2nd European Resources Forum, Berlin

Minutes from the European Resources Forum 2014

Minutes by:
Dr. Martin Hirschnitz-Garbers
Ecologic Institut gemeinnützige GmbH
Pfalzburger Str. 43/44 | 10717 Berlin | Germany
martin.hirschnitz-garbers@ecologic.eu

DAY 2 – 11. November 2014

Parallel Session A: Resources for the "Energiewende"

- Dr. Harry Lehmann; General Director, Division Environmental Planning and Sustainability Strategies, Federal Environment Agency, Germany
- Dr. Manfred Rosenstock; Deputy Head, European Commission, DG Environment, Unit Resource Efficiency & Economic Analysis
- Dr. Peter Viebahn; Co-Director Research Group Future Energy Structures, Wuppertal Institute for Climate, Environment and Energy, Germany
- Prof. Dr. Arnold Tukker; Director, Institute of Environmental Sciences, Leiden University, The Netherlands
- Moderator: R. Andreas Kraemer · Director, Ecologic Institute, Germany

Harry Lehmann presented different pathways to a post-carbon and resource efficient Germany, based on the study "Germany 2050 – A Greenhouse Gas-Neutral Country". In order to achieve existing energy and climate goals in Germany, e.g. reducing Greenhouse gas emissions by 80-95% by 2050, increasing the share of renewable energy in electricity generation to 80% and in final energy consumption top 60%, Germany's regions (*Länder*) need to work closely together in national energy provision as best as possible through renewable energy production. This in turn requires significant amounts or raw materials to produce, transmit and store renewable energy, e.g. minerals for photovoltaics, steel and copper for on- and offshore wind turbines. Likewise, for more electric mobility, we need lithium and other minerals for batteries for e-mobility. As air transport cannot be powered on batteries, but could be run on power-to-gas and transforming power-to-liquid to fuel planes, not only is there material demand for technologies, but also appropriate infrastructures. We will have to invest intensively in the infrastructure – materials you need for infrastructure and technologies for renewable energy are not renewable. In this context, we have to make sure we get most resources back from existing technologies and infrastructure, so increasing remanufacturing and avoiding putting relevant resources from worn-out technologies to go to the European e-waste pile.

Harry Lehmann concluded that we do not have an energy problem in Europe, but much more a resource problem. Hence we need to make a resource “Wende” at the same time as the “Energiewende”

In his speech, **Manfred Rosenstock** discussed potential synergies and trade-offs between resource policy and climate and energy policy. The European political context is focused on likely continuing increases in energy and resource prices on world markets. In this context, in order to foster competitiveness of the European economy, European resource policy is seen as one key pillar of industrial policy aiming to reduce dependencies and increase innovativeness in the economic structures. Here, the eco-efficient economy and green growth are key concepts, highlighted in the Europe 2020 strategy as well as in the associated Flagship initiative and Roadmap on a resource efficient Europe. The latest European Commission policy document is the Circular economy package, adopted in June 2014, and looking at specific elements to foster moving towards a circular economy, e.g. support for SMEs, improving resource efficiency in the building sector and using market-based instruments. In addition, it foresees a waste target review, approaches for specific waste streams, call for indicators and targets establishment (e.g. RMC as most suitable indicator).

The European 2030 Climate and Energy Policy Framework was agreed on October 2010, containing for instance the targets to achieve a 40% reduction in GHG emissions by 2030 compared to 1990, achieve at least 27% of energy supply from renewable energies and increasing energy efficiency by 27% by 2030 compared to 1990. Possible synergies and trade-offs between resource efficiency and decarbonisation include energy efficiency activities, which are a no-regret option for the economy and the environment and where resource efficiency activities, e.g. remanufacturing, extending life-times of products, usually have a significant GHG and energy savings potential. Improved waste management can also help reduced GHG emissions, e.g. reducing landfilling which reduces methane emissions. However, we also need to address potential trade-offs between resource and energy and climate policy. Decarbonisation could lead to increased competition for some resources, e.g. buildings renovation needing new materials and material mixes used for insulation may hamper material recycling. Here, it is important to look at whole life-cycle of resource efficiency and climate and energy activities.

Peter Viebahn provided some examples on the German level for energy policy’s material needs and some recommendations for policy action. Usually, if you discuss or read about the “Energiewende” in Germany, it is about the electricity sector; but it is much more than that and requires taking a holistic perspective of the entire energy system, e.g. infrastructures, mobility, industry. In different national projects, Wuppertal Institute scientists found out that geological availability of resources is not a limiting factor for renewable energy in Germany, but that some sub-technologies might become scarce and critical with regard to supply of minerals: for instance, Neodymium and Dysprosium, needed for magnets in wind energy production; Indium and Selenium for thin-film photovoltaics; Vanadium for redox flow battiers for large-scale battery storage.

Resource use is generally lower in renewable than in fossil-fuel based energy systems, with biomass use being an exception. The “Energiewende” and massive GHG reductions in principle are compatible with the supply of minerals, but critical minerals must be evaluated on an integrated, long-term level, also considering other economic sectors, e.g. the emobility strategy might lead to supply problems of Dysprosium. Hence, Mr Viebahn called for integrated resource and energy scenarios to combine resource efficiency and low-carbon targets, for extended cooperation with companies and governments of supplier countries and for increasing remanufacturing and recycling strategies.

According to **Arnold Tukker**, the main resource challenge is that we cannot continue the past and present increases in consumption of resources for economic growth: If we want to achieve 7% economic growth in the next decades, that implies doubling of the economy every 10 years, needing an oil barrel the size of the earth in 400 years, having to mine the whole earth crust in 307 years, using all water including seas in 190 years, and using energy equal the full solar influx in 131 years. Even if we aimed at annual growth rates of 2-3%, the implications are still dire. On a shorter term not all resources are equal as regards required reduction factors; while for fossil fuels it is greater than 10, for construction minerals absolute scarcity is less relevant, for biomass, land and water use we need a reduction of the factor 2. For metal ores and industrial minerals the reduction factors vary as metals require a very differentiated perspective: looking at supply risk and importance of the minerals for the economy creates results of critical materials in studies, but most of these results are not reflecting economic and political scarcity.

Therefore, in Mr Tukker's view one key lesson learned is that it is market failure, not scarcity. We have 800 times more proven reserves than currently in use (even economically viable); 2 trillion Dollar value in end products are estimated, while only 5 billion Dollars are needed for opening new mines. The future metal demand is highly uncertain and the supply is inelastic (in many instances co-mining occurs, e.g. copper is obtained from mining iron ore). As bankers have less risky investment options than raw materials extraction they are not investing in mining. The amount of resources needed to build low-carbon infrastructure is massive, e.g. the material requirement for thin-film photovoltaics, based on the assumption that 80% of energy supply should come from photovoltaics, would be exceeding known reserves for Cadmium, Tellurium, Selenium, Gallium, Indium, Germanium and Ruthenium. He concluded that we already face material criticality, currently mainly due to market failures and that a massive shift to renewable means a massive investment in infrastructure, so we have to work on substitution by new technologies, e.g. nanomaterials because substitutability of many metals is quite limited.

In the **plenary discussion** it was highlighted that scarcities for materials needed for renewable energy technologies result from both market failures and complex global value chains as well as from globally limited supply levels for some materials. This requires to integrate industrial, resource, climate and energy policy on a European level, which likely will be fostered through the Council adoption of the 2030 climate and energy targets in October 2014. As achieving these targets needs more materials for renewable energies, these political commitments hopefully contribute to better integrating the policy areas and to joining a “Ressourcenwende” and the “Energiewende”. This will require using and making existing infrastructure much more energy and material efficient, e.g. improving the grids and building smart(er) grids. It also means to better integrate the use of different renewable energies and their respective resource requirements, e.g. the use of biomass for energy production cannot and should not be seen as the solution to the energy problem due to land competition and land scarcities; but it should remain part of the energy mix and be used in a cascade, i.e. first use biomass for food, fibre, materials and only use residues for energy production.
