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Impact of an adjustment to Germany's renewable energy targets for 2030

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Content

According to the Renewable Energy Act (Erneuerbare-Energien-Gesetz, EEG) and the Offshore Wind Act (Wind auf See Gesetz), Germany's current expansion targets for renewable energies in 2030 are 215 GW of capacity for solar power, 115 GW for onshore wind power and 30 GW for offshore wind power. The targets came into force at the beginning of 2023 and were set on the assumption that the national electricity consumption in 2030 will be 680–750 TWh. However, recent studies predict lower electricity demand for 2030. For example, the meta-study commissioned by the BMWE in 2025, "Energiewende. Effizient. Machen.'[1], predicts a range of 580–700 TWh for electricity consumption in 2030, based on a combination of exploratory and target-reaching scenarios. The lower demand for electricity is mainly due to slower electrification in the transport and building sectors and an economic slump in industrial activity in recent years.
Against this backdrop, there has been political debate about adjusting the expansion targets for renewable energies. However, in a recent agreement on the power plant strategy („Kraftwerksstrategie"), the governing coalition committed to continuing the tender volumes from the EEG with unchanged ambition. While the political debate on adjusting the expansion targets has mainly focused on grid expansion and energy system costs, the effects of lower renewable energy capacities on electricity prices, the achievement of emission reduction targets and the import balance have so far taken a back seat. Our contribution, developed in the Kopernikus project Ariadne, therefore specifically examines these interrelationships. In addition, the importance of flexibility for the integration of electricity from renewable energies is examined in more detail with the aid of a model run with reduced flexibility options.

Methodology

PyPSA-DE (https://ariadneprojekt.de/modell-dokumentation-pypsa/) is a high-resolution, sector-coupled, linear model of the German energy system that was already used in the Ariadne scenario report on a cost-efficient energy transition [2]. To minimise energy system costs, PyPSA-DE creates a linear optimisation problem to plan the energy system infrastructure in Germany and its neighbouring countries, using up to 40 regions in Germany and hourly resolution over full weather years. The energy system costs consist of investment costs, operating costs and import costs. The investment costs include costs for energy infrastructure and generation, carbon capture and storage, and heat generators in buildings.
Based on two basic scenarios with electricity demand of 612–644 TWh ('low demand') and 722–754 TWh ('high demand'), this study considers different levels of renewable energy expansion that interpolate between the ambition of the EEG targets and significantly reduced renewable targets. In order to highlight the role of flexibility in the energy system, a variant with fewer flexibility options was modelled for the 'low demand' scenario. Specifically, in this variant electric cars cannot be charged flexibly, heat pumps, electric boilers and home batteries cannot be operated in a market-driven manner, and no expansion of utility-scale batteries above 2025 levels is allowed.

Results

- Although a reduction in renewable energy expansion would lower the subsidy granted by the EEG („EEG-Konto"), the additional costs for electricity customers would be significantly higher. In the extreme case of a 30% reduction of the targets, the electricity price would rise by EUR 20 per MWh, that is 2.0 ct per kWh. In this case, the additional costs for electricity customers would amount to EUR 9.0–13.2 billion, while the subsidy according to the EEG would fall by only EUR 7.0–7.5 billion.

- A lower expansion of renewable energies would lead to more electricity generation from natural gas and, consequently, to increased import dependency and a greater need for new gas-fired power plants. At the same time, electricity imports would rise.
- Supporting renewable energy generation with flexibility is essential for achieving climate targets and ensuring the cost-efficiency of the electricity system. Renewable energies in combination with batteries could cover part of the demand for new gas-fired power plants. Regulatory frameworks that enable market-driven provision of flexibility should therefore be a priority.
- The maximum permissible amount of greenhouse gas emissions in 2030 will be exceeded even with a slight reduction in the expansion of renewable energies.
- The target of covering 80% of gross electricity consumption with renewable energies in 2030 will only be achieved with a high level of renewable energy expansion.

References

[1] EWI & BET (2025): Energiewende. Effizient. Machen. –Monitoringbericht zum Start der 21. Legislaturperiode, im Auftrag des Bundesministerium für Wirtschaft und Energie.
[2] Luderer, Gunnar, et al. (2025): "Report: Die Energiewende kosteneffizient gestalten–Szenarien zur Klimaneutralität 2045." Ariadne-Report.

CV

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