

# Energy Efficiency for a Sustainable Future: How to Achieve the European Green Deal

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## Building Momentum: Energy Efficiency Progress So Far

In the past, energy efficiency was not always a priority for policymakers. But this has changed dramatically in recent years. This is in large part due to the growing urgency to combat climate change, but also the increasing geopolitical instability that has created insecurity of energy supply and volatile market pricing:

The imperative for policymakers to push stakeholders to reduce their energy use and to shift to greener alternatives has never been greater. Since the start of the energy crisis in early 2022, there has been a major escalation in action, with countries representing 70% of global energy demand introducing or significantly strengthening efficiency policy packages, according to the IEA. Since 2020, almost \$ 700-billion has been spent on energy efficiency investment support, an increase of 45%, with 70% of this in just five countries: the United States, Italy, Germany, Norway and France. In the EU, the energy efficiency directive has already contributed to energy savings of almost one third compared to the 2007 consumption projections for 2030.

To meet the Fit for 55 targets, EU countries must go further still. They must start reducing their energy use in the following areas:



### BUILDINGS

Accounting collectively for 40% of energy consumed, in the EU new buildings must be zero emission from 2030. Existing buildings must reduce their energy use in line with the targets.



### INDUSTRY

Accounting for 25.6% of final energy consumption. Any company consuming energy above a certain threshold must conduct energy audits. Energy management systems are made mandatory for large industrial energy consumers.



### PUBLIC SECTOR

Responsible for approximately 5-10 % of the Union's total final energy consumption. The sector must reduce this by 1.9% annually (excluding public transport and the armed forces) compared to 2021 and renovate buildings equal to 3% of public building floor space a year.



## Smart Metering Solutions: Knowledge is Power

To reduce the energy use of any major infrastructure, such as public utilities and commercial and residential buildings, current usage must first be monitored and measured. Smart metering solutions enable this at scale:

Internet of Things (IoT) or other communication network-connected smart metering technology provide detailed visual monitoring of energy use and loss throughout a large asset. Smart meters and calculators can be integrated into centralised control applications used to monitor and configure elements of a building, such as building management systems (BMS) or any other energy management software. From here energy use data can be accessed and analysed on a daily, hourly or real time basis, from control centres or even mobile phones. This data will include precise energy and water flow measurements from across a building.

Combining this information with intelligent data analytics platforms for processing, leads to a deeper understanding of an assets' energy use and, in turn, ways to reduce it. In this way, smart metering solutions are integral to improving energy efficiency and can be a building block for tangible action. This is acknowledged in the EU's directive on energy efficiency, which notes that building automation and control systems, and other solutions that provide active energy management, are 'important tools' for improving and maintaining good energy performance.



## Taking Back Control: What Can Be Achieved with Smart Metering Technology

Building Management Systems (BMS), also known as Building Automation Systems or Energy Management Systems, are integral to running a large facility:

They are also one of the best ways to leverage smart metering solutions for energy efficiency improvements. Using IoT infrastructure, and other communication standards and protocols, such as KNX, BACnet, LonMark, Modbus open protocol and N2Open, smart metering solutions can be easily integrated into the entire BMS pyramid to work seamlessly together. Smart metering technology can monitor and collect data on usage, while the BMS system controls different aspects of a building that impact on energy use, such as lighting, heating, cooling, ventilation, blinds/ shutters and water. Together they can enable a deeper understanding of energy use and wastage, so action can be taken to address it.



Building management systems integrated with smart metering technology can monitor and measure the temperature of different areas of a building, to optimise energy consumption with more precise control of heating, ventilation and air conditioning systems.

## The ways smart metering solutions help reduce energy use:



### Leak Detection

The nexus between water and energy is important to understand for energy efficiency. Effective management of water can make a significant contribution to energy savings. The water and wastewater sectors account for 3,5 % of electricity use in the EU – and this is expected to increase. At the same time, water leaks account for 24 % of total water consumed in the EU and the energy sector is the largest consumer of water, accounting for 44 % of consumption. Smart metering can identify where water for heating and cooling is being lost within the system, resulting in poor-performance, so the problem can be rectified.



### Identify Heat Loss and Enabling Heat Recovery

Smart energy calculators can identify where and how much heat is being lost during large industrial processes, such as in energy generation. This heat could potentially be recovered for other processes that require heating. Heat recovery, as it is known, can significantly reduce fuel demand, thereby reducing costs and CO2 emissions.



### Managing HVAC Systems

Building management systems integrated with smart metering technology can monitor and measure the temperature of different areas of a building, to optimise energy consumption with more precise control of heating, ventilation and air conditioning systems. For example, rather than ramping up air conditioning systems on a hot day, shutters and blinds can be closed instead.



### Manage Water Resources for Cooling and Heating

Inaccurate ambient and water temperature control can produce under or over-heated buildings – and wasted energy. Smart metering can provide accurate readings at short intervals enabling engineers to tweak the system as required to save energy and reduce costs. This can be particularly significant for cogeneration and district heating systems.



### Personalised and Precision Billing

In collective district heating and cooling systems, where each individual property is supplied from a central source, it is preferable for each unit to only be charged for what it consumes – which has become more important amid rising energy prices. Smart meters are the best and most cost-effective way to obtain accurate unit-specific energy consumption data straight to the BMS for personalised billing. Understanding energy use patterns in multiple-occupancy properties has other benefits, such as encouraging users to shift energy usage away from peak times towards periods of abundant renewable energy, using time-of-day charging.



### Better Reporting

Some reporting on energy efficiency and other climate change metrics are already mandatory, with requirements likely to increase over time. Management systems and smart metering solutions enable asset operators to provide concrete evidence of their energy use and the effectiveness of their efficiency improvements over time.

## Advanced Technologies: New Opportunities for Energy Efficiency

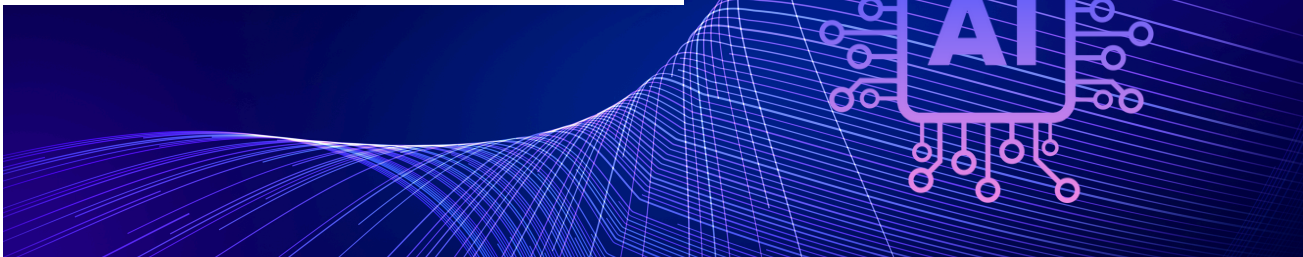
In the future, smart metering solutions and BMS applications will be supported by advanced technologies such as artificial intelligence (AI) and machine learning. These innovations will create new opportunities for further energy efficiency savings. They are developing rapidly, meaning their full potential is not yet known, but they are expected to offer real improvements in two key areas:

### Automation and Optimisation

Building and energy management systems incorporated with AI and machine learning are expected to be able to take smart metering data and autodetect anomalies and inefficiencies, sending alerts to managers and engineers. In some instances, the technology could potentially be used to automatically make adjustments, such as with HVAC systems, to achieve the desired temperature. Furthermore, by automatically analysing patterns in data using AI and machine learning, asset management systems can pinpoint the root causes of issues and recommend corrective actions, ensuring that building assets operate at peak efficiency.

### Better Forecasting

Recent and historic energy use data collected by smart meters, combined with weather forecasting, can be analysed by AI to accurately predict energy supply and demand metrics. This can help the grid and power producers manage energy production better, particularly with storage, so energy is never wasted.



## Maintaining Momentum: Marrying Technology with Ambition for a More Sustainable Future

In the European Union, the Fit for 55 policy package will drive momentum to increase energy efficiency across the bloc – supported by increasing price volatility that is, in turn, shifting consumer preference for energy efficient housing stock and other facilities:

The policy is ambitious – but achievable. Yet while the technology and know-how needed exists, it will not all be easy. 75% of the Union's building stock has a poor energy performance and, in particular, older assets will be harder to retrofit to improve energy efficiency. What's more, upfront investment will be required to implement systems and changes at a time when economies are challenged. It may also require enhanced fiscal support from governments in education and skills for both users and energy suppliers. Arguably, more

regulations and incentives are needed, especially at the local level; sustainable, energy efficient assets should be the norm rather than the exception. By prioritising better energy management, nations can significantly advance towards the emission reduction targets of the Paris Agreement and enhance supply security. Asset owners can reduce overall costs and comply with climate change policies. This approach benefits the planet as well as the public and private sectors, creating a win-win situation for all.



### INTEGRA Metering's CALEC® ST III: Smart Metering at its best

The thermal energy calculator CALEC® ST III covers all applications from heating, cooling and air-conditioning systems to solar heating. Smart metering data is accessible via a smartphone app for easy and user-friendly configuration, and the display offers optimised access to additional information. The solution features high modularity and supports combined, glycol, multi-tariff and various flow sensors.

**Together for a more energy efficient world. To learn more visit [integra-metering.com](https://www.integra-metering.com)**

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