CONFERENCE SUMMARY RECORD

October 2011

Umwelt Bundes Amt
For our Environment

„Sustainable Chemistry: A Challenge and an Opportunity for International Chemicals Management“

Background

Sustainable chemistry is a holistic concept, which contributes to avoid and reduce risks posed by dangerous chemicals and pollutants for the environment as well as for human health. It contributes to a decrease of resource consumption including energy and provides incentives for innovation to enterprises and scientists. In a globalized world this requires development as well as maintenance of international collaboration.

To get a comprehensive view on what has already been done and remains to be done the German Federal Environment Agency (UBA), the Organization of Economic Co-operation and Development (OECD), the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and die United Nations Industrial Development Organization (UNIDO) have jointly organized this conference on sustainable chemistry.

In its three sessions, the conference addressed new developments and trends in sustainable chemistry, including good practices, tools and concepts. The overall goal was to support sustainable chemistry strategies in policy and economy and to provide guidance for possible future work.

About 100 experts from all over the world attended the workshop, coming from Aus-tria, Belgium, Finland, France, Germany, Italy, Japan, Korea, Luxembourg, Poland, Sweden, Spain, the United Kingdom and USA; representing ministries and admini-strations, the EU-Commission, international organizations (i.e. OECD, UNIDO, EEB) companies, research organisations and NGOs.

Introduction

Significant progress has been achieved in the sustainability of chemicals, products and processes. Sustainable chemistry has demonstrated that new approaches can be developed to protect human health and the environment while at the same time generating economic benefits.

However, in an increasingly globalised economy, it is insufficient to develop sustainable chemistry on regional or national levels only as most of the impacts on human health and the environment occur at a global scale. The present patterns of use of materials and energy are unsustainable and are rapidly depleting the world’s available resources. The increasing consumption of goods is leading to more waste and pollution, overusing the world’s ecosystem.

For example, pharmaceuticals are present in the environment at a global scale caus-ing various severe problems due to their complexity and potential to interfere with bio-physiological

processes in organisms. However, despite its potential for efficient production as well as prevention of hazardous substances and their metabolites in environment and organisms, sustainability is hardly known as a strategy for the pharmaceutical industry. Although, front runner attempts already exists: the Swedish ranking system Fass[1] provides good indications for environmental classification of pharmaceuticals and the concept 'benign by design' brings sustainability right into pharmaceutical industry research.

This shows exemplarily that the evolution of sustainable chemistry will meet huge challenges. The anchorage of sustainable chemicals management on a global level requires future development and maintenance of international collaboration in order to strengthen and to ensure that industrialized countries, policymakers and all stake-holders take their responsibilities.

The presentations of the speakers of the conference can be found here.

Discussion and conclusions of the conference

Chemists not only in industry but all over the world view sustainable chemistry as a growing, profitable area in the future. But besides the prediction of an excellent future economic potential, there are some hurdles sustainable chemistry has to over-come.

Most prominently, besides the intrinsic hazards of chemicals the important issues for sustainable chemistry management are: water, climate, energy, waste, resources and social aspects.

There is a call for intergenerational fairness:

- Pay for decisions now and do not create further future depths.
- Sustainable chemistry should also take on the burdens of the past.

Furthermore, there are questions whether a chemical is at all necessary for a certain purpose and how to balance resource efficiency vs. hazardous properties in an overall estimation of sustainability.

Some values and resources have no price and there might be high costs in the future if no or inadequate action was undertaken. On the other hand, improved protection leads to a reduction of costs while sustainable chemistry reduces negative impacts of products and applications throughout the life cycle.

1. Supply chain matters

Observations:

Good indicators, tools and monitoring systems are missing in many regions and especially on a global scale. Indicators would have the potential to define sustainability in distinct areas and decision support tools could provide assistance in its implementation. Environmental management systems like ISO 14001 combine tools and indicators since they contain guidelines and recommendations as well as environmental performance indicators.

[1] *Fass* is a voluntary system for environmental classification of pharmaceuticals
http://www.fass.se/LIF/miljo_splash/index_en.jsp

Monitoring systems could make comprehensive evaluation possible and have the additional benefit to show where changes lead to financial benefits.

Needs:

Good monitoring systems (like under REACH) and indicators are needed for measurement of sustainable chemistry and to minimize use and release of chemicals. Additionally, they have to be specialised and adapted to different types of business.

Measurement and quantification of sustainable chemistry is possible, but since it applies to many aspects a bottom up approach is needed in addition to manage-ment initiatives. Additionally, the scope and application has to be defined and the data availability from enterprises needs to increase significantly.

For implementation of existing tools and instruments an easy to use and compre-hensive data system is needed. In terms of hazard, REACH is a system that can contribute to provide hazard data as well as information on risks for ingredients in certain products. In order to create an international collaborative way to create harmonized data translation from one system to another and in the value chain, the ensuring of intellectual property of data and contribution of all stakeholders is crucial.

Prerequisites to achieve this goal are trust, cooperation and exchange of information. Since the material safety data sheets (MSDS) are scarcely filled with data (on a global level) it is necessary to find solutions to transfer the knowledge from the start of a value chain to the products in the market. Therefore, value chain leaders and indicators are needed along with harmonised concepts and improved communication of all stakeholders.

On a technical level BAT, general standards as well as more and improved in-struments and tools like chemical leasing and the UBA guide on sustainable chemicals are helpful to obtain more sustainability in the chemicals sector. In general, more technical and organisational innovation, more knowledge transfer and training are important to reach this goal.

The meeting suggested that the OECD might be the right place to move some of this agenda forward, possibly by developing an inventory of existing decision support tools for sustainable chemistry, ultimately leading to the development of a toolbox of such approaches. OECD could also play a role in facilitating better access to relevant data for sustainable chemistry decision making by developing an inventory of such information sources in its member countries and creating appropriate web tools.

2. Chemicals policies and management

Observations:

Regulatory fragmentation is a key impediment to sustainable chemistry innova-tion. On the other hand, regulatory requirements and product standards are the most important policy factors driving innovation in sustainable chemistry pro-vided that they are stable and transparent.

The REACH regulation is an agreeable tool to spread good examples of chemical safety beyond the EU. For example, authorization under REACH is very much linked to sustainable chemistry, because the most hazardous chemicals (the Substances of very high concern; SVHC) are removed, although regulated hazardous substances can be exported outside the EU. Moreover, REACH is limited because it focuses on a hazard based risk assessment for health and environ-

ment. Other sustainability areas like resource and energy efficiency or green house gas potential are not under the scope of REACH.

Needs:

Regulatory programs and global harmonisation of chemicals management sys-tems are of great importance to foster sustainable chemistry. Still, existing instru-ments and conventions should (first) become fully implemented on a global scale.

In order to develop a coherent framework for sustainable assessment aspects like an agreed basis/start level, the right tools (out of the many already existing), financial effort and commitment, sufficient amount and quality of data and the potential of a system to be universally adoptable as well as social aspects (espe-cially in DC/CEiT) are needed.

A policy-induced management change is a key driver to create liability for the en-terprises. Together with enterprises politics are needed as front runners and creators of a market for sustainable products (and to rule out unsustainable products that are unwanted by society). Nonetheless, consumer habits must change also towards more sustainability.

Other drivers for more sustainability are innovations that reduce energy and re-source demand, the commitment of all stakeholders (consumers, enterprises and politics) to achieve resource efficiency as well as increased value adding through less resource consumption and manufacturing of long-life products in contrast to more sales.

3. Areas with potential for sustainability

Observations:

Sustainable chemistry is not implemented in SME's daily decision making to that extend as it is in most of the big enterprises dealing with chemicals. Many SME have not yet seen the need and the advantages of sustainable chemistry and their capacity for this area is often limited.

Industrialised countries and DC/CEiT have different starting points and needs for sustainable chemistry. In contrast to high potentials in DC/CEiT for sustainable solutions, there are less advanced technical standards and less competition compared with industrialised countries. Trade of advanced, innovative technologies and products provides opportunities to achieve more sustainable development models in developed and developing countries alike.

Needs:

In DC/CEiT as well as for SME, more innovations and space for innovation are needed; the potential for these goals must be developed by policies. Again, com-munication of all stakeholders is a prerequisite to achieve this.

Both areas, DC/CEiT and SME, need more voluntary efforts as well as guidance and awareness rising for sustainable chemistry management. Public-private part-nerships can be a strong tool working in that direction.

On a closer look the needs of SME and DC/CEiT are very heterogeneous: SME e.g. are lacking expertise in terms of waste and sound chemicals management. For DC/CEiT different approaches - and maybe definitions - of sustainable chemistry are needed for the different situations and levels of its implementation with regard to a certain region. E.g. the information on the nine new POPs and alternatives and substitutes is very scarce in DC/CEiT. Here, the POPs-

free-programme is a good example of an initiative looking for solutions in companies. It aims at stimulating the information exchange and the identification of POPs-free-products on a global scale.

Summary

The meeting elaborated on requirements and sustainable criteria for chemistry. For the implementation and assessment of sustainable chemistry globally harmonized indicators are needed to foster these progresses in practice. Meeting participants suggested that the OECD could play a useful role in moving this agenda forward.

In future chemicals management should rather focus on applications than sub-stances. Therefore, it is necessary to address the sustainable use of chemicals by means of a global approach (framework or recommendation). Additionally, the frag-mentation of regulations, systems and indicators of sustainable chemistry manage-ment must be overcome. Nonetheless, different approaches for different situations and regions are needed to bring sustainable chemistry into the market. There is not one unique solution to create a sustainable chemistry.

In order to create a common, future-orientated concept of sustainable chemistry sev-eral objectives have to be achieved:

Most of all, the negative impact of production and use on society and environment must be minimised in terms of hazards (for organisms and for the environment as sink of dangerous emissions) as well as resources (water, energy, materials etc).

Indicators for sustainability of chemicals and products, production and uses have to be developed based on a common understanding of all stakeholders. The measure-ment of these indicators can be already done by various instruments but the lack of data and its dissemination makes the task complex. The difficulty to obtain sufficient data is even intensified by the challenge to deal with confidential business informa-tion.

Additionally, this scenario comprises a complex combination of various parameters and notions. Therefore, data collection and communication between all stakeholders is crucial for success.

Imprint

Publisher: **German Federal Environment Agency**
Press Office
PO Box 1406, 06813 Dessau
E-Mail: **pressestelle@uba.de**
Internet: **www.umweltbundesamt.de**
Date: **October 2011**