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Minding the gap: why long-term flexibility matters

The EU climate goals set to 2030 and 2050 continue to push Europe to undergo an accelerated decarbonisation transition. The Commission has expressed the importance of sector integration in such a transition and defines energy system integration as “(...) the coordinated planning and operation of the energy system ‘as a whole’, across multiple energy carriers, infrastructures, and consumption sectors – is the pathway towards an effective, affordable and deep decarbonisation of the European economy in line with the Paris Agreement and the UN’s 2030 Agenda for Sustainable Development.”¹

With these goals in mind, the energy ministers of the EU Member States recently agreed on a joint 'general approach' on the legislative Gas and Hydrogen package on two proposals – a regulation and a directive – setting common internal market rules for renewable and natural gases and hydrogen.

Our main message: acknowledging the system “as a whole” includes acknowledging the pivotal role that power plants running on renewable and low-carbon gases may have in this transition.

The package establishes a regulatory framework for dedicated hydrogen infrastructure and markets, the decarbonisation of the gas grid, integrated network planning, consumer protection and security of supply. Let us focus on how the latter is linked to the electricity market.

In the context of electricity, security of supply refers to the combination of having adequate supply to meet demand and ensuring system reliability. In practice, security of supply is guaranteed when there is enough capacity to meet peak demand at any time. An energy system relying to a great extent on variable supply sources without adequate amounts of dispatchable power generation available in the background, will, eventually, not be able to guarantee that supply meets demand.

The new Commission proposal on Electricity Market Design defines “flexibility” as the “ability of an electricity system to adjust to the variability of generation and consumption patterns and grid availability, across relevant market timeframes”. This includes not only variations of seconds or minutes, but also days, weeks, and seasonal challenges. In practice, flexibility enables the deployment of intermittent energy sources, and minimises system costs.

Short term flexibility resources can provide quick bursts of power and respond rapidly to changes in demand and supply. However, currently, the costs and limited capacities for electricity storage can only ensure output for up to several hours. In the future, this limitation can be addressed by high energy density resources, such as power plants able to run on renewable gases like hydrogen, a role already recognised by European electricity transmission operators (ENTSO-E). Running on renewable fuels, power plants can provide power over a longer period and help to balance the grid during periods of low renewable energy generation and periods of high demand.

Decisions reached on the Gas and Hydrogen Package will have an impact on the system integration and flexibility in the electricity system. Hydrogen will remain a scarce resource for the years to come and therefore it must carefully be considered where to use it. Power generation plants should be a priority user, as their role is pivotal for a reliable renewables-dominated system. Large-scale hydrogen storage in combination with re-electrification in power plants are the only available climate-neutral solution providing long-term flexibility for the electricity system – providing clean energy whenever renewables and batteries fail to meet demand.

To ensure flexibility of the electricity system, the large-scale deployment of hydrogen set to begin in 2030, should include power generation facilities in its planning process. This would be the right approach to provide long-term flexibility to the electricity system and guaranteeing security of supply without undermining the EU climate goals.

¹ European Union: European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, on *Powering a climate-neutral economy: An EU Strategy for Energy System Integration*, 8 July 2020, COM(2020) 299 final, available at: [EUR-Lex - 52020DC0299 - EN - EUR-Lex \(europa.eu\)](https://eur-lex.europa.eu/lexuri/cs/l/uri/?uri=CELEX:52020DC0299) [accessed 12 April 2023]

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