

Technology: Smart Electric Thermal Storage Systems (SETS)

What?

Smart Electric Thermal Storage (SETS) allows the one-way storage of renewable energy as heat, which can then be used for space heating and hot water at a later point in time. SETS can be used to provide decentralised space heating and hot water, and can act as an energy storage system to provide distributed flexibility to the electricity grid.

Why?

KEMA has studied the potential for SETS, and more specifically its contribution to a low carbon energy system [1]. They found that SETS can drive down energy bills as a result of up to 20% efficiency gains compared to current night storage heaters. Its demand side management functionality also brings flexibility to the energy system by storing heat from renewable electricity generated at times of high supply and low demand. SETS is fully controllable and designed for integration into smart grid control systems. It can contribute to accommodating the increasing penetration of renewable resources across Europe. SETS highest storage potential will be achieved during seasonal periods where (space) heating demand is the highest. Its grid services have considerable potential in cutting peak consumption and emissions, as well as reducing the stress on the electricity distribution and generation system.

SETS is a potential “drop-in” replacement technology for the current fourteen million homes in the EU that are electrically heated. SETS can offer consumers:

- Lower Cost - up to 20% efficiency gain compared to night storage heaters.
- Increased Comfort - more control towards target temperature and less heat leakage.

It provides the energy system with:

- System Control - designed for smart grid integration.
- Reduced Carbon - increased efficiency and designed to support renewables.

Overall, the study of KEMA concludes that policies and new market mechanisms should be developed to support distributed flexibility services of which SETS is an example. SETS has the potential to be a contributor to the flexible, low carbon energy systems of the future [1].

Cost

The Quantum Space Heating and Water Heating System from Glen Dimplex is up to 27% cheaper to run than a standard storage heater system. It's also up to 47% cheaper to run than an electric convector or radiator system [3].

Where?

SETS is mainly intended to replace traditional night storage heaters.

RealValue, an European project funded under Horizon2020, will install thousands of SETS from Glen Dimplex into 1250 homes across Ireland, Germany and Latvia [2]. The project will demonstrate the effect and quantify the benefits of integrated local small-scale thermal energy storage on:

- Energy balancing
- Grid security and supply
- Network congestion management at local level
- Consumers / home owners
- Access new revenue streams for suppliers and thus facilitate benefits to flow back to consumers through effective tariff design.
- Decarbonisation and integration of Renewable Energy Systems

- The impact of demand side measures under different market structures and incentive regimes for policy makers and regulators

Manufacturers:

Glen Dimplex and SSE have taken a pro-active role regarding SETS, as they have developed the first market-ready SETS product, the Quantum Space Heating and Water Heating System [3].

Want to learn more?

[1] http://www.dimplex.co.uk/assets/Downloads_PDF/Kema_Report.pdf

[2] <http://www.realvalueproject.com/>

[3] http://www.dimplex.co.uk/products/domestic_heating/installed_heating/quantum/index.htm