World Energy Scenarios 2016

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Objectives of the study

In partnership with the World Energy Council and Accenture, the Energy Economics Group of PSI, quantified and analysed three scenarios (named Modern Jazz, Unfinished Symphony and Hard Rock) in order to explore alternative development pathways for the global energy system by 2060.

The Modern Jazz scenario describes a market-driven world oriented towards economic and affordable access to energy. The Unfinished Symphony scenario characterizes a rather government-driven world with coordinated international action to mitigate climate change. The Hard Rock scenario represents a rather fragmented world with low global cooperation and with priority on local energy security and exploitation of local energy resources.

Energy systems modelling

The scenario analysis was carried out by PSI using its global multi-regional MARKAL/GMM model. This optimisation tool represents around 400 different energy technologies (e.g. power plants, heating devices, vehicles, etc.) with their technical, economic and environmental characteristics, and determines the least-cost configuration of the global energy system based on 15 world regions and their specific boundary conditions.

Results

Dampened growth of world primary energy consumption and a peaking in per capita energy consumption before 2030 due to significant efficiency gains created by new technologies and tightening policies.

Demand for electricity expected to double to 2060: meeting this demand with cleaner energy sources requires substantial infrastructure investments and system integration to deliver benefits to all consumers.

New global capacity investments in the power sector

Wind and solar continue to grow at an unprecedented rate and create new opportunities and challenges for energy systems.

Transitioning global transport forms one of the hardest obstacles to overcome in order to decarbonise future energy systems.

Global car fleet in 2060

Reducing the 2°C climate target will require an exceptional and enduring effort, far beyond already pledged commitments, and with high carbon prices.

Performance of scenarios in view of the Energy Trilemma

Global cooperation, sustainable economic growth, and technology innovation are needed to balance the Energy Trilemma.

The challenge is to maintain the current integrity of energy systems worldwide while steering towards a new transformed future. This requires new policies and strategies, and consideration of novel and risky investments. The decisions taken in the next 10 years will have profound effects on the development of the energy sector in the coming decades. To this end, the WEC/PSI scenarios provide support to the development of robust medium to long-term strategies, government policies, as well as investment and disinvestment decisions.

Reference

World Energy Scenarios 2016 – The Grand Transition

https://www.worldenergy.org/publications/2016/world-energy-scenarios-2016-the-grand-transition/