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

## Renewable H&C Solutions for Buildings and Industry Workshop

**Sustainable Places 2020**

Digital event, 29 October 2020

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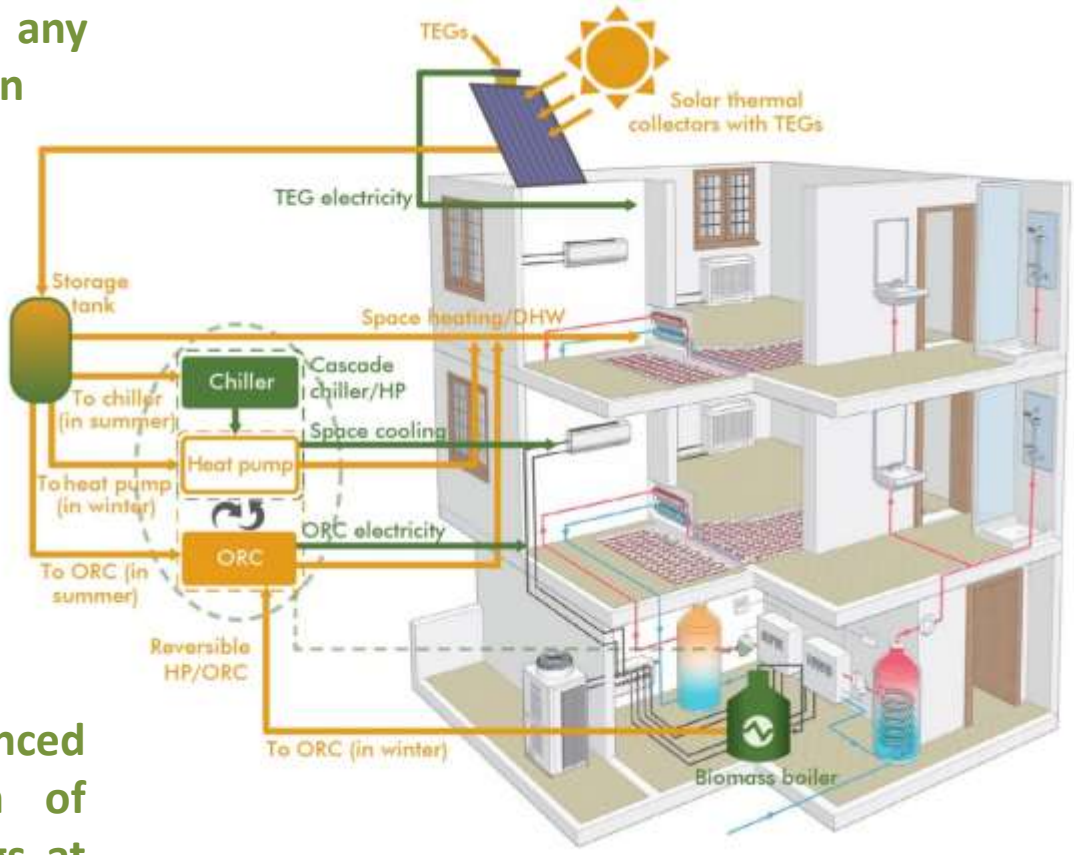
# Consortium

## (8 SMEs and 7 RTD partners)

# Concept

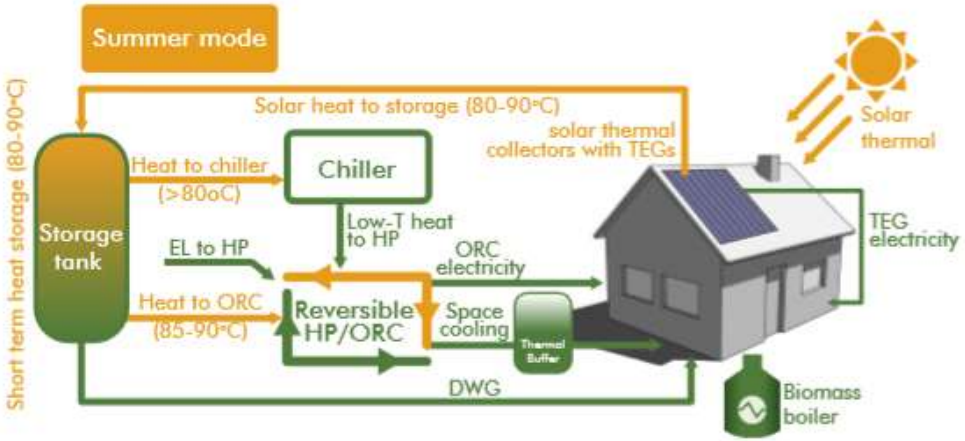
- **Exploitation of renewables (solar, ambient and bioenergy) for meeting all heating and cooling demand and a variable electricity demand without any geographical/building type restriction**

## Reversible heat pump-based configuration

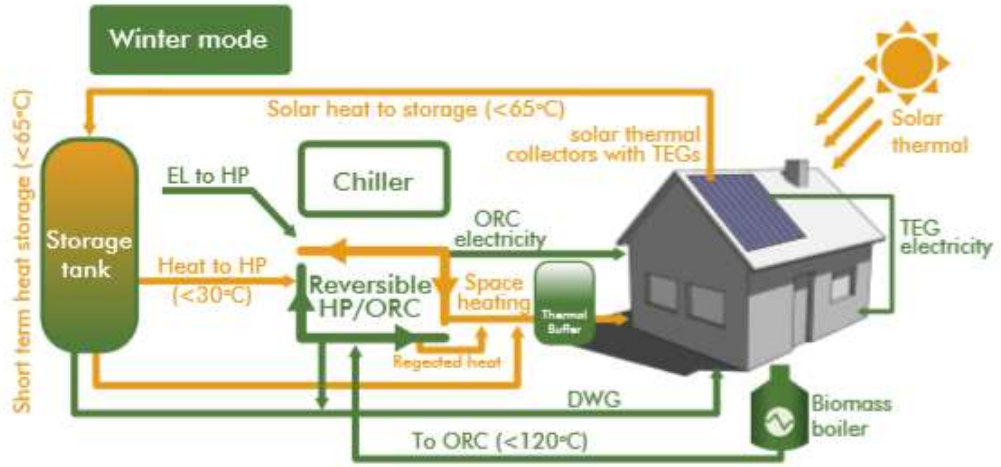



- **Innovative components and advanced system control for maximisation of renewable energy share in buildings at across the EU**

# Main Concept

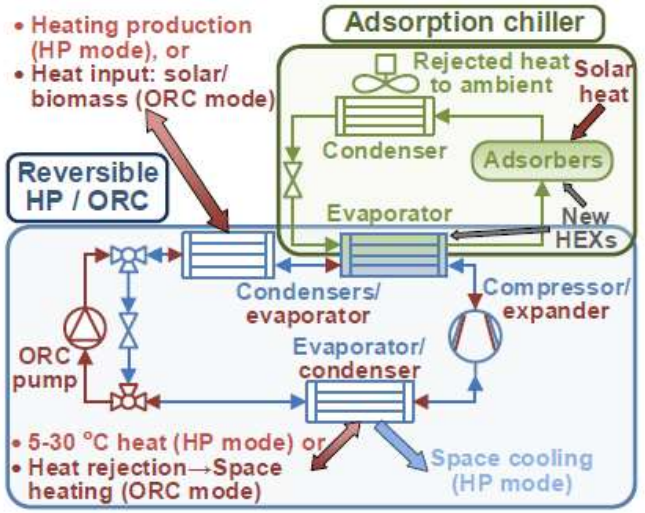



**Heat pump-based configuration** with innovative components and an advanced system control that combined, allow the maximised use of renewable energy in buildings at any moment of the year in all EU climatic zones



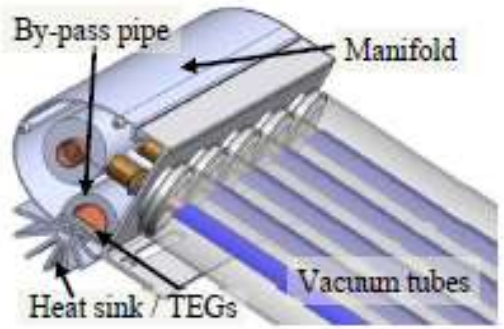
# Innovative aspects

- **Development and integration of innovative components**
  - Cascade adsorption chiller/heat pump
  - Reversible heat pump/ORC
  - Heat pump-based configuration
  - Solar thermal collectors with thermo-electric generators
  - High-temperature, low-emission biomass boiler for cogeneration
  - Advanced control system



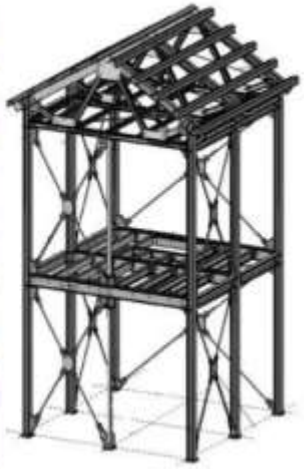

- **Integration and validation at intended environment**

- **Design adopted to buildings specifications and stakeholders feedback**



# Two DEMOs

## National Technical University of Athens

## Friedrich Alexander Universität Erlangen Nürnberg

# Overall ambitions

- Development of a compact system for implementation in new or existing building of different types
- Highly flexible, cost-effective solution
- Renewable energy share up to 85% across whole Europe
- System validation at two different climatic conditions

# System positioning

| Component | Current TRL | Target TRL |
|---|---|---|
| Cascade adsorption chiller/HP | 4 | 5 |
| Reversible HP/ORC | 4 | 5 |
| Heat pump-based configuration | 3 | 5 |
| Solar thermal collectors with TEGs | 4 | 5 |
| Biomass boiler for cogeneration | 4 | 5 |
| Advanced control system | 4 | 5 |

SolBio-Rev system: 3 → 5

# Food for thought…

1. Innovative system integration challenges

2. Combination of innovative H&C systems to “increase” conventional storage systems capacity

# *Thank you!*

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http://www.solbiorev.eu/