Specific policy targets for nuclear energy, CO₂ emission reductions and energy security will have a greater influence on future energy use than the availability of energy efficient technologies, concludes a recent study.

To keep global warming below 2°C, the EU-27 needs to reduce CO₂ emissions by 71% by 2050. Using a model developed for the European NEEDS project¹, the study analysed the outcome of five different policy scenarios designed to meet this target. The simplest ‘climate protection’ scenario achieved the required 71% reduction in GHG emissions by 2050 as well as the EU goal of a 20% reduction in emissions and a 20% share of renewables by 2020. The other four scenarios took into account additional concerns, such as energy security and a change in the nuclear policy.

Each of the five policy scenarios was compared to a reference ‘business-as-usual’ (BAU) scenario in which no specific policy targets were set. The only impact on energy use was via improvements in the energy efficiency of available technology.

In the BAU scenario, emissions rose by 24% by 2050, far exceeding the target value. Under the climate protection scenario, energy consumption in the household and commercial sectors in 2050 was similar to present values and 12.7% less than in the BAU scenario, which saw a rise of 26%. These and other results imply that relying on energy efficiency measures alone will fall far short of the 2050 goal and that specific policy targets are required.

Emission reductions in the climate protection scenario were mainly achieved through fuel switching to renewable energy sources and support to carbon capture and storage (CCS). However, to reduce dependency on natural gas and oil imports, further development is needed in the production of second-generation biofuels, new carbon capture and storage (CCS) technology, fuel cells and battery-operated electric vehicles.

By comparing the different policy scenarios, the study considered the impact on different sectors of policy design and target setting. Under the climate protection scenario, the GHG reduction was higher than the EU target for 2020 in sectors covered by the Emission Trading Scheme (29% instead of 21%) but lower in the exempt sectors, such as steel, cement and chemicals (6% instead of 10%). However, under a different policy scenario in which oil and gas imports were restricted as well as CO₂ emissions, non-ETS sectors showed more favourable GHG reductions (22%) because end users were forced to turn to renewable energy sooner, while ETS sectors contributed less with a 16% GHG reduction.

The impact of different timescales is also important. While the climate protection scenario was the cheapest up to the year 2020, enhanced nuclear energy combined with CO₂ emission reductions and a limit on imports was the most cost-effective scenario up to 2050.

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References:


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