Renewable Energy System for Residential Building Heating and Electricity Production (RESHeat)

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Project website: https://resheat.eu/en/home/

The **RESHeat** project is an innovative initiative under the EU Horizon 2020 program, aimed at developing a **zero-emission and autonomous energy system** based on **renewable energy sources (RES)**. It focuses on **trigeneration**, delivering heating, cooling, and electricity to reduce energy demand in residential and public buildings, while minimizing reliance on fossil fuels. The system integrates advanced **solar energy technologies**, including **sun-tracking photovoltaic (PV) panels** and **solar collectors**, which enhance the efficiency of energy capture. A significant feature of the project is its **seasonal underground thermal energy storage** system. Excess heat collected during the summer months is stored underground and can be used for heating in colder seasons. This ensures a reliable year-round energy supply. The goal is to meet **at least 70%** of the total energy demand of multi-family residential buildings through renewable sources. The project also incorporates the use of **heat pumps**. These are vital for both **heating and cooling**, as they transfer thermal energy with minimal electricity usage. In combination with solar technology, **solar-assisted heat pumps** enhance the overall efficiency of the system. The pumps are crucial for converting low-grade heat from underground storage into usable energy for residential heating or for cooling in warmer climates. This makes the RESHeat system adaptable to different regions and building types, ensuring **sustainable energy management**. The project's demonstrations are taking place in **Kraków** and **Limanowa** in Poland, as well as in the **Palombara Sabina**, Italy. These demonstration sites will test the system's **scalability** and **economic efficiency** for buildings with varying apartment sizes. Beyond the technology, the project is strongly focused on the **commercialization** of its innovations

The project is being implemented with the collaboration of several key partners, including: Cracow University of Technology, project Coordinator; FHU Czamara SC (Polish HVAC company), OILON OY (heat pump manufacturer from Finland), Brno University of Technology, La Sapienza University of Rome, ELFRAN Franciszek Ścisłowicz (small Polish sun-tracked solar collectors and PVT manufacturer), ATER Provincia di Roma (housing authority in Rome) and Municipal Buildings Management Board in Kraków.

RESHeat system Installation in Cracow

RESHeat system Installation in Limanowa

RESHeat system instalation in Palombara Sabina