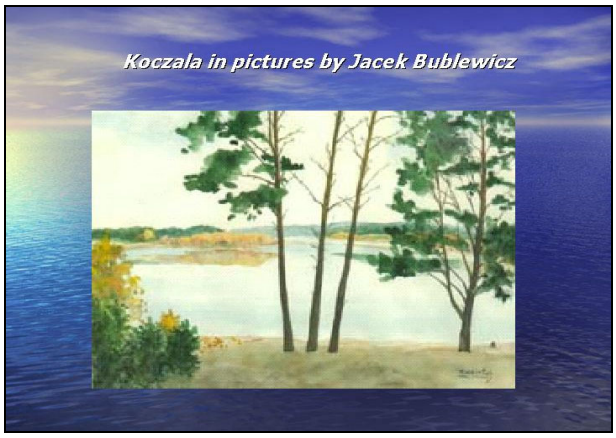

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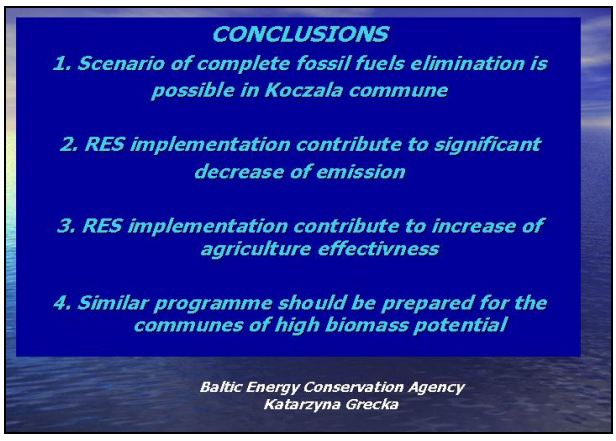

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Discussant Notes • Session: Energy Conversion

Biomass and Small Scale CHP

Dr. Georgiy Geletukha

Engineering Centre "Biomass", Kiev

CTI Capacity Building Seminar for CEE/FSU Countries
Climate Technology and Energy Efficiency – From "Best Practice" Experiences to Policy Diffusion

November 16-20, 2002
Evangelische Akademie
Tutzing, Germany

Energy conversion: Biomass and small-scale CHP
Discussant
Dr. Georgiy Geletukha
Scientific Engineering Centre "BIOMASS", Kiev, Ukraine

Slide 1

Biomass for energy has the biggest from RES feasible potential for the most of EU, CEE and FSU countries.

Table 1. Heat and power production from renewable energy in EU *)

Type of renewable energy sources	Energy production				Total investments in 1997-2010, milliard $	Reduction of CO_2 emission by 2010, mill t/yr
	1995		2010			
	mill toe	%	mill toe	%		
Wind energy	0.35	0.5	6.9	3.8	34.56	72
Hydro energy	26.4	35.5	30.55	16.8	17.16	48
Photovoltaics	0.002	0.003	0.26	0.1	10.8	3
Biomass	**44.8**	**60.2**	**135**	**74.2**	**100.8**	**255**
Geothermal energy	2.5	3.4	5.2	2.9	6	5
Solar thermal collectors	0.26	0.4	4	2.2	28.8	19
TOTAL	74.3	100	182	100	198.12	402

*) Energy for the Future: Renewable Sources of Energy. White Paper for a Community Strategy and Action Plan. Bruxelles, 1997, 53 p.

Slide 2

Poland

The strategic objective is to increase the share of renewable energy sources in Poland's primary energy balance to 7.5% in 2010 and to 14% in 2020.
Total share of biomass is expected of 94.8% from all RES.

Table 2. Base scenario of the implementation of renewable energy technologies up to 2010 *)

RES technologies	Additional capacity 2010 [MW]	Total power [GWh]	Total heat [TJ]	Total energy [TJ]	Share [%]
Wind turbines	600	1,200	0	4,320	1.8%
Small hydro power	200	800	0	2,880	1.2%
Photovoltaics	2	2	0	7	0.0%
Biogas from sludge	**500**	**2,000**	**5,000**	**12,200**	**5.2%**
Biogas from animal manure	**30**	**120**	**150**	**582**	**0.2%**
Landfill gas	**60**	**360**	**420**	**1,716**	**0.7%**
Wood fired CHP	**1,200**	**9,600**	**24,000**	**58,560**	**25%**
Solar air type collectors	100	0	200	200	0.1%
Solar Water type collectors	700	0	2,100	2,100	0.9%
Wood fired district heating plants	**4,700**	**0**	**47,000**	**47,000**	**20%**
Straw fired district heating plants	**2,200**	**0**	**22,000**	**22,000**	**9.4%**
Manually operated wood boilers	**8,900**	**0**	**71,200**	**71,200**	**30%**
Geothermal district heating	400	0	2,400	2,400	1.0%
Rape methyl esters				**2,000**	**0.9%**
Bio-ethanol				**8,000**	**3.4%**
TOTAL				235,165	100%

*) Ministry of Environment, 2000. Development Strategy of Renewable Energy Sector (Strategia rozwoju energetyki odnawialnej), Warsaw

Slide 3

Slovakia

Table 3. Technically available potential of RE-sources in Slovakia [TJ] *)

Type	Technical potential	Current exploitation	Available potential
Geothermal energy	22,680	1,224	21,456
Wind energy	2,178	0	2,178
Solar energy	18,720	25	18,695
Small hydropower plants (SHPP)	3,722	727	2,995
Biomass	**40,453**	**12,683**	**27,770**
Forest biomass	*6,710*	*1,778*	*4,932*
Energy plants	*6,613*	*0*	*6,613*
Wood industry	*15,862*	*9,497*	*6,365*
Agriculture biomass	*8,359*	*216*	*8,143*
WWTP sludge	*828*	*47*	*781*
Domestic waste	*2,081*	*1,145*	*936*
Total	**87,754**	**14,659**	**73,094**

*) Energy Policy of the SR, Ministry of Economy, 2000, updated by EGU for biomass, 2002.

Slide 4

From all bioenergy technologies the priority for the most of CEE and FSU countries are technologies for heat production. Power production is not feasible enough under existing "low" tariffs of the electricity in these countries.

Table 4. Bioenergy equipment that can be installed in Ukraine *)

Type of equipment	Approximate capacity of Ukrainian market, units	Installed capacity		Operation time	Replacement of fossil fuels,	Reduction of CO_2, emission	Total capital investments
		MW_{th}	MW_e	h/year	mtoe/year	mill t/year	mill US $
Wood-fired DH plants, 1-10 MW_{th}	250	500	---	4400	0.21	0.49	38
Industrial wood-fired boilers, 0.1-5 MW_{th}	250	250	---	8000	0.19	0.45	25
Wood-fired CHP plants, 1-10 MW_e	1	10	5	8000	0.014	0.03	5
Domestic wood-fired boilers, 10-50 kW_{th}	53000	1590	---	4400	0.67	1.57	80
Farm straw-fired boilers, 0.1-1 MW_{th}	15900	3180	---	4400	1.34	3.14	254
Straw-fired DH plants, 1-10 MW_{th}	1400	2800	---	4400	1.18	2.76	280
Straw-fired CHP plants, 1-10 MW_e	1	10	5	8000	0.014	0.03	8
Large-scale biogas plants	2903 [1)]	711	325	8000	0.93	22.36	290
Small-scale LFG power plants	90	20	80	8000	0.17	3.26	48
TOTAL	73795	9071	415		4.7	34.13	1027

*) Energy strategy of Ukraine up to 2030, draft (preparing at the moment).

Slide 5

Biomass for energy is one of the best options for GHG reduction

Table 5. Typical levels of GHG reduction for different types of energy production projects

Type of energy production project	Reduction of CO_{2e} during 2008-2012, kt CO_{2e}/ MWe	Income from JI mechanism (under 3$/t CO_{2e}), k$/ MWe	Income from JI mechanism (under 3$/t CO_{2e}), % of total investments
Energy from biomass	26.0-287.0	78.0-861.0	7.8-86.0
Wind power	7.7-32.0	23.1-96.0	2.3-9.6
Hydro power	11.3	33.9	3.4
Geothermal	24.0	72.0	7.2
Co-generation (CHP)	14.8	44.4	4.4

*) data of EcoSecurities Ltd. Refocus, Jan/Feb 2002.

Slide 6

Table 6. Economical and GHG reduction parameters of the Ukrainian bioenergy projects

	Lugansk landfill	Biogas plant at pig breeding farm (Elenovka village)
Investment, thous. USD	1345	413
Installed capacity, MW	2.0_e	$0.16_e + 0.32_{th}$
Emission reduction, thous. t CO2e/y by methane reduction and fossil fuel replacement	70.0	7.5
Emission reduction, t CO2e during 2008-2012 per 1 MW	175	234
Income during 2008-2012 (ERU price – 3 USD/ t CO_{2e}), thous. $US	1050	112
Ratio income / investment, %	78.1	27.2

*) data of EcoSecurities Ltd. Refocus, Jan/Feb 2002.

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Table 7. Examples of JI Projects in Ukraine *)

Project name	Activity	Cost, mill $	CO_2 emission reduction, mill t	Investment per tonne of avoided emission, $/t CO_2	IRR %
Skochinsky mine methane capture and utilisation	Gas capture	52	4.4	11.8	41
Energy efficiency increase at Zaporizhzhya integrated aluminium works	Industrial process	200	9.9	20	18
Associated gas capture for energy production on Kachanov Gas Processing Plant (6 W)	Energy efficiency	3	0.6	5.1	18
Reconstruction of Ivano-Frankivsk CHPP	Energy efficiency	37	4.5	8.1	13
Installation of power plant (2 MW) on landfill gas, Lugansk	**Renewable energy**	**1.5**	**1.4**	**1.1**	**16**
Total for 36 projects		563	66	10.8	

*) JI project database Internet address: www.ji.org.ua

Slide 8

CEE and FSU countries have a huge potential for "concentrated" biomass export to EC:

- Wood, straw and other agricultural residues pellets, briquettes, charcoal;
- Liquid biomass fuels (rapeseed oil, bioethanol, pyrolysis oil etc);

At the moment CEE and FSU countries have surplus of biomass and have no bioenergy equipment (and money to build it).

Export of biomass to EU countries is a good and practically the only one market chance for CEE and FSU countries to reserve money for bioenergy development in their countries. The possible schema:

- Establishment of "National Bioenergy Funds" in CEE and FSU countries;
- Commercial export of biomass to EU;
- Some share of received money have to be transferred to "National Bioenergy Funds" for support of national bioenergy development.

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For example:
Ukraine has about 40 mill t of straw per year.
At least 20% (8 mill t/y) may be exported as pellets to EU.

Cost in Ukraine	20$/t
Transportation	25-40$/t
Expected price in EU	80$/t
Minimum income	20$/t

8 mill t/y * 20 $/t = 160 mill $/y. 20% (about 32 mill $/y) may be transferred to bioenergy fund (reimbursed export VAT may be used for this).

Advantages for EU:
- cheap biomass source;
- possibility to reduce CO_2 emission.

Advantages for CEE and FSU:
- profitable business;
- source of money for bioenergy development;
- budget money are not used for bioenergy development.

CEE and FSU countries have a huge potential for growing of energy crops plantations.

Slide 10

CEE and FSU countries need help from/ cooperation with EU and other reach countries to speed up development of bioenergy.

Possible ways of such help:

- Involvement of CEE and FSU countries in realisation of Kyoto JI and CDM projects. Many things depend from our countries (like ratification of Kyoto protocol). Political requirement to potential EU members to ratify Kyoto protocol will help its ratifications.

- Open markets of EU countries for export of biomass from CEE and FSU (no custom duties).

- Stimulation of EU manufacturers of bioenergy equipment to enter on the markets of CEE and FSU countries. The most perspective strategy is establishment of joint ventures. At the moment it is too risky in the most cases. Under sharing of some risks with EU governments/ banks establishment of such joint venture will be much more active.

Advantages for EU:
- Enter on new markets with EU or EU licensed equipment;
- Possibility to reduce CO_2 emission though Kyoto JI and CDM projects.

Advantages for CEE and FSU:
- Profitable business;
- Fast receiving of technologies.

Slide 11

Topics for discussion:

1. Biomass for energy has the biggest from RES feasible potential for the most of EU, CEE and FSU countries.
2. From all bioenergy technologies the priority for the most of CEE and FSU countries are technologies for heat production.
3. Biomass for energy is one of the best options for GHG reduction.
4. CEE and FSU countries have a huge potential for "concentrated" biomass export to EC.
5. CEE and FSU countries need help from/ cooperation with EU and other reach countries to speed up development of bioenergy.

Slide 12

Between Economics and Environment – Energy Saving in the German Housing Sector

Siegfried Rehberg

Verband Berlin-Brandenburgischer Wohnungsunternehmen e.V., Berlin

Margit Gustiné

∫ integral GmbH, Berlin

The Verband Berlin-Brandenburgischer Wohnungsunternehmen (BBU) membership comprises at present 399 housing associations, limited companies, joint stock companies and housing cooperatives in Berlin and the surrounding province (Land) of Brandenburg. Their combined housing stock currently amounts to 1.2 mln housing units. Roughly 40% of the housing stock of Berlin and Brandenburg is owned by members of the BBU. Our members differ greatly in size, based on the number of dwelling units they manage. Ten associations have a housing stock of 25,000 units or more; 159 members manage 500 units or less.

Due to their origin as non profit companies until the year 1989 and because of their ownership, especially the communal housing associations, they were always ready to prosecute the social aims of environment protection and conservation of natural resources also for their housing stocks. Thereby the economic success of all measures was always the predominant goal, which does not mean that only monetary effects were intended.

Along with a greater competition in the housing sector, the instruments developed with the assistance of BBU in order to reduce costs, especially operating expense, are now increasingly implemented by the housing associations. The BBU is sure, that not only political requirements like the Energy Conservation Ordinance of the German government will cause noticeable effects of energy conservation on the housing stock. There will also be the initiative of housing associations to improve the quality and reduce the costs of their dwellings, in consideration of the decreasing of public aid for energy saving measures in the future.

Since the 70's they successfully reduced the annual consumption of final energy for room heating from 280 kwh/m²/year dwelling floor area to 145 kwh/m²/year, but further reduction could be realized. The analysis of energy balances shows, that some associations could reduce the average of energy consumption to less than 100 kwh/m²/year.

There are some types of buildings, that with a considerable effort can be transformed into a so called „3-litre-house", but those examples only show which technical and organizational specifications can be realized. With a justifiable economic expense, the energy consumption in the housing stock can probably be reduced during the next years to an average from 50 to 100 kwh/m²/year for room heating and 25 to 35 kwh/m²/year for water heating.

Structure:

1. The German housing sector and problems in the Neue Länder
   a. Structure
   b. Running costs for residential buildings
   c. Operating expense/ heat energy costs
   Excursion: specific energy consumption due to different heating limits in Germany and the MOE.
2. Energy saving strategies concerning the housing sector
   a. Energy policy measures adopted by the German government
      • Energy Conservation Act of 1977
      • Decree on Heat Cost Allocation
      • Energy Conservation Ordinance 2002
      • Excursion: Energy Strategies 2010 of the Land Brandenburg
   b. Measures adopted by housing associations:
      • increase rents – lower operating expenses
      • use synergy effects
      • improve security against increasing energy coasts
      • improve image for better rent of dwellings
      • lower the coasts of vacancy.

3. Best Practice Experiences
   Successful strategies and results of energy saving measures are illustrated using the examples of two housing associations in Berlin (26.000 housing units and 10.000 housing units)
   a. Administrative measures for energy conservation
      • Controlling
   b. Low cost investments
      • improvement of heating regulation
      • thermal insulation of joints and roof
   c. Higher investments
      • changing of energy supply / e.g. District heating building substations
      • renewal of heating and water heating systems
      • renewal of windows
      • thermal insulation of the building shell
      • use of renewable energy sources and block type power stations
      • controlled ventilation and heat recovery

BBU – Portrait of a strong partner in the housing sector of Berlin and Brandenburg

Our members and what we do for them

The BBU membership comprises at present 399 housing associations, limited companies, joint stock companies and housing cooperatives in Berlin and the surrounding province (Land) of Brandenburg. Their combined housing stock currently amounts to 1.2 million housing units. Roughly 40% of the housing stock of Berlin and Brandenburg is owned by members of the BBU. Our members differ greatly in size, based on the number of dwelling units they manage. Ten associations have a housing stock of 25,000 units or more; 159 members manage 500 units or less.

Our main function is the representation of members' interests and lobbying of the Berlin and Brandenburg governments. In addition we audit member's accounts and fulfill the role of tax consultant. Our subsidiary companies cover auditing, tax consulting, project management, management consulting, financing and portfolio analysis aspects.

Market orientation succeeds a subsidy regime

During the past five decades housing construction in Berlin was more or less publicly subsidized. In East Berlin and Brandenburg house construction was a government responsibility until after German reunification in 1990. In West Berlin building was primarily confined to social housing. After 1990 the governments of Berlin and Brandenburg continued to subsidize the housing sector. Recent budgetary problems have forced the government of Berlin to abandon subsidized social housing construction completely and to reduce all other subsidies in the housing sector to a minimum. In Brandenburg we are facing a similar situation. In future, investment in the housing sector will be governed by market mechanisms and market criteria only. This forces our members to adopt new market oriented strategies.

Oversupply currently governs the housing markets

The collapse of industry in Berlin caused a dramatic loss of workplaces. Since 1990 Berlin has lost 300,000 formerly subsidized industrial jobs. These losses have in no way been compensated for by new job creation in the service industry in the city. As a result, numerous households have moved to economically better off areas in the western part of Germany. Additionally, many households migrated to communities outside the city borders in order to live in owner occupied single and double family houses, which were not available at an acceptable cost within the city's boundaries. The decline in population was not balanced out by immigration into Berlin. As a result of all these developments the city's population stagnated and fell slightly from 3,43 million inhabitants in 1990 to 3,38 in 2001.

Berlin has at present a housing stock of 1,85 million housing units. The empty stock amounts at present to some 130,000 flats. The reason for this excess stock can only partly be explained by the population decline. A fundamental reason for this oversupply is the completion of 153,000 new dwellings between 1990 and 2000 in the city itself and 107,000 in neighboring communities. There are high numbers of unoccupied flats in particular in the prefab apartment blocks on the outskirts of East Berlin. Our large housing associations in the districts of Marzahn and Hellersdorf have to cope with a 15% rate of empty accommodation.

Berlin has a social housing stock of 250,000 apartments with rents regulated by the city government. This low rent stock is provided for low income households eligible for social housing It is of interest that about 40 % of Berlin households qualify for social housing on a means test basis.

Social problems in the housing stock

It is the big social housing estates, built in the seventies on the outskirts of the western part of the city and the prefab high rise estates in the eastern part of the city – which are primarily affected by a high rate of empty stock. The housing associations make every effort to make improve tenant comfort in order to retain them and to stem a rising vacancy rate. The retention of middleclass households in these residential areas is especially important, because without them social imbalances and a tendency towards social segregation would result.

It is also part of Berlin's housing policy to maintain the social mixture in the social housing stock and to prevent domination by low income households. For this reason the Berlin government has recently abolished the requirement for tenants with a comparably high income living in social housing stock to pay a rent surcharge. It is hoped that this will persuade these tenants to stay put. The surcharge on top of the basic rent had encouraged many of these tenants to move out and to seek alternative accommodation in nonsocial (private) housing stock.

Berlin also has depressed urban areas with a high level of poverty and unemployment. The city government is attempting to improve living conditions in these areas by providing a special social management system. This includes, for example, the introduction of self help projects.

Privatization in Berlin

In Berlin the city owned housing companies and associations are required to render a dividend of at least 5 % of the original capital. Together with other special payments, this is an essential contribution to the city's budget which, as you might be aware, is currently faced with an massive financial deficit. Expenditure exceeds revenue to a very great extent. As a further burden for the housing sector, individual associations were compelled to purchase other Berlin owned housing companies; and to transfer the purchasing price to the city of Berlin to create additional revenue for the city's coffers. In order to finance these transactions the associations were forced to sell part of their housing stock. Dwellings were sold either to investors or to tenant households. Finally, as a further boost for its finances, Berlin sold off one of its housing associations to a private corporation.

Selling flats to tenant households is a difficult business in Berlin nowadays. Berlin is still a so called "tenants city". Only 11% of the housing stock in Berlin is owner occupied. Berlin wants to this percentage to increase and has encouraged their housing associations to sell 15% of their stock to tenants. This has proved to be extremely difficult mainly because of the low level of rents in Berlin compared to other large cities in West Germany. Living in rented accommodation is still cheaper by far than owner occupation.

The housing market in Brandenburg

Since 1990 Brandenburg has experienced an almost complete breakdown of the former GDR industrial base; and, in southern Brandenburg, a considerable decline in its coal-mining industry. This has prompted the younger workforce in particular to leave Brandenburg, thus causing a dramatic increase in empty housing stock during the second half of the 1990s.

Between 1995 and 2001 the empty stock of BBU members in Brandenburg increased from 19,000 vacant flats (4,2 % of the complete stock) to 58,000 (13,6 %). A total of 54 out of 261 associations and cooperatives had to cope with over 15% of empty stock in 2001. In 2001 our members had an outlay of some 58,0 million euro to meet the debts incurred during the GDR regime and to cover the operating costs of the empty stock.

Part of the solution to the empty stock problem in Brandenburg is the demolition of the unoccupied flats. However because of the economic weakness of many of our members extensive government assistance is required. This assistance is necessary not only for demolition; but also, and far more importantly to avoid a future wave of bankruptcies. These would represent a political disaster and would be above all an economic disaster for the mortgage banks.

A further negative aspect is low occupation rates in flats in badly constructed buildings; poor technical facilities; and with badly designed floor plans. The associations and co-operatives are therefore making every effort to improve the quality of these apartments and bring them back on the market as a competitive product.

Finally, when over demand governed the housing markets in the past, those seeking accommodation had to accept what they were offered and there was no necessity for the provider – the associations, to be service oriented. Our members are struggling now to change that, because they have learnt that service orientation is the key to success in the housing market of the future.

Between economics and environment –
Energy saving in the German Housing sector

Siegfried Rehberg
Verband Berlin-Brandenburgischer Wohnungsunternehmen e.V., Berlin
Margit Gustiné
Integral GmbH, Berlin

11 Tutzing Präs.ppt 1

Slide 1

Structure

1. The Housing sector in Berlin and Brandenburg
2. Energy-saving strategies concerning the housing sector
3. Best Practice Experiences

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Slide 2

1. The Housing sector in Berlin and Brandenburg

Housing-stock 31. Dezember 2001

	Housing-units total	Housing-units BBU-members	thereof: Old stock before 1949	thereof: New stock after 1949	thereof: Prefab Buildings	Empty stock	Empty stock in %
Berlin	1.869.865	752.000	241.000	511.000		44.750	6,0
West	1.154.802	371.000	150.000	221.000	50.000	12.750	3,4
East	715.063	381.000	91.000	290.000	230.000	32.000	8,4
Land Brandenburg	1.251.223	440.000	100.000	340.000	270.000	59.000	13,7
Inside motorway circle	444.151	125.000					
Periphery	807.072	315.000					
Berlin/ Brandenburg total	3.121.088	1.191.533			550.000	103.750	

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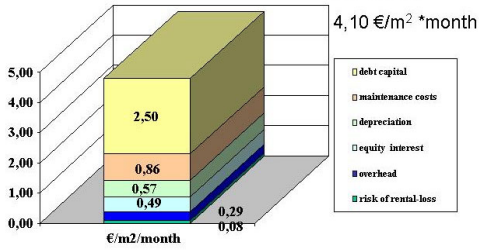
Slide 3

Components of the rental fee

Rental fee:
4,10 €/m² *month



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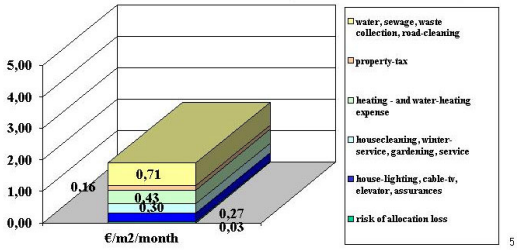
Components of the operating expense

operating expense:
1,90 €/m² * month



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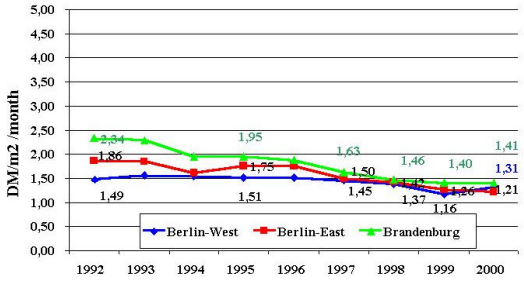
Slide 5

Warm operating expenses

average of the housing-stock
(mean-values from housing-associations with more than 1.000 housing-units, without elevators)



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2. Energy – saving strategies by housing associations:

- Realize the "energy conservation act"
- increase rents – lower operation-related costs
- use synergy-effects
- improve security against increasing energy-costs
- improve image for better rent of dwellings
- lower the costs of vacancy

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Heating standards

	Tempera-ture in living-rooms	Temperature in bathroom and WC	23.00 h to 6.00 h	Heating - period	Heating "degree-days" (average year)
Berlin/ Brandenburg	20 ° C	21 ° C	18 °C	September to Mai (start/ end if the outdoor-temperature at 21.00 h is at least 3 days lower than 12 ° C usually 250 heating-days	3.800
Riga	Mind. 20° C Overheating of many flats	Mind. 20° C	17 °C	September to Mai (start/ end if the outdoor-temperature is lower than 8 ° C ; usually 199 heating-days	3.662 .... 4.259

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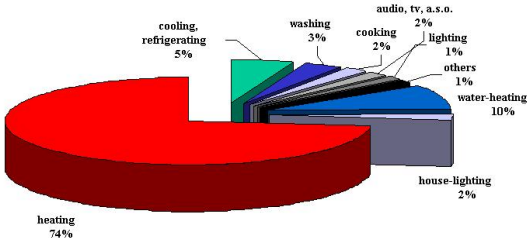
End energy use in households
(flat 65 m² - 3 persons)



heating	= 147 kWh/m²*a
water-heating	= 20 kWh/m²*a

Total = 12.925 kWh/a
= 199 kWh/m²

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Costs of energy consumption in households

Electric power consumption	3.500 kWh	500 ... 700 € / a
heating	9.425 kWh	500 € / a
total	12.925 kWh	1.000 ... 1.200 € /a

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3. Best Practice Experiences for energy saving

- Administrative measures / Energy controlling
- Low cost investments
- Higher investments with longtime amortisation

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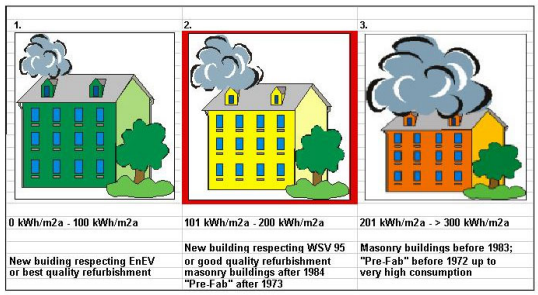
Classes of energy consumption heating-energy



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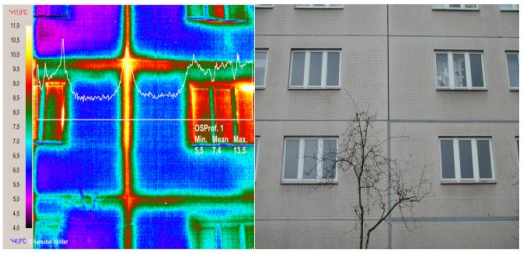
Energiebilanzen in der wohnungswirtschaftlichen Alltagspraxis

Determination of energetic weak spots by thermography

(Pict. Quartier Obstallee)

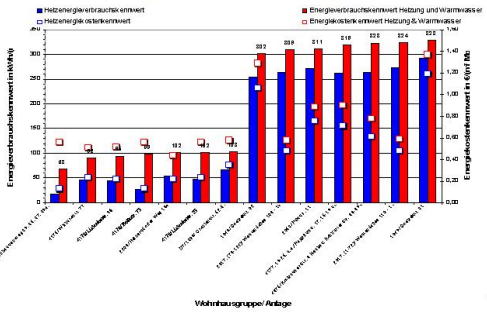


GB 11/2002 *Syrius* GmbH GSW

Slide 13

Energy consumption characteristics „TOP / FLOP LIST“

Top/Flop-Liste Energieverbrauchskennwerte Heizung & Warmwasser 1999



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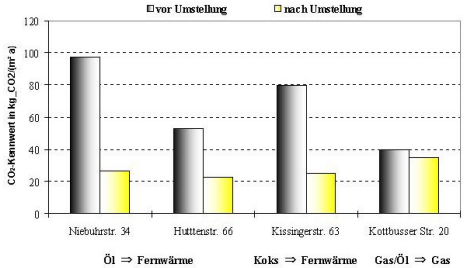
Reduction of CO_2 emissions by substituting the energy source

CO_2-Einspareffekte durch Energieträgerwechsel



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Ways of saving energy in pre fab housing (including moisture protection)

- Improvement of technical service facilities (e.g. installation of modern heating boilers or district-heating substations, thermostats, thermal insulation of pipes and fittings a.s.o.)
- Retrofitting thermostatic valves on radiators and installation of use controled cost measurements
- Replacement of radiators under the aspects of damage, inefficiency ...)
- Changes in user behaviour (e.g. temperatur control geared to the specific room use ...)
- Structural intervention - e.g. additional heat insulation on:
  - the facade,
  - The roof and the lower ceiling
  - installation of heat-insulation windows)
- Energy-conservation contracting

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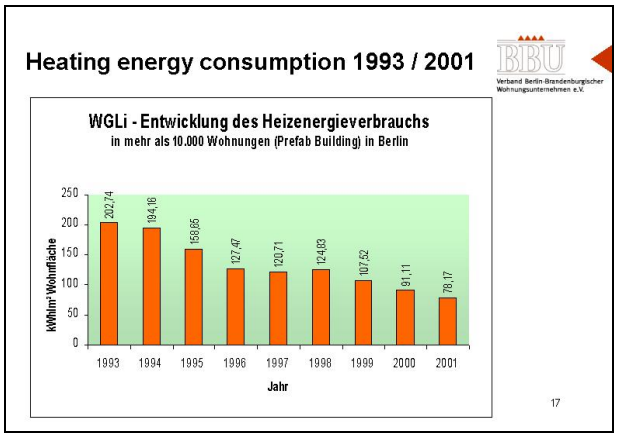

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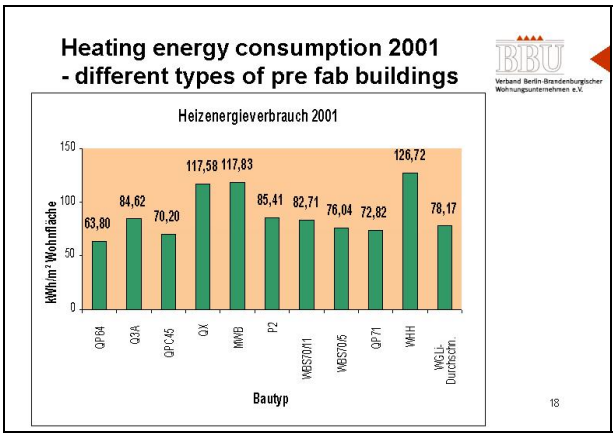

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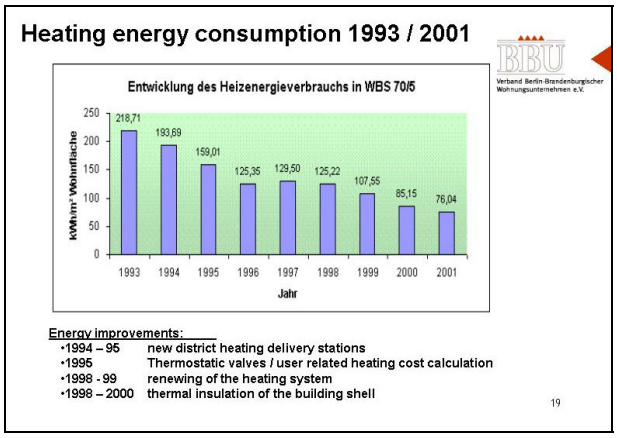

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Implementation of Performance Contracting in Slovenia

Barbara Petelin Visočnik

"Jožef Stefan" Institute, Ljubljana

Ralf Goldmann

Berliner Energieagentur GmbH, Berlin

Economic development of today's world is essentially dependent on the use of energy, which is irrepressibly increasing.

In the period from 1994 to 1997 energy use in European Union increased by 1,8 %, while this increase in Slovenia, one of the smallest countries in Central and Eastern Europe and a European Union candidate country, amounted to even 3,6 %. Energy statistics further show that only 44,2 % of Slovenia's energy consumption is covered by domestic energy sources, that energy intensity is 1,4 times higher than in the European Union, that the country's energy prices are 15 % lower in comparison to western European levels and that estimated energy saving potential is considerable. In order to improve the current situation in Slovenia there is, like in other accession countries, a high demand for investment in energy efficiency measures.

While efficient energy use is becoming more and more a stable practice in the Slovene industry, this is not a case in the public sector, where a small share of energy costs in total costs and a lack of money do not stimulate investments in energy efficiency. To overcome this lack of interest and make a good use of the energy saving potential in the public sector with the involvement of private capital, the European Commission in the Council Directive 93/76/EEC recommended to the member states to draw up and implement programs to permit a concept known as Third Party Financing *(TPF)* for energy efficiency investments in the public sector. Since the adoption of the directive in 1993 this concept, which is usually implemented by Energy Service Companies *(ESCO's)*, has already been implemented on a broad scale throughout Europe, also in Central and Eastern European countries, where there are, despite some positive projects, still certain barriers to overcome especially with regard to smaller projects in general and the application of Energy Performance Contracting *(EPC)*.

Within the *TRANSFORM program*, supported by the German government, a project *"Support for the Promotion of Third Party Financing of Energy Efficiency Investments in Slovenia"* was performed. The Project was coordinated by the Berlin Energy Agency and the Slovene state-owned Agency for Efficient Use of Energy *(AURE)* and the Institute "Jožef Stefan" were qualified as local competence centers for performance contracting. The project aimed at the sustainable development of the performance contracting market in the Slovene public sector, especially in municipalities and also hospitals.

Within the project a model contract for performance contracting under Slovenian framework conditions was developed and municipalities for possible pilot projects were identified. As a result of the analysis pilot performance contracting projects were developed in two municipalities. The tendering procedures for future energy saving partnerships were then handled according to comparable projects in Berlin. A best practice project for performance contracting was realized with a building pool in the municipality of Kranj, which annually consumes about 0,5 Mio. Euro of energy costs in a building pool of 14 buildings comprising administration buildings, schools and gymnasiums. The expected energy saving potential amounts to 15,1 %. The contract for the building pool was signed with a Slovenian contractor at the end of November 2001.

Though the project has removed some of the main barriers which were preventing a successful implementation of energy performance contracting in the Slovene public sector there are still some barriers remaining preventing a full development of the *TPF* market:

- lack of adequate information about *TPF* among potential users, their reluctance to long-term contracts and to the involvement of the private capital in the public sector,

which causes a skepticism of users towards this financing concept,

- lack of interest for *TPF* among potential users is caused also by a small share of energy costs in the overall costs which makes investments in energy efficiency unattractive,
- also the liberalization of energy market makes energy investments less favorable, because users are expecting that energy prices, which are now relatively high, are going to decrease,
- the Slovene *TPF* market is not yet enough developed to offer an appropriate number of domestic *TPF* providers, while at the same time the investors from abroad either take Slovenia as a too small market to have an interest to involve or they face problems with all the requirements they have to fulfill within the tendering procedures,
- even though that *AURE* is taking an active part in development of the *TPF* market, the Ministry of Finance has not yet taken up a point of view on *TPF*, which can cause unexpected problems for the users in the process of preparation and implementation of the *TPF* projects,
- the model contracts and tendering procedures have been developed, but the Public Procurement Law does not yet cover the *TPF* area, which makes the preparation and implementation of tendering procedures to be more uncertain for the users,
- further problems with development of *TPF* projects are connected with poor availability of energy data in the public sector and with the transfer of the ownership of the installed equipment and the calculation of value added tax.

To overcome this still existing barriers for development of the *TPF* market in the candidate countries of Central and Eastern Europe is the Berlin Energy Agency in collaboration with Energieverwertungsagentur from Austria and partners from eight *CEE* countries going to start a new project co-financed under the SAVE-Program. The main target areas of the project are investments into energy efficiency measures in the public sector and small scale *CHP*, where the allocation of private capital is hindered by relatively high transaction costs compared to the overall project volume. Within the project a Clearing House for *TPF* projects is going to be established in Berlin and competence contact points in the respective *CEE* countries are going to be created. This way common problems will be solved more effectively and the access for the private investors to the market in the *CEEC* will be facilitated with lower transaction costs. It is expected that the project is going to spread the adoption of the *TPF* approach and the development of concrete investment projects financed through this scheme in *CEE* countries.

Climate Technology and Energy Efficiency - From "Best Practice" Experiences to Policy Diffusion

Evangelische Akademie Tutzing, Germany
16th to 20th November 2002

IMPLEMENTATION OF PERFORMANCE CONTRACTING IN SLOVENIA

Barbara Petelin Visočnik
Jožef Stefan Institute, Energy Efficiency Centre

Ralf Goldmann
Berliner Energieagentur GmbH

Slide 1

FACTS ABOUT SLOVENIA

General data

- 20,273 km^2, 1,99 Mio inhabitants
- GDP 9.100 USD per capita

Energy data

- gross inland consumption 1997: 6,4 Mtoe
- consumption covered by domestic energy sources: 44,2 %
- energy use increase 1994 - 1997: 3,6 %
- energy intensity: 1,4 times higher than in EU
- energy prices: 15 % lower than in EU

Slide 2

ENERGY EFFICIENCY IN PUBLIC SECTOR IN SLOVENIA

Opportunities for energy efficiency

- estimated energy use (1997): 9,1 PJ
- estimated energy saving potential (1995): 34 %

Obstacles to energy efficiency

- small share of energy costs in overall costs
- low interest in energy efficiency
- lack of skilled people
- lack of money for investments in energy efficiency

Slide 3

THIRD PARTY FINANCING IN EUROPE

In the year 1993 European Commission launched

Council Directive 93/76/EEC to limit CO_2 emissions by improving energy efficiency

Article 4:

Member States shall draw up and implement programmes to permit third-party financing for energy efficiency investments in the public sector.

Slide 4

THIRD PARTY FINANCING IN SLOVENIA (1)

- No Third Party Financing before 1999
- 1999 launch of a project

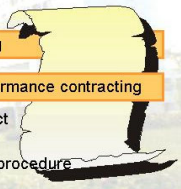
"Support for the Promotion of Third Party Financing of Energy Effciency Investments in Slovenia"

- within the TRANSFORM programme supported by the German Government
- coordinated by:
  - Berliner Energieagentur GmbH
  - Agency for Efficient Use of Energy
    Ministry for environment, spatial planning and energy

Slide 5

THIRD PARTY FINANCING IN SLOVENIA (2)

- Aim of the project:
  Sustainable development of the performance contracting market in the Slovene public sector.
- Objectives of the project:
  - Basic information on Third Party Financing
  - Development of a model contract for performance contracting
    - based on a German Standard Contract
    - adjusted under Slovene law
    - selection of an appropriate tendering procedure



Slide 6

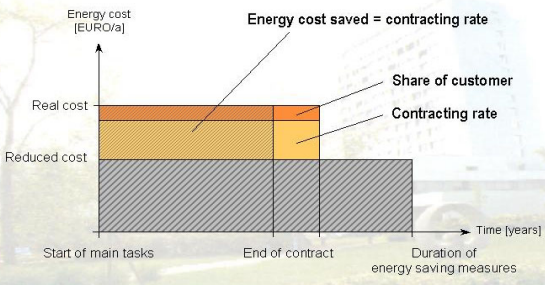
THIRD PARTY FINANCING IN SLOVENIA (3)

- Identification of possible pilot projects in municipalities
  - first questionnaires and detailed overview of energy data
  - selection of appropriate municipalities
  - start of the tendering procedure
- Pilot project in municipality of Kranj

  - building pool of 14 buildings with 0,5 Mio € of energy costs
  - guaranteed saving potential: 15,1 %
  - signing of a contract: 27.11.2001
- Qualification of local competence centres
  - Agency for Efficient Use of Energy
  - Jožef Stefan Institute, Energy Efficiency Centre

Slide 7

USED PERFORMANCE CONTRACTING MODEL



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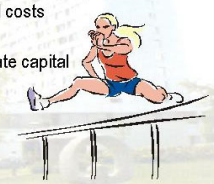
Implementation of Performance Contracting in Slovenia

PROBLEMS OF THE PILOT PROJECT IMPLEMENTATION (1)

Project Preparation and Development

- How to convince the municipality to start the project
  - small share of energy costs in the overall costs
  - reluctance to long-term contracts
  - reluctance to the involvement of the private capital
  - question of local employment
  - liberalization of energy market
- Baseline determination difficulties
  - poor availability of energy data
  - need for additional measurements



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Implementation of Performance Contracting in Slovenia

PROBLEMS OF THE PILOT PROJECT IMPLEMENTATION (2)

- Municipal project leader
  - overloaded municipal employees
  - lack of knowledge and experiences in the field of energy and TPF

Tendering Procedure and Awarding of a Contract

- No standpoint on TPF from Ministry of Finance
- TPF not included in Public Procurement Law
- TPF market is not yet enough developed
  - lack of domestic TPF providers
  - problems with tendering procedure or not interested foreign investors

Slide 10

Implementation of Performance Contracting in Slovenia

PROBLEMS OF THE PILOT PROJECT IMPLEMENTATION (3)

- Transfer of ownership and VAT

Tendering Procedure and Main Project Phase

- Change of the building use
- Lack of the TPF provider experiences
- Building users are used to the old building conditions
- TPF provider as the cause of all energy connected problems
  - boundary between TPF provider and TPF user competencies

Slide 11

Implementation of Performance Contracting in Slovenia

IDENTIFIED NEEDS

- local support for project development
- experienced backup for local project development
- contact point for investors in the EU
- clearinghouse and network for Energy Performance Contracting in CEE countries

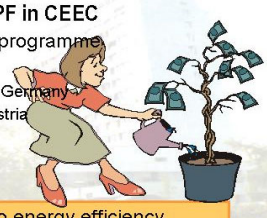
Slide 12

Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (1)

- **New project for promotion of TPF in CEEC**
  - co-financed under the SAVE programme
  - partners
    - Berliner Energieagentur GmbH, Germany
    - Energieverwertungsagentur, Austria
    - partners from 8 CEE countries
- **Aim of the project:**

Facilitation of investments into energy efficiency measures in the public sector and small scale CHP.



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Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (2)

- Objectives of the project:
  - Establishment of a clearing house for TPF projects in Berlin.
  - Creation of competence contact points in CEE countries.
  - Enabling private investors to access TPF market with lower transaction costs.
  - More effective solving of common problems.
  - Realization of concrete investments projects through TPF scheme.

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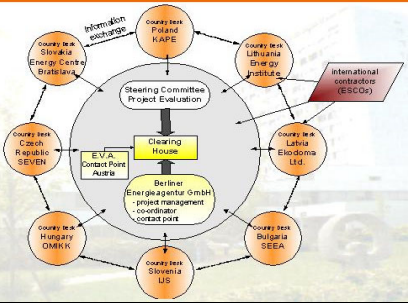
Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (3)



Slide 15

Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (4)

Common actions	WP 1	WP 2	WP 3	WP 4	WP 6	WP 5
	Creation and operation of the Clearing House	Creation of National Contact Points/ Country Desks	Implementation of the steering committee	Establishing a joint information exchange system	Networking	International Dissemination
National WPs	National work package **Hungary**	National work package **Poland**	National work package **Lithuania**	National work package **Latvia**	National work package **Bulgaria**	National work package **Slovenia**	National work package **Slovakia**	National work package **Czech Republic**
	OMIKK	KAPE	ISAG	Ekodoma	SEEA	IJS	Energy Centre Bratislava	SEVEN

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Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (5)

- Involvement of IFI´s
- Involvement of the ESCO Industry
- Creation of standard tools
  - Model Contracts
  - Model Tender Documents
  - Procedures for Baseline Creation
- Pre-feasibility checks

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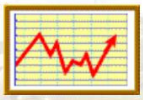
Implementation of Performance Contracting in Slovenia

FUTURE DEVELOPMENTS (6)

- Support for project development
- Support for project controlling
- Meeting place for possible joint-ventures
- Creation of local ESCO Market

Development of a sustainable support structure



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Implementation of Performance Contracting in Slovenia

KEY FACTORS OF SUCCESS

- transparent contractual and procedural standards stand for cost efficiency and secure project development/implementation
- competition ensures high economic efficiency
- decrease in consumption and costs amount to ~ 20 %

Energy Performance Contracting is a win – win strategy in terms of economy and ecology.

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Implementation of Performance Contracting in Slovenia

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Slide 20

Sustainable Institutional Mechanisms of Efficient Energy Use in Rostov Oblast Health Care and Educational Facilities

Dr. Igor A. Bashmakov

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To reduce energy and water bills for public institutions it is crucial to install meters. Just meters installation alone brings substantial bill savings, which can be later used as seed money for the continuation of energy efficiency activities in public sector. To have those savings sustainable monitored, accumulated and then allocated for energy efficiency improvement measure. So special institutional mechanisms of efficient energy use and system of meters service and maintenance are to be created. Five motivation schemes were developed.

Energy bills for public institutions consume 5-10% of municipal budget. In Rostov Oblast consolidated budget public buildings energy and water cost tripled in 1999-2001 and reached 1 billion rubles or 32 million US$. Those expenditures are used to buy:

- 420 million kWh of electricity;
- 1 million Gcal of heat;
- 72 million m3 of natural gas and
- 180 thousand t of fuel oil.

Two driving forces were behind this growth – physical limits for energy consumption grew by 45% and average energy prices doubled.

Before the 2000 energy efficiency improvements led mainly to the reduction of debts to utilities. Now they are capable to generate real financial savings. Since 2001-2002 energy limits are matching real consumption volumes and are backed by the sufficient budget allocations.

Program “Equipping social buildings of Rostov Oblast with energy and water meters and regulating devices” is under implementation: 1518 meters are to be installed; 42% of educational facilities as well as 36% of health care facilities are to be equipped with heat meters. Program for 2001-2002 is covering only half of social building's demand for metering equipment in the Rostov Oblast. Energy limits presently are set for 7107 public buildings in Rostov oblast.

Energy and water metering equipment installation allowed for creation of: energy meters installation services market; demand for sustainable savings generated by the installation of heat meters due to higher accuracy of consumed energy evaluation; Market for meters services and maintenance.

Conditional calculation methodologies are used to estimate volumes of energy consumption when energy meters are not installed. Such calculations are often based on absolutely fantastic assumptions. So, budget often is paying for resources never provided to public institutions. When heat meters are installed they generated bill savings: heat for heating - 16%; heat for hot water - 69%; water for hot water - 67%; cold water - 34%. So energy meters installation generates seed money for the future energy efficiency activities.

Savings for January-March 2002 (without VAT) are 1,5 million rubles. Energy prices growth “swallowed” large part of such savings - 982 thousand rubles. Nevertheless net savings reached 506 thousand rubles (without VAT). Payback for heat meters installation in 24 educational institutions – 0.5 years. It is crucial to allocate funds for heat meters maintenance to have such savings sustainable. Such decision was taken by the Rostov oblast administration.

Energy limits performed a positive role in bringing in financial order and handling non-payment problem in 1999-2001. But the threat of a “stick” without offering a “carrot” forces public institutions by all possible means to acquire extra allocations for financing energy consumption.

System of energy limits deeply rooted in the “economy of deficit” does not provide incentives for energy efficiency. Limits are adjusted mainly for additional energy consump-

tion. There are no budget allocations for energy efficiency improvements in Rostov oblast. No portion of energy costs savings is shared with the public institution all savings are automatically expropriated for other purposes. Motivation and incentives to use energy in public facilities more efficiently are absent.

Based on meter readings econometric analysis was conducted. Results of such analysis show that real volumes of heat and water consumption are determined by the set of complex factors: corrected heat load, determined by heating volume and integral heat efficiency coefficient; complex "regime factor", which determines deviations in supplied heat from required levels, and "technical compliance factor" for cold and hot water. For example the "technical compliance factor" is determined by the following factors:

- *Hot water temperature below 65-70 Co*
  - Low temperature of supply water
  - Failure of regulators
- *Hot water temperature over 70 Co*
  - Failure of regulators
- *Consumption of water is below norms*
  - Less water consuming devices are installed
  - Non functioning water consuming devices
- *Consumption of water is over norms*
  - High pressure in the system
  - Obsolete devices are used
  - Leaking water consuming devices
- *Consumption of water is below norms*

So this analysis have shown that it is possible to model specific heat energy consumption (Gcal/m^2/year). One important conclusion from such analysis is: heat supply company forcedly supplied 36% of district heat to audited educational facilities equipped with heat meters. Systems of serving and maintenance of heat meters have some costs. So heat meters are not to be installed at facilities with heat load lower 0,1 Gcal/h. They will not be able to generate enough savings to cover meter maintenance costs. Substantial part of savings is settled at gross standard accounts for annual meters verification. Part of costs is covering metering and billing services. Automated systems of meters readings and reporting while add upfront meters installation costs, allows for substantial reduction in costs for serving and maintenance of heat and water meters.

Transition to effective energy and water use requires renegotiating supply contracts. Monopolistic suppliers dictate terms of contracts. Terms of contracts are to be modified to launch effectively energy efficiency improvements mechanisms.

Energy efficiency improvement potential for public buildings in Rostov oblast can be split for three sections:

- *Measures with payback lower 1,5 years:*
  - Effective cold water consuming equipment and repair of cold water pipes and valves,
  - Balancing valves,
  - Reconstruction of hot water temperature regulation system.
- *Measures with payback from 1,5 to 5 years:*
  - Effective hot water consuming equipment and repair of cold water pipes and valves,
  - Energy efficiency improvement potential for public buildings in Rostov oblast.
- *Measures with payback from 5 to 8 years:*
  - Facade building heating temperature regulation;
  - Window stripping and heat reflecting film installation;
  - Radiator heat reflector,
  - Insulation of basement,
  - Periodic heating regime,
  - Roof insulation.

Present budget planning and execution procedures allow for energy costs savings to be reallocated for other purposes. Energy costs savings cannot be reallocated for salaries and personal benefits, but can be reallocated for building renewal and modernization budget lines as well as for acquisition of equipment. And vice versa.

Menu of sustainable institutional mechanisms of efficient energy use in public buildings as developed: «Energy stars»; «Sliding limit»; «Bill payment»; «Savings sharing»; «Professional management».

«Energy Stars» is an original system of prizing public buildings for high rating for efficiency of heat, water and electricity use.

«Sliding limit» scheme is applicable when all costs to install meters and energy efficiency improvements are financed out of budget allocations. It fits both present energy limitation system and present budget planning and execution processes. New limits are set with three years average formula. So two previous years consumption levels are in thee equation and limit smoothly slides to the new metered level of energy consumption in three years. Energy savings are shared between budget and public institution. The

share of the latter in savings is declining. If no additional savings are achieved, it will become zero in three years.

«Bill payment» scheme suggests that public building are contracting not for energy, but for energy services - indoor comfort, sufficient lighting, etc. New limits are established with accounting for risks New limit is lower and stable for 3-5 years.

«Savings sharing – performance contracting» is well known concept. All investments are made by the ESCO and effect is shared. This scheme contradicts present budget planning and execution procedures.

«Professional management» suggests the division of the responsibility for organization of teaching or health care activity from the responsibility for public building operation. Managing company not just optimize energy consuming regimes, but also makes building improvements to reduce energy losses. Information support of such schemes introduction is crucial. Information drives decisions. So following informational mechanism are to be created: monitoring system based on «Energy Attestat» - scale for weighting energy efficiency activities product; consulting center; «Energy efficiency day»; quarterly bulletin “Energy Star”; brochure “Plus Twenty”; weatherization lessons, «Tales about lost heat» for primary school.

Another important aspect is to neutralize the potential resistance of energy suppliers. So three possible schemes were considered:

- Financing of heat and water pipelines modernization using part of cost savings generated in public sector
- Investment component in heat tariff in parallel with quantitative targets for heat and water losses reduction
- Introduction of capacity charge in the structure of tariff.

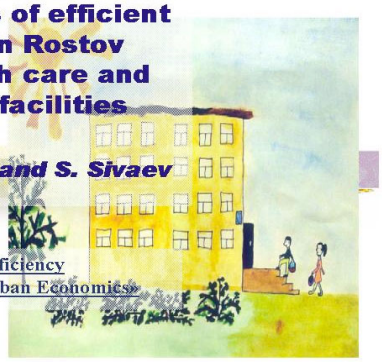
In conclusion it is important to note that people are doing what they are motivated to. So:

There are no bad habits, but there are bad incentives!

Sustainable institutional mechanisms of efficient energy use in Rostov Oblast health care and educational facilities

I. Bashmakov and S. Sivaev

Center for Energy Efficiency
Fund «Institute of Urban Economics»



Slide 1

Annual public buildings energy and water cost for the Rostov Oblast consolidated budget

1 billion rubles or 32 million US$

Those expenditures are used to buy:

- 420 million kWh of electricity;
- 1 million Gcal of heat;
- 72 million m3 of natural gas and
- 180 thousand t of fuel oil,

Or totally 0,5 million tce

Slide 2

In consolidated oblast budgets energy costs for public buildings in 1999-2001

tripled

- Limits for energy consumption grew by 45%
- Average energy prices doubled

Slide 3

Energy efficiency improvements: from reduction of debts to real financial savings

- Since 2001-2002 limits are matching real consumption volumes and are backed by the sufficient budget allocations
- Conditional calculation methodologies are used to estimate volumes of energy consumption when energy meters are not installed
- Such calculations are often based on absolutely fantastic assumptions
- So, budget often is paying for resources never provided to public institutions

Slide 4

Program "Equipping social buildings of Rostov Oblast with energy and water meters and regulating devices" is under implementation

- 1518 meters are to be installed
- Program for 2001-2002 is covering half of social building's demand for metering equipment in the Rostov Oblast
- Energy limits presently are set for 7107 public buildings in Rostov oblast
- 42% of educational facilities as well as 36% of health care facilities are to be equipped with heat meters

Slide 5

Realization of energy metering equipment installation allowed for creation of:

- Energy meters installation services market
- Demand for sustainable savings generated by the installation of heat meters due to higher accuracy of consumed energy evaluation
- Market for energy meters services and maintainance

Slide 6

Energy and water meters installation generated bill savings

- Heat for heating - 16%;
- Heat for hot water - 69%;
- Water for hot water - 67%;
- Cold water - 34%.
- So energy meters installation generates seed money for future energy efficiency activities
- It is crucial to allocate funds for heat meters maintenance to have such savings sustainable

Slide 7

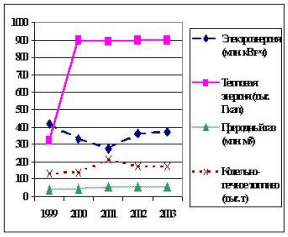
Payback for heat meters installation in 24 educational institutions – 0.5 years

- Savings for January-March 2002 (without VAT) are 1,5 million rubles
- Energy prices growth "swallowed" large part of such savings - 982 thousand rubles
- Nevertheless net savings reached 506 thousand rubles (without VAT)

Slide 8

Energy limits performed a positive role in bringing in financial order and handling non-payment problem

- Threat of "stick" without offering a "carrot" forces public institutions by all possible means to acquire extra allocations for financing energy consumption



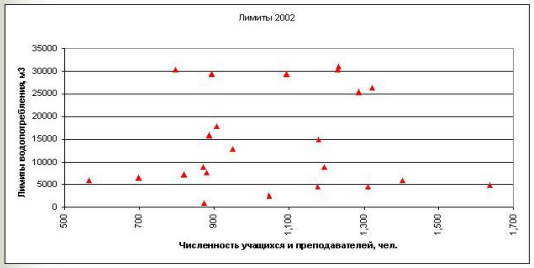
Slide 9

But system of energy limits deeply rooted in the "economy of deficit" does not provide incentives for energy efficiency

- Limits are adjusted mainly for additional energy consumption
- There are no budget allocations for energy efficiency improvements
- Energy cost savings are automatically expropriated
- Incentives to use energy in public facilities more efficiently are absent

Slide 10

Water limits versus number of water users in schools



Slide 11

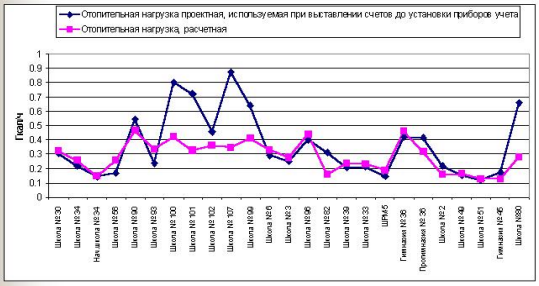
Heat supply company forcedly supplied 36% of district heat to audited educational facilities equipped with heat meters

Real volumes of heat and water consumption are determined by the set of complex factors:

- Corrected heat load, determined by heating volume and integral heat efficiency coefficient
- "Regime factor", which determine deviations in supplied heat from required levels
- "Technical compliance factor" for cold and hot water

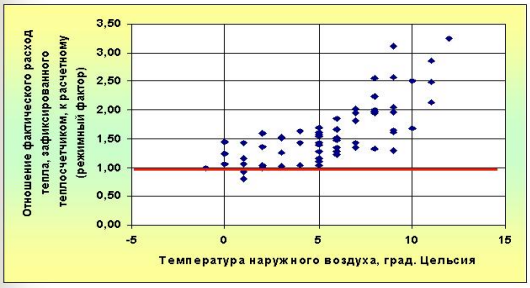
Slide 12

Corrected heat loads



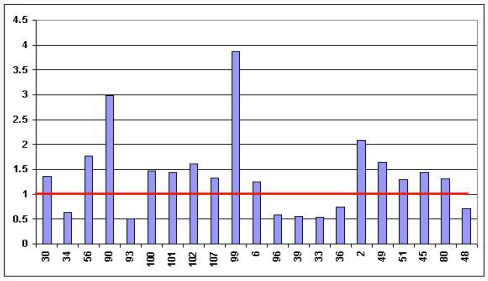
Slide 13

"Regime factor"



Slide 14

"Technical compliance factor" for hot water



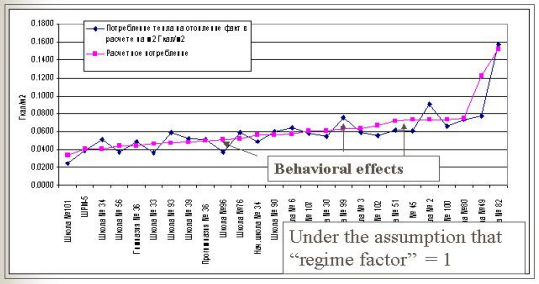
Slide 15

Components of the"Technical compliance factor"

- *Hot water temperature below 65-70 Co*
  - Low temperature of supply water
  - Failure of regulators
- *Hot water temperature over 70 Co*
  - Failure of regulators
- *Consumption of water is lower norms*
  - Less water consuming devices are installed
  - Non functioning water consuming devices
- *Consumption of water is over norms*
  - High pressure in the system
  - Obsolete devices are used
  - Leaking water consuming devices
- *Consumption of water is lower norms*
  - Switching off the system at non working hours
  - Due to installation of efficient water consuming equipment

Slide 16

It is possible to model specific heat energy consumption (Gcal/m2/year)



Slide 17

System of serving and maintenance of heat meters

- Heat meters are not to be installed at facilities with heat load lower 0,1 Gcal/h
- Substantial part of savings is settled at Gosstandard accounts
- Automated systems of meters readings and reporting while add upfront meters installation costs, allows for substantial reduction in costs for serving and maintenance of heat and water meters

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Transition to effective energy and water use requires renegotiating supply contracts

- Terms of contracts are dictated by monopolistic suppliers
- Terms of contracts are to be modified to launch effectively energy efficiency improvements mechanisms

Slide 19

Energy efficiency improvement potential for public buildings in Rostov oblast

Measures with payback lower 1,5 years:

- Effective cold water consuming equipment and repair of cold water pipes and valves
- Balancing valves
- Reconstruction of hot water temperature regulation system

Measures with payback from 1,5 to 5 years:

- Effective hot water consuming equipment and repair of cold water pipes and valves

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Energy efficiency improvement potential for public buildings in Rostov oblast

Measures with payback from 5 to 8 years:

- Facade building heating temperature regulation;
- Window stripping and heat reflecting film installation;
- Radiator heat reflector;
- Insulation of basement;
- Periodic heating regime;
- Roof insulation.

Slide 21

Present budget planning and execution procedures allow for energy costs savings to be reallocated for other purposes

Energy costs savings:

- Can not be reallocated for salaries and personal benefits
- But can be reallocated for building renewal and modernization budget lines as well as for acquisition of equipment
- And visa versa

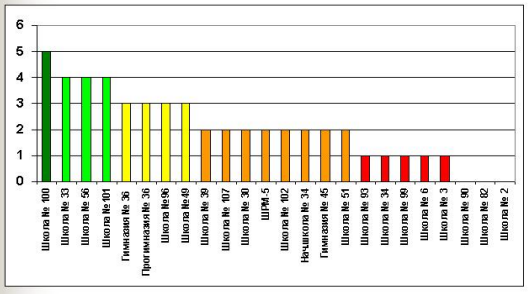
Slide 22

Menu of sustainable institutional mechanisms of efficient energy use in public buildings

- «Energy stars»
- «Sliding limit»
- «Bill payment»
- «Savings sharing»
- «Professional management»

Slide 23

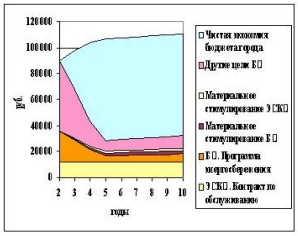
System of building energy rating «Energy Stars»



Slide 24

«Sliding limit»

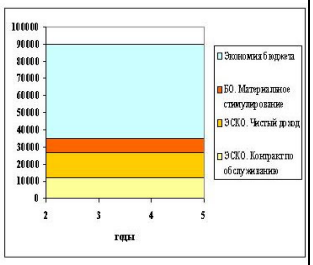
- Applicable when all costs to install meters and energy efficiency improvements are financed out of budget allocations
- Fits present energy limitation system
- Fits present budget planning and execution processes



Slide 25

«Bill payment»

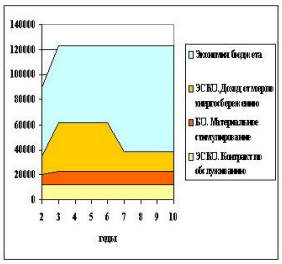
- Public building is contracting not for energy, but for energy services - indoor comfort, sufficient lighting, etc.
- New limits are established with accounting for risks
- New limit is lower and stable for 3-5 years



Slide 26

«Savings sharing – performance contracting»

- All investments are made by the ESCO and effect is shared
- Contradicts present budget planning and execution procedures



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«Professional management»

- Division of responsibility for organization of teaching or health care activity from the responsibility for public building operation
- Managing company not just optimize energy consuming regimes, but also makes building improvements to reduce energy losses

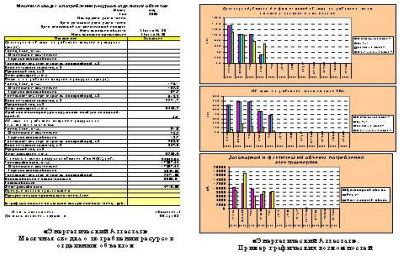
Slide 28

Information drives decisions

- Monitoring system
- Consulting center
- «Energy efficiency day»
- Quarterly bulletin "Energy Star"
- Brochure "Plus Twenty"
- Weatherization lessons
- *«Tales about lost heat»* for primary school

Slide 29

«Energy Attestat» - scale for weighting energy efficiency activities product



Slide 30

Compensating schemes for energy suppliers

- Financing of heat and water pipelines modernization using part of cost savings generated in public sector
- Investment component in heat tariff in parallel with quantitative targets for heat and water losses reduction
- Introduction of capacity charge in the structure of tariff

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There are no bad habits, but there are bad incentives!

Slide 32

Towards Sustainable Housing Management in Lithuania

Eduardas Kazakevičius • Michael Lee • W. Jan Brzeski

Lithuanian Housing and Urban Development Foundation, Vilnius

1. Introduction

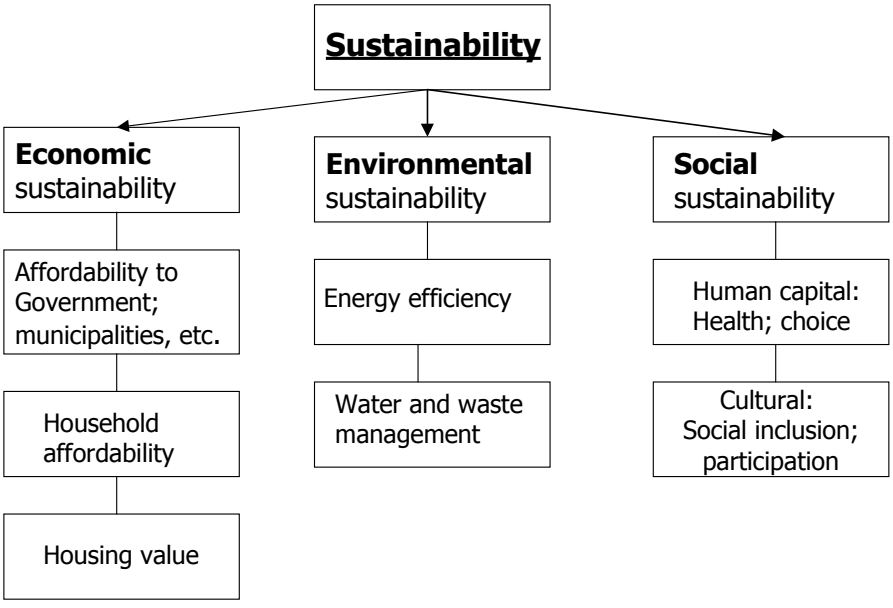
Lithuania inherited poor quality housing with space heating intensity significantly higher than that of the Western European countries. The high energy consumption is causing excessive greenhouse gas emissions and uncomfortable dependence on expensive imported fuels. In an attempt to boost energy efficiency of residential and public buildings the Energy Efficiency Housing Pilot Project (EEHPP) was implemented during 1996-2001. The Project's objectives were achieved through provision of loans for technically and economically viable packages of energy efficiency measures, enhanced by provision of energy consulting services to building owners, and by support to municipalities for energy efficient rehabilitation of schools.

Encouraged by the successful implementation of the EEHPP the Lithuanian government with the World Bank assistance initiated Lithuanian Housing Project, which includes development of a National Housing Strategy and within it preparation of a comprehensive program for Sustainable Housing Management.

2. Sustainability and housing

The concept of the sustainable development is typically associated with provision of new housing, which incorporates various approaches and technologies minimizing negative environmental impacts. Nevertheless, the large multifamily buildings built during the period of 1960 to 1990 are the most unsustainable part of the Lithuanian housing stock because: (a) more than a half of the population resides in these buildings and due to relatively low rate of new construction this will not change in the near future; (b) substantial share of the country's energy resources is consumed in these buildings; and (c) without proper maintenance and upgrading these buildings will eventually endanger people's health and safety. This contrasts sharply with the national strategic goal of efficient use of existing housing adopted by the governmental coordinating committee.

Figure 1. Components of sustainability



There is little experience in applying the concept of sustainable development to existing housing, not least because the existing housing stock does not fit well with the notion of development process. Nevertheless, it is generally agreed that the concept of sustainability should embrace: (a) a long term perspective that looks beyond current problems, and searches for durable solutions; (b) a welfare perspective that deals with the equitable distribution of goods and services, and with the present and future welfare of the people; and (c) ecological perspective that deals with maintaining and enhancing natural resource base.

At the same time sustainability is not equal to maintaining the status quo in resource management, such as in the case of existing housing stock. Consequently, the expanded notion of sustainable development and management as applied to the existing housing stock should include: (a) economic and financial sustainability, in the sense of affordable and efficient use of financial and human resources; (b) environmental sustainability, in the sense of rational long-term use of natural resources; and (c) social and cultural sustainability, in the sense of better social cohesion and inclusion through balanced distribution of social groups over the housing stock (Figure 1).

2.1 Economic sustainability

The first principle of economic sustainability is that the financial cost of a sustainable housing program must be affordable in the long run to central and local governments, and to each of the various other institutions involved in the implementation of the program.

The second principle of economic sustainability is that the cost of a sustainable housing strategy must be affordable to each individual household on a month-by-month basis. 'Affordability' implies both that the household *can* afford to pay the relevant costs out of its income and accumulated wealth, and that it *chooses* to do so. Household affordability is best achieved by allowing households a choice of housing conditions (and therefore of prices), combined with a social safety net to compensate for skewed incomes.

The third aspect of economic sustainability is that any program for existing housing must also optimize the value of the existing housing stock. This entails optimizing the physical life-span of the housing stock (e.g. by maintenance and repair, and perhaps by demolition or reconstruction), as well as maintaining or enhancing other aspects of its asset value by non-physical means.

2.2 Environmental sustainability

A sustainable housing program must embrace the rational and efficient use of natural resources: by minimizing harmful emissions; and by minimizing the use of non-renewable sources, especially of energy. In economic terms, there is no doubt that reduced consumption of energy has, and should continue to have, high priority in Lithuania, in both economic and environmental terms. Improvement of energy efficiency in residential buildings has, logically, been a principal concern of the Government during the last decade.

Enhanced energy efficiency is the subject of a draft new EU Directive on energy performance. This lays down minimum standards for the energy performance of large existing buildings that are subject to major renovation, as well as minimum standards on the energy performance of new buildings; it also introduces the need for energy certification for buildings, which are to be newly sold or rented.[1]

2.3 Social sustainability

Social sustainability focuses on the two aspects: human (the maintenance of human capital); and cultural (social cohesion). Housing management for human sustainability comprises: (a) minimizing the impact of housing on residents' health and safety, (b) emphasizing the psychological and social function of a house as a home, (c) access to a broad choice of housing, (d) accessibility for the old and disabled and provision for young people.

Housing management for cultural sustainability should reinforce social cohesion, e.g. by emphasizing aspects of social justice such as social inclusion (minimizing social exclusion) and reducing violence, and fostering social links and local decision-making.

[1] Amended proposal for a Directive of the European Parliament and of the Council, on the Energy Performance of Buildings.

3. Challenges on the way towards more sustainable management of housing

Numerous challenges mount on the way towards more sustainable management of the existing housing stock.

The heart of the program is the provision of private capital for the improvement (repair and upgrading) of common areas of buildings, to supplement the personal resources of individual householders. Because of the cost of the improvements relative to personal incomes, most households would need to take loans if they were to be able to afford the undertake essential maintenance and repairs. Because the housing improvements will provide direct and lasting benefits to individuals, the loans should be made on market terms.

However, despite the positive example of the EEHPP, banks have failed to respond to the opportunity by offering loans from their own resources. There are doubtless several reasons for the fact that EEHPP has not yet been commercialized. One may be that there are still relatively few homeowners associations (representing entities with which banks may negotiate for loans). Probably more significant is the absence of a system for securing collateral for loans made for common property. It may also be that banks would perceive the potential transaction costs of lending to homeowners associations or their members—even with acceptable collateral—to be so high that demand would be muted.

The existence of a well-managed association would clearly provide a greater level of comfort to a banker, by indicating the ability of the homeowners to act together for the common good. Unfortunately, despite almost complete privatization of municipal rental dwellings, a significant share of households do not behave as owners of valuable real estate assets with many simply unable afford homeownership with its full rights and obligations. The bulk of homeowners and building administrators lack knowledge and skills in economic/financial property management including energy efficiency issues seen in strategic perspective. Therefore only a fraction of Lithuanian multifamily buildings are professionally managed.

The creation of a market for common area upgrading loans will only be effective if homeowners have access to efficient and competitive maintenance organizations. This is not yet the case for much of Lithuania. Although there are examples of privatization of the municipal maintenance companies, it is not known whether these can be described as successful. There is yet a strong need to encourage municipalities to generate a competitive market among maintenance companies, to train the staff of the companies in property management and maintenance, and to develop appropriate management structures within the municipalities themselves. Also there is a need to improve the legal regulation of maintenance.

Due to diverse income levels of homeowners residing in the same buildings renovation volumes depend on financial capacity of the lowest income families if costs are to be equally shared among all apartment owners. Therefore without financial support poorer families will either hamper needed investments, or will be forced to move into lower quality housing thus causing social exclusion problem. Lack of social housing leaves very little freedom for municipalities in addressing this issue.

4. Opportunities for sustainable housing in Lithuania

There are, however, great opportunities in a more sustainable management of the existing housing stock. Since 1996 in the framework of the Energy Efficiency Housing Pilot Project more than 400 homeowners associations signed loan agreements and implemented energy efficiency measures in their living premises. In total more than 10 million EUR was invested.

Technical monitoring of implemented renovations of multifamily buildings revealed average heat savings of 24%. Social monitoring showed that 56% of surveyed families indicated reduced heat bills, 48% improved indoor comfort and 30% improved building appearance. There were no repayment defaults, as of December 2002, and more than 4 mln EUR repaid went into revolving fund for new lending.

There are several important lessons of the EEHPP, which can be useful for development of policies aiming at more sustainable management of multifamily buildings. First of all, homeowners were willing and able to renovate common property if provided with institutional and technical support and financial incentives. Homeowners associations took debt seriously and are repaying loans often faster than needed. The project success depended on proper legal

and regulatory framework. Main motivations for homeowners to take a loan were: (a) comfort improvements, (b) urgent repairs and (c) energy and cash savings. After project implementation, homeowners became more interested in energy savings and some started new projects.

The EEHPP showed that long term financing of cost-effective energy efficiency measures could create positive cash flow and thus alleviate pressing affordability issues. Reforming of housing maintenance and administration sectors should create more transparency and remove some of numerous misconceptions in this area. Overhauled housing policies and programs embedded in the National Housing Strategy should facilitate rational use and leverage of public and private funds.

5. The Sustainable Housing Management program

The Sustainable Housing Management program was developed by an expert team in the framework of the Lithuanian Housing Project. The final configuration of the program will be decided by the Lithuanian government in the beginning of 2003. In this chapter the program proposal will be briefly overviewed.

Sustainable management of the existing Lithuanian housing stock requires: (a) increased housing maintenance and upgrading; (b) improved housing choice; (c) reduced social exclusion; (d) improved housing affordability; (e) enhanced value of existing housing assets; and (f) improved flow of information about housing sustainability.

The increased housing maintenance and upgrading can be facilitated by: (a) viable bank lending with government provided risk reduction enhancement, regulatory improvements and better information for lenders; (b) creating financial support mechanisms for poorer households; (c) encouraging more rapid formation of homeowners associations in multi-family buildings; (d) providing more extensive information to householders about implications and techniques of home improvement; and (e) creating a more competitive market for building maintenance and property management services.

The improved housing choice can be enhanced by increasing the proportion of adequate rental housing and by enhancing residential mobility. The social exclusion can be avoided by maintaining a social mix in existing housing estates, by providing the financial means for poorer families to remain in their family homes and creating more choice in social housing. The improved housing affordability can be achieved by restructuring the system of welfare support, in order to target public assistance at the most needy households, or through such non-subsidy instruments as repurchase of dwellings by municipalities and reverse annuity mortgage programs. The enhanced value of existing housing assets can be achieved through proper maintenance and repair and by increasing use of community participation in local decision making.

5.1 Program areas

In total five areas of the program were proposed for consideration by the expert team.

Program area 1. To increase the economic maintenance, repair and upgrading of housing (energy-efficiency and structural improvements), especially of multi-family housing.

This element of the program is designed to increase the level of maintenance and upgrading of the existing multi-family housing stock, subject to the economic, market-based, viability of individual projects. It would facilitate bank lending to homeowner associations (or to members of the associations), among other things by Government guarantee of part of the loans.

The purpose of the loans would be the improvement of common areas: those parts of the buildings in common use (such as staircases, entrance lobby), basic structures (basement, roof, etc), and the building infrastructure (heating system, wiring, etc). The loans would need to be complemented by well-targeted subsidies to enable poorer families—who live in many of the multi-family buildings—to participate. Un-targeted subsidies, as used in the EEHPP, may be needed to a small extent in order to provide a continuing incentive for families to invest in housing rather than to consume.

Program Area 2. To improve housing affordability, especially of low income households.

Many low-income households would not be able to bear the full economic cost of housing (rent or loan repayments, utilities and the cost of servicing common areas) without considerable hardship. The present formulas for compen-

sation in Lithuania exclude certain categories of vulnerable household, such as pensioners who in practice are unable to adjust their personal circumstances. The program for housing sustainability addresses these constraints in recommending a system of housing allowances, ultimately to be merged into a comprehensive framework for social support (incorporating utility compensation payments, and compensation for repayments for common area upgrading within the same mechanism). The program also recommends investigating the feasibility of two non-subsidy mechanisms for helping poorer families cope with high housing costs - reverse mortgages for the elderly, and the re-purchase of owner-occupied homes by municipalities at the request of an owner who wishes to revert to being a renter.

Program Area 3. To enhance the value of existing housing through local initiatives.

Value is added to housing both by the action of owners in improving the structural condition, internal and common external facilities, and the appearance of their dwellings, but also by external factors.

Proposed instruments include a group of actions that can be taken at local level to enhance the sustainability of housing within neighborhoods, in most cases by municipal initiative: the development of improved neighborhood (ward-level) social and commercial facilities, participation of the community in local decision-making, and maintaining value by the municipality purchasing vacant units for social housing. The program also includes public education and information on property rights and obligations, including issues of the land surrounding multi-family buildings.

Program Area 4. To improve housing choice by increasing the proportion of adequate rental housing and by enhancing mobility.

There are several actions to increase the proportion of adequate rental housing and enhance mobility. The program will increase rental housing through a two-fold approach: the simultaneous strategic expansion of social housing by municipal acquisition of existing dwellings (especially outside the larger towns, where there is little or no private rental housing); and the encouragement of private rental housing, mainly by the provision of tax incentives for investors. Additional assistance may be given to renters through the tax system (e.g. the payment of rent could be treated as a tax-deductible expense). The ultimate provision of housing allowances for tenants of private rental housing will also prove to be an important incentive for the conversion of existing dwellings to rental tenure.

The absence of housing mobility is addressed through a minor investigation into constraints to real estate transactions. Indirect incentives to increased mobility may also result from the provision of greater choice in housing.

Program Area 5. To reduce problems of social exclusion, especially in large housing estates.

The alleviation of social exclusion is the most important component of the principle of social/cultural sustainability (the reinforcement of social cohesion, social justice and fostering social links and local decision-making).

The program of housing sustainability incorporates two principal components: maintenance of a social mix by providing financial and other assistance that allows poorer families to remain in their family homes; and the maintenance by municipalities of individual units of social housing within blocks of housing that is otherwise privately-owned. These are complemented with policies to strengthen the position of marginalized families in low-rent accommodation, through legal/regulatory actions, enforceable by local governments.

5.2 The impact of the proposed programs

The program would have positive impacts on most of the criteria for sustainability. The greatest benefits would accrue to the health and safety of the residents of multi-family buildings, to the owners of flats in those buildings as their economic value is retained and increases, in improved residential energy efficiency, and in the reduction of problems of social exclusion in residential neighborhoods.

The program would affect individual household affordability in a number of different ways, depending on income, tenancy and personal circumstances. Its most important impact would be to provide access to loans for upgrading multi-family housing. A few of the poorest households might have marginal financial gains (if the housing allowance were structured so as to reduce the cost of their municipal housing tenancy). Some elderly households would have the opportunity to improve their own personal financial conditions. Many other households, however, would be faced by slightly higher costs, especially if they opt to upgrade their multi-family dwellings. Although a number of households would be marginally financially worse off as a

result of the program, adequate protection would be provided for the most vulnerable. The overall program would, however, be seen as more equitable by benefiting only this vulnerable group.

There would be a number of impacts on the government budget, which have not been estimated in any detail. The largest would derive from the common area upgrading project. It is difficult to estimate the cost of this with readily available data, and much work will be needed to define the various parameters of such a program. However, it was estimated that the annual cost to the budget would be less than the estimated present-day subsidies to municipal maintenance companies.

Implementation of policies for increased municipal involvement in sustainable housing management should have no significant net impact on municipal budgets. The acquisition of small volumes of additional social housing would be loan financed (not grant-funded, as at present), and would be serviced from rents (and Government-funded housing allowances) chargeable on those dwellings. It was assumed that the increased revenue from rents would largely be offset by reduced grants from central government, although it was recommended that municipalities be allowed to keep a proportion of the increased revenues they are able to generate.

6. Conclusions

The concept of sustainable housing management is proving to be a useful guiding principle for developing a broad government program pulling together various housing policy projects based on economic, social and environmental sustainability criteria, and based on both subsidy and non-subsidy implementation instruments. Once implemented these projects will bring more sustainability into the Lithuanian housing sector.

HOUSING AND URBAN DEVELOPMENT FOUNDATION

TOWARDS SUSTAINABLE HOUSING MANAGEMENT IN LITHUANIA

Eduardas Kazakevičius
Michael Lee
W. Jan Brzeski

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Slide 1

SUSTAINABLE DEVELOPMENT?

Brundtland Commission (1987): "*…development that meets the needs of the present without compromising the ability of future generations to meet their own needs*".

Lithuanian National Report on Sustainable Development: "*a compromise between environmental, economic and social objectives allowing seeking universal being of the society for itself and future generations without exceeding allowable limits of environmental impact*".

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Slide 2

SUSTAINABLE PRODUCTION
New

- Environmentally friendly materials
- Renewable energy, zero emissions
- Good infrastructure

3

Slide 3

SUSTAINABLE PRODUCTION
New

- Affordable housing
- Environmentally conscious tenants
- Socially sustainable communities

4

Slide 4

SUSTAINABLE MANAGEMENT
Existing

YES:

- For many families this is the only affordable option
- Energy efficiency existing stock can be improved
- Present diverse social mix should be preserved

NO:

- Wealthier families will move out and remaining owners will lack sufficient funds for proper maintenance
- Building lives are limited and construction quality is poor, so substantial investments are risky
- Existing housing preserves "Soviet" urban infrastructure

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Slide 5

HOUSING SUSTAINABILITY
What Is It ?

It's a long term objective which can not be reached within the short term:

- **Economic / Financial Sustainability**
  - Affordable housing
  - Rational use of financial and human resources
- **Environmental Sustainability**
  - Rational use of natural resources
- **Social / Cultural Sustainability**
  - Broad housing choice
  - Ensured public health
  - Social cohesion

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HOUSING SUSTAINABILITY
Challenges

Economic / Financial:

- Many households can not afford to be owners, participate in efficient asset management
- Due to legal barriers, involvement of commercial banks in financing of multifamily building renovations is hindered
- Limited fiscal / financial capacity of the State and municipalities to support building renovations
- Building renovation depends on financial capacity of lower income owners if costs are to be equally shared

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HOUSING SUSTAINABILITY
Challenges

Environmental:

- Most of buildings are of low quality materials and are poorly maintained
- Heating intensity in buildings is high compared to Western countries, thus causing excessive CO_2 emissions
- Individual cost-effective solutions can compromise societal goals (e.g. single boilers vs co-generation and district heat)

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Slide 8

HOUSING SUSTAINABILITY
Challenges

Social / Cultural:

- Despite 97% privatization many households do not behave as owners of property assets
- Limited housing choice including restricted supply of municipal rental housing
- Owners lack knowledge and awareness on housing management and energy efficiency
- Diverse social mix makes it difficult to reach unanimous decisions in multi-family buildings

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HOUSING SUSTAINABILITY
Challenges

Mature market:

- Perfect information
- Rational choice
- No capital shortages
- No market domination
- Appropriate regulations
- Little gov't involvement

Lithuanian market:

- Limited awareness
- Numerous misconceptions
- Capital scarcity
- Oligopolistic maintenance services market
- Inappropriate regulations
- Excessive gov't involvement

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HOUSING SUSTAINABILITY
Opportunities

- Successful implementation of Energy Efficiency Housing Pilot Project, 1996 - 2001
- Development of National Housing Strategy, 2002
- Preparation of Sustainable Housing Program, 2002
- Adoption of National Housing Strategy and implementation of the Sustainable Housing Program, 2003 -

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HOUSING SUSTAINABILITY
Opportunities

Financial / Economic:

- Long term financing of cost-effective energy measures can create positive cash flows to households
- Municipalities implement restructuring of housing maintenance and administration functions
- Social support scheme developed within EEHPP helped poorer families participate in renovation on equal terms

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Slide 12

HOUSING SUSTAINABILITY
Opportunities

Environmental:

- Most buildings have district heat, so better energy efficiency and co-generation will reduce greenhouse gas emissions
- Cost-effective measures implemented within the EEHPP reduced heat consumption by avg. 20 - 30%
- EU requirements and co-financing should improve the quality of municipal infrastructure and services

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HOUSING SUSTAINABILITY
Opportunities

Social / Cultural:

- EEHPP created efficient support for active owners and raised awareness on energy efficiency and housing management
- Restructuring of maintenance and administration will bring more transparency and remove various misconception
- New policies and programs of Housing Strategy will broaden housing choice and ensure rational use of public funds

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ENERGY EFFICIENCY
Pilot Project

Objectives

- Support private initiatives to improve residential energy efficiency
- Support public initiatives in improving energy efficiency in schools
- Support housing privatization and private initiatives in maintenance

Constituents

- Provision of loans for technically and economically attractive packages of energy efficiency measures
- Introduction of the concept of long-term lending for housing improvement to the commercial banking sector
- Development and provision of energy consulting services
- Support for municipalities in energy efficiency school rehabilitation

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ENERGY EFFICIENCY
Pilot Project

Results:

- More than 400 loan agreements signed since 1996
- More than 10 million EUR invested
- Average heat savings of 24%
- 56% of surveyed families indicated reduced heat bills, 48% improved indoor comfort, 30% improved building appearance
- No repayment defaults, as of October 2002
- 4.2 mln EUR repaid by Oct 2002 into revolving fund for new lending

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ENERGY EFFICIENT HOUSING
Pilot Project

Lessons:

- ❑ Homeowners were willing and able to renovate common property if provided with institutional / technical support and financial incentives;
- ❑ Associations take debt seriously and are repaying loans often faster than needed;
- ❑ Proper legal and regulatory framework is mandatory;
- ❑ Main motivations for homeowners to take loan were: (a) to improve comfort, (b) to carry out urgent repairs and (c) obtain savings;
- ❑ After project implementation, homeowners become more interested in energy savings and some start new projects;
- ❑ Case stories have an important demonstration effect when communicated directly to homeowners

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NATIONAL HOUSING STRATEGY
Basic Framework

Goals: Broad housing choice | Efficient use of existing housing | Efficient provision of new housing

Basic social / economic principles and preferences

Objectives:

Improved tenure choice	Improved housing mobility	Improved existing housing stock
Enhanced ability to pay	Responsible homeownership	Non-profit housing

Programs: *Legal, technical, financial constrains*

Tools: *Cost benefit criteria*

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SUSTAINABLE MANAGEMENT
Emerging Program

Objectives:

- ❑ **More energy efficiency and upgrading of existing housing**
- ❑ **Better housing choice: more rental and mobility**
- ❑ **Wider housing choice: improved affordability**
- ❑ **Reduced problems of social exclusion**
- ❑ **Enhanced values of housing assets**

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SUSTAINABLE MANAGEMENT
Emerging Program

Instruments:

- ❑ **Modify regulatory / institutional framework**
- ❑ **Reduce lending risk through public guarantees**
- ❑ **Target financial support at qualifying households**
- ❑ **Encourage formation of more homeowner associations**
- ❑ **Create more competitive market for maintenance services**
- ❑ **Consider tax incentives to investors into rental housing**
- ❑ **Reduce constraints/impediments to property transactions**

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SUSTAINABLE MANAGEMENT
Emerging Program

Instruments:

- ❑ **Encourage participatory municipal district management**
- ❑ **Support poorer families to stay in upgraded buildings**
- ❑ **Develop non-subsidy alternatives of housing support**
- ❑ **Conduct more research to better inform the stakeholders**
- ❑ **Educate owners about property ownership and sustainable management**

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SUSTAINABLE MANAGEMENT
Two Scenarios

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Slide 22

Emissions Trading Will Accelerate the Introduction of Renewable Energies into the Markets

Michael Schmalholz

Future Camp GmbH, München

The Kyoto Protocol demands the contracting states to reduce their greenhouse gas (GHG) emissions – mainly CO_2. It sets individual GHG-targets for each country that they will have to fulfill as of 2008. In order to comply with this target, each member state fixes a certain amount of emissions per year (absolute cap) that shall not be exceeded. Corresponding to the amount of emissions allowed, each state allocates tradable certificates to its companies (1 certificate allows to emit 1 ton of carbon dioxide equivalent during a specified period of time). The amount of certificates will be reduced on a pro rata temporis basis – which will automatically reduce the amount of GHG emissions.

The Flexible Mechanisms of the Kyoto Protocol

To reach the GHG emission targets, the Kyoto Protocol offers "Flexible Mechanisms" (Emissions Trading, Clean Development Mechanism and Joint Implementation). These mechanisms are intended to facilitate the compliance and to decrease the costs of emission reductions.

- *Emissions Trading* introduces a great degree of flexibility for the participants as they can either reduce emissions in their own companies or buy emissions certificates on the market if their current situation – e. g. financial situation or investment cycle – does not allow active mitigation. Thus, emissions trading can contribute to the reduction of costs. Moreover, companies can partly finance their investments in energy saving and/or emission reduction measures by selling certificates that, due to reduced emissions, they do no longer require.
- The project based mechanisms of *CDM* (Clean Development Mechanism) and *JI* (Joint Implementation) enable companies to acquire themselves certificates when they invest in or realize projects that reduce GHG emissions either within developing countries (⇨ then CDM) or within industrialized and EIT countries (Economies in Transition ⇨ then JI). The reduction of emissions must be real and measurable – which has to be verified by a third party or operational entity. The certificates gained from CDM or JI are as valuable as those from Emissions Trading. They can either be used to comply with a company's individual reduction target (cap) or be sold on the market.

The Impact of these Flexible Mechanisms on the Renewable Energy Sector

An outstanding advantage of these Flexible Mechanisms is that they substantially support technologies with a low or even non-existing carbon content (esp. renewable energies). Thanks to the Flexible Mechanisms the reduction of GHG-emissions becomes a new commodity. Projects to reduce GHG-emissions that are based on renewable energies will henceforth be able to "generate" GHG-certificates. These certificates constitute a *financial add-on* for investors that can

- make a project more profitable or cost-effective,
- sustain the company & shareholder value,
- enhance price competitiveness of renewable energies,
- secure loans from banks.

Furthermore, it will make the public aware of the specific role of renewable energies for the protection of our climate, thereby providing an ideal marketing-platform. This will additionally facilitate and accelerate their introduction into the markets.

These advantages would still be valid, even if the prices for certificates should not exceed US-$ 3–5 thereby not sufficing to fully cover the expenses of the investment.

On the contrary, the World Bank Experience with the Prototype Carbon Funds shows clearly that even a revenue stream based on emission reduction at US-$ 3/t CO_2 – as assumed by the Bank – can have substantial impacts on the change in internal rate of return (IRR) of projects.

Table 1: Impact of Emission Trading

Technology	IRR
Energy Efficiency - District Heating	2 – 4
Wind	0.9 – 1.3
Hydro	1.2 – 2.6
Bagasse	0.5 – 3.5
Biomass with methane kick	Up to 5.0
Municipal Solid Waste with methane kick	> 5.0

PCF, at PCF and Climate Change Synergy Workshop, Beijing, November 30, 2001

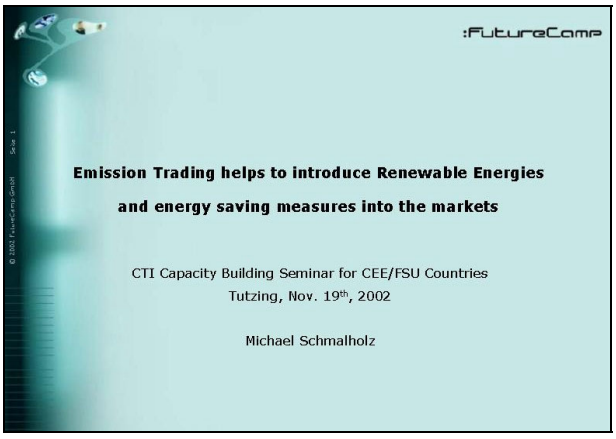
Actual example: National biomass project of FutureCamp

One of Future Camp's recent climate projects has been a biomass project of a Bavarian company. The key element of this project was the bundling of more than 20 (in the year 2001, in 2002 it will presumably be 45) smaller decentralized biomass units to a single project. The project bundling allowed an exceeding reduction of transaction costs due to a standardized baseline for a multitude of small and medium local plants. This approach enables even medium-sized companies (and their customers) to take part in and to profit from emissions trading. The system is being validated by an independent party (TÜV Süddeutschland) – and the first VERs (verified emissions reductions) from the year 2001 are already sold!

Conclusion

To conclude, the Kyoto Protocol will henceforth exercise a major influence on the renewable energy sector as it provides a significant additional source of revenue and competitive advantages for renewable energies. CDM and JI will help to accelerate the introduction of renewable energies into markets. Therefore the Kyoto Protocol opens the door to an extensive use of renewables for the production of power and heat. The protection of climate is not only and necessarily a restraint but also a great business opportunity

Slide 1



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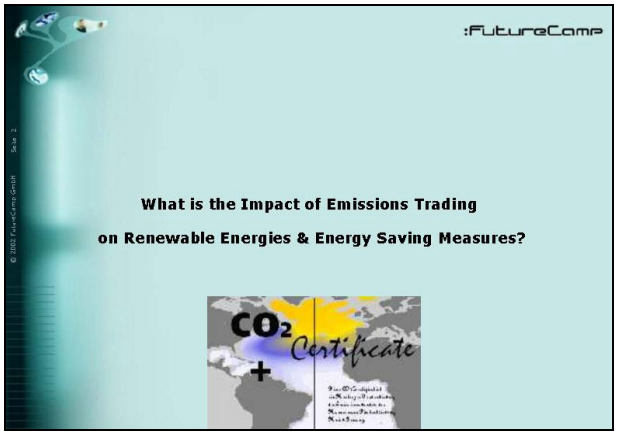

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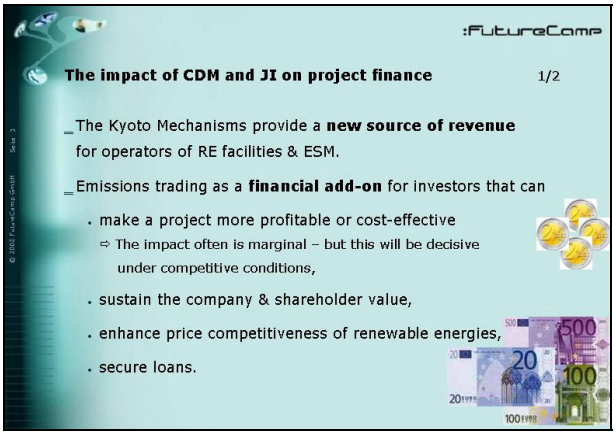

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The impact of CDM and JI on project finance 2/2

- Credits from CDM- & JI-projects will be demanded from investors by banks and insurances!

Emissions trading offers multiple business opportunities in the field of Renewables & Energy Saving Measures.

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Impact of Emissions Trading – The World Bank Experience with the Prototype Carbon Funds (PCF)

Assuming a revenue stream based on emission reduction (at US-$ 3/t $CO_{2\,eq.}$), the change in **internal rate of return** (IRR) of projects could be:

Technology	Δ IRR
Energy Efficiency - District Heating	2 – 4
Wind	0.9 - 1.3
Hydro	1.2 - 2.6
Bagasse	0.5 - 3.5
Biomass with methane kick	Up to 5.0
Municipal Solid Waste with methane kick	> 5.0

PCF, at PCF and Climate Change Synergy Workshop, Beijing, November 30, 2001

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What will be the specific opportunities for the renewable energy & energy saving sector gained through Emissions Trading?

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The ranking of CDM project types (10=max, 1=min)

Project type	Score	Pros	Cons
Methane gas capture	9,0	cheapest CDM project, easy to monitor, large reductions	
Biomass	7,4	large potentials, baseline estimation easy, credible	
Fuel Switching, coal to biomass	6,9	Simple, baseline estimation easy, credible	Few potential projects
Hydropower	6,8	Small hydropower reliable and low-cost.	Large hydropower problematic (environmental integrity, risk)
Energy efficiency	6,7		baseline troubles
Fuel Switching, coal to gas	6,5	Potential for low-cost CERs	Limited experience
Wind Power	6,3		Technical problems likely High transaction costs.

Source: pointcarbon.com, 2002

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Source: pointcarbon.com, 2002

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The Kyoto Mechanisms provide a significant source of revenue for Renewables & Energy saving measures!

CDM, JI & ET will help to introduce renewable energies into markets!

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Example: National biomass project of FutureCamp

- Client: medium-sized company in Bavaria
- Description: **Bundling** of decentralised smaller biomass units (60-660 KW) to a single project
  - ⇨ 2001: 23 units
  - ⇨ 2002: 45 units
  - Only reduction of Methane (not Carbon Dioxide) to avoid conflict with „Renewable Energy Law"
- Verified Emission Reductions (VERs):
  - 2001: ≈ **4000** t CO_2/a
  - 2002: ≈ **8-9000** t CO_2/a
  - 2003: **> 10.000** t CO_2/a (estimated)

Slide 11

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Example: National biomass project of FutureCamp

- Advantages:
  - **Standardised baseline** for a multitude of local plants
    - ⇨ **Massive Reduction of transaction costs**
  - Enabling small & medium-sized companies to profit from emissions trading
- The system is being validated by **TÜV Süddeutschland.**
- The first VERs are **already sold!**

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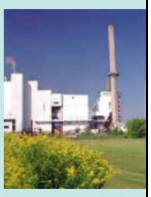
Options for the Biomass Community

- Biomass projects are favoured project-types by several countries
- Biomass has competitive advantages compared to other renewables
- Simplified procedures for small-scale projects (below 15 MW installed capacity)
- Climate projects should be connected with given or planned business activities
- Even if the direct economic impact is low, climate projects
  - clearly communicate the decisive role of renewables for a sustainable energy future
  - help to develop new businesses in new markets



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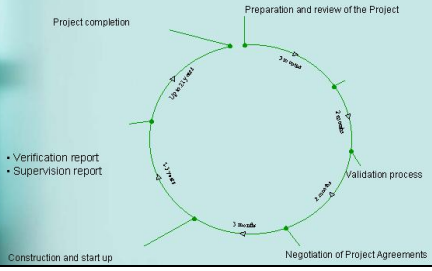
What are the basic steps to realise a project?



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What are the basic steps to realise a project?

- **Project Idea**, Description and **short check** on CDM- / JI-Feasibility
  ⇨ December 2001 to January 2002
- Developing a „**Project Design Document**" (PDD)
  - Determination of the GHG-reductions in comparison to a reference scenario („baseline-study")
  - Monitoring & Verification System
  - Integration in project development process
  - ⇨ February to July 2002

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What are the basic steps to realise a project?

- **Validation** of the PDD by an independent party
  ⇨ August 2002
- **Registration** of the project by national & international institutions
  ⇨ August 2002
- **Verifying** the reductions ex post (annually), done by independent and liable verifiers
  ⇨ For the first time: December 2002 (for 2001)
- Overall: ≈ 8 – 9 months

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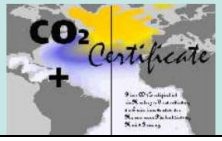
This entails relatively high expenditure.

But the input is absolutely worthwhile as you have a significant return on investment!



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Our services in the field of climate protection

Slide 18

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Our services in the field of climate protection

- Knowledge transfer to your company
- Continuous support by a 'multi skills' team
- Project Design Documents (e.g. Baseline Study, Monitoring)
- Implementation of new business processes
- Integration of climate change aspects into your business strategies (Climate Strategy, Risk Management, Business Planning)

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For further details please contact

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Discussant Notes • Session Improving Energy Efficiency in Residential and Public Buildings

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Riga Technical University, Riga

Slide 1

Aspects discussed

- Environmental & climate change
- Political & strategical
- Financial
- Human factor & Social aspects
- Ownership
- Economical
- Technical

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Environmental & Climate Change

Slide 3

Are we ready for emission trading from EE measures in building ?

- Are energy savings from EE measures in buildings are attractive?
- Are countries ready for emission trading: transaction costs, climate change agency, etc?
- Target of Kyoto protocol of countries?

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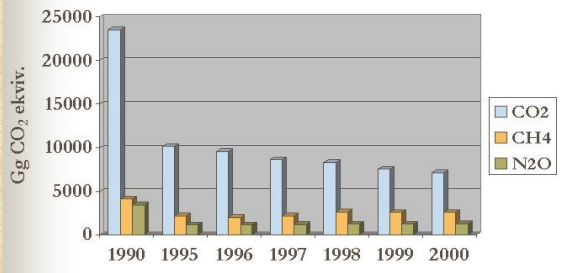
GHG emissions in Latvia



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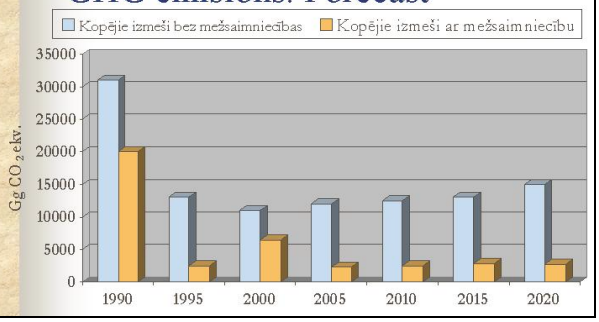
GHG emisions. Forecast



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Policies & strategies

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Which national laws & documents are in connection with EE in buildings?

- GHG policy and startegy
- National Energy Programme
- National Building Programme
- Energy Efficiency Strategy
- 3rd National Climate Change Report
- Law on Energy

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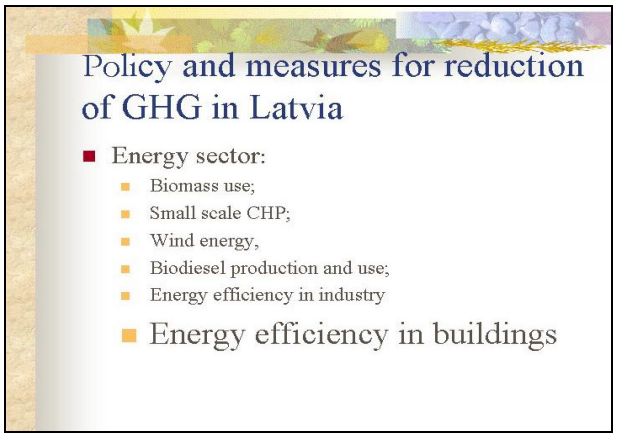

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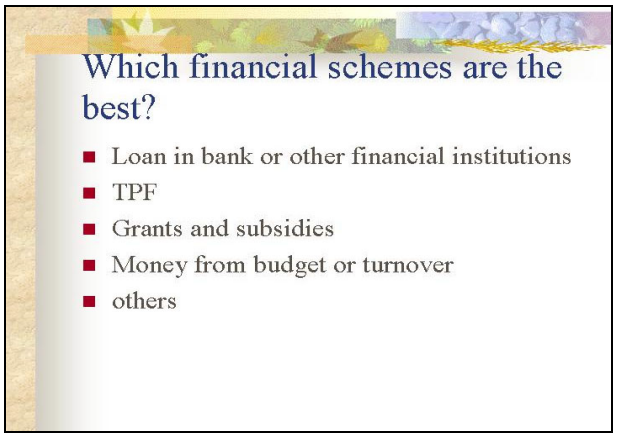

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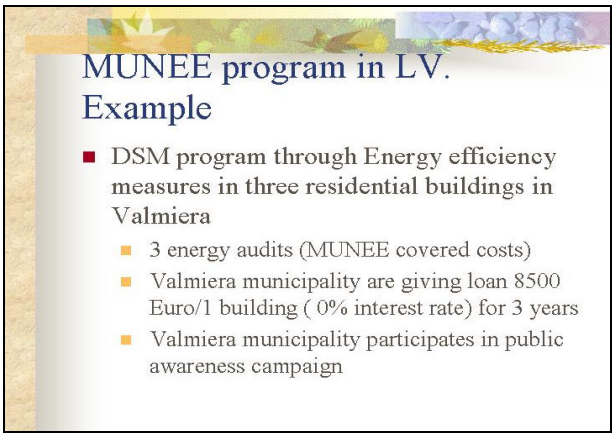

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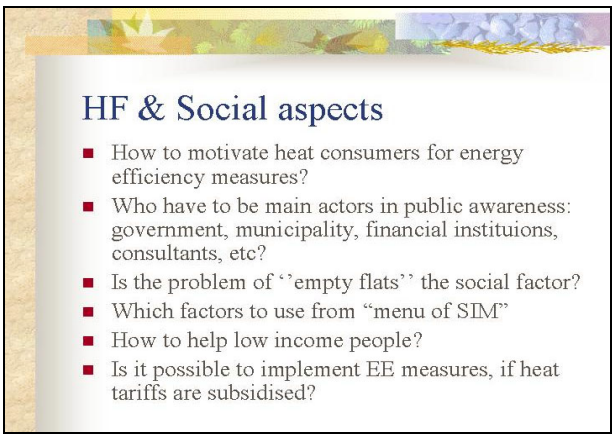

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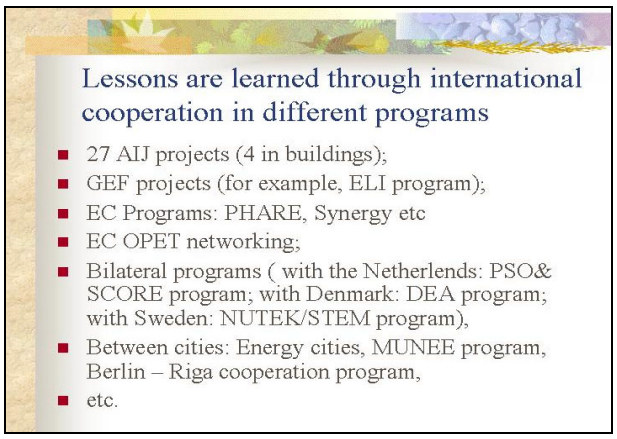

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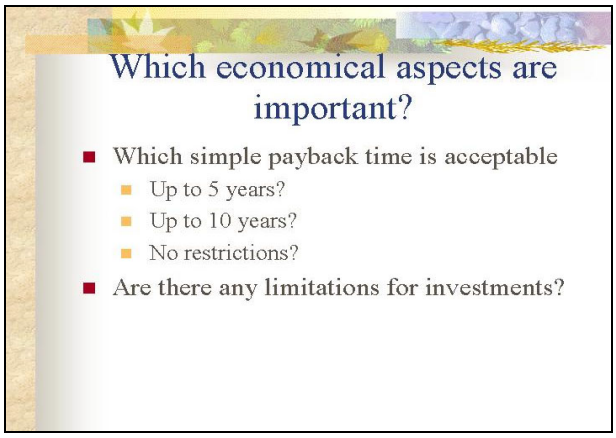

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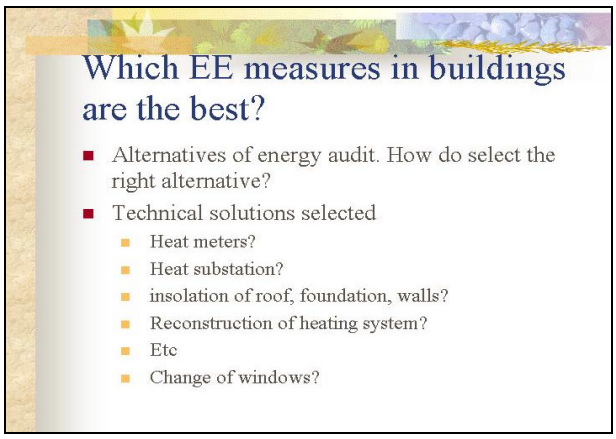

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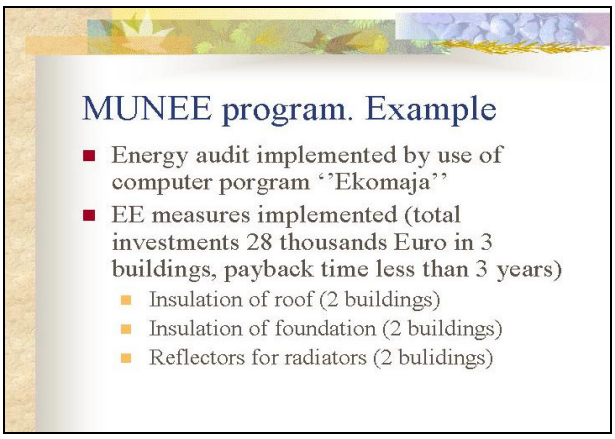

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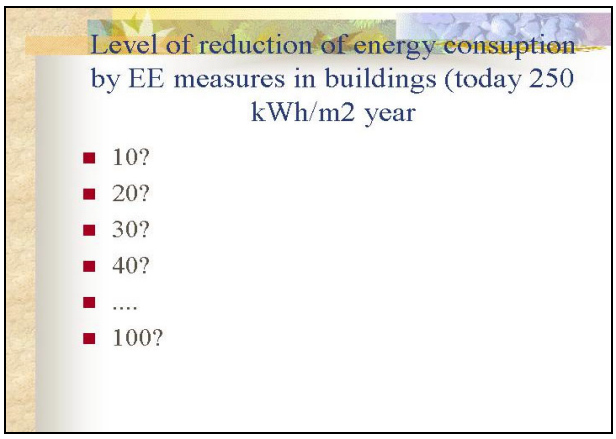

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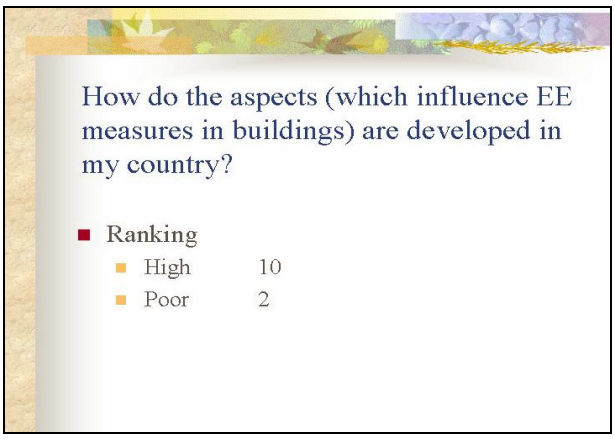

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Major Challenges to International Climate Protection Policy

Dr. Hans-Joachim Ziesing

German Institute for Economic Research, Berlin

1. International negotiations

The United Nations Framework Convention on Climate Change (UNFCCC), which was passed in Rio de Janeiro in 1992 and came into force in 1994, represents the first international treaty seeking to combat the risks facing the global climate.[1] In particular, the countries listed in Annex I of the Framework Convention ('those parties to the convention that are industrialized countries, as well as the other parties listed in Annex I'), known collectively as the 'Annex I countries',[2] undertook to implement measures at national level seeking to restrict anthropogenic emissions of greenhouse gases and to protect and enhance their greenhouse gas sinks and reservoirs.[3]

Thus, in Rio in 1992, the Annex I countries had already agreed in principle to reduce their greenhouse gas emissions by 2000 to the level reached in 1990. However, at this stage the agreement amounted to no more than non-binding declarations of intention. The negotiations became more serious at the third Conference of the Parties to the UNFCCC in Kyoto in 1997.

The ratification of the protocol passed in Kyoto would have obliged the industrialized countries listed in Annex B (the 'Annex B countries'),[4] as the main parties responsible for the additional greenhouse effect, to commit themselves for the first time under international law to binding concrete restrictions on or reductions of their emissions. Under Article 3, § 1, these countries would have been obliged to individually or jointly ensure that their total anthropogenic emissions of the six most important greenhouse gases[5] did not exceed their allocated quotas, with the aim of reducing their total emissions to at least 5% less than the 1990 level by the compliance period of 2008 to 2012.[6]

Now, despite the USA's withdrawal from the international negotiations, the conditions have been created for the Kyoto Protocol to come into force in the near future.[7] This process was furthered by the recent Conferences of the Parties in Bonn and Marrakech, where the participants managed to reach agreement on significant issues regarding the implementation of the protocol - in particular, with respect to the system used to monitor its compliance, the design of the so-called flexibility mechanisms (emissions trading, joint implementation and the clean development mechanism), credits for carbon sinks, and the promotion of climate protection in the developing countries.

However, on the long slow path to ratification, numerous concessions were made to hesitant signatories in order to

[1] Cf. Article 2 of the UN framework agreement (Framework Convention on Climate Change).

[2] The Annex I countries include the OECD countries, with the exception of South Korea and Mexico, and the transition countries, with the exception of Croatia and Slovenia. Thus, the Non-Annex I countries are basically the developing and newly industrialized countries.

[3] Cf. Article 4, § 2a, of the Framework Convention on Climate Change.

[4] The Annex B countries include the OECD countries, with the exception of Turkey, South Korea and Mexico, as well as the Russian Federation, Ukraine, Bulgaria, Estonia, Croatia, Latvia, Lithuania, Romania and Slovenia.

[5] Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), partly halogenated hydro fluorocarbons (HFCs), per fluorocarbons (PFCs) and sulfur hexafluoride (SF_6).

[6] Australia, Norway and Iceland were actually granted an increase in emission levels. The European Union as a whole and its member countries undertook to reduce emissions by 8%. Under the EU burden-sharing agreement, Portugal, Spain, Greece, Sweden and Ireland were also granted increased emission levels.

[7] Under Article 25, § 1, the Kyoto Protocol will enter into force on the ninetieth day after the date on which 'hot less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 percent of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession.' Although the protocol had already been signed by 79 parties in mid-August 2002, the second condition was not fulfilled because only 36% of the relevant emissions had been accounted for. Following the withdrawal of the USA, arrival at the 55% quota now depends on Russia (which accounts for 17.4% of emissions) and other countries ratifying the protocol. Given that the Russian government declared itself basically in favor of ratification on 11 April 2002 and that other countries have also indicated their intention to sign, the protocol is likely to become internationally binding within the foreseeable future.

secure their agreement. The result was that the reduction targets stipulated in the Kyoto Protocol, which were not particularly ambitious to begin with, have since been further weakened. Nonetheless, for the first time binding agreement has been reached on the reduction of greenhouse gases by the first compliance period of 2008-2012.

The Intergovernmental Panel on Climate Change (IPCC) [1] believes, however, that much larger emission reductions must be achieved in the long term if the risks facing the global climate are to be mitigated. This is why the future Conferences of the Parties will, on the one hand, have to agree on emission limits that both are much stricter than those stipulated for the first compliance period and at the same time extend beyond 2008-2012 and, on the other, incorporate the developing countries to a greater extent in the reduction commitments. Further efforts to encourage the USA, the largest emitter world wide, to rejoin the Kyoto process will also be necessary, however.

2. Overview of global emission trends

Lack of data prevents us from providing a comprehensive picture of global emissions of the six greenhouse gases listed in the Kyoto Protocol. Data of this kind are only available for the Annex B countries, and even in this case they are not always up to date.[2] Disregarding certain inaccuracies resulting from the varying dates of the most recent reports, it can be shown on the basis of these sources that the greenhouse gas emissions in the Annex B countries were almost 7% lower in 1999/2000 than in 1990.

Thus, the joint reduction target of a collective 5.2% by the first compliance period of 2008-2012 has already been overshot. However, this result should not be seen too optimistically, for the decrease is almost exclusively due to the massive economic decline in the transition countries.[3] At the end of the 1990s, greenhouse gas emissions in these countries were almost 38% below their 1990 level. Thus, the 'western' industrialized countries listed in Annex B of the Kyoto Protocol[4] together increased their emissions by over 6% during this period; if the EU-15 countries had not achieved a reduction, the increase would actually have amounted to over 11%. The group of industrialized countries has therefore not yet even stabilized its greenhouse gas emissions, let alone come any closer to the reduction target of a hefty 6.6% stipulated in the Kyoto Protocol. The largest absolute increase in emissions was attained in the USA, followed by Canada, Japan and Australia.

The differences in the trends for emissions between the transition countries and the industrialized countries are at the root of the debate on 'hot air' or phantom emission reductions. The transition countries were granted much more generous emission allowances in the Kyoto Protocol than they are ever likely to need by 2008-2012. If it were possible to sell such allowances, which basically only exist because of the economic collapse and not because of targeted reduction efforts (whence the name 'hot air'), to the industrialized countries under the planned regulations on international emissions trading, the overall reduction in emissions would not be any greater. The Kyoto Protocol itself sees reductions in emissions via emissions trading as

[1] cf. 'Climate Change 2001: The Scientific Basis.' Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge/New York 2001 cf. the IPCC reports on the Internet at http://www.ipcc.ch.

[2] The following are the main data sources used in this report: UNFCCC, FCCC/SBI/2001/13 corr.: 'National Communications from Parties included in Annex I to the Convention.' Report on National Greenhouse Gas Inventory Data from Annex I Parties for 1990 to 1999. Note by the Secretariat. Corrigendum, 9 May 2002; International Energy Agency (IEA): 'CO_2 Emissions from Fuel Combustion', 2001 edition, Paris 2001; European Environmental Agency (EEA): 'Annual European Community Greenhouse Gas Inventory 1990-2000 and Inventory Report 2002', Technical Report no. 75 (http://reports.eea.eu.int/-technical_report_2002_75/en), April 2002; European Commission: '2001 - Annual Energy Review', Brussels, January 2002; Federal Republic of Germany 2001 report on a monitoring mechanism of Community CO_2 and other greenhouse gas emissions in accordance with Council Decision 99/296/EC, March 2002; 'BP Statistical Review of World Energy', June 2002. The data provided by most of the sources on greenhouse gas or CO_2 emissions only refer to the years up to 1999 (non-EU-15 countries) or 2000 (EU-15 countries). With the exception of the German data, the CO_2 emissions up to and including 2001 referred to in this report were extrapolated from the energy consumption data by country and energy source published in the BP statistics up to 2001. For Germany, original DIW Berlin estimates were made based on the energy balance sheets, the evaluation tables for the energy balance sheets and the estimated primary energy consumption for 2001.

[3] The 'economies in transition' include Poland, the Czech Republic, Hungary, the Russian Federation, Ukraine, Bulgaria, Estonia, Croatia, Latvia, Lithuania, Romania, Slovakia, Slovenia and Belarus.

[4] With the exception of Turkey, the Annex B countries are the same as the Annex II countries in the Framework Convention. They include the OECD countries, with the exception of South Korea, Mexico, Poland, the Czech Republic, Hungary and Slovakia.

having only a supplementary function to the measures undertaken in the buyer's own country.[1] Against this background, the efforts of the Europeans, in particular, to restrict the volume of trade in hot air in the first compliance period and to demand that potential buyers achieve at least half of their reduction commitments on their own territory are understandable.[2]

The estimated changes in emission levels for CO_2, the most important greenhouse gas, indicate that in recent years the emissions trend world wide has diverged even further from the targeted goals. Thus, total CO_2 emissions from fuel combustion increased world wide in the 1990s; in 2001 they are likely to have been around 13% higher than in 1990 and almost 3% higher than in 1999.[3] Without the sharp reductions in the transition countries, worldwide CO_2 emissions would actually have been higher by around a quarter than in 1990. The developing countries showed a particularly sharp rise, increasing their CO_2 emissions by 44%.

While the substantial total increase in these countries considerably expanded their share of worldwide CO_2 emissions - from over 31% (1990) to nearly 40% (2001) - the largest share (almost half) is still accounted for by the western industrialized countries (Annex II countries). At over 11% between 1990 and 2001, the increase in CO_2 emissions in this group was only slightly lower than the average increase world wide. Only Germany and Great Britain achieved a notable decline in emissions in absolute terms, though Luxembourg, Denmark and Belgium also achieved a reduction on 1990. All the other Annex II countries showed a greater or lesser degree of increase in their emission levels. At 730 million t of CO_2 (15.2%), the USA had by far the greatest increase in absolute terms, followed at a distance by Japan (almost 130 million t), and Canada and Australia (around 80 million t each). Thanks to the decreases in Germany and Great Britain, the CO_2 emissions in the EU-15 countries as a whole were only 0.7% higher in 2001 than in 1990.

Forecasts suggest that an increase in emissions can be expected practically everywhere in the future. Thus, in its latest forecast the U.S. Energy Information Administration (EIA) actually comes to the conclusion that under the defined reference conditions, 'global carbon dioxide emissions are expected to grow more rapidly over the projection period than they did during the 1990s.'[4] The EIA expects world carbon dioxide emissions to increase on 1990 by almost 36% by 2010 and by almost 70% by 2020. Even the Annex I countries are expected to increase their emissions substantially (by 12% and 26%, respectively). An even higher increase in emissions will be prevented by the expected trends in the transition countries where, despite the increase expected in the future, emissions will remain substantially below the 1990 level until 2020.[5] The remaining Annex I countries, by contrast, will show a sharp increase which, at 54% by 2020, is likely to be largest by far in the USA. However, in the western European countries, too, which together have made a (binding) commitment to reducing greenhouse gas emissions by 8% by 2008-2012, CO_2 emissions, at least, are expected to rise sharply.

All in all, if the relevant framework conditions of climate protection policy are not fundamentally modified, the reduction targets sought at the global level are likely to be missed by a large margin. This outcome will be all the more probable if it does not prove possible both to reinsert the USA in the Kyoto process and oblige it to achieve an absolute reduction in emissions, and also to induce the developing countries to undertake specific commitments with respect to medium-term restrictions on emissions.

[1] Cf. Article 6, § 1d, under which any party listed in Annex I may transfer emission reduction units to any other party listed in Annex I or may acquire them from any other party listed in Annex I as long as 'the acquisition of emission reduction units [is supplemental to domestic actions for the purposes of meeting commitments under Article 3.'

[2] In the long term, however, i.e. in the second compliance period, agreement on a new (more recent) base year would represent a more goal-oriented policy than such restrictions on demand.

[3] On worldwide emissions growth in the 1990s, also cf. Hans-Joachim Ziesing: 'CO_2 emissions: No change in the trend in sight.' In: Economic Bulletin, vol. 38, no. 12, December 2001.

[4] Cf. Energy Information Administration: 'International Energy Outlook', Washington D.C., March 2002.

[5] This also has implications for the 'hot air' problem mentioned above.

3. Emission trends in the EU-15 countries

According to the national inventories of the member states, the EU-15 countries' total greenhouse gas emissions in 2000 were around 148 million t (CO_2 equivalents) or 3.5% lower than in 1990. While the self-imposed goal of stabilizing emissions at the 1990 level was thus actually exceeded, less than half of the distance to the binding target of an 8% reduction by 2008-2012 has been covered. Moreover, observing the trend during the 1990s it becomes evident that greenhouse gas emissions were reduced by around 3% in the first half of the decade, but only by another 0.5% in the second half.

This divergence becomes even more graphic if the absolute figures are compared: of the entire reduction, 128 million t, or around 86%, was achieved between 1990 and 1995, while the fall in emissions in the second half of the 1990s only amounted to slightly over 20 million t. If the reductions continue at this pace, the target for 2008-2012 (which would require a further reduction of nearly 190 million t on the 2000 level) will be missed by a large margin.

A more detailed analysis of the national data shows that the picture drawn for the EU as a whole must be substantially modified. The only reductions that really stand out in the 1990s are those achieved in Germany (231.3 million t) and Great Britain (93.4 million t). However, in Germany, especially, the hefty reductions achieved at the beginning of the 1990s in the former GDR have been followed by a substantially slower pace of reduction. [1]

If Germany and Great Britain are removed from the equation, greenhouse gas emissions in the EU rose by almost 8% between 1990 and 2000, increasing at an even higher rate in the second half of the 1990s than in the five previous years. The increases were particularly marked in Spain, Greece, Italy, Portugal and Ireland, with emissions in this group increasing by almost 180 million t (17%) between 1990 and 2000.

Only Belgium, Denmark, the Netherlands and Sweden, where emissions had increased to a greater or lesser extent in the first half of the 1990s, showed reductions in the second half of the decade. However, the emissions in Belgium and the Netherlands were still much higher in 2000 than in 1990. France achieved a relatively constant - if only weak - reduction in emissions.

4. Factors behind the changes in greenhouse gas emission levels in the EU

The changing levels of greenhouse gas emissions in the EU-15 countries are believed to have been determined by the following main factors:

- population trends (demographic component),
- per capita GDP trends (income component),
- macroeconomic energy intensity trends (energy intensity component),
- trends in the greenhouse gas content of primary energy consumption (energy mix component).

The relative influence of the individual factors on the changes in greenhouse gas emissions between 1990 and 2000 was estimated using the component decomposition method.[2]

The reduction in emissions in the EU-15 countries as a whole can be primarily explained on the basis of changes in the energy source structure in favor of low-emission or emission-free energy sources (570 million t) and - to a much smaller extent - falling energy intensity (400 million t). Together, these two effects substantially outweigh the emission-increasing effects of rising per capita GDP (682 million t) and a growing population (140 million t). However, this picture is reversed when the changes in Germany and Great Britain are left out of the equation. Then, the emis-

[1] For an analysis of greenhouse gas emissions in Germany and Great Britain, cf.: 'Greenhouse Gas Reductions in Germany and the UK - Coincidence or Policy Induced? An Analysis for International Climate Policy.' Study on behalf of the German Federal Ministry of the Environment (BMU) and the German Federal Environmental Agency (UBA). Fraunhofer Institute for Systems and Innovation Research (ISI), Science Policy and Technology Policy Research (SPRU) and German Institute for Economic Research (DIW Berlin), June 2001. This study shows that around 60% of the reductions in emissions in Germany are a consequence of the structural transformation of the economy in the former East Germany.

[2] On the component decomposition method used here cf. Jochen Diekmann, Wolfgang Eichhammer, Anja Neubert, Heilwig Rieke, Barbara Schlomann and Hans-Joachim Ziesing: 'Energie-Effizienz-Indikatoren. Statistische Grundlagen, theoretische Fundierung und Orientierungsbasis für die politische Praxis', Heidelberg 1999.

sion-reducing effects of a 'better' energy mix and more efficient energy use are entirely nullified by the increase in emissions determined by the demographic and economic factors, and the result is a total increase in emissions of around 176 million t.

The figures for the individual countries reveal the following insights:

- The population effect alone led to some degree of increase in greenhouse gas emissions in all of the EU-15 countries. Measured as a relative share, this effect is particularly noticeable in Luxembourg, Ireland and the Netherlands. Across the EU, an increase of over 3% in greenhouse gas emissions can be ascribed to the higher population in 2000 than in 1990.
- The income effect, in other words the increase in per capita GDP, made a substantial contribution to higher emissions in all the EU countries, and this effect was particularly noticeable in Ireland, Luxembourg, Portugal and Spain. The effect in Germany, Sweden, France and Italy was relatively weak in comparison. Across the EU, the increase in per capita GDP between 1990 and 2000 led to an increase of around 16% in greenhouse gas emissions.
- The energy intensity effect varied substantially across the EU countries. It led to reduced emissions in most countries, in particular Luxembourg, Ireland, Germany, Denmark and Sweden, where substantial improvements in macroeconomic energy productivity were achieved over the observation period. However, energy productivity actually worsened perceptibly in Portugal and Spain, while the same applies to a less substantial extent to Greece and Belgium. Only minor progress with respect to energy productivity was achieved in Italy, France and Finland. Across the EU, this effect led to a reduction in greenhouse gas emissions of almost 10%.
- The changes in the energy source structure were accompanied by lower greenhouse gas emissions in most cases. Thus, the energy mix shifted in favor of low-emission or emission-free energy sources (especially natural gas). This factor had a substantial effect in Luxembourg, followed at some distance by Great Britain, Finland, Ireland, Belgium, Germany and France. The effect was much less marked in Greece, Sweden and Spain. Across the EU, greenhouse gas emissions were reduced by almost 14% as a result of changes in the energy mix.

5. EU reduction targets at risk

Overall, then, it is not possible to present a uniform picture for the EU member states. Nonetheless, it must be concluded that both in the EU as a whole and in most of the individual member states the factors that increase emissions still have the upper hand. Despite this rather unfavorable trend to date, the EU has assumed a pioneering role in the recent Conferences of the Parties as regards the implementation of the Kyoto Protocol and commitments to reductions. Unlike the USA, the EU has still not abandoned the goal of reducing greenhouse gas emissions by 2008-2012 by a total of 8% on 1990, and thus to a greater extent than the average for all the industrialized countries. Within the EU, the commitments undertaken by the individual member states vary considerably owing to the burden-sharing agreement.

Thus, emissions in Germany must be reduced by 21%, which amounts to around three-quarters of the total reduction target assumed by the EU. Germany had already fulfilled around 90% of its reduction target by 2000, and its share of the decrease in emissions still to be achieved by 2008-2012 now amounts to less than 14%. Thus, the EU target can only be fulfilled if the other EU countries are willing and able to achieve much greater reductions in their greenhouse gas emissions during the remaining period than would correspond to their emission shares in 2000.

The prospects of this being achieved are clearly not very good. Thus, the European Environment Agency has complained that 'more than half of the European Union countries are still heading towards overshooting their agreed share of the EU's greenhouse gas emissions target by a wide margin. This is the case for Austria, Belgium, Denmark, Greece, Ireland, Italy, the Netherlands, Portugal and Spain.'[1] The (estimated) changes in CO_2 emission levels over the last two years also demonstrate that there has still been no change in trend in the EU-15 countries: As in 2000, there is likely to have been a further increase in emissions in 2001 (cf. table 2). After all, the EU commis-

[1] Cf. European Environment Agency News Release, Copenhagen, 29 April 2002 (http://org.eea.eu.int/documents/news-releases/greenhouse_gas_emission.).

sion had already concluded that according to the member states' projections, the existing policy concepts and measures would probably not suffice to further reduce the total volume of greenhouse gas emissions at EU level. Thus, by 2010 'at best a stabilization of emissions at 1990 level will be achieved.'[1]

However, if the EU-15 countries and the individual member states wish to underpin their pioneering role in global climate protection by also implementing effective climate protection policy measures, then it seems that they need to significantly intensify their climate protection efforts. The EU Commission has indeed commissioned numerous studies to this end, which have proposed a sufficient range of appropriate strategies. The European Climate Change Program (ECCP), which must now be implemented at national level, represents a step in this direction. [4] The emissions trading mechanism proposed by the Commission - which was already provided for in the Kyoto Protocol - also acquires particular importance in this context. [5]

6. Developments in Germany

Of all the large industrialized countries, probably only Germany, Great Britain and France[2] are likely to fulfill the reduction target agreed for 2008-2012. This would require a further reduction on the 2000 level of 'only' around 25 million t (CO_2 equivalents) in Germany. While the pace of emissions reduction has slowed down considerably in Germany in recent years, this goal should be attainable if the climate protection policy pursued by the German government is consistently adhered to and intensified.

However, it is still unrealistic to believe that the federal government's goal (reaffirmed once again in its recently published Third Report on Climate Protection in Germany)[3]. of reducing German CO_2 emissions by a quarter on 1990 as early as 2005 will be achieved. CO_2 emissions adjusted for temperature were only a good 15% lower in 2001 than in 1990. Temperature-adjusted CO_2 emissions would thus have to be reduced by 2005 by around another 100 million t, or almost 12% on the 2001 level. This appears improbable given the significantly weakened rate of reduction in recent years.[6]

The sectoral structure of energy-related CO_2 emissions changed significantly during the 1990s.[7] While the energy sector is still by far the largest emitter, transport is now in second place, followed at a distance by industry and private households. The crafts, trade and service sectors, by contrast, are playing an increasingly insignificant role with respect to emissions.

The energy sector shows the largest absolute decline in (non-temperature-adjusted) CO_2 emissions compared with the base year 1990 (almost 72 million t or 16%), followed by the industry sector with a decline of 50 million t (30%) and the crafts, trade and service sectors (around 30 million

[1] Cf. Commission of the European Communities: Commission Report to the European Parliament and Council under Council Decision no. 93/389/EEC for a monitoring mechanism of Community CO_2 and other greenhouse gas emissions, as amended by Decision 99/296/EC, COM(2001) 708 final, Brussels, 30.11.2001.

[2] Under the European burden-sharing agreement, however, France is only obliged to stabilize, but not reduce, its greenhouse gas emissions by 2008-2012 compared with 1990.

[3] Cf. 'Klimaschutz in Deutschland'. Dritter Bericht der Regierung der Bundesrepublik Deutschland nach dem Rahmenübereinkommen der Vereinten Nationen über Klimaänderungen, Berlin, July 2002, p. 56.

[4] Cf. Commission of the European Communities: 'EU policies and measures to reduce greenhouse gas emissions: Towards a European Climate Change Program (ECCP)', Com(2000) 88 final, 8.3.2000, http://europa.eu.int/comm/environment/climat/-eccp.htm; European Commission, 'European Climate Change Program (ECCP): Long Report', June 2001; Commission of the European Communities: 'Communication from the Commission on the implementation of the first phase of the European Climate Change Program (ECCP),' COM(2000) 580 final, Brussels, 23.10.2001.

[5] Commission of the European Communities: Proposal for a Directive of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, (COM(2001) 581 final, Brussels, 23.10.2001.

[6] Also cf.: Hans-Joachim Ziesing: 'CO_2-Emissionen im Jahre 2001: Vom Einsparziel 2005 noch weit entfernt'. In: Wochenbericht des DIW Berlin, no. 8/2002.

[7] Some of the figures published by the DIW in the past (cf. Economic Bulletin, vol. 38, no. 12, December 2001) for the years 1999 and 2000 required revision following retrospective corrections of the energy data on which they were based. It is not yet possible to provide sectoral data for 2001 because the relevant energy data are not available. These figures will be published in an additional DIW Berlin Wochenbericht report this autumn. Readers should note that the structure of emissions presented here is based on the system of classification of sectors used in the energy balance sheets, while the official national emission inventories adhere to the classification system stipulated in the UNFCCC guidelines. Thus, while the sectoral structures of the two reporting systems vary substantially, the differences between the respective emission totals are only insignificant.

t or 34%); private households emitted over 14 million t (11%) less CO_2 in 2000 than in 1990. The temperature factor is extremely noticeable in households, in particular, due to the dominant importance of heating energy consumption. Thus, the sharp decline in actual CO_2 emissions after 1996 cannot yet be interpreted as the result of an extremely effective energy savings policy because at an estimated 1% the temperature-adjusted reduction between 1996 and 2000 was only insignificant.

Only the transport sector showed higher emissions in 2000 than in 1990 (almost 13%). However, for the first time since 1994, emissions fell in this sector in 2000 (by around 2% on the previous year). The decline was borne almost exclusively by road traffic emissions, while air traffic again showed a hefty increase (6%).[1] The decrease continued in 2001 because sales of Otto fuel (3%), diesel fuel (1.3%) and - as a consequence of 11 September - aircraft fuel (4.6%) fell perceptibly.

7. Conclusion: further action essential

The world summit in Johannesburg faced huge challenges in combating the risks to the global climate. The industrialized countries, especially, which are considered to be the main parties responsible for the climate problems, have still not managed to collectively stabilize greenhouse gas emissions, let alone reduce them. Only the fall in emissions in the transition countries - which is certainly not the result of climate protection policy - has eased the tension. If the sharp increases in emissions in the developing countries are added to the equation, then at global level there is still no evidence of a shift in trend towards long-term emission reduction. Based on the current data, if the framework conditions for climate protection policy are not fundamentally revised, then the global reduction targets can be expected to be missed by a massive margin.

The IPCC's belief that much more substantial emissions reductions than provided for in the Kyoto Protocol are required in the long term must also be noted. Thus, the future Conferences of the Parties will also have to agree on emission limits that both are much stricter than those stipulated for the first compliance period and at the same time extend beyond 2008-2012, and also incorporate the developing countries to a greater extent in the reduction commitments. However, the efforts to persuade the USA to rejoin the Kyoto process must also be continued.

The data indicate that many EU member states are also likely to fail to fulfill their reduction commitments. If the EU wishes to remain credible in the pioneering role it has assumed at the international negotiations on climate protection, it must achieve its agreed targets by implementing the climate protection schemes at its disposal. This would include an appropriate design at European level of the emissions trading system proposed by the EU Commission.

Germany is unlikely to achieve its self-imposed goal of reducing CO_2 emissions as early as 2005 by a quarter on the 1990 level. However, if it pursues its climate protection policy consistently, it has good prospects of fulfilling the reduction target of 21% agreed within the framework of the European burden-sharing system by 2008-2012. But here, too, climate protection policy makers must bear in mind that much more substantial reductions of greenhouse gas emissions will be necessary in the long term. This means gearing energy and environmental policy even more decisively towards improved energy productivity, increased use of low-emission energy sources and much greater recourse to renewable energy sources.

[1] The fuel consumed in international air traffic is still not taken into consideration in the national emission inventories. In the German case this amounts to an estimated 80% of the total aircraft fuel tanked in the country.

DIW Berlin

Future perspectives of climate protection policies and strategies

CTI Capacity Building Seminar
for CEE/FSU Countries
Tutzing, 16 - 20 November 2002

Dr. Hans-Joachim Ziesing
Deutsches Institut für Wirtschaftsforschung, Berlin
(German Institute for Economic Research)
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Slide 1

DIW Berlin

AGENDA

- The Kyoto targets and the development of greenhouse gas emissions in the 1990s
- The future perspectives of world-wide greenhouse gas emissions
- Scenarios of the German Parliament's Study Commission on Sustainable Energy
- Policies and measures
- Some conclusions

Slide 2

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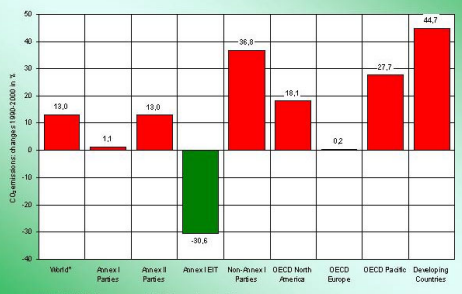
CO_2 emissions by region 1990 - 2000



Slide 3

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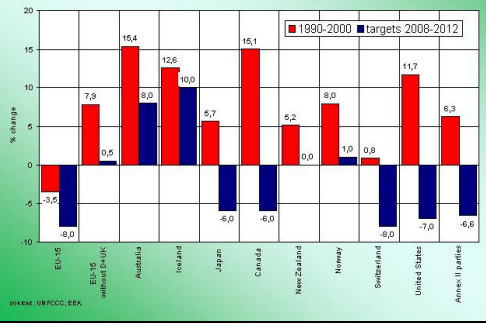
Annex II Parties: Greenhouse gas emissions 1990 – 1999/2000 and Kyoto targets 2008-2012



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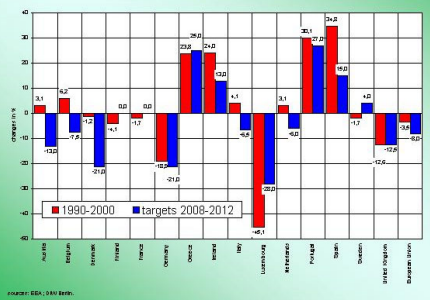
EU-15: Greenhouse gas emissions 1990 – 2000 and Kyoto targets 2008-2012



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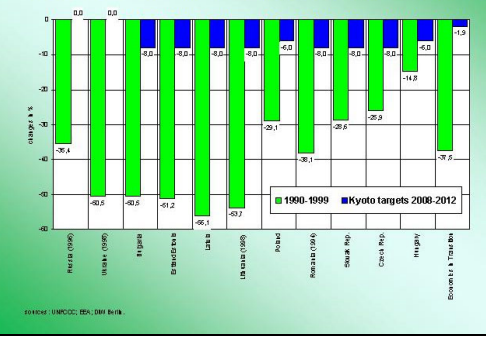
Economies in Transition: Greenhouse gas emissions 1990 – 1999 and Kyoto targets 2008-2012



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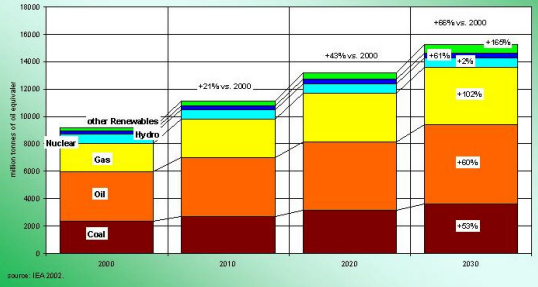
TPES by fuel 1971 – 2030 (IEA 2002)



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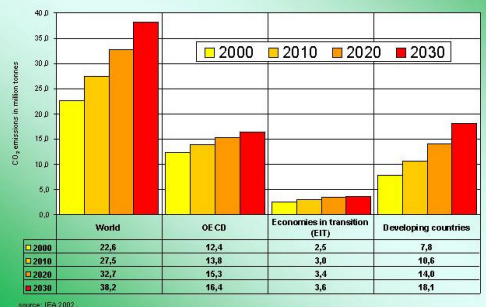
CO_2 emissions by region 2000 - 2030 (IEA 2002)



	World	OECD	Economies in transition (EIT)	Developing countries
2000	22,6	12,4	2,5	7,8
2010	27,5	13,8	3,0	10,6
2020	32,7	15,3	3,4	14,0
2030	38,2	16,4	3,6	18,1

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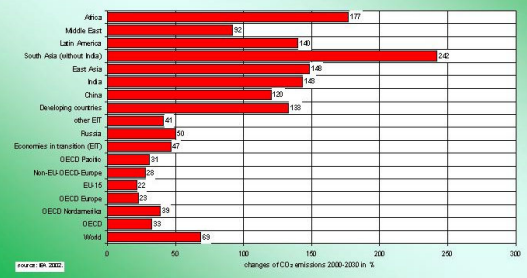
CO_2 emissions by region: % change 2000 - 2030 (IEA 2002)



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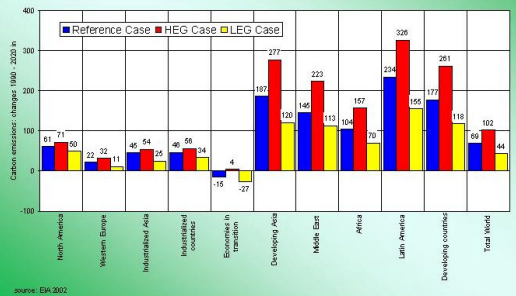
Worldwide carbon emissions by region: % change 1990 - 2020 (EIA 2002)



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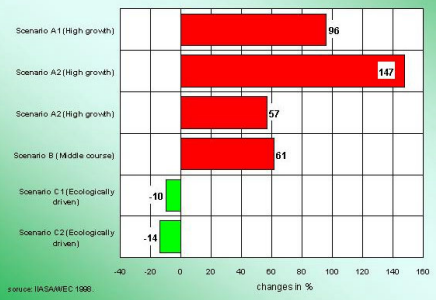
IIASA/WEC scenarios of worldwide CO_2 emissions, 1990 - 2050



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First conclusions

1. The past development of greenhouse gas emissions is not a success story and the expected development is in absolute contrast to the environmental needs
2. Even the moderate Kyoto targets probably will not be met unless ...
3. effective policies and measures will be implemented especially in Annex II parties
4. The way?

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DIW Berlin

The strategical options for a sustainable energy system are ...

- ENERGY EFFICIENCY
- RENEWABLE ENERGIES
- FUEL SWITCH BETWEEN FOSSIL FUELS IN FAVOUR OF LOW CARBON FUELS
- NUCLEAR POWER ???
- CARBON SEQUESTRATION ???

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Six essential elements of a coherent framework for effective energy efficiency policies according to IEA

- Establish and maintain an effective market structure
- Help market actors recognise their best interest and act on it
- Focus market interest on energy efficiency
- Ensure access to good technology
- Develop and maintain a supportive institutional framework
- Act to ensure continuity

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What is the picture for Germany?

- What happened in the 1990s?
- What are the emission's targets?
- What are the forecasts? Do we meet the targets?
- What should and could be done? A view on different scenarios
- Conclusions

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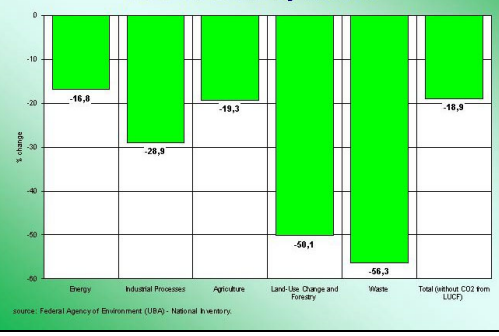
Greenhouse gas emissions in Germany 1990 to 2000 by sector



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CO_2 emissions in Germany 1990 to 2000 by sector

sources: Federal Agency of Environment (UBA); AG Energiebilanzen; DIW Berlin.

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The effects of unification and climate policies on the reduction of CO_2 emissions in Germany 1990 - 2000

	Gt CO_2	%
Total reduction of CO_2 emissions	151,6	100
Caused by effects of unification	90,6	60
Caused by climate protection policies and other measures	61,0	40

source: ISI,SPRU,DIW, 2001.

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Study Commission (Enquete commission) of the 14th German Bundestag „Sustainable Energy Supply under the Conditions of Globalisation and Liberalisation“

26 members
13 of them members of the parliament
13 of them external experts

Final report (only in german):
http://dip.bundestag.de/btd/14/094/1409400.pdf

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DIW Berlin

Characteristics of the commission's scenario

Reference Case	Fossil efficiency	Efficiency and renewables	Fossil nuclear energy mix
Energy policy like business-as-usual	higher efficiency of fossil fuels (supply side)	higher energy efficiency in all energy sectors	Additional nuclear power plants allowed (but not before 2010)
No extension of ecological taxes from 2003 on	More ambitious energy policy	Share of renewable energies in 2050: Not less than half of primary energy consumption	Moderate implementation of energy efficiency policy
energy taxes constant in real terms	continuously increasing energy taxes	continuously increasing energy taxes	
	Possibility of CO_2-Sequestration		Possibility of CO_2-Sequestration
	Additional options		
Option: Alternative basic data	Option: Alternative basic data	Thress options 1. Alternative data 2. 100% solar 3. Short term phase out of nuclear energy	Option: Alternative basic data

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Specific targets for the commission‘s scenarios regarding the reduction of greenhouse gas emissions

- 2010: minus 21 %
- 2020: minus 35-40 %
- 2050: minus 80 %

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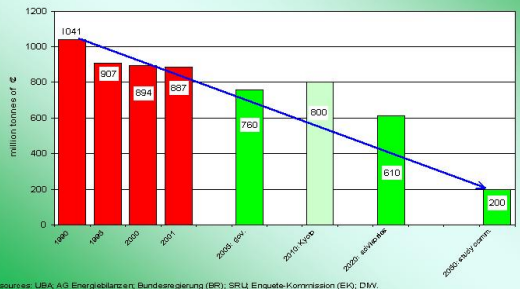
CO_2 emissions in Germany 1990 to 2001 and targets up to 2050



sources: UBA; AG Energiebilanzen; Bundesregierung (BR); SRU; Enquete-Kommission (EK); DIW.

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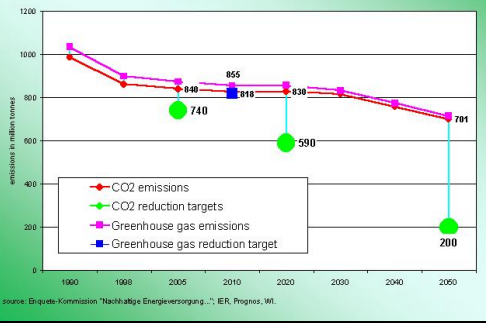
CO_2/GHG emissions in Germany reference case and reduction targets



source: Enquete-Kommission "Nachhaltige Energieversorgung...."; IER, Prognos, Wi.

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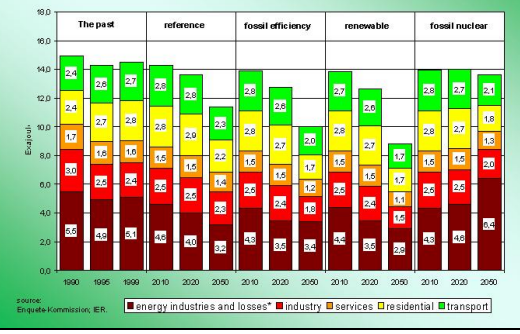
Energy consumption in Germany in different scenarios 1990 - 2050 by sector



source: Enquete-Kommission; IER.

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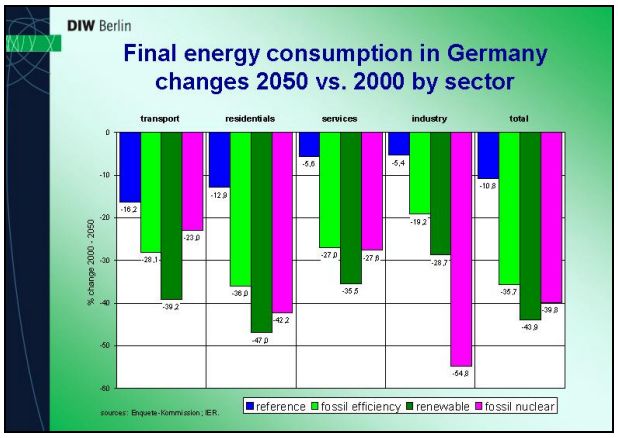

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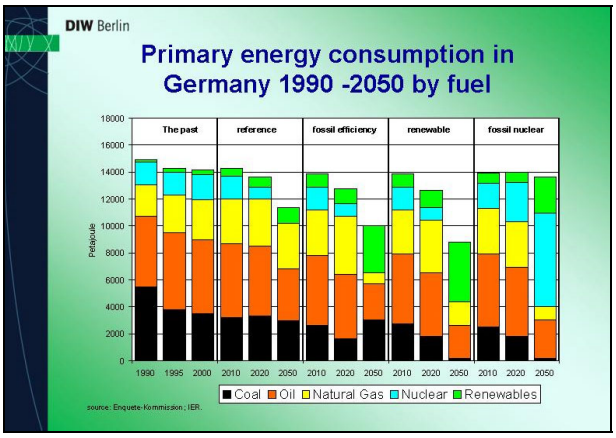

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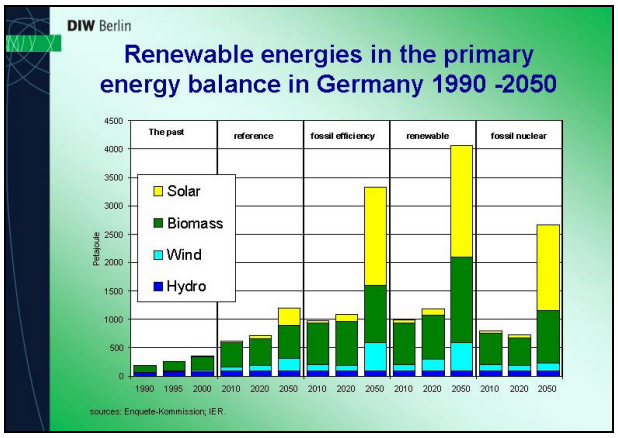

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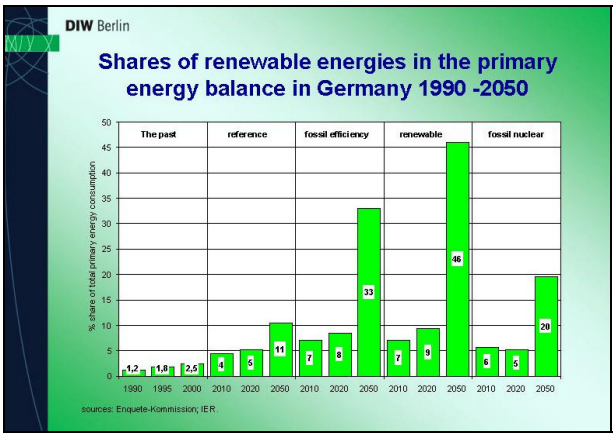

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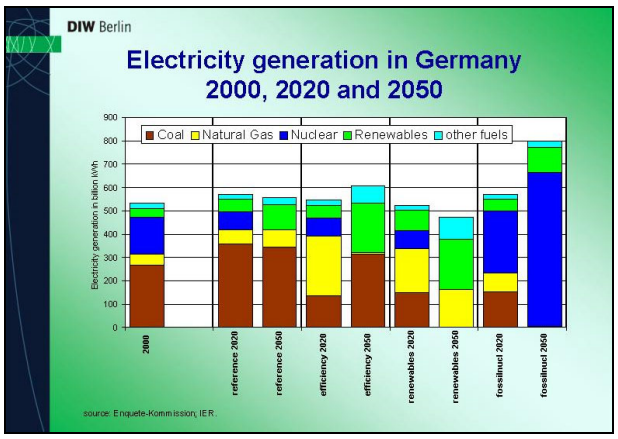

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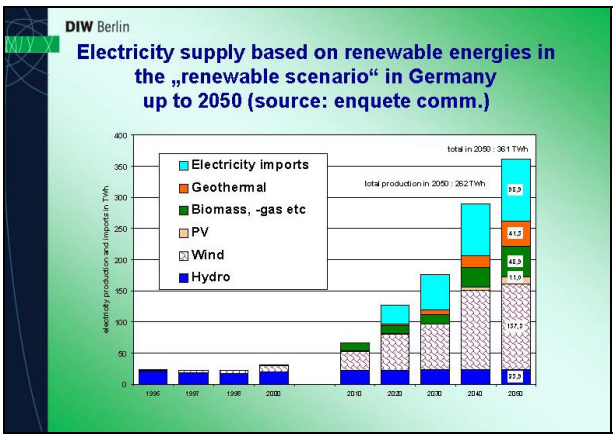

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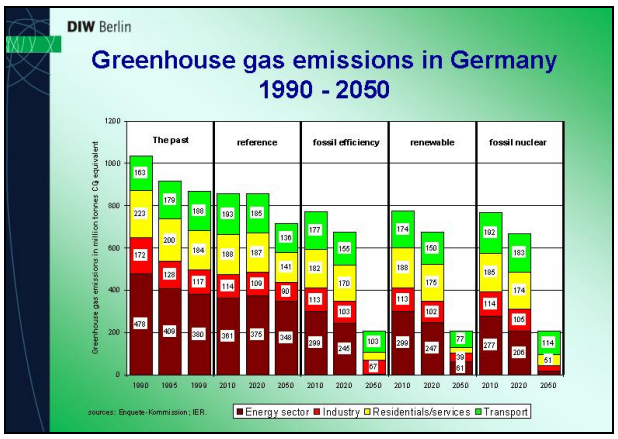

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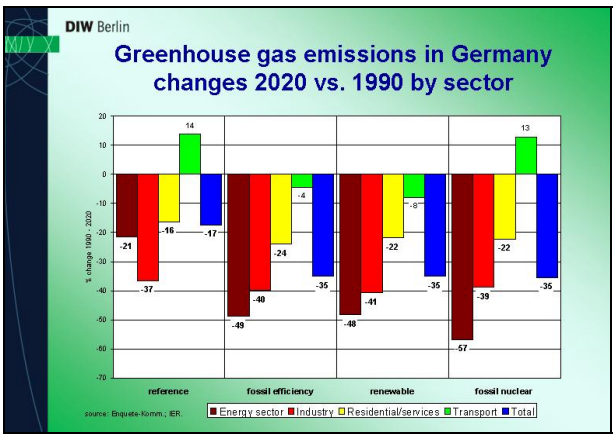

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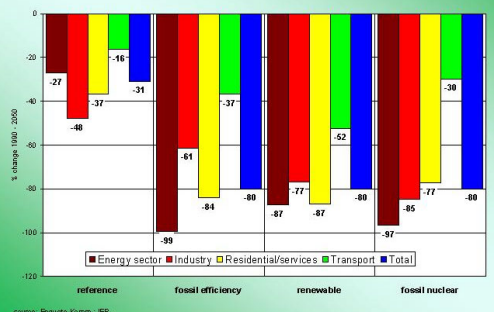
Greenhouse gas emissions in Germany changes 2050 vs. 1990 by sector



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Direct systems costs in Germany in the Enquete's basic scenarios (discounted to 1998; without social costs)

	2010	2020	2030	2040	2050
	total direct systems costs in billion 98 Euro*				
Reference	184,2	138,0	98,7	68,6	45,9
fossil efficiency	184,8	139,3	101,1	70,9	48,7
renewable	186,0	139,5	102,5	72,2	51,2
fossil nuclear	183,4	135,8	96,6	66,6	44,6
	differences to reference scenario in billion 98 Euro*				
fossil efficiency	0,6	1,2	2,4	2,3	2,8
renewable	1,8	1,5	3,8	3,6	5,3
fossil nuclear	-0,8	-2,2	-2,0	-2,0	-1,3

*) discounted to 1998 basis.

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DIW Berlin

Direct systems costs related to the GDP in Germany in the Enquete's basic scenarios

	2010	2020	2030	2040	2050
	direct cost in % of real GDP				
reference scenario	12,5	11,7	10,9	10,0	9,1
fossil efficiency	12,5	11,8	11,1	10,4	9,7
renewable	12,6	11,8	11,3	10,6	10,2
fossil nuclear	12,4	11,5	10,6	9,7	8,9

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Direct systems costs per capita in Germany in the Enquete's basic scenarios (discounted to 1998; without social costs)

	2010	2020	2030	2040	2050
	total direct systems costs per capita in 98 Euro*				
Reference	2244	1708	1266	936	677
fossil efficiency	2251	1723	1297	967	719
renewable	2266	1727	1315	985	755
fossil nuclear	2234	1680	1241	908	658
	differences to reference scenario per capita in 98 Euro*				
fossil efficiency	7	15	31	32	42
renewable	22	19	49	49	79
fossil nuclear	-10	-28	-26	-28	-19

*) discounted to 1998 basis.

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What did we learn from our scenario work?

1. There is no endogenous way to meet the ambitious emission's targets
2. On the other hand there are technical and other options available to succeed
3. To tap the full potential of these options a fundamental change of energy and environmental policies is indispensable
4. Appropriate policies and measures are necessary and available
5. But first of all we need a common understanding concerning the climate change problems and the targets. Politicians must be positive about this

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The policy mix for a sustainable energy needs ...

- ... clear targets - flexible instruments...
- ... international harmonised policies plus national policies and measures
- ... global instruments plus specific instruments
- ... instruments in line with different phases of markets and competition
- ... economic instruments plus specific instruments

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What are the robust steps towards a sustainable energy future?

- Improve energy efficiency in all segments of the demand and supply side – last but not least improve efficiency in electricity use
- Expand the contribution of renewable energies at the highest possible rate
- Be prepared for a long-run introduction of hydrogen
- Develop strategies in favour of a more sufficient behaviour of energy consumers

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DIW Berlin

The concrete targets of the commission's recommendations? -I-

- Reduction of greenhouse gas emissions: minus 40% by 2020 and minus 80% by 2050
- Improve the overall energy efficiency: 3 % in the next 20 years (1.4 % in the 1990s!)
- Increase of the electricity production on the basis of renewable energies with a factor 4 by 2020
- Increase the overall primary energy production of renewable energies by a factor 3.5 by 2020
- Expansion of the electricity production in CHP plants with a factor 2 by 2010 and 3 by 2020

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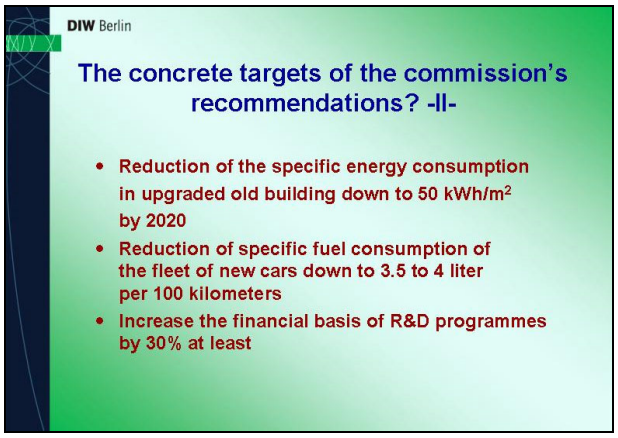

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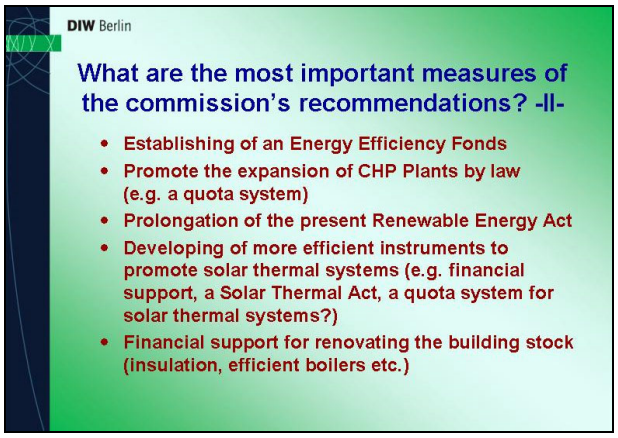

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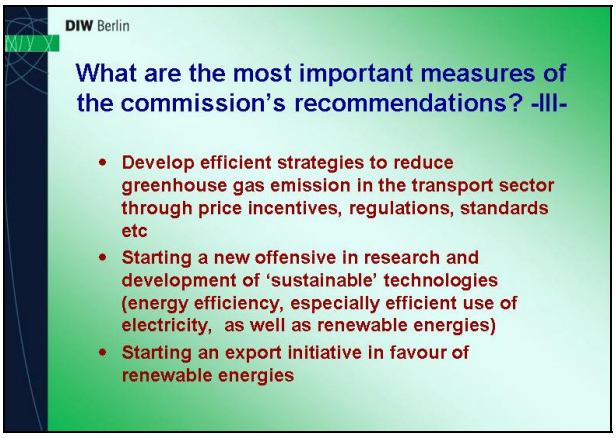

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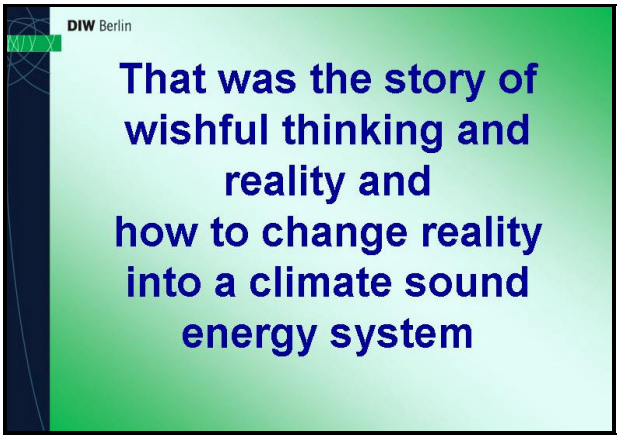

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Long-term Perspectives for a Sustainable Energy Future in Germany

Dr. Jürgen Landgrebe

Federal Environmental Agency, Berlin

A sustainable use of energy in Germany is technically feasible. On behalf of the Umweltbundesamt, the Wuppertal Institut (WI) and the German Aerospace Centre (DLR) created scenarios for a long-term development of energy use cutting CO_2 emissions by 80% in 2050 compared to 1990 levels. This development will include a fundamental change of energy sources. It will constitute both a challenge and an opportunity for the whole society. The long-term scenarios are economically viable, compatible with other objectives of energy policy (e.g. supply security) and do not cause insurmountable problems.

Such a development is possible only if the efforts to increase the use of renewable energy sources are continued consistently. A new focal point of energy policy in Germany is the impending need for replacement and renewal of existing nuclear and fossil power stations in the electricity sector. A steadily growing energy efficiency, a reorientation of the energy system mainly towards combined heat and power generation (CHP) and energy saving is unavoidable. With regard to long-term infrastructure requirements (decentralization, new fuels), necessary decisions must be taken at an early stage. Sufficiently robust lines of development must be identified and followed.

It is important that the path-way towards a sustainable energy future shall be opened quickly by the implementation of effective instruments and measures: because the faster this happens the more moderate the necessary changes will be in economic and legal framework conditions and the easier it will be for both companies and consumers alike to adapt to the altered framework conditions.

1. Challenges for a sustainable energy supply

Four major sustainability deficits in the present energy supply can be derived from the guidelines for sustainable development.

1. *Global climate change* is widely seen as a problem with a high possibility of occurrence which is linked to the usage of fossil energy fuels. Nevertheless, international energy policies show differentiated positions regarding the urgency with which climate change is to be counteracted.
2. The *scarcity and price increases of crude oil and natural gas* nowadays are not the main perspective of politics and the public, even though it is largely agreed that the so-called “depletion mid-point” of crude oil – meaning the point at which the maximum of supply is reached – will occur in the next 15–20 years.
3. Varying positions exist in respect of any *nuclear dangers*, especially with regard to the possibility of accidents and their consequences as well as the dimension and time span of radioactive impact during usage and disposal.
4. The *strong difference in energy usage between industrialized and developing countries* has virtually not decreased over the last few years.

Analyses of existing scenarios, i.e. consistent descriptions of possible futures of energy systems, show that only a combination of efficiency and fuel switch strategies and consequently the development of renewable energies, allows all sustainability deficits of today’s energy supply system to be overcome. In addition, sufficiency strategies have a supplementary implication for industrialized countries. The following action requirements have been identified for Germany on the basis of the results of available studies:

- An increase in the average energy productivity by 3–3.5% per year for at least two to three decades (compared with approximately 1.7%/year in the last decade). This would reduce primary energy consumption by 25% to 30% by the year 2030 compared to status quo conditions.
- An increase in the share of renewable energies in primary energy consumption to 12–15% by the year 2030

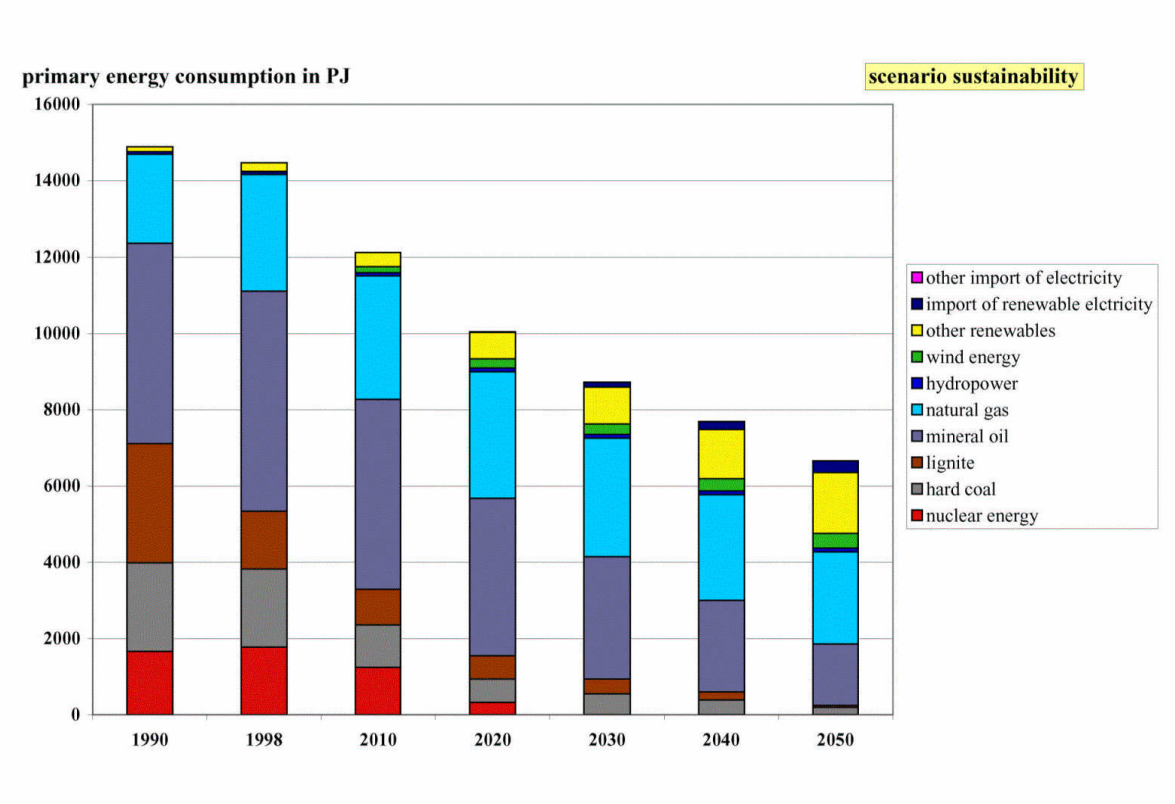
and in the generation of electricity to 25%, in comparison with a status quo development with shares of 4 to 5% for primary energy and under 15% for electricity.

- An increase in the contribution of combined heat and power (CHP) to energy supply by 2020 to at least twice to three times the current contribution.

2. Benchmarks of the scenarios – with "efficiency" to "sustainability"

The requirements specified so far are not sufficient for achieving the sustainability targets in the long term. Our analyses show a massive need for change until the middle of the century, especially if the long-term CO_2 reduction target (80% reduction by the year 2050, compared to the 1990 level) is to be achieved. Within such a sustainability scenario primary energy consumption must be more than halved in the next 50 years to approximately 46% of today's level (base year 1998 – Figure 1). Final energy requirements must be reduced to 54% of today's level. A persistent strategy to economize on electricity should reduce the demand for electricity by the year 2050 by a total of 20%. This comes true if energy-efficient devices and production processes are implemented during the cycle of typical reinvestments. Those hurdles which today often stand in the way of energy conservation must be decisively diminished through innovative measures and instruments (e.g. energy efficiency funds).

Figure 1: Development of primary energy consumption in the sustainability scenario until the year 2050.

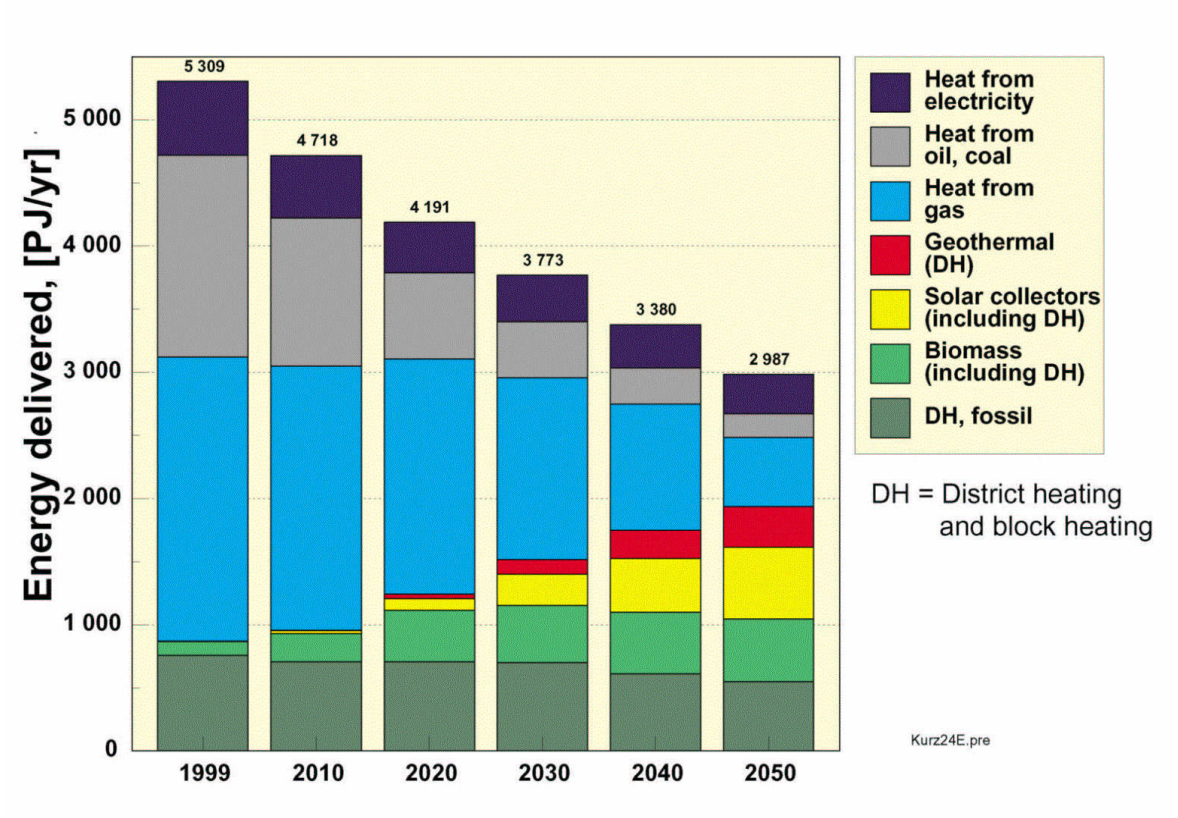


3. Electricity supply of the future - efficient, decentralized and widely networked

Not only economizing on electricity is needed in such a changed energy world but also its supply has to change drastically. The replacement of German power stations which will become necessary within the next two decades due to aging processes (by the year 2020 up to 70% of today's capacities have to be replaced) creates the necessary scope. The increase in generation of electricity from renewable energies and CHP will result in a shift in the generation of electricity to the location where it is used. Intelligent control systems must ensure that these decentralized electrical power units are coordinated and conveniently fitted into the load management of the consumers

(virtual power stations). While natural gas will extend its contribution to electricity supply in the medium term, renewable energies will become the dominant factor not later than 2040 (in 2050 their share in generated electricity will amount to approximately 65%, Figure 2), whereby all available domestic options as well as the import of electricity from renewable energies from abroad (offshore wind energy from North Sea countries, electricity from solar thermal power stations in Southern Europe or North Africa) will be of importance. Large condensation power stations, which dominate today's generation of electricity, will only play a subordinate role in 2050. After 2030 these conditions will create sufficient scope for electrolytic hydrogen production. As a result, electricity generation will rise again despite the further decline in the demand of final consumers.

Figure 2: Structural changes during electricity generation in the sustainability scenario by the year 2050. From 2030 onwards, this includes electricity requirements for hydrogen production by electrolysis, amounting to 57 TWh/a in 2050.



4. Renovation of buildings and district heating – Hallmarks of efficient heat supply based on fossil and renewable energy sources

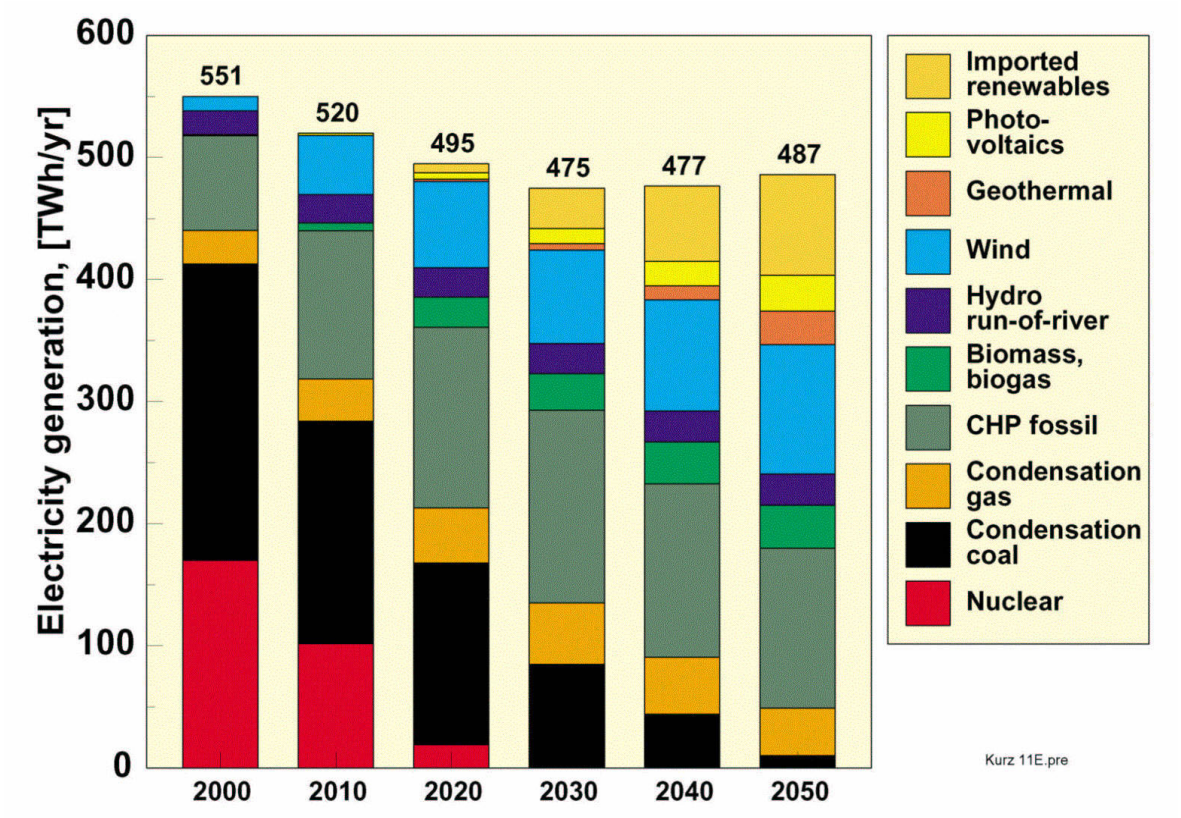
Apart from the improvement of insulation standards for buildings, the sustainability scenario requires primarily a drastic increase in the energetic renovation rate. Although 2.5% of all existing buildings are being renovated each year (e.g. façade renewal), it is only in every fifth case that this also includes energetic renovation. The specific reduction potential of 50 to 70% can only be fully exploited through a consistent increase in the number of energetically renovated buildings.

Parallel to the interconnection of smaller and medium-sized generators to virtual power stations the sustainability scenario requires the expansion of intelligently linked heat supply systems. This will make it possible to combine a number of efficient techniques with their individual advantages in the best possible way. In the first step, efficient heat supply based on cogeneration with fossil fuels can be the foundation for gradually introducing renewable energies on a larger scale later on.

The structural changes assumed in the sustainability scenario presuppose that by 2050, about two thirds of the heat requirement, which will then be 45% lower, will be distributed via district and central heating systems (Figure 3). The

restructuring of the heat sector will cause individual heating systems supplied on the basis of crude oil to disappear completely and the number of those supplied with natural gas to decrease sharply. The German settlement structure, with built–up areas and relatively small properties, represents in principle a good starting point for the development of district heating systems. Nevertheless, it will take decades to implement the necessary measures and they will have to be introduced as fast as possible.

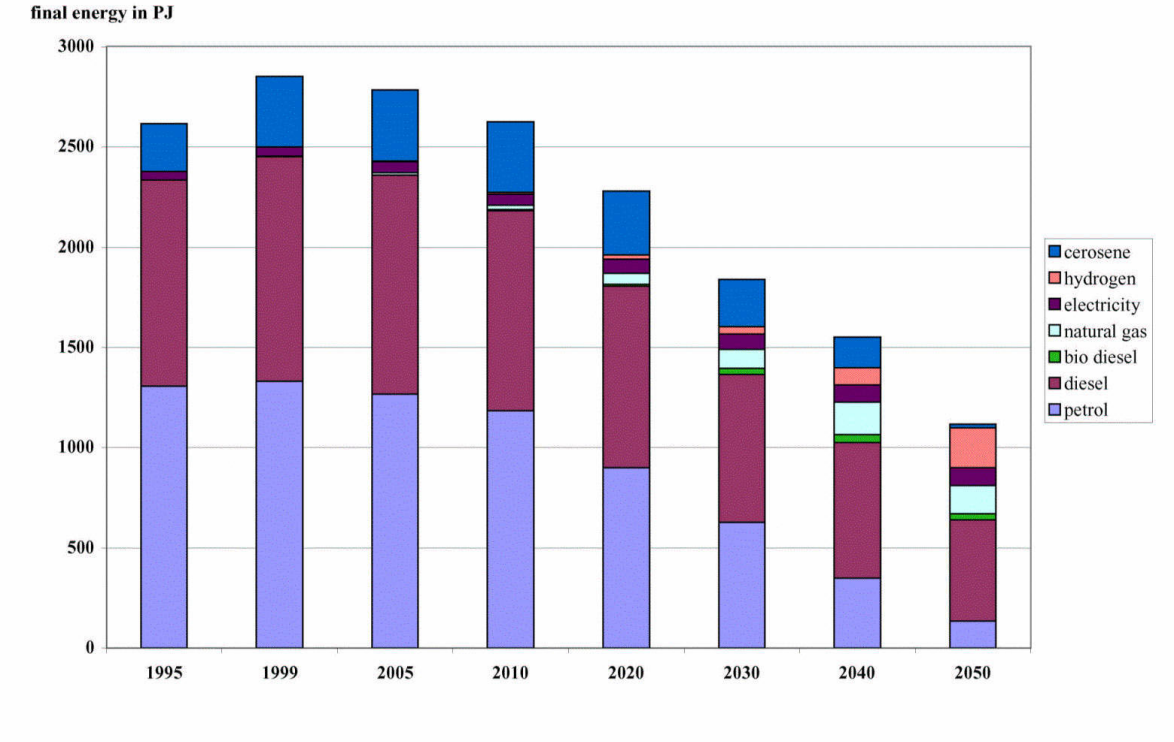
Figure 3: Development of the heat demand and change in the heat supply structure (space heat, hot-water supply, process heat) in the sustainability scenario through district and central heat supply systems based on fossil fuels, biomass, as well as solar thermal and geothermal energy, with the remaining energy demand being covered by conventional solutions.



5. Transportation – first efficient, then renewable

In the transport sector the interconnection of efficiency and fuel switch strategies plays a substantial role, whereby initially efficiency improvements are at the forefront of attention. Since passenger transport mileage is assumed to grow by 10% by the year 2050 and goods transport mileage is assumed to more than double, effective efficiency improvements for vehicles have the highest priority. A focused strategy to reduce the consumption of the vehicle fleet by technical measures, accompanied by a voluntary switch to more economical vehicles as a result of increased energy awareness, will lead to a marked reduction in fuel consumption. This applies in particular to automobile traffic (average fleet consumption in the year 2030 approx. 4.5 l/100km, in the year 2050 approx. 2 l/100km). The introduction of alternative fuels will take place over time, and will gain significance around 2020 (Figure 4). In the beginning diesel's share will increase in proportion to the relative growth of goods transport while petrol's share will fall accordingly. The share of natural gas will increase to 2.5% in the year 2020 and to 12% in the year 2050. Natural gas will thus assume the role of forerunner in the launch of hydrogen gas, because hydrogen gas will already contribute 17% of the demand for fuel in the year 2050. Many technologies developed for the use of natural gas can be easily adapted for hydrogen applications. Biodiesel will play a moderate role due to the competition between the cultivation of energy crops and the desired expansion of organic farming for sustainability reasons.

Figure 4: Development of final energy demand for transportation and its structure in the sustainability scenario until 2050.



6. Economic and social impacts

In the sustainability scenario, distinct changes will occur in the energy system in the course of 50 years, presupposing considerable investment in techniques for more rational energy use and energy conversion and for the use of renewable energies. Given observance of the principles specified below, the restructuring towards sustainable energy supply can also be economically worthwhile.

1 *First and foremost, the energy supply system must be optimized and organized more efficiently*: In most cases a more rational use of energy or the avoidance of unnecessary energy use is more cost-effective in the short to medium term than the supply of renewable energies. Appropriate investments are partly even combined with economic advantages in comparison to a status quo development. They are therefore a key condition for limiting the additional costs of the sustainability scenario. These technological options should therefore be rapidly applied in all consumption sectors so that renewable energies can then cover significant shares of this reduced energy demand.

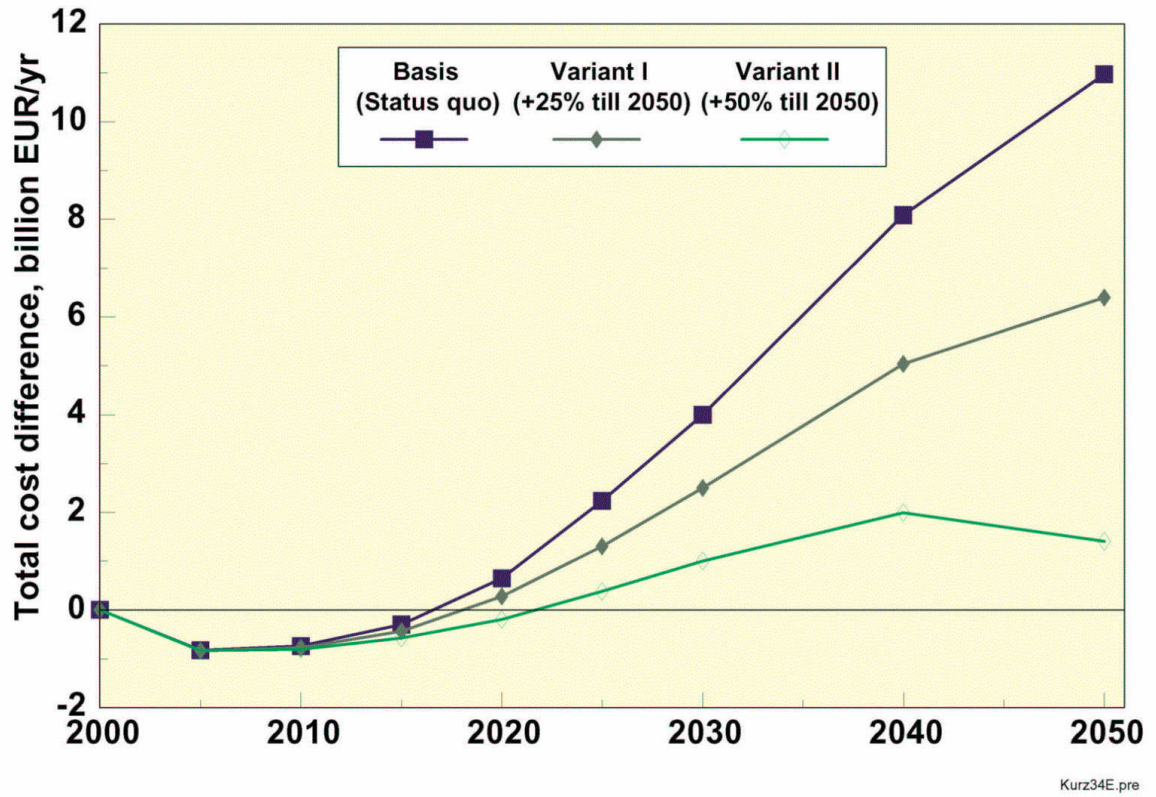
2 *Costs must be minimized throughout the renewable energies development phase*: The use of potential renewable energies should occur at productive locations with well-adapted plants to achieve a high utilization of the installed plants. The expansion should place as few adjustment demands as possible on the network to achieve low costs for the expansion of grids and to limit the necessary reserve capacity for power plants operating with fossil fuels. This means that the adjustment of energy demand and renewable energy supply should be as optimal as possible time wise for achieving a balanced mix of energy sources.

3 *The mobilization of all relevant technologies must be well timed and take place in the right order*: In consideration of point 2, more technologies which today are still expensive (photovoltaic) or yet to be demonstrated (HDR: hot dry rock concept for the generation of electricity) should be brought into the market so that they can take over the market dynamics required at a later time. On the other hand, they should not dominate the markets too rapidly since otherwise the average energy production costs will become unnecessarily high.

If one balances the annual additional investments which arise within the framework of the sustainability scenario in

comparison to the status quo development (additional investments in energy saving measures and renewable energies) and compares them to the avoided expenditures (saved fuel costs and avoided investments in conventional facilities), the sustainability scenario (until the end of the review period) results in a difference in costs of approx. 200 billion EUR (referenced to the year 1998 the present value of the cumulative differential costs is around 40 billion EUR). The average additional costs for the national economy therefore amount to an average of 3.8 billion EUR/a (or 48 EUR/person and year) which equals about 0.14% of the average GDP (gross domestic product) in this time period. Costs like this are not very unusual for the energy sector, corresponding for example to spending on hard coal subsidies in the last two decades. Compared to the status quo development, even negative costs can be expected for the first two decades due to cost-effective saving measures being carried out. Differential costs will then rise in proportion to the gradual exhaustion of cost-effective investments in saving measures the simultaneous increase in investments in renewable energies (Figure 5).

Figure 5: Course of the difference in costs between the sustainability and status quo scenario for three different alternatives for future prices of fossil energy sources.



Which course the difference in costs will take after the year 2030 depends on the anticipated cost development of the relevant energy sources. If there is a sharper increase in energy cost than in the predicted status quo development – which due to the moderate increase in the status quo development is not unlikely – or if the external costs with the aid of suitable instruments are largely included in the market prices of energy, then the differential costs even of relatively expensive energy saving options as well as those of a number of technologies from the area of renewable energies will drop in the course of time towards zero or will even become negative. Towards the year 2050 the sustainability scenario could thus be cost neutral in comparison with the higher price alternatives of the status quo development.

The sustainability scenario foresees particularly sharp reductions in Germany's domestic fuels, i.e. hard coal and lignite. This however represents no risk to our supply security. The sustainability scenario can, on the contrary, be understood as an active safeguard against supply crises because due to the absolute decrease in primary energy consumption and the increased development of renewable energies, the demand for imported energy sources can decrease absolutely. Also, the relative share of imported en-

ergy will be lower than the corresponding figures in the status quo scenario. In the sustainability scenario already in 2020 approximately 2,700 PJ less energy will be imported from other countries to Germany than under status quo conditions. This is nearly 20% of today's entire primary energy consumption and more than 25% of today's energy imports. At the same time, renewable energies and energy saving will make an important contribution to the diversification of the energy supply, supplementing the reduced usage of domestic coal and the import of natural gas and oil from abroad.

While fossil fuel imports to Germany will decrease, the purchase of electricity from renewable energies from abroad is envisaged to commence in 2030. Formally, this means greater dependency on imports, but this disadvantage may be outweighed by the potential contribution of this option to peacekeeping and crisis prevention. In countries with currently high fossil energy exports, the development of renewable energies (and their export at a later time) can be a fundamental basis for a peaceful and economically profitable transition. For countries that are currently heavily reliant on imports but have a large potential domestic supply of renewable energies, this option opens up new business fields and additional options for obtaining foreign currencies, provided that their own energy problems are solved first of all. In addition, it can make an indirect contribution to the solution of other urgent problems (e.g. seawater desalination).

Also no negative effects are expected for the labor market. During the implementation of the various measures necessary for carrying out the sustainability scenario, there will be both winning and losing branches of industry. In the building industry an additional 85,000 to 200,000 jobs can be created or conserved through building renovation, and in the area of renewable energies, employment potential could be created for 250,000 to 350,000 persons in the long term. In contrast, the decrease in employment in the coal and mineral oil industry, which is already noticeable under status quo conditions, will accelerate. This process however will proceed so slowly that a socially compatible transition will be possible.

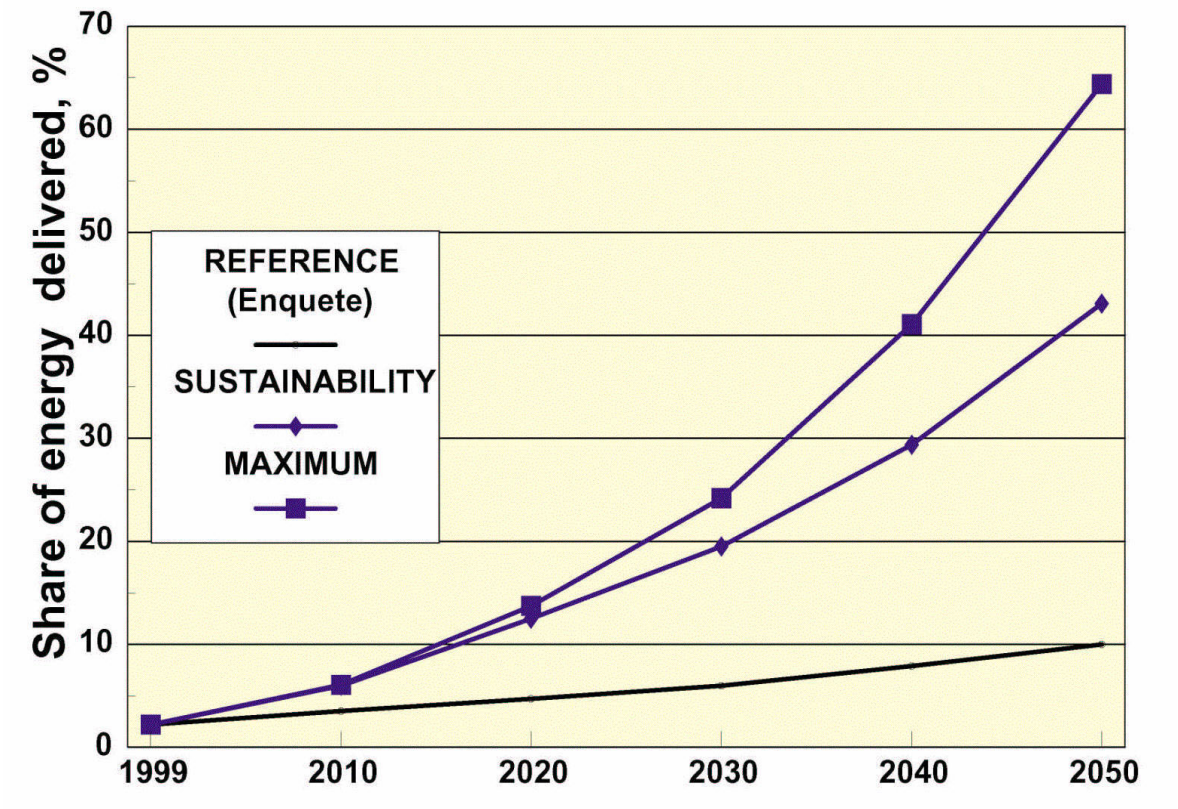
7. Further perspective of a sustainable energy supply

Without doubt, the development outlined is to be seen as very ambitious and requires a particularly dedicated energy policy for many decades. Renewable energies have to be moved more into the centre of efforts and energy efficiency policy has to become the new main focus. The question arises nevertheless whether the future path mapped out here is the most we can do or whether further scope remains. To address this question, it must first be discussed whether renewable energies could be developed even faster, or in what timeframe the entire energy supply could be converted to renewable energies.

The rate of development of renewable energies can only be increased if important basic conditions such as a progressive European and international climate protection policy, energy-conscious behavior of power suppliers and consumers, as well as farsighted investments in large production plants for renewable energies, are interlinked in an optimal way. In this case it would be the transport sector in particular which could switch to renewables more quickly than is assumed in the sustainability scenario, and there could be a further increase in renewable energies in electricity and heat generation.

Any major expansion would however only make sense from 2030 onwards, because only then at the earliest will there be a sufficiently efficient car fleet – a key condition for the introduction of "expensive" alternative fuels. Moreover, the CO_2 reduction effect of the direct use of renewable energy in electricity generation will be higher up to at that time. The resulting effect of such a development, in the form of a significant increase in renewables' shares, particularly in the transport sector, is described in Figure 6 in a "maximum version". It assumes sufficient availability of low-cost electricity generation potentials from renewable energies, at costs of around 5 cent/kWh, mainly from large offshore wind-farms and solar thermal power stations. This additional electricity generation is a source for electrolytic hydrogen generation (in combination with extended demand management, electrolysis serves as a flexible consumer) and therefore essential for the wide introduction of hydrogen as an alternative fuel. In 2050, around 70% of the then clearly reduced vehicle fuel requirement will be met by hydrogen in this "maximum version". The additional electricity generation from renewable energies at that time will be 238 TWh (covering about 60% of total final energy demand).

Figure 6: Development of the renewable energy segments of final energy consumption in the "sustainability" scenario in comparison to a "maximum version" and the reference scenario of the Enquete Commission.

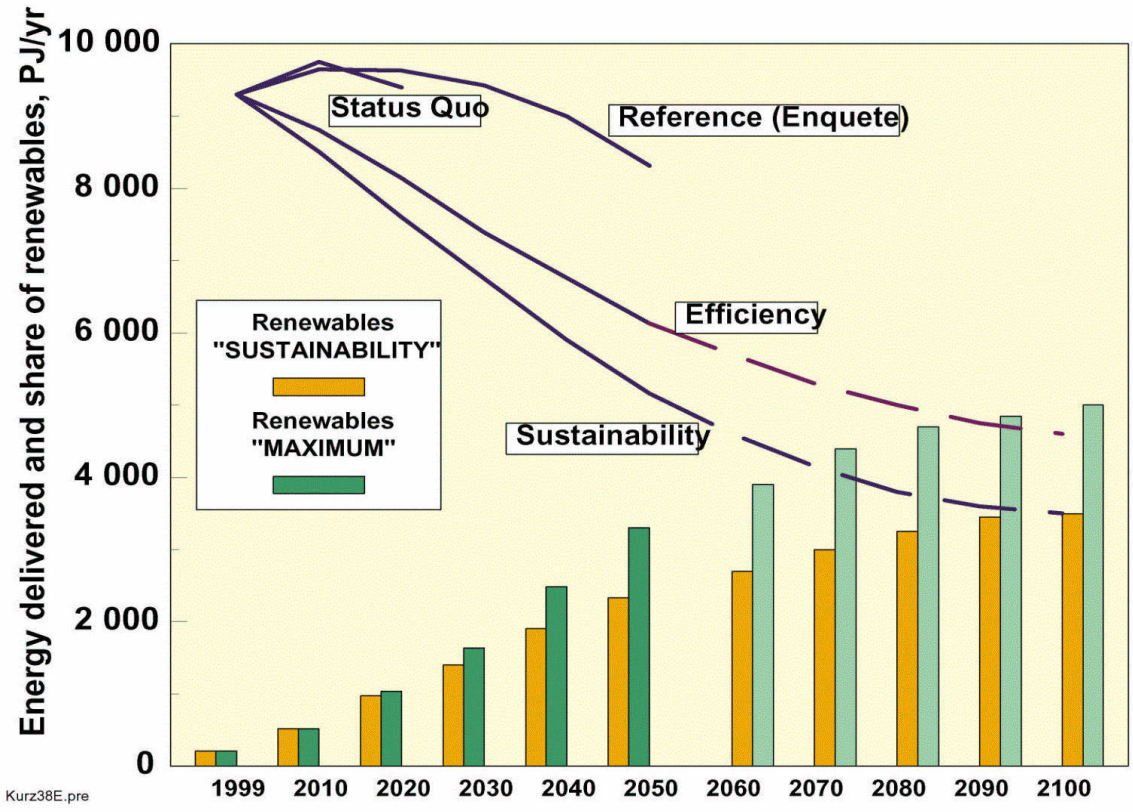


In the final analysis, the development outlined above should only be understood as a step on the way to a totally CO_2-free energy supply. Thus an extrapolation of the maximum version leads to the virtually complete avoidance of energy-related CO_2 , with a share of hydrogen from renewable energies of around 30-35% of final energy consumption. Hydrogen will then cover 85% of the transportation sector's requirement and around 30% of the heating sector's requirement. In the electricity sector the remaining condensation power stations will also operate with hydrogen to cover the necessary reserve capacity.

Under favorable circumstances – meaning a reduction in energy consumption corresponding to the sustainability scenario and simultaneous growth of renewable energies corresponding to the maximum version – renewable energies could meet virtually the entire energy demand by around 2070; with a slower rate of development of renewable energies, the fossil fuel substitution process could last until the year 2100 (Figure 7).

At any rate, reaching the target is possible only if the development of renewable energies and energy saving through energy-efficient appliances and production processes go hand in hand. Only by the comprehensive introduction of renewable energies together with an energy saving offensive can the present sustainability deficits in the energy supply be expected to clearly diminish without simultaneously causing new types of problems. Right from the start, attention should be paid to an economically and ecologically optimized development of renewable energies. This applies to the use of wind energy potentials (onshore as well as offshore), the upgrading of hydroelectric power plants (especially the big plants in the south of Germany) as well as the further extended use of biomass, geothermal energy and photovoltaic.

Figure 7: Interaction of energy efficiency and development of renewable energies, and derived possible further development of the most important scenario variables in the course of this century.



At the beginning the reduction effects of the new technologies will show themselves only slowly because of their still relatively high costs and small contribution to energy supply. For this reason sufficiently high and extended preliminary input is required. This is precisely why it is essential to couple this option with an ambitious yet broadly profitable strategy for rational energy use. Energy policy must face both challenges if it wants to reach its targets. This is necessary not only against the background of national development perspectives, but also as a part of global responsibility. If industrialized countries do not develop the technologies needed to make energy supply globally sustainable and if their deployment is not encouraged, it will not be possible to solve the existing global problems. In contrast to former times, the challenge now does not consist solely in developing individual technologies. Rather, what is needed is networked thinking and to integrate the various technologies into intelligent systemic solutions (e.g. decentralized power supply and heating networks). This also requires new forms of co-operation among the participants (e.g. energy industry, plant suppliers, equipment manufacturers, banks).

A sustainable energy world differs in many points from the world we know today. As shown in the context of scenarios describing the change processes for the players involved, this does not give any cause for concern. Changes cannot be avoided to reach the aims of sustainability, and for the players involved this represents both a challenge and an opportunity.

The Danish Program 'Energy 21'

Ture Hammar

Danish Energy Authority, Copenhagen

This energy strategy was produced in 1996 by the Danish government and approved by the Parliament. It was a comprehensive plan that outlines long term goals for the energy sector, especially related to climate change policies and security of supply.

'Energy 21' is a follower to a number of energy strategies produced by the Danish government. Since 1976, a tradition and methodology has developed around a consensus-seeking process in which the fragile situation of energy supply has been subject to positive action on the national level.

Substantial investments have been organized around the energy strategies, firstly the introduction of natural gas from the North Sea, and also expansion of the CHP/DH grids, including conversion of power stations from oil to coal (and later on to orimulsion, biomass and gas). In the mid 80s, the focus turned on renewable energy, CHP and energy efficiency, and the strategy 'Energy 2000' from 1990 became a role model for national sustainable energy strategies throughout the world.

Energy 21 was elaborated in the integrated Danish environment and energy ministry, and the set-up was extremely ambitious, involving hundreds of people in the preparation and discussions.

Inside the Danish Energy Agency, more than 50 people worked on the preparations for a whole year. A dozen external working groups also assisted, and the public and political decision-making process strove to involve all stakeholders and views. A certain degree of consensus was achieved on setting ambitious long-term targets. The strategy has been used as a tool since.

The strategy itself contains elements as

- long term targets and objectives, based on sustainable energy criteria
- concrete targets for renewable energy, energy intensity and long-term CO_2- reduction
- commitment to domestic and international action
- proactive framework for a sustainable market reform
- domestic action program for all parts of the energy sector, both demand and supply side
- forecast of a long term development, outlining new actions in the longer run.

The strategy illustrates that it will be possible to reach a high degree of independence of energy imports, to reduce GHG emissions, and at the same time reducing energy costs' share of the GDP (which is already very low in Denmark). It also recognizes that the European and international context has huge influence.

Since 1996, actions have been taken to implement 'Energy 21'. A follow up took place in the climate strategy 'Climate 2012' and new initiatives are announced from the recent government. The sustainable market reform has been one of the most demanding tasks in the follow-up. Denmark has e.g. introduced a CO_2 - emission quota trading as the first country, and also the construction of off shore wind farms is increasing.

A recent updating of the forecasts shows that the development towards the targets will stop after 2003 if no long-term decisions are taken. It is e.g. a question whether new domestic actions will be substituted by purchasing energy and emission rights from abroad. An additional question is the role of electricity export that may grow to form 40-50 percent of the domestic consumption.

Energy 21 Revisited

Tutzing 20 November 2002

Ture Hammar
Danish Energy Authority
Ministry of Economic and Business Affairs

Slide 1

Danish Energy Strategies over 25 years

• 1976	DE 76	• oil crisis
• 1981	EP 81	• economy
• 1984-86	RE + EE	• new programmes
• 1990	E 2000	• first sustainable strategy
• 1993	Follow up	• innovative actions
• 1996	E 21	• long term comprehensive
• 2000	C 2012	• after Kyoto
• 2003	C strategy	• new solutions

Slide 2

Ambitions in 1995

- New Danish 'super ministry' integrating environment and energy
- Why and how substitute the strategic consensus achieved in 1990 with 'Energy 2000'?
- The answer: By comprehensive strategic effort integrating all options, aspects, sectors, also involving stakeholders and public
- Focused analysis and decision-making process towards long term consensus

Slide 3

The process

- Comprehensive organisation in DEA and institutions
- A dozen external working groups
- Produce background material and information
- Scenarios 'Denmark's Energy Futures'
- Public and political debate
- Selection of main future
- Shopping list of Policies & Measures and policy style
- Design of strategy
- Political process

Slide 4

Contents of Energy 21

- Long term target environment, security and economy
  - Env targets: CO_2 - 20% by 2005, - 50% by 2030,
  - Energy targets: Ren.En. + 35%, En.Int. - 55% by 2030
- Commitment in domestic action and internationally
- Proactive sustainable market reform
- Action programme for
  - Energy supply, including infrastructure and efficiency
  - Renewable Energy
  - Energy Efficiency and demand side
  - R&D

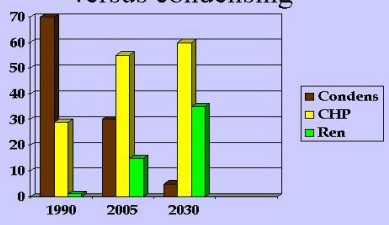
Slide 5

Impact of Energy 21

- Forecast of long-term development
  - Energy consumption decrease - 15%
  - Renewable energy becomes major future fuel
  - Clean CHP and renewables cover electricity demand
  - Energy costs % share of GDP will be slightly reduced
  - CO_2 emissions falling constantly

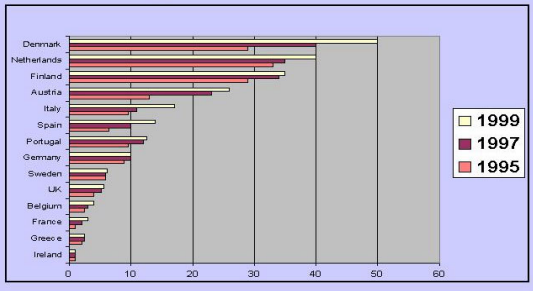
Slide 6

DK % share of CHP & wind power versus condensing



Slide 7

Cogeneration in EU15: % of national electricity production 1999/1997/1995

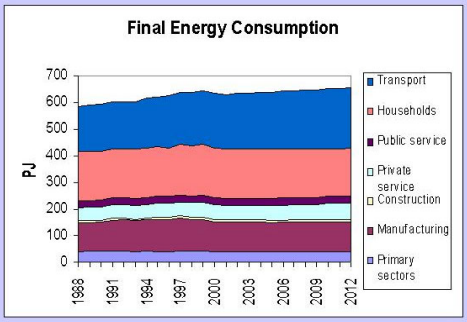


Slide 8

Challenges on demand side after 2003

- Reinforcement of demand side actions
- Awareness and information activities
- Competent R&D base
- Advisory and co-operative bodies
- *Without new actions - see next figure*

Slide 9

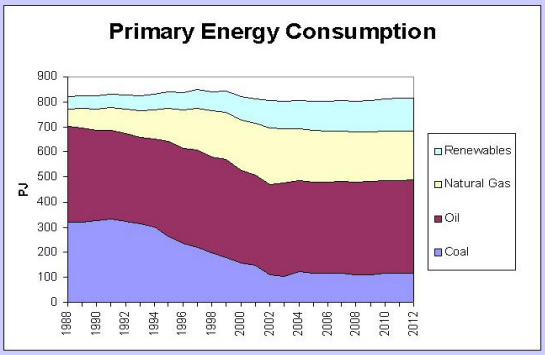


Slide 10

Challenges on supply side after 2003

- Expansion of Renewable Energy
- Emission Quota Caps for power plants
- Modernisation of power stations
- Use of clean fuels
- Electricity exchange with neighbours
- Emission trading and JI projects
- *Without new actions - see next figure*

Slide 11



Slide 12

The Japanese Program to Prevent Global Warming

Yasushi Nagami

Ministry of the Environment, Tokyo

1. GHG emissions in Japan

Current Situation

- Kyoto Goal for Japan :-6%
- GHG emissions in 2000:+8.0%
- Increase in transport, commercial and household sector

Reasons

- Increase household car, the number of households and electric appliance
- Enlargement of the area of office

2. Climate change policy program

History • Principles

- “Win-win approach” :integration of the environment and economy
- “Step by step approach” : review and assess progress in 2004 and 2007
- All sectors should make their utmost to take actions
- International cooperation

Contents

- A package of more than 100 individual measures to be taken by all relevant government agencies
- Specifies emission reduction goals by sectors
- Identifies estimated reductions by individual measures
- Include measures to enhance forest management and other sink activities

Measures for each sector

Industry Sector

- Voluntary action plan by each industries

Commercial/Institutional Sector

- Application of energy management system to large commercial buildings
- The National and local governments establish their action plan to reduce GHG emissions

Household Sector

- Strengthen mandatory energy efficiency standards: “Top-Runners Standards”
- Application of Top-Runners Approach to gas and other appliances
- "Climate Action Advice" for citizens
- "Local Partnership Council" for the promotion of actions at local level

Transport Sector

- Accelerated introduction of vehicles achieving Top-Runners Standards

Renewable Energy and Energy Switching

- Mandate electric utilities to achieve the fixed level of the electric power generated from new energy.

Related links in English:

Ministry of the Environment (about climate change)
Ministry of Economy, Trade and Industry (top page)
Ministry of Economy, Trade and Industry (energy policy)
Ministry of Land, Infrastructure and Transport
NEDO (New Energy and Industrial Technology Development Organization)
Keidanren (Japan. Federation of Economic Organizations)

Contents

- The GHG Emissions in Japan
  - Current Situation
  - Reasons
- The Climate Change Policy Program
  - History
  - Measures for Each Sector
- Conclusion

Slide 1

1.The GHG Emissions (and the Target) in Japan

Unit:CO2mt	1990	2000	2008-2012
CO2-Energy Origin	1099,2	9,9%	(0,0%)
(Industry)	490,3	0,9%	-7,0%
(Transport)	212,2	20,6%	17,0%
(Households, Office)	262,4	21,3%	-2,0%
(Energy Conversion)	77,3	11,4%	
(Industrial Process)	57,0	-7,0%	0,0%
CO2-Actions by citizens, R&D etc			(-2,0%)
CO2-Non-energy etc.	20,1	45,3%	
CH4,N2O	65,5	-10,1%	(-0,5%)
HFCs, PFCs,SF6	48,2	-26,4%	(+2,0%)
	(1995)		
Kyoto Mechanism etc.			(-1,6%)
Sink			(-3,9%)
Total	1233,0	8,0%	-6,0%

The percentages with bracket are the percantages compared to the total amount .

Slide 2

1. The GHG Emissions in Japan

Current Situation
- The Kyoto Goal of Japan: -6%
- In 2000: 8.0% above the 1990(1995) level
- Need to reduce the current level by 14%

Main Reasons
- Transport
  Increase of the number of household cars(11%)
- Households
  Increase of the number of households(13%) and electric appliances
- Commercial
  Increase of the Area of Office(27%)

Slide 3

2. Program -History

- The Action Plan against Global Warming (1990)
  - To Stabilize GHG in 1990 Level until 2000
- The Climate Change Policy Program(1998)
  - To Achieve the Kyoto Goals(-6%)
- The New Climate Change Policy Program (2002)
  - Strengthen the Existing Program to Achieve the Kyoto Goals and to Ratify the Kyoto Protocol

Slide 4

2.Program - Principles

- The "win-win approach" -the integration of environment and economy
- The "step by step approach"- review and assess progress in 2004 and 2007
- All sectors (national and local governments, business and industry and civil society organizations) should do their utmost to take actions.
- International cooperation

Slide 5

2.Program – Measures(1)

Industrial Sector
- Tightened energy efficiency requirements in factories.(The Energy Efficiency Law)
- Solid implementation of voluntary action plans by industries.

Slide 6

2.Program – Measures(2)

Voluntary action plans by industries(example).
- The Automobile Industry
  - GHG from the manufacturing process will be stabilized at the 1990 level by 2000
- The Electronic Machinery Industry
  - GHG from industrial process will be improved more than 25% over 1990 by 2000

Review of Keidanren(2002)
- 3% reduction compared to 1990 level.

Slide 7

2.Program – Measures(3)

The Commercial /the Institutional Sector
- Application of energy management system to large commercial buildings
- Promote appropriate energy conservation measures for buildings at the construction stage

(the Energy Efficiency Law)
- The national and local governments establish their action plan to reduce the GHG emissions

(the Climate Change Policy Law)

Slide 8

2.Program – Measures(4)

Action Plan to Reduce GHG of National Government (Example of Contents)

- Change all cars to eco-cars and reduce fuel consumption of governmental cars by 15% by 2005
- Stabilize consumption of paper
- Reduce energy consumption of buildings by 10%

Slide 9

2.Program – Measures(5)

The Household sector

- "Local Partnership Council" for the promotion of actions at local level (the Climate Change Policy Law)
- Energy efficiency standards: Top-Runners Approach (the Energy Efficiency Law)
  -Refrigerators,Air-conditioners, TVs, Videos, Lighting, Copying Maschines, Personal Computers, Cars, etc.

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2.Program – Measures(6)

The Transport sector

- Accelerate introduction of vehicles achieving standard of top runner approach (the Energy Efficiency Law)
- Promotion of efficient logistics systems including shift of transport modes from trucking to shipping

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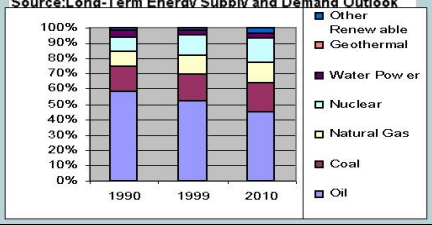
Energy Supply

(Unit:PJ)	1990 (Result)	1999 (Result)	2010 (Target)
Oil	11.881	11.920	10.488
Coal	3.367	3.986	4.412
Natural Gas	2.051	2.903	3.212
Nuclear	1.896	2.980	3.599
Water Power	851	813	774
Geothermal	39	39	39
Other Renewable	271	271	774

Source:Long-Term Energy Supply and Demand Outlook



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Energy Source	1999 (Results)	2010 (Target)	Increase (1999-2010)
Photovoltaic	2.012	45.666	2169,2%
Wind Power	1.355	51.858	3728,6%
Waste Power	44.505	213.624	380,0%
Biomass Generation	2.090	13.158	529,6%
Solar Thermal	37.926	169.893	348,0%
Waste Thermal	1.703	5.418	218,2%
Biomass Thermal	-	25.929	
Black Liquor, Waste Wood	176.859	191.178	8,1%
Unused Energy (including cooling by snow & ice)	1.587	22.446	1314,6%
Water Power	812.700	774.000	-4,8%
Geothermal	3.870	3.870	0,0%
Total	1.084.606	1.517.040	39,9%

Source:Long-Term Energy Supply and Demand Outlook
Unit:MJ

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2.Program – Measures(7)

Renewable Energy and Fuel Switching

- Mandate electric utilities to achieve the fixed level (planned 1.35% in 2010)of the electric power generatetion from the new energy
- Subsidies for the renewable energy (FY 2002 by NEDO)
  - R&D
    - Photovoltaic Energy 55 Million Euro
    - Wind Energy 5,4 Million Euro
    - Fuel Cell 195 Million Euro
  - -Diffusion 782 Million Euro

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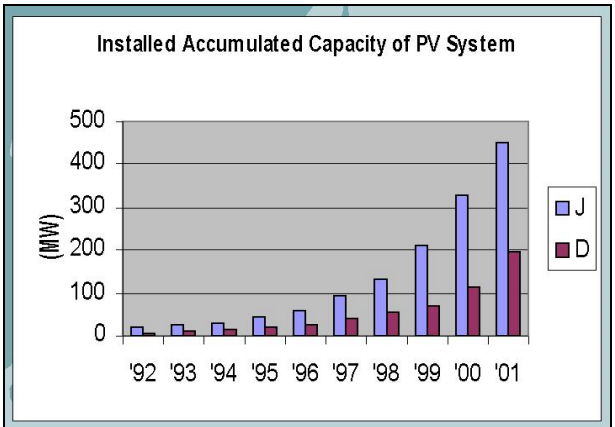

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3.Conclusion

Developed Measures in Japan

- Governments Action Plan
- Top Runner Standards
- Introduction of Photovoltaic System

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Activities of Georgia on the Way to CDM

Paata Jandelidze • Marina Shvangiradze

National Agency on Climate Change of Georgia, Tbilissi

1. Activities already carried out

Georgia has ratified United Nations Framework Convention on Climate Change (UNFCCC) in 1994 and became non Annex I Party to the Convention.

The Initial National Communication of Georgia on Climate Change financially supported by GEF has been prepared in 1997-1999 and submitted to the Fifth Conference of Parties (COP5); Main achievements are the first National Inventory of Greenhouse Gases (GHG) emissions and sinks by sources for the time period 1980-1996 and GHG mitigation projects (abatement of GHG, enhancement of sinks) facilitating the sustainable development of countries economy.

Along with fulfillment of other commitments to the UNFCCC Georgia paid sufficient attention to the local capacity building. In this concern the creation of National Agency on Climate Change (NACC) at the Ministry of Environment and Natural Resources Protection of Georgia can be considered as a result of activities for implementation the Convention Principles at the national level. The principle responsibility of NACC is facilitating the coordination among different institutions and activities related to the climate change; strengthening the local capacity for integration of the climate change issues in national development plans.

After carrying out of National Inventory, Vulnerability Assessment and Adaptation (to the climate change) potential as well, climate change mitigation has been determined as a country's priority. Therefore a number of mitigation project concepts have been developed and submitted for further implementation to the Joint Implementation Programme of Netherlands, USAIJ, Global Environmental Facility (GEF). Since 1999 GEF has financed two projects under Project Development Facility:

- Removing barriers to energy efficiency in municipal heat and hot water supply system in Georgia (PDF-B project). The pilot project on geothermal hot water supply to the Saburtalo district of Tbilisi has been elaborated;
- Removing barriers to development of small hydropower sector for the mitigation of GHG emissions in Georgia. Ten business plans for rehabilitation of selected small hydropower plants have been designed.

In the purpose of reducing the transaction costs related to the implementation of mentioned pilot/demonstration projects a new consolidated project *Promoting the Use of Renewable Energy Resources for Local Energy Supply* was developed and submitted to the GEF and KfW for cofinancing. The start up of the project is expected in early 2003.

Along with the implementation of prepared pilot/demonstration projects one of the main goals of the project is creation of Revolving Fund for Renewable Energy providing thereby the improved conditions for financing of renewable energy projects. Part of Fund's resources will be spent for development of new proposals in the fields of RE (biomass, wind, solar energy) and carrying out of feasibility studies, preparation of business plans etc.

Estimating GHG reduction for the mentioned projects, Baselines for electricity generation and heating sectors have been developed using the analysis based on integrated resources planning principles.

Besides in the framework of the UNDP/GEF project "Capacity Building to Assess Technology Needs, Modalities to Acquire and Absorb Them, Evaluate and Host Projects" technology needs assessment has been carried out focusing on Energy and Industry sectors of Georgian economy. As a result the following proposals have been developed:

- Tbilisi CHP Plant Modernization Applying Advanced Energy Efficient Technologies;
- Adoption of Advanced Communication Technologies for High Voltage (500 KV, 220 KV) Transmission lines;
- Adoption of Energy Efficient Technologies for Street and Indoor Lighting;
- Rustavi JSC "Azoti";
- Rustavi Metallurgical Plant;
- Tbilisi Bakery Plant No 4;
- JSC "Temkis Puri" (Bakery Plant);

- JSC "Spaghetti – 94";
- Rustavi Cement Plant.

All these proposals could be considered as potential CDM projects in case of finding the interested investors.

Not least interest is paid to the enhancement of GHG sinks (forests) enhancement. Georgia is interested in forests' participation in CDM but special assessment of benefits for country from forest CER should be done after the final COP decision on this issue. At this moment special investigation of existing in Georgia project proposals on forests has been fulfilled by ICF experts. According their conclusions country has a big potential in this sector. Sustainable development of forest is also one of the priorities of country's economy because of forests huge resources.

Due to the tangible regional disbalancement of implemented projects Georgia is interested very much in Kyoto mechanisms that should contribute to implementation of projects/measures aimed at GHG reduction, climate change adaptation, sustainable development and support equitable regional distribution (Decision 17/CP.7, Annex B to the M&P for a CDM, item 4 (c) Review the regional and sub-regional distribution of CDM project activities with a view to identifying systematic or systemic barriers to their equitable distribution and take appropriate decisions, based, inter alia, on a report by executive board).

Georgia satisfies all three CDM eligibility criteria:

- Georgia has ratified Kyoto Protocol at 16.06.1999;
- Georgia has several times expressed its intention on voluntary participation as a Party in CDM;
- the Climate Change National Agency is designated as CDM national authority.

Georgia through its representative in the CDM Executive Board (Ms. Marina Shvangiradze - Alternate from CEE Region) is actively participating in the international process of creation of conditions for prompt start of CDM and also development of relevant Modalities and Procedures.

2. Barriers

According to the Decision 17/CP.7, Annex B to the M&P for CDM, Items 4 (b) and (c) we consider two types of barriers for successful participation in CDM: barriers to hosting of CDM projects and barriers to the participation in CDM related international processes.

Barriers to hosting (implementation) of CDM projects:

- Absence of national plans and indicators for sustainable development of countries economy and its branches (the purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development - Kyoto Protocol, Article 12.2);
- Absence of assessments of the total national or sectoral potential of CDM projects and GHG abatement along with the limited prediction of economic and GHG trends. Still it has been studied at the expert level.
- Absence of strong and permanent system for national inventory.

At the initial stage Georgia is interested in small-scale CDM projects (Box 1) but the issue of *bundling* and *de-bundling*[1] makes us becoming a little confused. It is quite difficult to attract heavy foreign capital investments for large-scale projects due to the high risk and not appropriate business/investment climate, non-predictability of results and payback conditions. Thus de-bundling the large scale projects into smaller ones with low initial investment cost could somehow diminish the investment risk. As small the pilot phase of project is as less the risk is. Though bundling of different types of small-scale projects while studying their feasibility or implementing them significantly reduces the transaction costs which is quite high in non-Annex I countries and certainly in transition countries which are lacking institutional arrangements and have a high level of bureaucracy. We are still considering this issue and anticipating more flexible decision.

[1] Joint Implementation Quarterly. Vol. 8, No. 3, 2002

Box 1

Small-scale CDM projects:

Type 1: small-scale renewable energy with max. capacity up to 15 MW

Type 2: energy efficiency projects max. reduction of energy consumption, supply/demand side 15 GWh-eq

Type 3: other projects with annual direct emissions of less than 15 $ktCO_2$-eq (agriculture, fuel switch, transport, methane recovery, "rest group")

Barriers to the participation in CDM related international activities:

- Lack of experts and expertise for participation in CDM panels (small scale CDM projects, methodological and baseline, accreditation panel for accreditation of designated operational entity, assessment teams) and processes at the international level.

Considering the barriers to the participation in CDM related international processes we would like to discuss the following steps in the accreditation process:

- According to Box 2 the host countries are most vulnerable to the steps 1, 3, 4 and 5. Among the non-Annex I countries (CDM host countries) countries in transition have the additional problems related to the experience in accreditation processes. Under the equitable distribution of CDM projects we consider not only implementation of concrete projects but also the participation in accreditation procedure, in assessment teams and having the designated operational entities (DOE). (Decision 17/CP.7, Annex B of M&P, item 4(b) Review the regional and sub-regional distribution of designated operational entities and take appropriate decisions to promote accreditation of such entities from developing country Parties.). There are some decisions from CDM EB facilitating this equitable distribution:
- That a non-Annex I Party expert selected to be included in the CDM-AT roster of experts could be assigned to follow the work of a CDM-AT as an observer. Experts observing CDM-AT work would be paid travel and DSA in accordance with UN regulations. Such experts can observe any applicant entity;
- To organize, in conjunction with the Board meeting in March, a joint workshop between the CDM-EB, the CDM-AP and experts from the roster of CDM-AT members, with a view to enhancing knowledge on the CDM and common understanding of the accreditation process; (there are some specific issues related with CDM and not practicing in international accreditation processes);
- Applicant operational entities from non-Annex I Parties may have the possibility of paying 50% of the non-reimbursable fee when the entity apply for accreditation, provided that these entities state their inability to pay the full fee at application, bearing in mind the need to meet the standards as contained in para 1 (c) and (d) of Appendix A to the CDM M&P. The remaining 50% of the fee should be paid at a later stage once and if the operational entity is accredited and designated and starts operation;
- To continue its consideration of means for enhancing regional balance in the distribution of designated operational entities.

Despite these steps at the initial stage we anticipate significant difficulties and serious barriers to keep the equitability.

Application costs is also the barrier for non-Annex I countries potential operational entities and despite the decision from CDM EB on reduction the application costs up to 50% due to facilitate the participation of non-Annex I countries entities in the process it would be desirable more flexible and concessive approach.

Considering the regional approach we have to bearing in mind the situation in Central and Eastern European region. The constituency of region is not homogenous, which could arise several barriers implementing the mechanism. The CEE region consists of two types of countries: Annex I and non Annex I, both of them with the economy in transition.

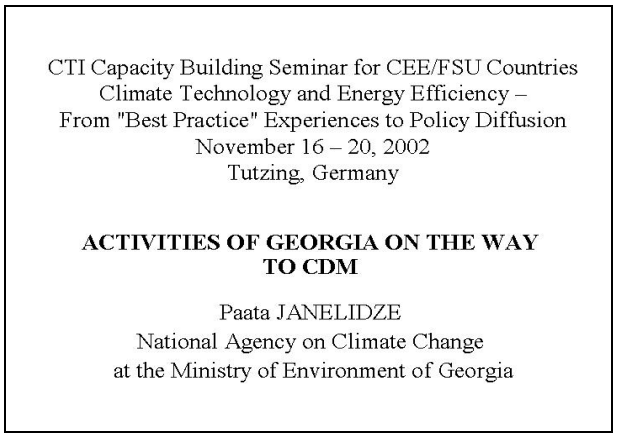
Box 2

1 Application for accreditation by an entity
2 Consideration of the application file by the CDM Accreditation Panel (CDM-AP)
3 A desk review by a CDM Accreditation Team (CDM-AT) of the documentation provided by the applicant entity
4 On-site assessment by the CDM-AT of the premises of the applicant entity
5 At least one witnessing activity by the CDM-AT
6 Reporting of the CDM-AT to the CDM-AP
7 Recommendation on accreditation by the CDM-AP to the Executive Board
8 The decision on accreditation and, therefore, recommendation for designation to the COP/MOP by the Executive Board

Future Activities:

Building of local capacity for CDM

- Establishment of national inventory system of GHG (National Communication Support Programs regional project, second national communication);
- Creation of national system of CDM projects monitoring and certification of reduced GHG;
- Participation in World Banks National Strategy Study program (NSS) for forecasting the future trends of GHG and assessment of potential CDM project pipelines;
- Rising the awareness of existing in Georgia accreditation entities for participation in CDM processes. Rising their awareness on Climate Change issues and convincing them in advantages for their business;
- Training of experts for participation in CDM related panels and accreditation (assessment) teams. At the first stage the opportunity to have representatives as an observers in accreditation teams is acceptable for host countries undergoing the lack of experience, experts and expertise in this field. (the launching of the accreditation process has shown that even in developed countries it is difficult to find experts equally aware the climate change and accreditation problems. Hence the accreditation panel designated by CDM Executive Board suggested at Boards 6th meeting to organize the workshop for arising the awareness experts on climate change issues.);
- There are some preliminary negotiations with the representatives of different programs aimed at assistance to the CDM capacity Building in host countries. (BMZ, The Netherlands Government have special funds for this purpose). We are anticipating also decisions and funds at international level to launch the process which would be unable otherwise;
- Georgia is very much interested in regional approach to CDM and carefully monitors the African approach (regional initiatives. This approach is much more stimulated by the regional (integrated) planning of large-scale and long term economical projects such as TRASECA, gas and oil pipelines, etc.



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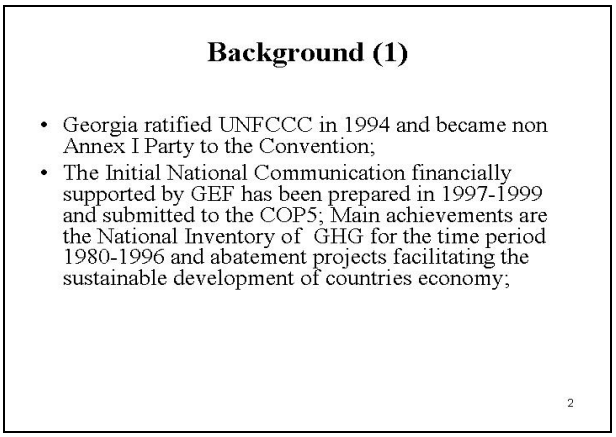

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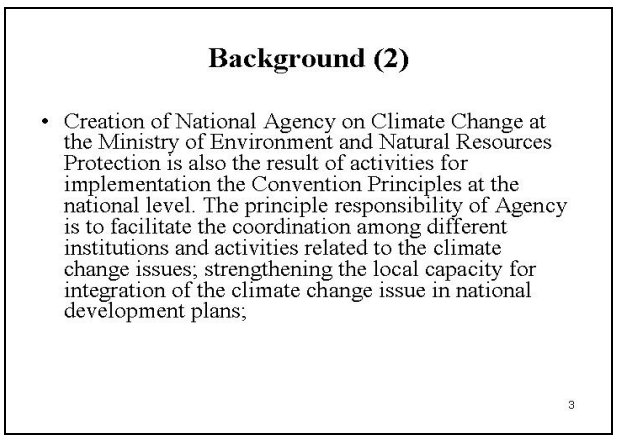

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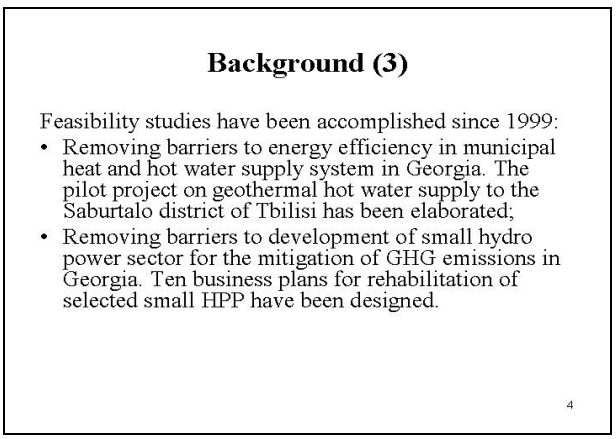

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Background (4)

- On purpose to reduce the transaction costs related with the implementation of mentioned pilot/demonstration projects a new consolidated project "Promoting the Use of Renewable Energy Resources for Local Energy Supply" was developed and submitted to GEF and KfW for co-financing;
- Along with the implementation of prepared pilot/demonstration projects the main goal of the project is creation of Revolving Fund for Renewable Energy thus providing the equity share for renewable energy projects.

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Background (5)

- Baselines for electricity generation and heating sectors have been developed;
- Technology needs assessment has been carried out focusing on Energy and Industry sectors of Georgian economy. As a result 8 proposals were developed. 4 in energy sector and 4 in industry sector;
- All these proposals could be considered as potential CDM projects in case of finding the interested investors.

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Background (6)

- Forests; Georgia is interested also in forests participation in CDM but special assessment of benefits for country from forest CER should be done after the final COP decision on this issue. At this moment special investigation of existing in Georgia project proposals on forests has been fulfilled by ICF experts. According their conclusions country has a big potential in this sector. Sustainable development of forest is also one of the priorities of country's economy because of forests huge resources;

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Background (7)

- Due to the tangible regional disbalance of implemented projects Georgia is interested very much in Kyoto mechanisms, that should contribute to implementation of projects/measures aimed at GHG reduction, climate change adaptation, sustainable development and support equitable regional distribution (Decision 17/CP.7, Annex B to the M&P for a CDM, item 4 (c) Review the regional and sub-regional distribution of CDM project activities with a view to identifying systematic or systemic barriers to their equitable distribution and take appropriate decisions, based, inter alia, on a report by executive board;)

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Background (8)

Georgia satisfies all three CDM eligibility criteria:

- Georgia ratified Kyoto Protocol in 16.06.1999
- Georgia has several times expressed its intention on voluntary participation as a Party in CDM
- The Climate Change National Agency is designated as CDM national authority

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Barriers (1)

- According the Decision 17/CP.7, Annex B to the M&P for CDM, Items 4 (b) and (c) we consider two types of barriers for successful participation in CDM: barriers to hosting of CDM projects and barriers to the participation in CDM related international processes.

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Barriers to hosting (implementation) of CDM projects (1)

- Absence of national plans and indicators for sustainable development of countries economy and its branches (The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development - Kyoto Protocol, Article 12.2)
- Absence of assessments of the total national or sectoral potential of CDM projects and GHG abatement amount along with the limited prediction of economic and GHGs trends. Still it has been studied at the expert level.
- Absence of strong and permanent system for national inventory.

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Barriers to hosting (implementation) of CDM projects (2)

- At the initial stage country is interested in small-scale CDM projects.

Small-scale CDM projects:

Type 1: small-scale renewable energy with max. capacity up to 15 MW

Type 2: energy efficiency projects max. reduction of energy consumption, supply/demand side 15 GWh-eq

Type 3: other projects with annual direct emissions of less than 15 ktCO2-eq (agriculture, fuel switch, transport, methane recovery, "rest group")

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Barriers to hosting (implementation) of CDM projects (3)

"Bundling" and "debundling"

It is quite difficult to attract heavy foreign capital investments for large-scale projects due to the high risk and not appropriate business/investment climate, non predictability of results and payback conditions. Thus debundling the large scale projects into small ones with the low initial investment cost could diminish the investment risk. Bundling of different types of small-scale projects reduces the transaction costs which is quite high in non-Annex I countries and certainly in transition countries which are lacking institutional arrangements and have a high level of bureaucracy. We are still considering this issue and anticipating more flexible decision.

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Barriers to the participation in CDM related international activities (1)

- lack of experts and expertise for participation in CDM panels (small scale CDM projects, methodological and baseline, accreditation panel for accreditation of designated operational entity, assessment teams) and processes at the international level;

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Barriers to hosting (implementation) of CDM projects (2)

Accreditation procedure

- Application for accreditation by an entity
- Consideration of the application file by the CDM Accreditation Panel (CDM-AP)
- A desk review by a CDM Accreditation Team (CDM-AT) of the documentation provided by the applicant entity
- On-site assessment by the CDM-AT of the premises of the applicant entity
- At least one witnessing activity by the CDM-AT
- Reporting of the CDM-AT to the CDM-AP
- Recommendation on accreditation by the CDM-AP to the Executive Board
- The decision on accreditation and, therefore, recommendation for designation to the COP/MOP by the Executive Board

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Barriers to hosting (implementation) of CDM projects (3)

- Among the non-Annex I countries (CDM host countries) countries in transition have the additional problems related to the experience in accreditation processes.
- Eqitable distribution of CDM projects - not only implementation of concrete projects but also the participation in accreditation procedure, assessment teams and having the designated operational entities (DOE). (Decision 17/CP.7, Annex B of M&P, item 4(b) Review the regional and subregional distribution of designated operational entities and take appropriate decisions to promote accreditation of such entities from developing country Parties.).

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Barriers to hosting (implementation) of CDM projects (4)

Decisions from CDM EB facilitating equitable distribution:

- Non-Annex I Party experts selected to be included in the CDM-AT roster of experts could be assigned to follow the work of a CDM-AT as an observer;
- Organization a joint workshop (CDM-EB, the CDM-AP and experts from the roster of CDM-AT), with a view to enhancing knowledge on the CDM and common understanding of the accreditation process;

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Barriers to hosting (implementation) of CDM projects (5)

- Applicant operational entities from non-Annex I Parties may have the possibility of paying 50% of the non-reimbursable fee when the entity apply for accreditation. The remaining 50% of the fee should be paid at a later stage once and if the operational entity is accredited and designated and starts operation;
- To continue its consideration of means for enhancing regional balance in the distribution of designated operational entities;

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Future Activities (1)

- Building of local capacity for CDM
- Establishment of national inventory system of GHG (regional project of NCSP, second national communication);
- Creation of national system of CDM projects monitoring and certification of reduced gases;
- Participation in NSS program for forecasting the future trends of GHGs and assessment of potential CDM project pipelines;

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Future Activities (2)

- Rising the awareness of existing in Georgia accreditation entities for participation in CDM processes.
- Training of experts for participation in CDM related panels and accreditation (assessment) teams. At the first stage the opportunity to have representatives as an observers in accreditation teams is acceptable for host countries (the launching of the accreditation process has shown that even in developed countries it is difficult to find experts equally aware the climate change and accreditation problems)

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The Flexible Mechanisms under the Kyoto Protocol – The German View

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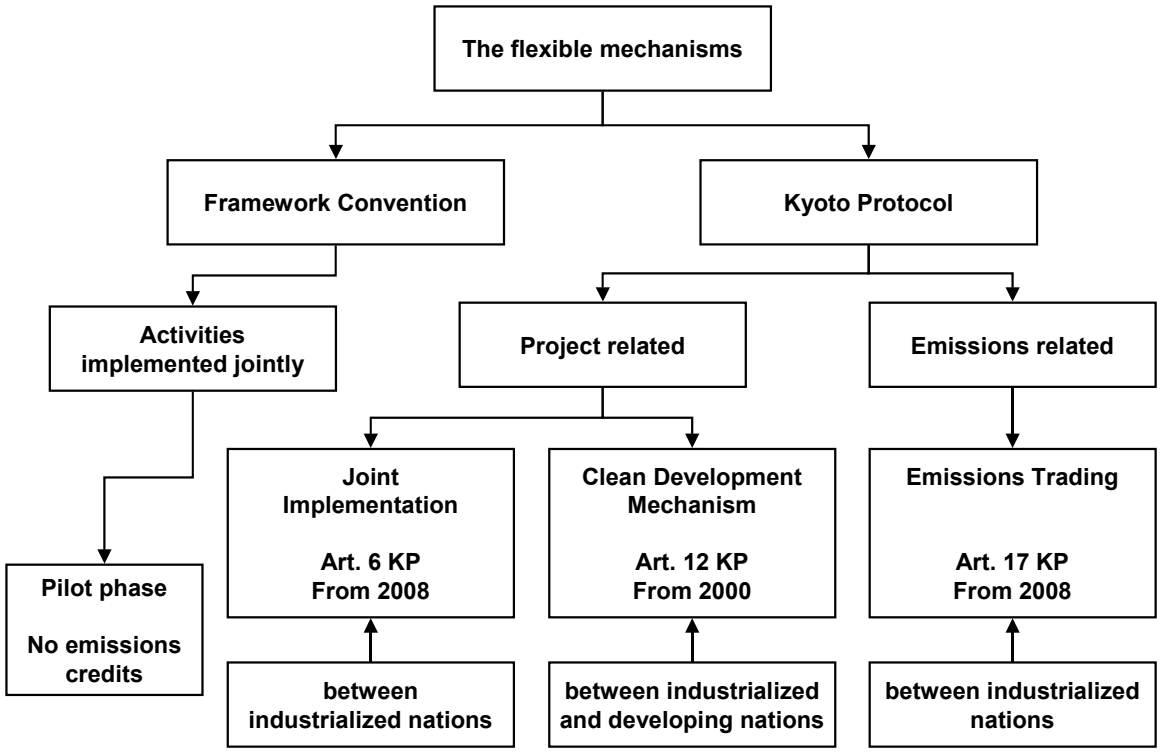
The issue of the greenhouse effect, its causes and the possibilities of countermeasures against it have been discussed in scientific circles, the business world, politics and society for 15 years now. Certainly, the intensity of the debate varies greatly from one world region to another. Whereas the small island nations, particularly in the Pacific (Alliance of Small Island States – AOSIS), that are the first to be affected by the climate change already underway are in the front line together with the European Union, the subject is virtually taboo in the USA.

Nevertheless, an important step forward was taken in Marrakech with regard to an internationally agreed climate protection policy. Marrakech has created the preconditions to enable the Kyoto Protocol to come into force within a few months. As a result, the so-called Kyoto Mechanisms - Joint Implementation, Clean Development Mechanism and Emissions Trading - are also becoming more important. All three mechanisms are based on the intention to use the cost differences between various emitters of greenhouse gases to achieve global climate protection in an economically efficient way. Especially suited to that is the combating of the greenhouse effect, in which it is not a question of where on our planet emissions harmful to the climate are avoided, but that they are reduced.

The aim of my following remarks is to portray the current situation, to elaborate on the opportunities for investors and host countries offered by the Kyoto Mechanisms depicted in figure 1, and to point out the prospects.

Figure 1: The flexible mechanisms of the Framework Convention on Climate Change and the Kyoto Protocol



A. Brussels trends – The EU climate strategy

The activities of the European Commission during the last two years were characterized by the realization that in the "business as usual" case the EU as a whole would fall well short of the commitments it made in Kyoto in 1997. This was the finding of a scientific study presented at the beginning of 2000. The alarming statement at that time was: instead of having come very close to the target it took on in Kyoto - "Reduction of greenhouse gases by 8 per cent in the period 2008-2012 (base year 1990)" – the amount of greenhouse gases emitted from the territory of the European Union in 2012 will be about 1 per cent higher than its emissions in base year 1990 (see table below).

The European Commission's conclusion: since the EU member countries were obviously not in a position to realize the required reduction targets (see table below) by means of national policies and measures, further steps at Community level were essential.

Table 1: Greenhouse gas reduction potential within the European Union under cost-efficiency criteria for all relevant sectors to 2012 (including implementation of the voluntary commitment of the European motor industry)

Marginal cost 20 $/t$CO_2$ equivalents	GHG emissions 1990 or 1995 in megaton CO_2 equivalents	Baseline emissions 2010 according to "business as usual"	Cost-efficiency potential beyond the "business as usual" case
Energy supply	1.422	minus 6 %	minus 13 %
Industry	757	minus 9 %	minus 12 %
Transport	753	plus 31 %	minus 4 %
Households	447	plus/minus 0 %	minus 6 %
Small-scale consumption	176	plus 14 %	minus 15 %
Agriculture	417	minus 5 %	minus 4 %
Waste management	166	minus 18 %	minus 13 %
EU as a whole	4138	plus 1 %	minus 9 %

This was the starting signal for the European Climate Change Program (ECCP). The concept was developed initially within the framework of an extensive process in which not only officials of the EU member country governments but also representatives of industry and environmental groups participated. Recommendations for the design of the European climate protection policy were drawn up from the spring of 2000 to July 2001. The results of this process focused on the sectors 'Flexible Mechanisms', 'Demand-related measures', 'Energy supply', 'Industry', 'Transport' and 'Fluoridated Gases'.

The result of the year-long, at times extremely contentious discussion process: 40 cost-efficient measures were identified. With a greenhouse gas reduction potential of 664-765 megaton CO_2 equivalents, the measures cover a potential of double the reduction target the EU took on in Kyoto. The European Commission calculated that the total costs of realizing the EU target with the most cost-efficient measures would in 2010 be 3.7 billion €s, or 0.06 per cent of the EU's gross domestic product.

The measures focus on the following sectors:

- Introduction of EU-wide emissions trading
- Greater use of renewable energy sources
- Improving energy efficiency in buildings
- Tightening energy-saving standards for domestic appliances as well as communications and entertainment technology devices
- Energy consumption management
- More intensive use of cogeneration of power and heat
- Better control of fluoridated greenhouse gases by maintenance, leak tests and monitoring
- A more climate-efficient 'modal split' in the transport sector by improving infrastructure and levying fees and charges.

Because of the currently very controversial discussion, which in part is being conducted with completely wrong arguments, and also because of the theme of my address, I would now like to pick out from the basket of proposals the introduction of an EU-wide trade in greenhouse gas emissions.

Table 2: EU burden-sharing, emissions development 1990 to 1999, and target achievement level of the individual EU member countries

EU country	Targets for the commitment period 2008–2012 according to the burden-sharing of 1998	Emissions trends between 1990 and 1999	Emissions reduction target to 2008-2012
Belgium	minus 7.5 %	Plus 2.6 %	minus 10.1 %
Denmark	minus 21 %	plus 4 %	minus 25 %
Finland	plus/minus 0 %	Minus 1.1 %	Target achieved
France	plus/minus 0 %	Minus 0.2 %	Target achieved
Germany	minus 21 %	minus 18,7 %	minus 2.3 %
Greece	plus 25 %	plus 16.9 %	Target achieved, but continuing upward trend
Ireland	plus 13 %	plus 22.1 %	minus 9.1 %
Italy	minus 6.5 %	Plus 4.4 %	minus 10.9 %
Luxembourg	minus 28 %	minus 43.3 %	Target achieved
Netherlands	minus 6 %	Plus 6.1 %	minus 12.1 %
Austria	minus 13 %	Plus 2.6 %	minus 15.6 %
Portugal	plus 27 %	plus 22.4 %	Target achieved, but continuing upward trend
Spain	plus 15 %	plus 23.2 %	minus 8.2 %
Sweden	plus 4 %	Plus 1.5 %	Target achieved
United Kingdom	minus 12.5 %	Minus 14 %	Target achieved
EU as a whole	minus 8 %	minus 4 %	minus 4 %

Source: European Commission, 2001

The basic structure of the proposed directive tabled by the European Commission on October 23, 2001; introducing EU-wide trading in greenhouse gases; arises from the following overview.

- Binding concept
- Installation-related (> 20 MW combustion installation input) or registration of the most energy-intensive sectors (Appendix I)
- Allocation of emissions allowances on the basis of absolute quantities
- Fundamentally all 'Kyoto gases' – start with CO_2 (Appendix II)
- Introduction phase 2005-2007
- Final phase 2008-2012 – after 2012, a five-year extension in each case
- Drawing up of national allocation plans for all sectors
- Allocation method: 'grandfathering'
- Allocation rules (Appendix III) take account of technical possibilities, need/growth, newcomers and early action
- Burden-sharing of 1998 remains unaffected
- 46 per cent of the EU's estimated CO_2 emissions in 2010 is registered.

If one looks at the possibilities the Commission's proposal provides for in designing national allocation plans, it can be seen that all the alarmist claims which interest groups are presently disseminating are completely unfounded.

The fairytale of "a brake on growth" proves to be false if only because in the free-of-charge allocation of emissions allowances not only the technical potential of each installation can be taken account of, but also their need and so-called 'early action' – which against the background of the prompt reductions of greenhouse gas emissions already made by Germany and not least also by German industry – is extremely important.

The threat of job losses is also unconvincing because the "scientific studies" which are supposed to prove this assume a "worst case" scenario, which actually no-one in Germany is aiming at. At the same time, those who warn against the negative impacts of emissions trading evidently quite deliberately overlook the fact that in all probability Germany and German industry will be sellers of emissions allowances and not fuel the demand for emissions certificates.

In addition, the argument that emissions trading would in effect pay "closure bonuses" and drive German industry out of the country is actually so absurd that one should not even take notice of it. I can only say here that no rational economists and also no logical ecologists would dream of constructing such "closure bonuses" in the context of emissions trading.

German chemicals industry is launching massive and expensive advertising campaigns against emissions trading instead of constructively getting to grips with realizing German interests within the framework of an EU-wide concept.

The impression is hardening that the critics are not at all concerned about the instrument as such, but rather that the climate protection policy goals in general are unpopular. But it would seem that for some sections of German industry it is not proper to admit that. In the end, the objectively unfounded opposition in German industry is strengthened by the conjecture of those who since the existence of the industry's declaration of voluntary commitment to climate protection have never tired of claiming that its targets are at best "business as usual", and that a thoroughgoing input to climate protection by German industry is out of the question. I must remark here that these comments come not only from the environmental movement, but also from senior representatives of German companies.

What must remain is:

- basic approval of the EU draft directive; and
- constructive participation in its development as well as seeking to anchor German concerns in the draft.

Fundamental opposition makes no sense, since both the Council of Europe and the European Parliament have given the ECCP a green light. In addition, the decision on whether to introduce EU-level emissions trading will be taken by a qualified majority vote (Art. 175.1 EEC Treaty).

From the German Federal government's point of view, this means working on the draft directive that is on the table with the following goals:

- creation of a voluntary pilot phase for the period 2005-2007, before the binding EU-wide emissions trading system comes into force in 2008;
- formulation of clear and transparent rules for the initial allocation of emissions allowances if only to prevent distortion of competition between the EU member countries;
- clarification of the interplay or relationship between EU-wide emissions trading and other instruments already in place, such as Germany's ecological tax reform, the climate protection agreement with German industry, the Renewable Energy Sources Act (EEG), the Act on Heat-Power Cogeneration (KWK-G) and the European Commission's Directive on Integrated Pollution Prevention and Control (IPPC) ;
- ensuring consistent monitoring and robust sanctions measures for cases where installation operators violate the agreed rules;
- inclusion of the project-related mechanisms Joint Implementation and Clean Development Mechanism from the start; and
- opening up the draft directive to other sectors and actors, such as private households and transport;
- using the structure of the voluntary agreements to combat Climate Change established in 1995 and updated in 1996 and 2000 through a so-called "pooling system".

B. The status of international climate protection negotiations

The Seventh Conference of the Parties (COP7) to the UN Framework Convention on Climate Change, held in Marrakech, Morocco, from October 19 to November 10, 2001, took an important step forward in the international negotiations on climate protection after a lengthy process of conferences in:

- Rio de Janeiro 1992
- Berlin 1995 (COP1)
- Geneva 1996 (COP2)
- Kyoto 1997 (COP3)
- Buenos Aires 1998 (COP4)
- Bonn 1999 (COP5)
- The Hague 2000 (COP6)
- Bonn 2001 (continuation of COP6).

In the early hours of November 10, the conference adopted the Marrakech Accords[1] - due not least to the entirely positive engagement of the so-called 'countries in transition'. That concretized the Bonn Agreement of 2001[2] and put it on an operational basis in such a way that the Kyoto Protocol can now be implemented.

[1] Available at UN Climate Secretariat in Bonn at http://www.unfccc.de/index.htm

[2] Available in German at homepage of Federal Environment Ministry: http://www.bmu.de/download/dateien/kyoto Bonn.pdf

It means the international community now has the principles, precise terms, processes, rules and guidelines with which the Kyoto Protocol has been made handle able and realizable. The industrialized nations (the so-called Annex I or Annex B countries) can now ratify the Protocol. All required detailed regulations are to hand. The national measures to implement the commitments accepted by the industrialized nations in Kyoto in 1997 to reduce or limit emissions are now becoming more and more recognizable.

So despite all misunderstandings and confusion along the way, 2001 was in the end a good year for international climate protection. For a long time before that things looked very different:

- the conference in The Hague produced no usable result;
- despite all prophecies of doom, the wreckage inherited from The Hague was glued together. Bonn delivered the political agreement which many no longer expected;
- on the other hand, everything looked like turning into waste paper again at the beginning of 2001 due to the blow the new US Administration under George W. Bush delivered to climate protection policy by rejecting the Kyoto Protocol;
- in sharp contrast to that are the ever louder warnings from the IPCC, which in its Third Assessment Report ('Climate Change 2001', available via the homepage of IPCC: http://www.ipcc.ch as well as of the Federal Environment Ministry: http://www.bmu.de/fset800.php) calls for action in unprecedented clarity.

This means international climate protection policy is located in an area of tension between scientific warnings and a growing attitude of political refusal:

- the IPCC points out expressly that the upward trend of greenhouse gas emissions is all too clear and is caused by man;
- therefore the activities got underway by the industrialized nations to date are far from sufficient to reverse the trend and decouple economic growth and an increase in greenhouse gas emissions;
- in marked contrast to that is the attitude of rejection of the world's greatest emitter of gases harmful to the climate: the USA.

In this situation, the US government's blockading stance must be broken open and the gap between the technical and economic opportunities closed – at international, regional and national level. The efforts made in developing the rules of the Kyoto Protocol were also based on this aim. The goal - which is not always recognized by all participants in the negotiations - is to reconcile economic policy requirements with environmental policy concerns. The attempt to achieve symbiosis between ecology and economics - at a time of worsening world economic conditions - has become ever clearer the further away in time from Kyoto. All the valves offered by the Protocol have been opened, so:

- application of the rules on sinks;
- the so-called 'flexible' mechanisms: Joint Implementation (Art. 6 KP), Clean Development Mechanism (Art. 12 KP) and Emissions Trading (Art. 17 KP);
- reporting and monitoring (Art. 5,7,8 KP), and
- the compliance system (Art.18 KP)

have been used as far as possible. It must now be seen whether the rules also prove successful in practice, and whether the willingness to compromise shown in the successful conclusion in Marrakech has not smashed too much climate protection policy china.

The procedure, however, has faced the testing of the rules with another obstacle. The rules recommended by COP7 will not be able to be adopted until the first meeting of the Parties to the Protocol (the so-called MOP1). The result is that we shall not know finally what the rules for the Kyoto Protocol's first commitment period (2008-2012) look like until 2003.

Nevertheless, the decisions taken in Bonn and Marrakech have delivered clarity and legal certainty. They have also made clear that the great majority of the industrialized nations is meeting its responsibility, although the world's greatest emitter of greenhouse gases – the USA – continues to evade it and at best is prepared to implement somewhat more than "business as usual".

That means there is now a reliable foundation for designing the policies of both the industrialized and developing countries. It is a foundation which in the final analysis industry also needs to operate the instruments the Kyoto Protocol offers and use the business opportunities, for German industry in particular, that can be derived from an internationally agreed climate protection strategy.

Compliance

Logically, compliance is a main item of the international climate protection regime. A relatively robust compliance concept was adopted in Marrakech. The system provides for binding consequences for failure to meet commitments. In addition, it contains detailed rules of procedure for decision-making. The following central points characterize the concept:

- the 'Enforcement Branch' – composed of six representatives of developing countries and four from industrialized nations – decides in cases of doubt on the fulfillment or non-fulfillment of commitments;[1]
- the 'Facilitative Branch', made up of the same representative ratio, will tackle implementation problems beyond non-fulfillment;
- if reduction or limitation commitments are not met, the difference between them and actual emissions – plus 30 per cent ('compensation rate' of 1.3 times excess emissions) – will be deducted from the emission volumes permitted for the subsequent commitment period;
- in addition, countries which fail to fulfill their commitments can be excluded from using the Kyoto mechanisms (suspension of eligibility). In that case, it is planned that eligibility will be restored at the latest when the commitments for the second period are fulfilled; and
- as a sanction, the compliance system provides for an action plan if reporting obligations are not met or commitments are not fulfilled.

It was also agreed in Marrakech that failure to fulfill commitments accepted with ratification of the Kyoto Protocol can also be reported by other parties to the Protocol. There is also a complaint procedure which enables appeals against 'Enforcement Branch' decisions, but which can only be successful if the decision process was not conducted according to the rules. An 'Enforcement Branch' decision remains in force while a complaint procedure is under way. The rules and processes adopted in Marrakech are open to the public.

[1] The CDM Executive Board is constituted as follows:
- one member from each of the five UN regional groups;
- two members from each of the Annex I and Non-Annex I countries;
- one member from a so-called 'Small Island State'.

Fundamentally, decisions will be taken by consensus. In cases of doubt, a 75 per cent majority will suffice.

The 'flexible mechanisms'

Subsequent to COP7 in Marrakech, the newly-formed Executive Board of the Clean Development Mechanism met for the first time (see above). The chief task of this body is to register and review CDM projects. Its members include two representatives of the EU.

To be eligible to use the flexible mechanisms, the parties to the Kyoto Protocol must fulfill the following conditions:

- ratification of the Kyoto Protocol;
- commitment to the compliance system adopted in Marrakech, whereby participation cannot be withdrawn retroactively by the establishment of a system with binding consequences under international law;
- establishment of a national system to register emissions;
- punctual and correct presentation of annual greenhouse gas balance sheets and submission of sinks inventories;
- punctual and correct reporting on the carbon stored in sinks from the second commitment period (2013–2017). During the first commitment period (2008–2012) a qualitatively incorrect report will result only in the respective sinks being unable to generate emission credits.

In Marrakech, in addition to the three variants of emissions allowances or credits known since Kyoto a fourth – Removal Units (RMUs) – was established:

- Assigned Amount Units (AAUs): Emissions allowances to which the Annex I countries are entitled within the framework of the Kyoto Protocol for the period 2008-2012;
- Removal Units (RMUs): Emissions credits which a country receives when its national ecosystems absorb carbon from the atmosphere ('sinks function');
- Emission Reduction Units (ERUs): Emissions credits generated as part of Joint Implementation projects between industrialized nations according to Art. 6 of the Kyoto Protocol;
- Certified Emission Reductions (CERs): Emissions credits generated as part of Clean Development Mechanism projects implemented jointly by industrialized and developing countries.

The following possible applications are provided for:

- All emissions allowances can be used to fulfill emissions commitments.

- All emissions allowances may be traded freely between the Parties. This rule clearly increases the liquidity of the emissions market.
- Emissions allowances can be carried over (called 'banking') to future commitment periods as follows: AAUs without limit; ERUs and CERs up to a limit of 2.5 % of a Party's initial AAUs. RMUs: no banking.

These rules require a fully developed tracking system that can follow the path of the various emissions allowances in a thoroughgoing way.

Emissions Trading

With regard to emissions trading, it is clarified that Parties to the Kyoto Protocol can trade the four above-mentioned emissions allowances with each other. To prevent the non-covered sale of emissions allowances, every Party is obliged to hold a certain amount of its allowances in a Commitment Period Reserve (CPR). If a Party falls short of the required amount in the CPR it cannot sell any emissions allowances until it has realized the defined minimum amount again. Trades that take place regardless of that rule will be considered invalid in the context of commitment fulfillment according to the quantitative guidelines of Annex B of the Kyoto Protocol. They are thus worthless.

Clean Development Mechanism

The CDM Executive Board mentioned above was set up with the fact in mind that CDM projects could be implemented as early as the beginning of 2000. The Board decides on the functions, guidelines and methods which the actors must apply. Implementation of CDM projects by developing countries without the participation of industrialized nations (so-called 'unilateral projects') are not expressly prohibited and therefore are permissible. Sinks projects cannot be included in the CDM until the Executive Board has adopted guidelines for their implementation under this mechanism.

Joint Implementation

- Climate protection projects between two industrialized nations are called Joint Implementation (JI). Emissions credits can be generated within JI, but they must be deducted from the host country's AAUs. ERUs can be used by the Parties to fulfill their own commitments or for sale. Basically, there are two ways in which JI projects can be recognized:
  - **First track**: Provided the host country has met all the eligibility requirements for using the Kyoto mechanisms (see above), it can itself implement the registration and verification process.
  - **Second track**: On the other hand, if a host country does not meet its reporting obligations, a JI project must be registered and subjected to international review by the newly-formed JI Supervisory Committee. The Committee consists of 10 members (plus 10 deputies) and is constituted as follows: three representatives of western industrialized nations, three from Central and Eastern Europe, and four from Non-Annex I countries including one seat reserved for a representative of the small island developing states. The voting procedure corresponds to that of the CDM Executive Board.

In the course of the Marrakech voting process compromises had to be made on various issues. In particular, the original German negotiating position was cut back considerably. Thus, the 'carry forward' of sinks activities to subsequent commitment periods (banking of RMUs) - as always called for by Germany - was formally excluded. But this still is possible via a 'RMU bypass' by which the corresponding Party carries forward other emissions allowances instead of RMUs and uses its RMUs to cover its emissions limitation commitment.

Furthermore, both Germany and the EU had demanded that the complete and qualitatively sufficient fulfillment of reporting obligations in the sinks sector belonged to the criteria of eligibility for using the flexible mechanisms in as early as the first commitment period and not - as adopted in Marrakech – only from the second period. Germany in the end also had to relinquish its call for a 'concrete ceiling', meaning a precisely quantified limit to which emissions credits from the flexible mechanisms could be used to cover a Party's own commitments.

Reporting, monitoring and verification

In the overall Marrakech Accords, the European Union had to make concessions to the Umbrella Group and G77 countries, but in countermoves it was also able to push through some significant concerns of its own. The most important point in the negotiations was the requirements and processes in reporting and the crediting of sinks according to Art. 3.3 and 3.4 of the Kyoto Protocol (reforestation, forest management and emissions reduction in agriculture). After the concessions made in Bonn with regard to carbon sink

crediting, above all to the Umbrella Group, Marrakech had to demand sufficiently high requirements for reporting on sinks and provide incentives for good-quality sinks inventories. In the end, a compromise satisfactory to all sides was achieved here.

With regard to reviewing greenhouse gas inventories and other reports, so-called Expert Review Teams (ERTs) will be set up. In the case of poor reporting, these teams will be able to correct inventories and present reports which will form the basis for the compliance checks by the Compliance Committee. The issue of the selection criteria for technical review experts was solved in the end by reaching a compromise between technical expertise and a balanced international representation.

When will the Kyoto Protocol come into force?

The quorum requirements for the Kyoto Protocol contain two points, both of which must be fulfilled:

- it must be ratified by 55 Parties to the Convention; and
- they must include developed countries representing at least 55 per cent of the CO_2 emissions of the Annex I nations in 1990.

At present, about 90 countries have ratified the Kyoto Protocol. But developing countries currently still account for the great majority of the 'ratifiers'. In June 2002 the politically potent block of the EU member countries and the European Commission ratify the Protocol together. The European Union thus made a contribution of 24.1 per cent to fulfillment of the quorum.

With regard to achieving the quorum of 55 per cent – after the announcements of Canada, China and others to ratify - Russia in particular (17.4 per cent) is still a 'shaky' candidate that holds the key to the Kyoto Protocol's coming into force. To all appearances it also does not wish to hand it over for the time being.

Various actors in Russia still seem intent on landing more 'goodies' for their country. It must be expected that it will be some months before the Russian government and the Duma, the Russian Parliament, have got their act together. In the final analysis, however, the economic incentive of the Kyoto mechanisms is so great for Russia that it will ratify the Protocol in order to benefit from its blessings. This is already being emphasized by the relevant government departments in Moscow.

C. Conclusion and prospects

Marrakech has made the Kyoto Protocol ratifiable. That also brings into sharper focus the opportunities offered by the project-related mechanisms Joint Implementation and Clean Development Mechanism. For the Central and East European countries, consistent use of joint implementation gives them the opportunity to attract investment to improve their energy supply infrastructure, which as a rule is no longer up-to-date. For western countries, joint implementation enables them to fulfill their Kyoto commitments at much lower cost than they would incur by implementing purely national measures. Building new power plants and rehabilitating existing ones, optimizing transport power line energy, measures to improve energy users in the end-consumer sectors of industry, trade and private households, cogeneration of power and heat, using renewable energy sources, vigorous rehabilitation of old buildings and the building of efficient new houses, using domestic appliances and communications and entertainment technology with a lowest possible consumption of energy, use of state-of-the-art metrology and control engineering, improving transport infrastructure and deployment of low-fuel vehicles – the list of the opportunities goes on and on.

Hopes are also raised by the fact that the Confederation of German Industry and various important industrial branches have declared that they view the project-related mechanisms Joint Implementation and Clean Development Mechanism as more important than emissions trading. But JI and CDM will play a significant role as instruments of climate protection and technology transfer only if it is possible to:

- put the information flow on a broader basis;
- eliminate misunderstandings;
- curb unrealistic expectations;
- create the infrastructure required for implementation both in investor and host countries;
- put in place the preconditions which the Kyoto Protocol, the Bonn Agreement, and the Marrakech Accords demand (above all, reporting and monitoring); and
- offer not only technical solutions, but put together full-solution packages (including maintenance, spare parts supply and insurance services).

Recommended reading

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The flexible Mechanisms under the Kyoto Protocol – the German View

by
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on the occasion of the

BMU/CTI – Workshop

in November 2002
in Tutzing

Slide 1

What has the aij pilot phase achieved?

- aij projects meet with coolness in the host countries
- In the introductory phase, aij projects need massive assistance from the investor countries – political, technical and economic barriers have to be overcome
- The level of information on aij projects and their implementation is very low in both investor and host countries
- A lack of institutional, technical and financial capacities, above all in the host countries, impede aij projects
- Development and implementation of aij projects could be facilitated by bilateral or multilateral framework agreements (memoranda of understanding)

Slide 2

What has the aij pilot phase achieved?

- Considerable consultancy for all actors (companies and governments) is required
- Only with growing familiarity with projects will the need for consultancy and thus transaction costs reduce
- Project-related funds can reduce transaction costs, above all for interested small to medium-sized businesses – the Netherlands' experience with ERUPT and CERUPT should be used
- General, internationally accepted rules would facilitate the development and implementation of aij projects

Slide 3

What has the aij pilot phase achieved?

- The government must ensure the ecological integrity of the projects ("Golden Standard" – positive list)
- The government must ensure timely climate bookkeeping/ emissions inventories
- The government must ensure no deviation from the target corridor (monitoring, sales approval, right of first refusal)
- The government must put regulatory frameworks in place (e.g. to prevent distortions of competition)

Slide 4

Challenges following Marrakech and New Delhi

- Ratification of the Kyoto Protocol
- Creation of institutional and organisational capacities (designated national authority – DNA)
- Rules for recognition of JI and CDM projects
- Presentation of reports to the UNFCCC (Art. 5.7 and 8 KP) and national reports (Art. 12 KP) in conformity with requirements – currently considerable shortfalls in Germany
- Creation of structures to use ERUs (JI) and CERs (CDM)

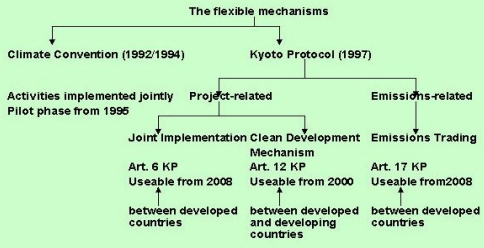
Slide 5

Preconditions for use of the Kyoto Mechanisms

- Ratification of the Kyoto Protocol
- Commitment to the compliance concept adopted in Marrakech
- Establishment of a national system to register emissions
- Punctual and correct presentation of annual greenhouse gas balance sheets and submission of sinks inventories
- Punctual and correct reporting on the carbon stored in sinks in the second commitment period (2013-2017)

Slide 6

The flexible mechanisms



Slide 7

Status of the preparations I

- Ratification of the Kyoto Protocol – Waiting for Russia
- DNA – enhancement of capacity of the Joint Implementation Coordination Office (JICO) located at the Federal Environment Ministry
- Development of practical support (JI and CDM guides for users)
  - Project development according to flow chart
  - Early examination of suitability and climate protection input
  - Reduction of transaction costs
  - Facilitation of investment decisions
- Project Design Document (PDD) as basis for recognition

Slide 8

Status of the preparations II

- Forwarding to and clarification by the Executive Board in the case of CDM projects – CoP8 in New Delhi
- Forwarding to and clarification by the Supervisory Committee in the case of JI projects as one of the next steps
- Project guide as test of suitability

Slide 9

Status of the preparations III

- Use of ERUs and CERs:
  - implications of national commitments and the objectives of industry, energy supply, private households, small-scale consumption and transport
- Integration in the EU-wide trading of greenhouse gas emissions (Draft European Commission Directive of 23 October 2001 – Status of the negotiations)
- Use of alternative instruments with comparable results (voluntary commitment declaration, eco-tax, Renewable Energy Sources Act (EEG), Heat-Power Cogeneration Act (KWKG), and the EU Directive on Integrated Pollution Prevention and Control (IPPC)
- Funds for implementation of JI and CDM projects (ERUPT, CERUPT, KfW-Fund, PCF etc.)
- Sales to third parties or their inclusion (e.g. brokers, project developers)

Slide 10

Project development and implementation process

- Project guide as support for the entire project cycle
- Development phase: the project is given a brief scrutiny (self-evaluation?)
- Early agreement between investors and DNA in investor countries
- Option: advance notice and rough examination at DNA
- Drawing up of the project design document by the certification office (designated operational entity)

Slide 11

Project guide

- Basic knowledge – JI and CDM categories
- Validity check
- Development of the project design document (PDD)
- Monitoring concept
- Verification and validation
- Technical installations

Slide 12

Objectives of the validity check

- Alignment of project development on the JI and CDM characteristic
- Validity check to assess at a very early point in time the project idea's prospects of success
- Minimising of transaction costs
- Abridged documentation as the basis for initial agreement with
  - the designated operational entities (DNAs) of investor and host countries
  - the designated operational entities, and
  - possibly also the investors or sponsors
- Option: advance notice – goal: creation of investment certainty

Slide 13

Tasks of the validity check from the companies' point of view

- Lowering the recognition threshold
- The check offers early orientation and certainty
- Potential clarification of the use of ERUs and CERs in Germany
- Advance notice serves at the same time as the basis for developing the project design document (PDD)
- Abstaining from a validity check and initial agreement with a designated national authority increases later scrutiny costs

Slide 14

Tasks of the validity check from the point of view of the government

- Early ensuring of the ecological integrity of German JI and CDM projects ("Golden Standard" – positive list)
- Prevention of misunderstandings – minimising of conflicts
- Gaining of experience for the further development of the Kyoto mechanisms
- Control possibility with regard to realising national climate protection targets
- Early participation of the public
- Acceleration of the recognition process based on the project design document

Slide 15

Abridged documentation

- Information on all project participants
- Technical description of the project, identifying the interfaces and the system's limits
- Suitability of the project as a JI or CDM project
- Quantification of the estimated emissions reduction / initial validity check of the baseline
- Project planning and financing
- Assessment of the project risks

Slide 16

Reporting system during the project cycle

Slide 17

Reporting system II

- Identical certification facility (DOE) can upon inquiry of the project participants submit the project design document to the Executive Board for verification
- After acceptance by the designated national authority, the Executive Board deals with the project design document
- Public participation (at short notice)
- The designated national authority reacts to monitoring and verification reports within the set timeframe

Slide 18

Conclusion I

- Structures and processes will be developed step-by-step in 2002 and 2003 and be available when the Kyoto Protocol comes into force
- Planning for JI and CDM projects can begin immediately
- For CDM, however, Executive Board decisions are still necessary
- JI and CDM assume the existence of a workable emissions trade in order to be able to turn ecological inputs into economic dimensions
- Before 2008, JI can be used in economic terms only in combination with emissions trading

Slide 19

Conclusion II

- The project guide and validity check is now available
- The Federal Environment Ministry and its Joint Implementation Coordination Office (JICO) should be called in early to clarify the process
- Negotiations are already under way on bilateral arrangements – but conclusion only according to need

Slide 20

Conclusion III

- Priority projects:
  - rational and economical use of energy
  - renewable energy sources
- Restraint on sinks projects – rules are to be expected at the earliest for COP9 – COP/MOP1, probably in 2003
- Rules for small-scale projects are to be adopted by COP8 in New Delhi in 2002

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Climate glossary

aij	activities implemented jointly (pilot phase for JI and CDM)
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety
CER	Certified Emission Reduction (emissions credit from CDM projects)
EB	Executive Board – body for formulating the rules for CDM projects and recognising such projects
DNA	Designated National Authority (in Germany: BMU)
DOE	Designated Operational Entity (accredited certification office)
ERU	Emission Reduction Unit (emissions credit from JI projects
JIKO	Joint Implementation Coordination Office in the BMU, Arbeitsgruppe Z II 6
KP	Kyoto Protocol of 1997

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Climate glossary II

MoU	Memorandum of Understanding (agreement as basis for JI and CDM projects, binding under international law)
PDD	Project Design Document (basis for recognition by EB und SC)
PP	Project participants
PUB	Public participation
RL	Directive
SC	Supervisory Committee (JI supervisory body)
SV	Climate protection agreement of German industry of November 9, 2000
UNFCCC	United Nations Framework Convention on Climate Change
WSSD	World Summit on Sustainable Development (Johannesburg)

Slide 23

Any further questions?

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Energy Saving Policy Diffusion and Comparative Policy Monitoring

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The paper takes up current energy policy issues, as the liberalization and deregulation of electricity and gas markets according to the respective EU directives. These directives are part of the Community Acquis and of high priority in the accession process. The wave of changing frame conditions of the energy markets via deregulation, privatization etc. has also reached FSU countries. Deregulation is followed up by re-regulation, and especially the integration of environmental targets in this policy process appears to be a difficult task. Nuclear energy and nuclear safety is on the international agenda since the Chernobyl disaster and will continue to be an important topic in the future. The use and promotion of renewable energy sources and implementation of energy efficiency measures are suggested as long-term strategy in the energy sector. The aim of the paper is to show, whether diverging or converging approaches in energy policy can be seen in the CEE/FSU countries, and which role comparative policy monitoring can play in this process.

A comparison of traditional and modern energy policy shows that supply-side oriented approaches, targeting only a small number of actors, promoting or substituting one fossil energy source by another, or nuclear power is outdated. Modern energy policy focuses on final energy usage, is demand-side oriented, directed to a large number of actors, and using new instruments and institutions to promote renewable and local energies.

Policy instruments can be determined by the degree of coercion, ranging from direct activities of the state via state companies over law and order regulation, promotion measures as subventions and transfer payments to reminding measures and public relations. Since several years self-regulation of private actors is regarded as additional instrument, bringing responsibility of corporate actors into the problem solution.

The policy design of the regulatory framework shows the key role of economic incentives, based on an adequate institutional infrastructure. Vertical and horizontal policy integration has to be assessed to emphasize simultaneous benefits and side effects such as GHG emission reduction, energy security, industrial competitiveness, job creation; stress other socio-economic benefits. The design of policy instruments always depends on the political sphere and on power struggles between the public and private actors of the regulated sector. Therefore policy tool selection is not a neutral process to minimize the social cost of state intervention. Alternative policy tools involve distinct models of state intervention and policy processes. However, an empirical analysis of the context, actors and modalities of the political choice of instruments is necessary.

The EU integration process accelerates policy convergences, but despite policy convergences national differences do exist. That indicates that there is not a single particular policy instrument that can be considered universally effective under all circumstances. Different sets of measures have to be adopted in different countries. Cross-country comparisons show that the role of the state is still covering very important functions, e.g. as energy consumer, but also as promoter of marked-based energy efficiency instruments, as forerunner, giving best practice examples, and introducing new instruments, and as broker in energy saving policy. However, state administrations tend to be captured by the interests of energy supply industry.

The comparison of energy saving policy gives a picture of recent developments in the energy sector, and general patterns of the environmental and energy policies. By sketching country-specific regulation patterns, progress in implementation of relevant energy savings regulations and the institutional structure can be shown. Policy-monitoring and ex post evaluation of ongoing programs is giving an analysis of enforcement provisions and mechanisms, as well as of the effectiveness of implementation, cost effectiveness and impacts and of socio-economic side effects. Existing monitoring examples, presented at this seminar, are stressed, e.g. the monitoring of the German biomass ordinance and the PEEREA policy monitoring process.

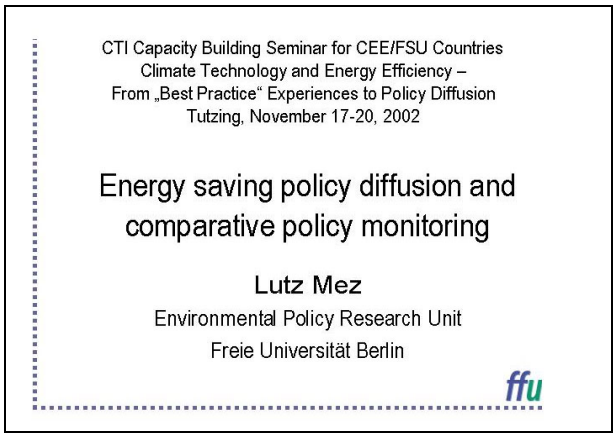
Monitoring and evaluation should be ideally independent to reduce bias. And evaluation mechanisms should be considered already at the program formulation stage. Clear, concise and transparent energy efficiency strategies should

base on a solid analysis with similar and verifiable quantitative energy efficiency indicators. Special attention has to be paid to end use energy efficiency indicators.

The effectiveness of energy saving policy regulation depends further on the policy integration with other policy areas. Measurable steering and reinforcement, the governmental policy style and negotiations before decision-making, close networks of stakeholders and communication structures, and policy learning through consensual

target setting through planning are additional factors for successful policy. On the other hand, mechanical top-down regulation or the believe in single optimal instruments are outdated.

Modern energy saving policy is the result of ecological problem pressure, and requires highly developed capacities of the politico-administrative system, to handle problems and causes in a constructive way. Constitutive elements of an ecological energy policy are implemented as policy-mix. Ecological modernization of energy economy – in the long perspective without fossil fuel and nuclear power.



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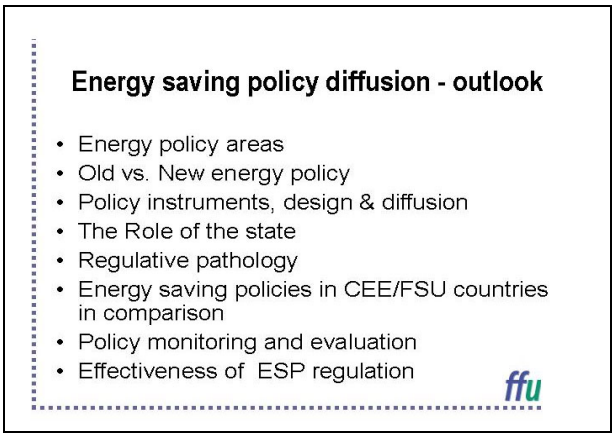

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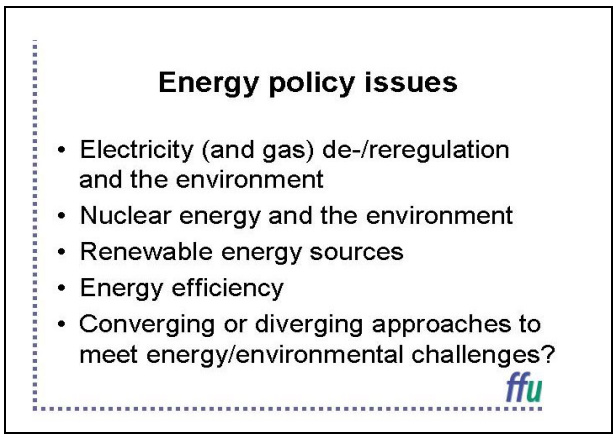

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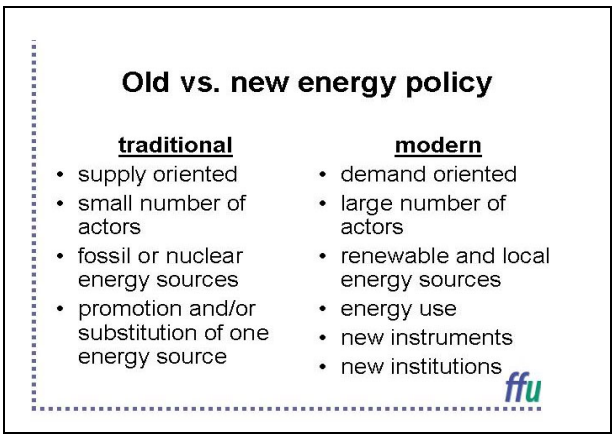

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Policy instruments

Private behaviour	Reminding	State expenditures	Regulation	Public ownership
Self regulation	Talks Conferences Advice	Promotion Subventions Transfer payments	Law & order Ordinances Taxes Levies Charges	State companies
Minimum----------Degree of coercion----------Maximum				

Source: Doern/Phidd 1983:133

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Policy design – regulatory framework

- Key role of economic incentives
- Adequate institutional infrastructure
- Vertical and horizontal policy integration
- Design of policy instruments
- Alternative policy tools involve distinct models of state intervention
- Empirical analysis of the context, actors and modalities is necessary (cf. Varone/Aebischer 2001)

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Policy diffusion

- Cross-country comparisons
- EU integration process accelerates policy convergences
- Despite policy convergences national differences do exist
- Different sets of measures have to be adopted in different countries

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The role of the state as:

- Promoter of market-based energy efficiency instruments
- Forerunner, giving best practice examples, introducing new instruments
- Energy consumer
- Referee/broker in energy saving policy
- Captured by the energy industry

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Causes and consequences of regulative pathology

- Complexity
- Non-government
- Organizational pathology
- Incrementalism (muddling through)
- Welfare state
  Power of industry
  Social split
- Over-complexity
  Over-regulation
  Over-stabilization

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Energy saving policy comparison I

- Recent developments in the energy sector
- General patterns of environmental and energy policies
- Sketch of country-specific regulation patterns
- Progress in implementation of relevant energy savings regulations

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Energy saving policy comparison II

Focus
- Show policy and institutional factors inhibiting effective energy saving policy implementation

Country-specific regulation patterns
- Analysis of energy saving policy instrumentation
- Analysis of energy saving policy styles
- Analysis of actor configurations and institutional setting
- Country profiles: description of sector-specific regulation patterns

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Energy saving policy comparison III

- Assessment of the implementation process in the different countries
- Current state of implementation
- Institutional implementation structure
- Assessment of policy instruments and measures adopted
- Public and private expenditure analysis
- Enforcement provisions and mechanisms

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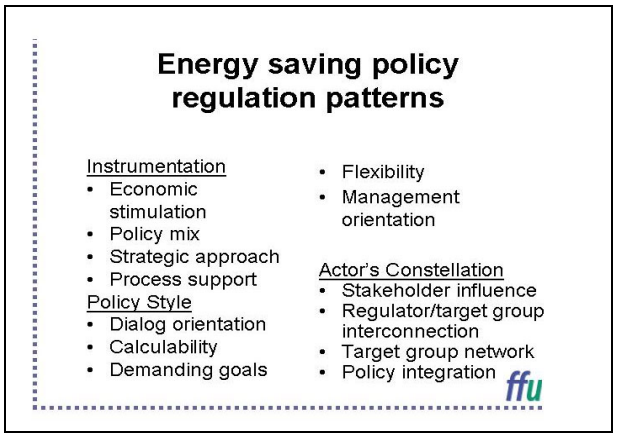

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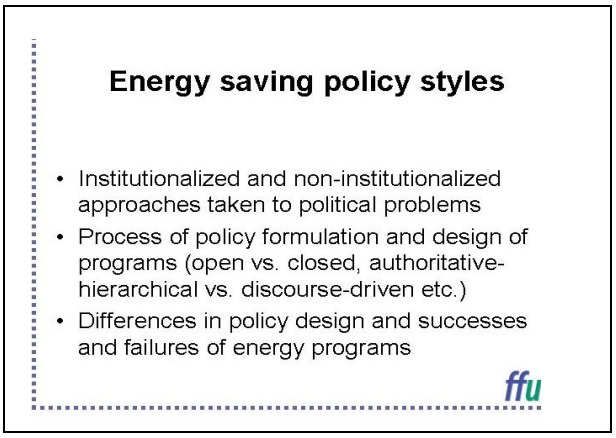

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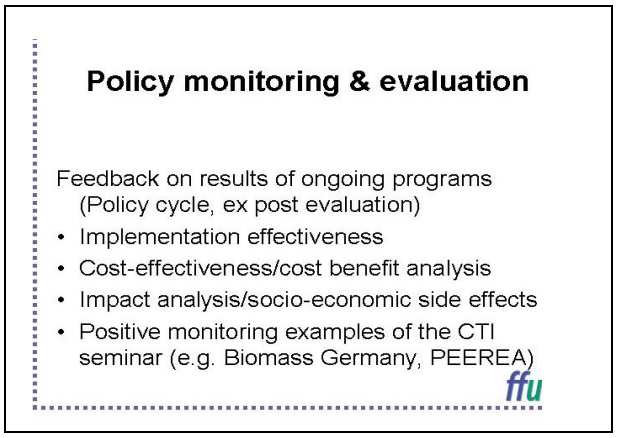

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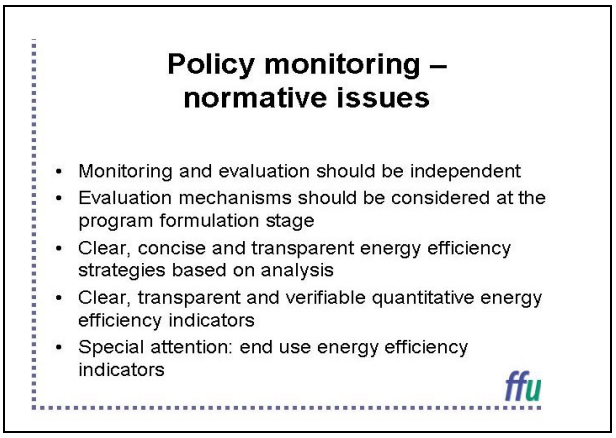

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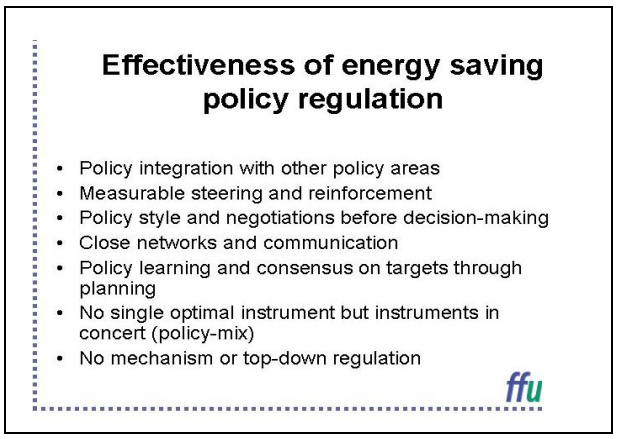

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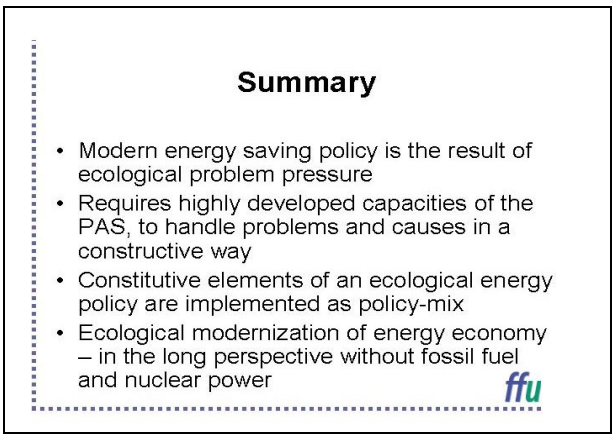

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