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powering people

Power2People Follow Up Report: Smart Thermostats

A Eurelectric report

November 2022

Eurelectric represents the interests of the electricity industry in Europe. Our work covers all major issues affecting our sector. Our members represent the electricity industry in over 30 European countries.

We cover the entire industry from electricity generation and markets to distribution networks and customer issues. We also have affiliates active on several other continents and business associates from a wide variety of sectors with a direct interest in the electricity industry.

We stand for

The vision of the European power sector is to enable and sustain:

- A vibrant competitive European economy, reliably powered by clean, carbon-neutral energy
- A smart, energy efficient and truly sustainable society for all citizens of Europe

We are committed to lead a cost-effective energy transition by:

investing in clean power generation and transition-enabling solutions, to reduce emissions and actively pursue efforts to become carbon-neutral well before mid-century, taking into account different starting points and commercial availability of key transition technologies;

transforming the energy system to make it more responsive, resilient and efficient. This includes increased use of renewable energy, digitalisation, demand side response and reinforcement of grids so they can function as platforms and enablers for customers, cities and communities;

accelerating the energy transition in other economic sectors by offering competitive electricity as a transformation tool for transport, heating and industry;

embedding sustainability in all parts of our value chain and take measures to support the transformation of existing assets towards a zero carbon society;

innovating to discover the cutting-edge business models and develop the breakthrough technologies that are indispensable to allow our industry to lead this transition.

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WG Customers & New Services

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KEY MESSAGES

- Smart thermostats are **a relatively easy to use and implement technology** which helps households and enterprises of all sizes improve their energy efficiency. Though offering many benefits, this technology is still relatively unknown in the European market.

- Smart thermostats are an **increasingly familiar technology** in European households which can help tackle two of Europe's key energy sector challenges: **optimising household energy consumption** without reducing user comfort and **providing flexibility** to the power system by adjusting consumption during peak periods.

- Smart thermostats **can provide consumers with an average of 10-15% of energy savings** when connected to climate control devices like electric heat pumps or air conditioning units.

- Key barriers to the uptake of smart thermostats include a **lack of awareness** of the technology, **lack of digital literacy**, and a **lack of properly qualified installers** who can set up the system for customers and connect it to climate control appliances to reach the highest benefit for the customer.

- Eurelectric recommends **targeted awareness campaigns**, state-supported **technical assistance programmes** for consumers, **direct funding** programmes for vulnerable consumers and those living in energy poverty, and **upskilling programmes** to certify existing climate control appliance installers to integrate digital systems.

Smart Thermostats Facts

In light of the ongoing conflict between Russia and Ukraine and the resulting cut of natural gas flows to European markets, there is a renewed focus on energy savings to help consumers through the winter months. One relatively easy and inexpensive solution to help European consumers save on average 10%[1] of their thermal energy is through the deployment of smart thermostats. Smart thermostats are devices which connect through a smartphone app or web-based dashboard to allow better control over heating and cooling systems via sensors and AI technology that automate the system and offer feedback on energy consumption and how to reduce it. Since 68.2% of EU residential final energy consumption is for space heating[2], the use of smart thermostats offers the potential for immense energy savings.

This technology can be easily integrated into existing Internet of Things (IoT) networks and connected through platforms consumers may be familiar with, like Amazon's Alexa or Apple's Home Kit, and can deliver significant energy savings without sacrificing comfort. Unfortunately, uptake of smart thermostat technology remains low. As of 2021, only 9.1 million homes are currently equipped with smart thermostats in Europe, with the highest levels of market penetration in the UK, Ireland, the Netherlands, and Belgium.[3]

To promote the uptake of this technology with a European-level initiative, in a joint statement with United States President Joe Biden, Commission President Ursula von der Leyen signalled the EU's intention to install one and a half million energy saving smart thermostats across the EU ahead of the winter heating season.[4]

Energy Efficiency Gains and Reduction on Consumer Bills

When smart thermostats are connected to home heating and cooling appliances, they can use AI or machine learning to learn the preferences and routines of the members of the household and can use this information to automate the climate control system to use less energy to maintain the same level of comfort for the members of the household.

Smart thermostat companies like Nest and Tado claim users can save between 7-31% on their energy costs.[5, 6] With the average household energy cost of € 1.545,82[7], this translates to a €123-479 reduction on energy bills.

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[1] https://en.grenoble-em.com/news-smart-thermostats-how-convince-future-users, EU average

[2] https://ec.europa.eu/eurostat/statistics-explained/index.php/Energy_consumption_in_households#:~:text=The%20main%20use%20of%20energy,EU%20households%20space%20heating%20consumption.

[3] Delta EE's Annual State of the Market for Connected Home Systems

[4] https://www.reuters.com/business/energy/eu-us-aim-15-mln-smart-thermostats-europe-this-year-2022-06-27/

[5] https://support.google.com/googlenest/answer/9254386?hl=en-GB#zippy=

[6] https://www.tado.com/gb-en/savings

[7] https://www.acer.europa.eu/gas-factsheet and https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_price_statistics#Electricity_prices_for_household_consumers (combing average household energy spend on gas from ACER and electricity [electricity determined by average consumption of 3700 kwh/year * average 2021 EU household electricity price from Eurostat])

Value Add

Many of our members have been marketing Smart Thermostats as an energy saving solution for customers, but with the relatively low cost of energy before the crisis, the demand remained low across the Union. With the recent spike in both electricity and gas prices, the return on investment for this technology is much more immediate for most consumers, generally coming in less than a year and a half.

Country	Average annual household energy consumption[8]	Average annual energy savings with smart thermostat[9]	How long it will take to pay for itself (return on investment)[10]
Austria	4653 kWh	907 kWh	11 months
Czech Republic	3442 kWh	671 kWh	18 months
Denmark	3614 kWh	705 kWh	10 months
France	5478 kWh	1068 kWh	11 months
Italy	2633 kWh	513 kWh	19 months
Netherlands	3127 kWh	610 kWh	26 months
Spain	3918 kWh	764 kWh	11 months
Sweden	9032 kWh	1761 kWh	5 months

Barriers to Adoption

In our Power2People report, a key barrier identified was the awareness gap which is limiting average consumers' active participation in the energy transition. 80% of consumers are not actively engaged in the energy transition, with 26% of those surveyed not being aware of any of the products and services their supplier offers for saving energy or access to financing. Targeted information campaigns coordinated between governments, national regulatory authorities, and private entities like suppliers are an easy and affordable solution to increasing awareness and utilisation of these solutions by consumers.

Another barrier is low digital literacy which is contributing to the lack of knowledge of smart thermostats, and the connected services which can help manage them, and a lack of implementation of these systems in customers' homes. Only 44% of customers surveyed between the ages of 16 and 74 had a basic level of digital literacy, which signals that many consumers may need additional help bring such technology into their home and become comfortable using it.

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[8] Based on 2019 data from Odysee Mure: https://www.odyssee-mure.eu/publications/efficiency-by-sector/households/electricity-consumption-dwelling.html

[9] Using the average between the Google and Tado claims of 8-31% savings, 19.5%, rounded to the nearest kWh

[10] Based on the average cost of a smart thermostat being €185 according to: https://callmepower.be/fr/energie/guides/consommation/thermostat-intelligent and average electricity price for H2 2021 from Eurostat (most recently available data): https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Electricity_price_statistics

Beyond those barriers identified in the Power2People report, there are two more that are preventing a more exponential growth in the use of smart thermostats. The first of these is a lack of properly trained installers. Demand for these products is expected to rise from 1.9 million units purchased annually to over 4.5 million units annually.[11] But, without adequately skilled installers to connect these devices, the full potential will not be recognised, and people may revert to more traditional technologies which they may be more comfortable using. In addition, there can also be issues with connecting thermostats effectively to specific climate control appliances due to a lack of standardisation in the market.

Policy Recommendations

1. **Targeted Awareness Campaigns** – Public authorities and suppliers can increase the uptake of smart thermostats by partnering to develop and implement campaigns which reach audiences through a variety of media, including in print, on TV, through social media, and in brick-and-mortar locations (in town halls and energy one-stop shops on the public side and in supplier shops on the private side).
2. **Technical Assistance** – Governments should develop public-private partnerships with energy suppliers and smart thermostat companies to provide technical assistance to those who may need help mapping out how to take advantage of smart thermostats in their home, including upgrading appliances and fixtures to be more efficient and connected with such systems, and to provide upskilling programs for installers so they may effectively install and connect smart thermostats for customers.
3. **Direct Funding for Vulnerable Consumers and those in Energy Poverty** – smart thermostats and their connected services can provide substantial savings when optimising the energy use of households, which vulnerable consumers and those experiencing energy poverty could benefit most from. In addition to providing technical assistance, governments should allocate funding through grants to subsidise the purchase and installation of such thermostats in social housing and in private homes of those experiencing energy poverty. A study from the Grenoble Management School shows that public subsidies serve as a positive incentive to encourage the uptake of smart thermostat technology[12].
4. **Financing Support** – beyond the direct funding opportunities mentioned above, governments should work with financial institutions and suppliers to develop and implement a financial instrument to be available to all customers looking to fit their home with smart thermostats and connected climate control appliances. This could be achieved by providing publicly funded guarantees to secure low-interest loans or allow for bundled offers from suppliers where a customer can pay off the cost of the technology and installation in tandem with their regular energy bills.

Eurelectric Members' Solutions

Eurelectric's members have been proactive in providing innovative products to help their consumers more efficiently manage their energy consumption. We would like to highlight three products from our members. The first is Enel X's HOMIX smart thermostat platform which integrates with Amazon's Alexa and uses AI to learn family routines and preferences so it can automate the level of climate control. HOMIX is also a smart home gateway and can connect a whole host of appliances to automate climate appliances as well as lighting, home security, and other IoT appliances.

[11] Delta EE's Annual State of the Market for Connected Home Systems
[12] https://en.grenoble-em.com/news-smart-thermostats-how-convince-future-users

Another great example from our members is the Ngenic Tune thermostat. This smart thermostat connects to water-based heating elements (either a heat pump or an electric boiler). Through these thermostats, the energy used for heating can be optimised automatically based on customers' comfort and be tied to the spot price market to prevent a customer from overconsuming during peak periods. The application embedded in the thermostat also allows for remote surveillance of the heat pump and advanced analytics of the building to maximise the energy efficiency of the elements it is connected to. This system also allows the customer to participate the mFFR markets through aggregation to the TSO and even sell unused power locally back to the DSO.[13]

And the last set of solutions from our members we would like to highlight are the UP smart thermostat from French energy company Engie in Belgium and "Mon Pilotage Elec" in France. The UP thermostat includes a dedicated app where users can control their system from a distance. These products allow for energy savings when one deviates from their normal routine while still maintaining their preferred level of comfort. Additionally, "Mon Pilotage Elec" is a solution to control electrical heating, allowing customers to save up to 15% on heating energy per year while monitoring the electricity consumption in real time. Thanks to an application, customers can control their expected heating temperature and chose the best moment of the day for them or the room. It can be done anywhere using a smartphone, tablet or computer. Customers can also participate directly to the network, allowing "Mon Pilotage Elec" to launch a heating cycle just before a production peak of the national network, or to postpone a heating cycle in the event of a consumption peak.[14]

[13] www.ngenic.se
[14] https://particuliers.engie.fr/economies-energie/economies-au-quotidien/mon-pilotage-elec.html

Eurelectric pursues in all its activities the application of the following sustainable development values:

Economic Development

- Growth, added-value, efficiency

Environmental Leadership

- Commitment, innovation, pro-activeness

Social Responsibility

- Transparency, ethics, accountability

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