

# Solar - Biomass Reversible energy system for covering a large share of energy needs in buildings



## SolBio - Rev Project Concept

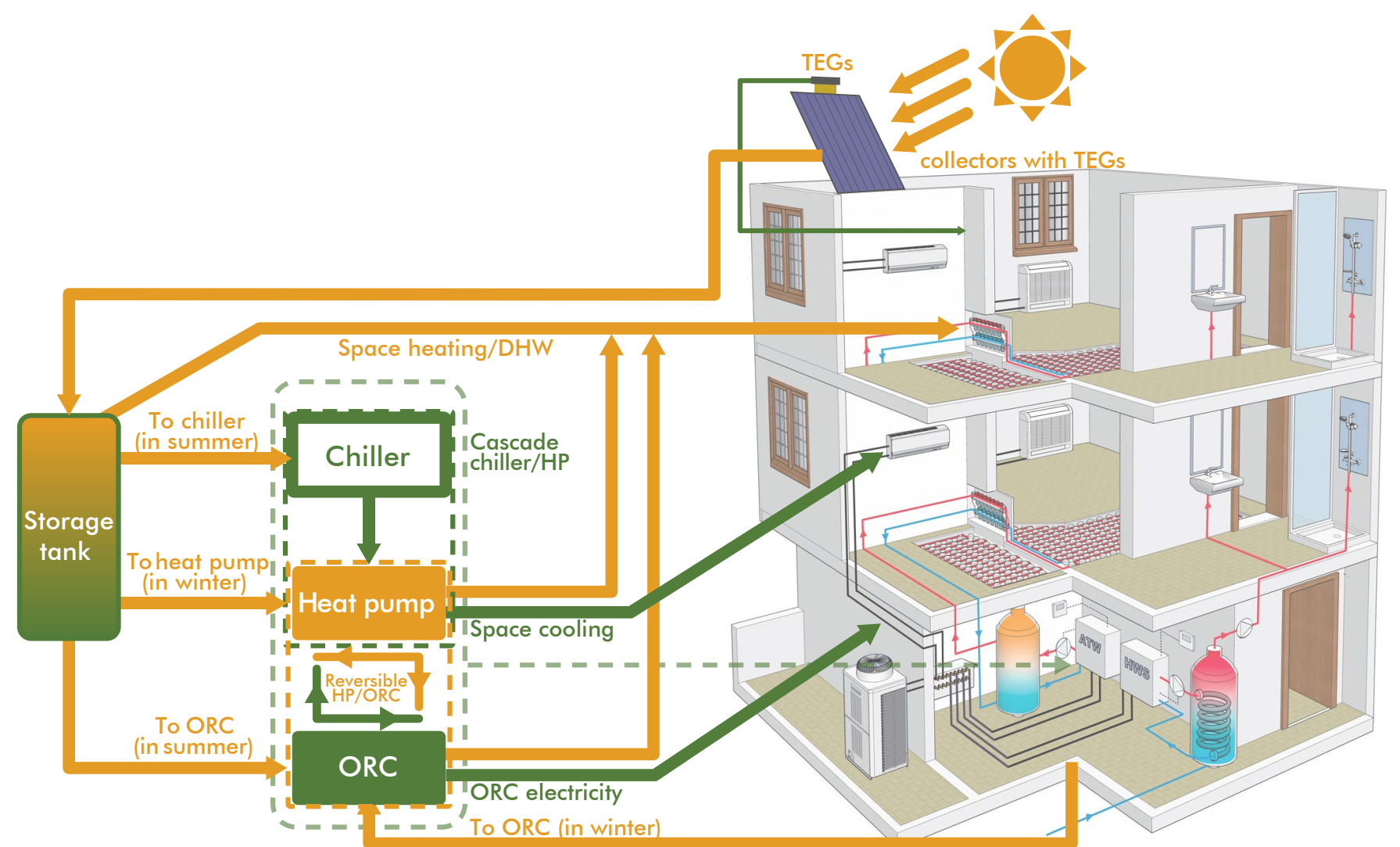
The SolBio-Rev project concept is to develop a configuration based on renewables that allows covering all heating and cooling demand and a variable electricity demand (from zero up to even 100%) in a cost-effective manner. This configuration is based on solar, ambient and bioenergy, while it is suitable to be installed in various buildings types and sizes without any geographical restriction. The main technologies included have already proven their performance and they are combined with the aim to exploit all possible energy flows/sources, ensuring their cost-effectiveness compared to standard solutions.

The system concept relies on integrating a creative heat pump-based configuration with innovative components and an advanced system control that combined, allow the maximised use of renewable energy in buildings at any moment of the year in all EU climatic zones.

## Objectives

The core objective of the SolBio-Rev project is to combine promising renewable energy technologies based on solar, ambient and bioenergy, having at the core an innovative heat pump-based configuration and to allow the efficient application of this solution, without any geographical restriction at least in the EU.

The overall objective of the proposed SolBio-Rev system is to cover a very high energy share in a variety of buildings in a cost-effective manner, and at the same time secure the needs of the users.



## Impact

The very high energy share of the SolBio-Rev solution results to a reduction of the dependence on fossil fuels by up to 70%, thus aiding on EU energy security of supply, for: (1) heating with gas commonly used in EU, with boiler efficiency of 90%, (2) cooling with standard electrical chillers or air-conditioners (powered by grid electricity generated from fossil fuels), with an average COP of 2.5, and (3) electricity needs from gas-fired power plants, with a typical thermal efficiency of 40%, including transmission and conversion losses.

The technologies developed will have extended lifetime expectancy of at least 20 up to 40 years. Moreover, SolBio-Rev's materials and components will be selected to maximise their (re-)useability or recyclability, contributing to the circular economy.

Reducing air pollutant emissions: SolBio-Rev solution reduces air pollutants emitted for heating (e.g. from gas/oil boilers) and for electricity production (e.g. from power plants), including cooling production.

The use of the SolBio-Rev system in EU buildings of various sizes and types could lead to the reduction of primary energy consumption of the whole building sector (including single-family houses) by 40% (compared to the current energy consumption of 430 Mtoe/year) and 15% of CO<sub>2</sub> emissions.

## Partners



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814945