POSITION OF THE RESOURCES COMMISSION OF THE GERMAN ENVIRONMENT AGENCY

// APRIL 2016 //

A resource-efficient Europe

A programme for climate, competitiveness and employment

German Environment Agency

Umwelt Bundesamt

Imprint

Published by:
Resources Commission of the German Environment Agency (KRU)

The Resources Commission of the German Environment Agency (KRU) advises the Agency and makes concrete proposals for the further development of resources policy.

Office:
German Environment Agency
Section I 1.1 (Dr. Alexandra Lindenthal)
PO 14 06
06844 Dessau-Roßlau
Phone: 0049 340-2103-0
Email: info@umweltbundesamt.de
Internet: www.umweltbundesamt.de

www.facebook.com/umweltbundesamt.de
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Date: April 2016

ISSN 2362-8273

A resource-efficient Europe – A programme for climate, competitiveness and employment

An ambitious resource policy supports the development of an integrated, social and competitive Europe. Even though a global coordination for climate protection is economically, environmentally and socially necessary in the long term, the EU can provide a significant contribution to such a development single-handedly. Doing so would even be of great economic advantage! The newest results of a comprehensive model show that. In separate scenarios they display a global solution, a European solo effort with predominantly market-based instruments, and the effects of an engaged civil society in the EU.[1] The calculations were conducted with the environmental economic model GINFORS (GWS), coupled with the vegetation model LPJmL (PIK) within the framework of the project POLFREE (Policy options for a resource-efficient Europe, www.polfree.eu).[2]

Effects of "business as usual": economic, social and ecologic imbalances:
If no proactive climate and resource policy is implemented anywhere in the world (business as usual), economic and social imbalances will occur by 2050, mainly based on the following developments:

- Large price increases for resources, especially for food,
- Weakening of economic growth and employment, among other things due to price increases for resources,
- Increase of global CO_2 emissions by 50%.

Therefore, with business as usual, environmental shortages will inevitably lead to a negative development for Europe and the world: lower growth rates, fewer jobs, shortage of land and resources and related conflicts. At the same time the world population will increase by a third until 2050. Additionally, people in developing countries will eat more dairy products, meat and fish – whereby the demand for livestock feed increases further. As agricultural land is limited, prices for food will increase extremely. Prices for fossil fuels and ores will increase significantly by 2050 as well. All this leads to less and less of household incomes remaining to spend otherwise, so the demand for other products decreases. Falling growth rates, not only in the EU but worldwide, reflect this. "Business as usual" leads to a global warming of approximately 6 degrees. The average per capita consumption of raw materials increases globally from 6.8 tonnes annually to 9.1 tonnes – with a much larger world population. As a consequence the pressure on global ecosystems will get stronger and stronger and migration flows will increase due to crises and uninhabitable areas.

The way Europe tackles these challenges is decisive: reactively or offensively. If Europe opts for a far-sighted policy to counter these dynamics, bottlenecks and constraints will turn into opportunities. A positive economic development is possible if Europe accepts the environmental challenge, while creating new jobs and opening up scopes for social balance and justice in the process. A proactive policy is the very prerequisite for economic and social innovation, both in production and consumption.

Scenarios and sustainability targets:
In alternative scenarios (**"EU Goes Ahead", "Civil Society Leads"**) the EU pursues different variants of a dedicated climate and resources policy, so that in both the following **sustainability targets** will almost be reached by 2050:

- Consumption of abiotic materials: 5 t RMC per capita,
- cropland footprint 30% less than in 2005,
- reduction of the water exploitation index to 20%,
- CO_2 emissions 80% of 1990 levels.

Only in the scenario "**Global Cooperation**", the other countries of the world pursue policies that are just as committed, so that the above targets for material, land and water use are also achieved globally and a global CO_2 emissions trajectory that is consistent with the 2 degrees climate goal is realised by 2050. In the scenarios "**EU Goes Ahead**" and "**Civil Society Leads**" the other countries have weaker climate policies which only allow achievement of a 4 degrees goal.

1 Meyer, B., Distelkamp, M., Beringer, T. (2015): Report about integrated scenario interpretation. Deliverable 3.7a of the POLFREE project. www.polfree.eu
2 Under direction of: Paul Ekins, University College London (UCL), involved institutions: UCL, TNO, Wuppertal Institut für Klima, Umwelt, Energie, International Center for Integrated assessment and Sustainable development (ICIS Universität Maastricht), Gesellschaft für Wirtschaftliche Strukturforschung (GWS), Sustainable Europe Research Institute (SERI), International Synergies (IES), Potsdam-Institut für Klimafolgenforschung (PIK).

Economic results:

„Global Cooperation“:
- Prices for resources incl. food significantly lower than in reference,
- Investments increase substantially,
- Income and employment globally and in the EU higher than in reference,
- Resource exporters are losers (e.g. Russia and Brazil).

„EU Goes Ahead“
- Resource prices remain high, as global demand only changes slightly,
- First Mover Advantage: EU exports higher and imports lower than in “Global Cooperation”,
- Real GPD in EU 12% higher than with “business as usual”, +3.4 million jobs.

„Civil Society Leads“
- Gradual, independent changes in the structure and level of consumption (in 2050: level of 1995),
- No negative effect on exports, imports reduced through decrease in consumption,
- Zero growth in real GDP,
- Working time reduction of 20% per employee,
- 17 million additional jobs.

The results of the “**EU Goes Ahead**” scenario suggest that the EU should risk a solo effort in environmental policy. The reduction of resource use with persistent high price increases leads to a competitive advantage for the EU, which results in significantly higher income and higher employment rates. A further hike of GDP and employment will be induced by strongly rising investment in new technologies. Obviously, a resource efficient Europe will only contribute little to the solution of global environmental problems, but the economic success of the EU will – so the argument – convince the other countries to also establish dedicated resource policies. **Therefore, the EU would not risk anything by going it alone. On the contrary: it would damage the union economically if it did not!** Also, the EU would hold the key to the solution of global problems.

The “**EU Goes Ahead**” scenario is based on the following **policy mix**:

Climate policy:
- Reform of the existing European emissions trading system : elastic supply,
- Directly compensated taxes on coal, gas and oil for all other industries,
- Quota for renewable energies in power generation (globally, lower in Non-EU-countries),
- Support for electric mobility through regulations and economic instruments (globally),
- Tax on air transport,
- Subsidisation of public land-based transport,
- Subsidisation of investments in the energy efficiency of buildings.

Abiotic resources:
- Quotas for the recycling of ores and non-metallic materials,
- Tax on the use of non-metallic minerals,
- Taxes on final demand, not including exports, according to the goods’ raw material content (RMC),
- Subsidisation of goods with a low RMC,
- Tax on water from public supply,
- Support for resource efficiency in manufacturing industries.

Food, agriculture and forestry:
- Information programme for consumers and producers on how reduce food waste,
- Information programme on how to reduce the “crop yield gap”,
- Tax on meat, dairy and eggs,
- Autonomous reduction of the meat demand,
- Limitation of agricultural land use,
- Limitation of water abstraction in agriculture.

Environmental tax reform:
- Compensation of environmental taxes through reduction of general corporate taxes.

What are the "Learnings"? What has to be done?
The Resources Commission draws the following conclusions for German and European policy from the results of the project: firstly, the great importance that clearly formulated global and European objectives for sustainable resource use have – these form points of reference or corridors of a committed resources, climate and economic policy; secondly, a stronger combination of the economic, environmental and social advantages of all three scenarios (global cooperation, strong resource policy with regulatory and price instruments, supporting voluntary measures by citizens/ civil society); and thirdly, an urgent recommendation that more scenarios of this kind be developed– also from the German perspective – in order to evaluate the advantages and disadvantages of concrete policies and their interactions even better and to test, differentiate and implement the best possible policy mixes.

The Resources Commission therefore recommends to the German Environment Agency to reflect on the results in greater depth for its own policy strategies, to feed them to the European level, and in Germany, maybe further explore the potentials demonstrated by Germany. A differentiated policy mix and, based on that, a master plan or a roadmap with short, medium and long term goals and steps should be developed. These research findings did not yet exist when ProgRess II was developed. The current results as they stand now should however be actively included into the ongoing and further process of developing a resource policy or a resource programme. That is why the Resources Commission has dealt with the findings in detail. The perception that resource policy only means costs and burdens the economy is radically called into question by these results. They show that it is economically and socially worthwhile to be offensive and formative here. We therefore recommend developing and implementing a proactive resource policy and the above-mentioned roadmap. A proactive German resource strategy and its implementation, with integrated consideration of all input-oriented resources, AND actively calling for such an economically so relevant strategy at European level is fundamental for the European economy and its competitiveness. Especially the contribution that socio-technical potentials could make, as well as integrating and researching and testing them, would be extremely important for reducing absolute resource consumption, i.e. it is key to combine the more technical optimisation via economic/industrial policy with a societal perspective (social innovation processes, integration of education, research, production and consumption, stronger actor-integrated use of the potentials of industry and digitalisation 4.0 for a resource strategy and sustainable development).

The Resources Commission therefore recommends that research in this field and on the required transformation should be further increased on the basis of the findings presented: What improvements in economic and social outcomes can be achieved through a variation of the policy mix? Which steps need to be taken to implement such a programme? Are there institutional or legal obstacles which require an adjustment of the concept? What measures are to be taken to implement such a programme at European level?

Appendix:

Within the framework of the POLFREE project the effects of policy mixes with up to about 30 different instruments were analysed in 3 alternative scenarios using the GINFORS model. These scenarios differ on the one hand with regard to international cooperation and on the other hand in the way socio-economic outcomes are assessed by society. They put the traditional concept, which evaluates market outcomes and gets installed "top down" by the government of a country, and a concept committed to the "Beyond GPD" model which is supported by civil society "bottom up" in extreme contrast to each other.

In the scenario **Global Cooperation** it is assumed that an international agreement for the implementation of a policy mix is reached. The use of instruments is linearly intensified year after year until the following targets are achieved in 2050: reduction of the CO_2 emissions of the EU-countries to 80% of 1990 levels, emission reduction in non-EU-countries until the global climate goal is reached (approximately 15 Gt.), limitation of the extraction of abiotic resources to 5 t per capita, reduction of the "cropland footprint" to 30% of the figure in 2005, reduction of the water exploitation index to under 20%.

The scenario assumes a traditional assessment of socio-economic outcomes by society, which has GDP and employment at its centre. Therefore the policy mix includes elements from all three categories, whereby however only those economic instruments which are easy to implement are admitted, so as to gain international acceptance. This means, for instance, that emission rights remain excluded. The policy mix implies an environmental tax reform in the sense that the rise of environmental taxes is compensated by a lowering of other taxes.

The reduction of CO_2 emissions works through a CO_2 tax, a quota for the use of renewable energies in power generation, the promotion of electric mobility and the subsidisation of investments in the energy efficiency of buildings. To achieve the goal for the extraction abiotic resources mandatory recycling rates in metal production and requirements for the use of non-metallic minerals are very important. Furthermore, the taxation of metals and non-metallic minerals reduces their use. For achieving the land use goal, different measures to reduce meat consumption as well as further measures to avoid food waste by both consumers and producers are important. Encouragement of soil productivity through information programmes also has an important role to play.

The investments initiated by the measures induce growth and additional employment in the EU and globally through a multiplier/accelerator process. This development is supported by falling prices, in comparison with the reference, due to the lower demand for abiotic resources and food..

The **EU Goes Ahead** scenario simulates that the EU-countries largely go it alone, with non-EU-countries investing little in their climate policies, so that the 4 degrees warming goal is achieved globally. Here too, a traditional assessment of socio-economic outcomes by society is assumed. The instrument mix of the EU countries is similar to the one in the **Global Cooperation** scenario and is dominated by economic instruments, whereby their design is chosen so that no distortions of competition vis-à-vis non-EU-countries develop. In this scenario as well environmental taxes are compensated by lower taxes in other areas.

The EU-environmental targets are also achieved in this scenario. The investments initiated by the measures induce a multiplier/accelerator process which is stronger than in the **Global Cooperation** scenario. In 2050, the EU's real GDP is 12% higher and 3.4 million more people are employed in the EU than in the reference scenario. As mentioned before, the design of the political measures avoids direct competitive disadvantages vis-à-vis non-EU-countries that only pursue a restricted environmental policy. The indirect effects even favour the EU-countries: as global demand for resources is only reduced to a limited extent by the EU-policy, resource prices remain high. Insofar the lower resource inputs in the EU give it a competitive advantage vis-à-vis non-EU-countries, with the result that in the scenario **EU Goes Ahead** real exports by the EU are higher and real imports into the EU are lower than in the **Global Cooperation**. scenario.
In the scenario **EU Goes Ahead** , therefore, the EU evidently enjoys a "first mover advantage" through its solo effort in environmental policy.

The scenario **Civil Society Leads** again describes a solo effort of the EU, whereby the assessment of socio-economic outcomes now covers not only the results of market processes but moreover the overall

social development. A civil society that is committed to the “Beyond GDP” model wants to take the design of a sustainable future into its hands and as consumers and employers change traditional behavioural patterns.

In the field of climate policy the traditional instruments of CO_2 taxes, quotas for renewable energies for power generation and promotiom of electric mobility are supplemented here by an autonomous reduction of private and air transport and a reduction of living space through increased communal living. Here too, reducing the extraction of abiotic resources is achieved by recycling rates for ores and non-metallic minerals, but this is now supplemented by the independent reduction of the demand for durable consumer goods through repair and shared use. Moreover independent changes in waste management and meat consumption are in the foreground. Along with many individual measures, the scenario assumes a general renunciation of consumption as well as a reduction of the annual working time per employee, which is intended to provide more space for leisure, family and social engagement.

The EU-environmental goals again are widely achieved. Only for the indicator RMC per capita, a reduction of only 45%, instead of 60%, compared with the present figure is achieved by 2050. Overall, it was found that the reduction of consumer goods at the expense of goods with high resource utilisation is not sufficient to achieve the EU-environmental targets. Therefore consumers reduce their overall consumption rate in small steps until in 2050 the goal is finally achieved. Over the entire time period the macroeconomic consumption rate is autonomously lowered by only 10%. This however triggers a negative multiplicative cycle effect in which the reduction of consumption lowers the income which in turn negatively influences the consumption demand. Altogether, the macroeconomic consumption level in the EU drops to the figure in 1995 by 2050. Almost unchanged exports and imports that fall with consumption levels have a stabilising effect, so that real GDP remains unchanged over the entire time period and therefore in 2050 lies approximately 20% below the level of the reference. The reduction of working hours per employee of 20% and the lower real wage rate, compared to the reference scenario, lead to an increase in employment in the EU of 17 million people by 2050.

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