ENE/NES Seminar ¦ 24th November 2016, 11:00 am ¦ PSI WHGA/001

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„World Energy Scenarios 2016“

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PLACE: PSI Auditorium WHGA/001

Abstract:

The energy sector is changing with different supply and demand patterns evolving in the long term, and the energy landscape is likely to look differently in 50 years compared to today. Meeting future energy demand will be a challenge, and policy makers and business leaders today have to take decisions on our future energy infrastructure in a context of multiple uncertainties. Given the long lifetime of many of the energy technologies requires careful and robust planning of investments in the energy sector anticipating future technology innovation and global policy developments.

A key foundation for policy and investment decisions is a thorough understanding of critical drivers and uncertainties which shape our energy future. Exploratory scenarios, i.e. plausible and coherent stories of how the future may unfold based on systematic analysis of drivers and uncertainties, can strengthen our capacity to define balanced policies and take informed investment decisions. The World Energy Council (WEC) in partnership with PSI and Accenture produced three explorative scenarios looking to 2060, where the scenarios correspond to three possible future pathways of the global energy sector. These scenarios were quantified by PSI's global multi-regional energy system model GMM, which was the central tool for this analysis.

The scenarios illustrate that a successful transformation of the energy sector requires intensified global political and economic collaboration, as countries aiming at improving energy security, expanding energy equity and reducing carbon emissions. Efficiency gains through technology innovation and smarter energy usage are important to slow down the primary energy consumption and per capita energy

demand. Electricity plays a central role in decarbonising several final energy sectors, which will require substantial infrastructure investments both in power generation capacity and electricity grids.

Contrary to global trends of the past, the scenarios reveal that in the next 50 years the electricity production is dominated by non-fossil technologies. In this context wind and solar continue to grow in all regions, while the deployment of hydro and nuclear shows regional differences (e.g. hydro is particular important for Africa and nuclear in Asia). CCS, as another low-carbon technology, requires support by governments to reach broad deployment.

However, transitioning the global transport forms one of the hardest obstacles to overcome in an effort to decarbonise future energy system. The penetration of alternative transport solutions, such as e-mobility, biofuels, bio-methane and fuel cells, occurs in particular after 2030. Consumer preferences, availability of vehicle charging infrastructure through distributed energy systems, technology innovation and stringency of the climate policy are important drivers for the deployment of alternative transport solutions.

A clear message from this analysis is, that limiting global warming to no more than 2°C compared to the pre-industrial level will require an exceptional and enduring effort, far beyond already pledged commitments in Paris COP 21. In all three scenarios, the carbon budget for attaining the 2°C climate target is likely to be exceeded in the next 30 to 40 years. This implies that coordinated global action at unprecedented levels with meaningful carbon prices are necessary for an accelerated deployment of new technologies creating efficiency improvements and enabling continued reductions in CO2 emissions if the 2°C climate target is to be achieved. On the other hand, and if climate policy fails, the scenario analysis shows that in a fragmented global and economic political system the world may see its carbon emissions to increase by 2060 compared to today's levels.