Energy Efficiency Hub



Smart meters

Smart meters are a cornerstone of digital infrastructure for the energy transition. They enable real-time data collection, help monitor and track integrated energy systems, and inform operational and strategic decisions. Smart meters enhance consumer and provider engagement and unlock demand-side flexibility that modernise grids, integrate more renewable electricity, and improve operational efficiency and resilience. They are, simply, essential infrastructure for achieving climate targets and building a cost-effective, secure energy system.

Global deployment of smart meters has accelerated since 2010, with over 1 billion units installed. Combined with smart tariffs and digital controls, smart meters could enable household savings of 5-15% on average and are central to unlocking flexibility benefits across power systems. Nevertheless, barriers to deployment remain, including issues with data privacy and security, interoperability, standardisation, skill gaps, and legal or bureaucratic delays.

Selected lessons

- Smart meters contribute to increased efficiency and savings, both for consumers and power systems, and can help unlock demand-side flexibility.
- Information from smart meters can help consumers become more aware of their energy consumption and increase their ability to make active decisions about it.
- The collection and analysis of accurate data allow for proper monitoring and evaluation, helping policy makers and regulators make informed decisions.
- Smart metering plans should consider social aspects and other factors related to acceptance to avoid drawbacks.
- Clear identification and communication of economic benefits are critical for consumer acceptance.
- Strong governance, coordination, and continuous stakeholder engagement, including with utilities, regulators, and consumers, are key to accelerate the rollout of smart meters.
- Addressing data security and interoperability standards at an early stage can help ensure a successful smart metering roll-out.
- Both present and future functionalities should be considered when designing smart metering programmes.

Energy Efficiency Hub 2026. All Rights Reserved.

Examples of relevant policies adopted by Hub Members include the following:



Germany adapted a two-part approach as of late 2022, incorporating a metering system and a smart meter gateway responsible for the communication and encryption of the data from meters. The gateway can control various metering systems from different sectors and is designed to enable remote updates. Rollout of the smart meters is expected to begin in 2023.



In **Japan**, 91% of electricity customers have smart meters installed as of 2022, with the cost being borne through consumers' electricity rates. These meters enable utilities to collect data every 30 minutes, and consumers can access data via home energy management systems (HEMS). In the Strategic Energy Plan, the government obliges both public and private sectors to promote the uptake of smart meters.



Saudi Arabia installed 10 million smart meters over 13 months, from February 2020 to March 2021, by mobilising 6 000 installers and introducing local manufacturers to increase local capacity. The new meters can display consumption patterns, select energy rates, and provide daily and monthly energy reports. Saudi Arabia established a governing entity to regulate and ensure proper data use.



As of 2022, the **United States** had installed over 103 million smart meters, mostly residential, supported by the Energy Policy Act (2005) and the Energy Independence and Security Act (2007). The US Energy Act of 2020 required federal agencies to implement new energy and water metering plans and install more smart water meters. Executive Order 14057, issued in 2021, required federal facilities to achieve 100% carbon pollution-free electricity by 2030, obliging them to transition to meters that provide data at 15-minute intervals. Recent deployment of smart meters was supported by funding initiatives such as the American Recovery Act and the Infrastructure Investment and Jobs Act.

Energy Efficiency Hub 2026. All Rights Reserved.

Resources

- The Digitalisation Working Group informs and advances the digitalisation of energy-efficient technologies.
- IEA report on lessons learned and best practices to unlock the benefits of distributed energy technologies.
- IEA Digital Demand-Driven Electricity Networks (3DEN) initiative to accelerate progress on power system modernisation and utilisation of distributed energy resources.

These policy insights are derived from Members' exchanges during Policy Exchange Workshops. Hub Members regularly exchange knowledge and practical experience through the Energy Efficiency Hub's Policy Exchange Workshop series. These closed-door sessions provide a platform for experts nominated by Member governments to explore specific energy efficiency topics in greater depth across sectors such as buildings, transport, and industry. Each workshop features national policy presentations, peer-to-peer discussion among officials responsible for design and implementation, and scene-setting contributions from IEA experts.

Findings presented in this Policy Insight are drawn from the discussions that took place during the following Policy Exchange Workshops: 12 September 2022 (Germany, Japan, Saudi Arabia, United States)

For more information, please contact the Energy Efficiency Hub Secretariat at secretariat@energyefficiencyhub.org.

Energy Efficiency Hub 2026. All Rights Reserved.