

FHP

Flexible Heat and Power, connecting heat and power networks by harnessing the complexity in distributed thermal flexibility



Newsletter July 2018



The power system is undergoing a structural transformation driven by the increasing share of distributed Renewable Energy Sources (RES), which will increase significantly in the coming years. One of the main challenges in the following decades will be, as foreseen by ETIP SNET¹, the integration of ever-increasing penetration of variable RES with little or no control on the spatial location and the size of the generation units (mainly for PV) and located far from the main consumption centres (mainly for wind power).

The increase of intermittent, consumer-owned, distributed and non-dispatchable renewable generation tends to reduce the flexibility of the grid to transport and distribute fluctuating

inflows in a cost-efficient and secure manner. The integration of current and future variable renewable generation capacity presents a number of planning and operational challenges, especially for Distribution System Operators (DSOs) and Balance Responsible Parties (BRPs), which if not correctly addressed threaten with executing RES curtailment actions as the only way to resolve overgeneration situations.

A solution for this challenge can come from the progressive electrification of two sectors classically dominated by fuels as primary energy sources: transport and heating. The trendy transition from Internal Combustion (IC) engines to hybrid/electric cars and from

¹ http://www.etip-snet.eu/wp-content/uploads/2017/03/Final_10_Year_ETIP-SNET_RI_Roadmap.pdf

gas/gasoil boilers to Power to Heat (P2H) systems, e.g. heat pumps in buildings/private homes and district heating systems possibly coupled with large thermal storage solutions like Ecovat², requires a smart integration of these resources into the power system. These new loads will change the load profiles and possibly increase the share of electricity in the overall energy consumption. But these loads also hold a promising characteristic: their flexible demand.

The FHP concept is to use the P2H distributed thermal flexibility to make most effective use of available RES energy, and to create the

conditions to increase the amount of such RES also at distribution system level.

We specifically focus on RES curtailment mitigation, i.e. minimizing curtailments of temporary excess RES generation that would result in either market based (economic reasons) or grid related (technical reasons) curtailment. For this, distribution grid connected thermal flexibility is used, making optimal use of – but not surpassing – the distribution grid capacity and providing value in innovative business use cases.

² <https://www.ecovat.eu/>



Centralized P2H solution in Uden (Netherlands). Large thermal storage facility to heat office and domestic buildings.

Partners



FHP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731231

Contact details:

web: www.fhp-h2020.eu

e-mail: info@fhp-h2020.eu

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