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Meeting UNFCCC Requirements on Reporting Projected Emissions by applying Energy Scenarios

Summary

Germany has seen a number of activities on energy models and particularly on low carbon society scenarios in recent years. The most prominent of these were a number of scenarios developed for a parliamentary commission from 2000-2002, based on two parallel model developments. One of the models was coordinated by the Wuppertal Institute for Climate, Environment, Energy (WI), the other by the Institute of Energy Management and Efficient Energy Use (IER). Based on this work, there are currently two interlinked scenario programmes in Germany, supported by the Environment Ministry and the Federal Environment Agency:

- Scenarios on the accelerated use of renewable energy, which have a focus on technology development and a long-term perspective until 2050
- Climate Policy Scenarios, which are the basis for UNFCCC reporting and decision-making on climate policies in Germany and have a mid-term perspective until 2030

The scenarios are predetermined by a fixed target to reduce GHG emissions in Germany by 40% by the year 2020, by 50% by the year 2030 and by 80% by the year 2050, relative to 1990. They (currently) exclude the use of Carbon Capture and Storage (CCS) and foresee the implementation of German law on phasing out nuclear power until 2023.

In order to reach the given GHG-reduction target, the main measures implemented in the scenarios are efficient energy use (including), fuel switch from coal to gas in electricity generation and a high share of renewables.

The increase of efficiency leads to a decrease of primary energy consumption by approx. 20% until 2020 and 50% until 2050. This is based on introduction of efficient technology (e.g. in industry, power plants), systemic solutions (e.g. cogeneration, cascades of heat use, mobility based on public transport) and energy-efficient consumption patterns (e.g. in housing, mobility). At the same time the share of renewables increases from today below 5% to 10-12% in 2020 and 50% in 2050. This is based on a continuation of the rapid growth of wind and biomass supply in electricity generation until 2020 and the assumption that solar and geothermal power will contribute high shares from 2030 onwards.

In terms of economic impacts, the additional cost for climate policies appear to be moderate, even in case relatively low fossil fuel prices are assumed. The system costs of energy supply would be around 9 per cent of GDP by the year 2050, with some 0.3 to 1.2 per cent additional cost in the “Sustainable Energy Supply” scenarios.