Smart grid metering system

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Smart grids are energy networks that can automatically monitor energy flows and adjust to changes in energy supply and demand accordingly.

When paired with smart meters, which measure the energy fed into and consumed from the grid, they can provide real-time information on energy-usage to consumers and suppliers.

Since smart grids can respond to changes in supply and demand, they are well suited to cope with variations in supply from renewable energy sources, helping to integrate more wind and solar, as well as new electricity loads, such as heat pumps and electric vehicles.

Smart grids open-up the possibility for consumers who produce their own renewable energy, for example from roof-top solar panels, to sell it back to the grid. With smart meters, final customers also get accurate and regular measurements of their energy use, and get billed only on electricity they actually use. This puts an end to incorrect bills, and back billing, which are currently a significant concern for consumers.

Smart meters can provide close to real time feedback on energy consumption, enabling consumers to better manage their use, save energy and lower their bill, for example, by adapting their energy usage to different energy prices throughout the day. Moreover, smart meters enable consumers to actively participate in energy communities and energy sharing schemes.

Through smart metering, network operators get a better insight into each part of the network. This allows them to better plan their investments and manage their infrastructure in response to the requirements of their customers, therefore reducing network operation and maintenance costs which are ultimately borne by consumers through network tariffs.

In order to reach the Fit for 55 and REPowerEU objectives for renewables and energy efficiency, it is estimated that about EUR584 billion of electricity infrastructure investments are needed between 2020 and 2030, in particular in the distribution grid. Investments in digital solutions, such as grid optimisation, at distribution level will help reduce further expenditure on enhancing the existing grid infrastructure, allowing for the faster deployment of electric cars, decentralised renewables, heat pumps and other technologies - by using existing infrastructure.

Smarter grids are the backbone of the digitalisation of the energy system, hence increased investments in data exchange between transmission system operators (TSOs) and distribution system operators (DSOs), efficient infrastructure and network planning are key to accelerating the development, implementation, and upscaling of digital solutions across the entire energy value chain. TheDigitalisation of Energy Action Plan, adopted in October 2022, aims at effectively promoting investments in smart grids.

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The deployment of smart grids is one of the 3 priority thematic areas of theTrans-European Networks for Energyaiming to help integrate renewable energy, complete the European energy market and allow consumers to better regulate their energy consumption.

Smart grid projects that benefit at least 2 EU countries are identified asProjects of Common Interest (PCIs)and are key to reinforcing energy security and the integration of renewables across the EU. The smart grid projects that apply for a PCI label are evaluated and proposed for inclusion in the Union list of PCIs by the Smart Grid Regional Groupestablished under the TEN-E Regulation.For more information, explore someexamples of PCIs selected under the smart grids deployment thematic area.

The EU"s Joint Research Centre (JRC), in close cooperation with the Directorate-General for Energy, compiles and periodically updates an inventory ofsmart grid projects in the EU. In cooperation with Eurelectric, the JRC also provides aninteractive map of smart grid and meter projects.

The Commission also supports the development of smart grids through research and innovation projects, funded by Horizon2020 and Horizon Europe. In particular, the Commission initiativeBRIDGEcombines smart grid and energy storage projects to cooperate on themes of common interest and ensuring the fast development and market uptake of smart grid solutions.