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kamstrup

Unlocking ~10 pct. additional capacity in existing European grids through optimisations

GRID MANAGEMENT SERVICES is a patented technology that combines advanced analytics and operational expertise to tackle increased electrification, enabling grid operators to validate, optimise, and invest with radical precision.

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The EU once again finds itself in an energy crisis. Russia's war in Ukraine and the recent disruptions in Iran have exposed the EU's energy import dependence and increased prices. Therefore, delivering access to affordable energy produced in Europe has become one of the EU's top priorities.[1]

However, Europe's energy challenge is no longer only about the price of energy — it is increasingly about access to grid capacity. Across the EU, growing electrification of industry, transport, heating, and data infrastructure is accelerating demand for electricity connections faster than grids can expand.

While investments in European grids reached USD 92 billion in 2025,[2] **the EU anticipates that further investments of €730 bn. for distribution and €472 b. for transmission grid developments are needed between now and 2040**.[3] Meanwhile, current grid capacity in certain EU member states are not only insufficient for anticipated renewable deployment, but also for the growing volume of electrification projects currently awaiting connection.

In several member states, companies seeking to electrify or expand production are already facing significant delays in obtaining grid connections due to insufficient capacity and long lead times for grid infrastructure upgrades.[4] In some cases, connection timelines now stretch several years into the future. This is a severe issue for Europe's energy independence, but also our competitiveness, because when companies cannot secure access to electricity, production, investments, and jobs risk moving outside the EU. Strengthening Europe's electricity grids is therefore not only about expanding physical infrastructure, but also about operating existing grids far more intelligently and efficiently.

Grid management services respond effectively to this pressing European issue by unlocking capacity immediately. By utilizing existing smart meter data and digital grid intelligence, DSOs can

[1] As documented by recent initiatives like the Affordable Energy Action Plan, the European Grids Package, and the AccelerateEU communication.

[2] IEA: World Energy Investment 2025.

[3] European Commission 2025: 'Commission Notice on a guidance on anticipatory investments for developing forwardlooking electricity networks' (C/2025/3179).

[4] Some national TSO's are announcing shutdowns on connections, which is temporarily the case in e.g. Denmark.
At DSO-level, some member states are only able to accommodate electrification of 1 to 2 pct. of households currently heated by boilers due to insufficient grid capacity.

increase visibility, optimize asset utilization, unlock additional capacity of upwards to 10 pct. in existing grids, and make more effective investment decisions.

Potential: Impact from increased grid management

Grid optimizations enable approximately 5-10 pct. higher planned capacity. The economic impact from managing grids throughout the EU is assessed to be substantial. And the economic case is no longer theoretical — it is grounded in operational evidence.

A case study[5] has been performed at a Danish DSO using voltage and power data from 10.000 smart meters to map phase connections, validate GIS data, and identify load imbalances. The case study documented that 34 pct. of transformers had GIS discrepancies, having too many or too few meters connected than otherwise registered, and that 9 pct. of transformers and 16 pct. of feeders displayed high levels of load imbalance (>15 pct.). Based on this case study, **the Danish DSO is estimated to potentially save €24 mil. in costs over a 10-year period**[6] from higher asset utilization, reduced grid loss, verified grid topology, and fault prevention.

Scaled to a European level,[7] the economic impact from applying grid managements services to all DSOs corresponds to **potential cost savings of €1.6 bn.[8][9] per year**, thus **reaching €15.7 bn. over a 10-year period**, based on current smart meter roll-out.[9] If EU member states were to reach full smart meter penetration amongst 100 pct. of end-consumers,[10] **the savings would rise to €25 bn.** over a 10-year period.

Barriers hindering roll-out

Despite proven potential, a number of regulatory, economic, and technical barriers found at EU and member state level hinder full roll-out of grid management services. These barriers include:

- **Economic disincentives**: Previously, the methods for calculating tariffs have discouraged DSOs from investing in digital technologies. This is because tariffs were designed based on operators' capital

[5] Kamstrup: Kamstrup og N1 optimerer elnettet.
[6] The estimated potential savings are based on observations from the analyzed part of the grid over a limited time period (data collected over 4 weeks). For the purpose of estimating scale, it has been assumed that these observations are representative of the wider grid and the full year. In practice, conditions will vary, and actual results may differ. The estimates are therefore intended to indicate the potential scope of savings only and do not constitute a guarantee of realized savings.
[7] EU27+3 (Switzerland, Norway, and UK).
[8] Based on estimated cost savings from the Danish DSO case study of ~€80 pr. smart metering point over a 10-year period.
[9] pct. according to Berg Insight 2025: 'Smart Metering in Europe' (19th edition). [10] Assumed to be 310 million end consumers as per Berg Insights.

expenditures (CAPEX), such as traditional physical infrastructure, whereas digital technologies have been classified as operational expenditures (OPEX).

This has created a bias in favor of investments in conventional capacity.[10] Article 18 of the latest Electricity Market Regulation from 2024 (Regulation (EU) 2024/1747) already includes language on tariff methodologies to consider both OPEX and CAPEX, but this has not yet been effectively implemented across member states. A significant CAPEX bias is thus still present in several member states.[11]

- **Fragmentation of data rules**: Data access conditions, formats, and privacy interpretations continue to vary across — and sometimes within — national markets despite recent efforts including implementing regulation (EU) 2023/1162. For instance, the use of meter data is still limited to only billing in some member states,[12] thus prohibiting market participants or other actors from utilizing the data for greater public purposes like grid management services. Other issues revolve around interpretations of rules regarding storage and usage. DSOs in some member states[13] interpret legislation as preventing storage and usage of data by actors located outside the host country. These fragmented data rules hamper the EU single market and make it difficult to develop and scale innovative solutions across member states.
- **Inadequate smart meter penetration**: Smart meter data is a fundamental requirement for grid management services. While the EU has previously set a target to reach 80 pct. smart meter roll-out in 2024, only 63 pct. of EU27+3 electricity consumers had a smart meter installed at the end of the year.[14] The penetration varies greatly between member states, ranging from 100 pct. in countries like Denmark, Estonia, and Italy to 14 pct. in Germany and similar levels in Hungary, Greece, and Czechia.[15]
- **Lack of clarity regarding public tenders**: Acquiring grid management service solutions require public tenders according to EU legislation, but experience shows that DSOs are reluctant to initiate these tenders, partly due to lack of clarity in designing tenders for these types of solutions. Currently, this

[10] DIGITALEUROPE 2025: 'DIGITALEUROPE's feedback on the European Grids Package consultation' and Roberto Monaco, Claire Bergaentzlé, Jose Angel Leiva Vilaplana, Emmanuel Ackom, Per Sieverts Nielsen 2024: 'Digitalization of power distribution grids: Barrier analysis, ranking and policy recommendations.' Energy Policy, Volume 188, ISSN 03014215.
[11] ACER 2026: Managing the ramp-up of electricity distribution investments to better serve grid users. ACER report on distribution system operator (DSO) revenue setting practices.
[12] This has previously been the case in Ireland but continues to be the case in other member states like Austria.
[13] This is a barrier in e.g. Sweden.
[14] Berg Insight 2025: 'Smart Metering in Europe' (19th edition).
[15] De Paola, A., Andreadou, N., Kotsakis, E., Clean Energy Technology Observatory: Smart Grids in the European Union- 2023 Status Report on Technology Development, Trends, Value Chains and Markets, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/237911, JRC134988.

limits the implementation of technologies such as grid management services to pilots and PoCs under the thresholds for public procurement and therefore is a barrier for large scale roll-outs for maximum impact.

Our recommendations

To ensure that grid management services can be advanced and applied to more potential grids across the EU, a number of EU initiatives to remove barriers and support the right incentives are recommended:

- Ensure level playing field for grid modernization technologies: The European Commission should monitor implementation of provisions in art. 18 in Regulation (EU) 2024/1747 regarding tariff methodologies reflecting both CAPEX and OPEX. The Commission should consider issuing guidance notes for member state DSOs and potentially consider other compliance – and enforcement – mechanisms. The Commission is also called upon to adopt ACER's recommendations[16] on regulatory mechanisms to remove or reduce CAPEX versus OPEX bias.
- Remove barriers and complete the single market – harmonize data standards: The Commission should affirm its ambition to let grid operational data flow freely within the EU's internal market. As part of the Strategic Roadmap for Digitalization and AI in the Energy Sector, the Commission is therefore encouraged to make it a central priority to harmonize standards across EU member states for access, storage, and utilization of smart metering data for greater public purposes than simply billing, simplifying data privacy rules with inadvertent effects for greater public purposes like grid modernization. The common EU data standards should be mandatory for member states to implement and not enable individuals to opt-out.
- Make digitalization a competitive indicator: The Commission should define key performance indicators for energy system digitalization, including for smart meter roll-out and specific smart grid indicators, for member states collectively and for individual operators to continuously be assessed against. This will hopefully make digitalization a competitive indicator and guide investments towards those types of solutions.
- Remove lack of clarity regarding public tenders: The Commission is invited to issue guidance notes for member state DSOs to ensure clarity regarding how to design public tenders involving grid modernization, including grid management services.
- One-stop shop to improve access to financing for grid projects: The EU already provides several financial instruments aimed at supporting grid infrastructure modernisation. However, the available

[16] Figure 10 in ACER 2026: Managing the ramp-up of electricity distribution investments to better serve grid users. ACER report on distribution system operator (DSO) revenue setting practices

funds remain underused[17] in many EU member states, particularly by DSOs and smaller stakeholders due to administrative complexities and barriers to access. Therefore, the Commission is urged to set up a one-stop-shop that simplifies access to financing from the upcoming Competitiveness Fund by reducing barriers as much as possible.

- Maintain and strengthen financing: Financing mechanisms in the upcoming European Competitiveness Fund is recommended to support digitalization and management of grids. For one, funding should be available for pilot projects applying grid managements services on a larger scale. Moreover, it is also essential to support smart meter roll-out projects in areas in which meters would otherwise not have been rolled out on market terms, especially in member states with low smart meter penetration rate.

[17] E.DSO 2023: Assessing EU Funding Priorities: Connecting the missing pieces to solve the DSO funding puzzle.