RES4BUILD project advances development of integrated renewable energy based solutions tailored to end user needs and requirements

Press release: 1 March 2021

The Renovation Wave aims to accelerate improvements in the energy performance of 35 million buildings across Europe by 2030. Much emphasis is on advancing technology integration by developing integrated and compatible technology packages for building renovations. However, accelerating the uptake of renewable energy technologies combined with Integrated Energy Systems (IES) also requires consideration of financial and social innovation to address non-technological barriers.

The EU-funded **RES4BUILD** project incorporates this approach by developing integrated renewable energy-based solutions that are tailored to the needs and requirements of users and installers. The project aims to increase the uptake of renewable energy solutions for heating and cooling; decarbonising energy consumption in buildings and contributing to EU energy and climate goals.

The project team is working to improve the performance and reduce the cost of the most innovative components of the **RES4BUILD** solutions: integrating photovoltaic thermal (PVT) collectors with magnetocaloric and multi-source heat pumps, optimising their performance through advanced control and building energy management systems (BEMS).

Developed by MG Sustainable Engineering AB and the University of Gävle, the prototype PVT collectors with novel reflector geometry have been tested in two different climatic zones (Sweden and Greece). The prototype multi-source vapour injection heat pump, manufactured by Psyctotherm, is undergoing testing at the Danish Technological Institute. Meanwhile, the prototype magnetocaloric heat pump, developed and being tested by the Technical University of Denmark, has achieved record Carnot efficiencies of over 25%. Advanced algorithms for optimisation and control have been developed to be used as part of the **RES4BUILD** BEMS. The fully integrated system will begin testing in early 2022. Two related publications are available to date: “Impact of hysteresis on caloric cooling performance” and “Numerical & Experimental Study of an Asymmetric CPC-PVT Solar Collector”.

In parallel to the technical work, JIN Climate and Sustainability (JIN) and the Baltic Energy Conservation Agency are collaborating with end-users and other stakeholders on case studies in the Netherlands and in Poland. This work aims to devise a best practice approach for more integrated and systematic renovations of energy systems, ultimately contributing to more efficient operation and optimised interaction with the grid, and thus a lower energy bill for European consumers. A recent report provides recommendations on what a robust IES should include based on these case studies.

Work package leader, Eise Spijker from JIN commented that *“To make the EU Renovation Wave a reality, IES for the built environment need to provide turn-key integrated technology solutions, offer innovative financial products, and apply robust end-user engagement practices.”*

RES4BUILD project coordinator, Michael Papapetrou added *"It is encouraging to see that we have promising results from the lab and the prototype systems, but we are equally excited for the insights we gain from the stakeholder engagement process. Understanding the needs and expectations of the end-users and the installers is an important element driving our work".*

The developed solutions will be validated in different regions, and together with a full life-cycle analysis and market review will pave the route to the market and ensure wide adoption.

For more information on the project and more regular updates, please visit the project website at res4build.eu or follow the project on Twitter @RES4BUILD. The abovementioned publications and report are available at https://res4build.eu/results/.

Notes for Editors:

*The **RES4BUILD** project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 814865. The project, "Renewables for clean energy buildings in a future power system", will run from 2019 to 2023. This output reflects only the author's view. The Innovation and Networks Executive Agency (INEA) and the European Commission cannot be held responsible for any use that may be made of the information contained therein.*

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Image caption: The prototype PVT collectors with novel reflector geometry undergoing testing in Greece ©NCSR Demokritos