Sustainable Places 2023

WORKSHOP – “District Heating and Cooling in the Future Energy System”

Thursday, June 15th 2023 - 9:00-12:30 - Madrid

This project has received funding from the H2020 programme under Grant Agreement No. 101036656

ABOUT THE PROJECT

HYPERGRYD

Hybrid Coupled Networks for Thermal-Electric Integrated Smart Energy Districts

Duration:
October 2021 – March 2025 (42 months)

Call: H2020-LC-GD-2-1-2020
(Research and Innovation action)

Total Cost: € 6M

Partners:
19 partners from 7 countries

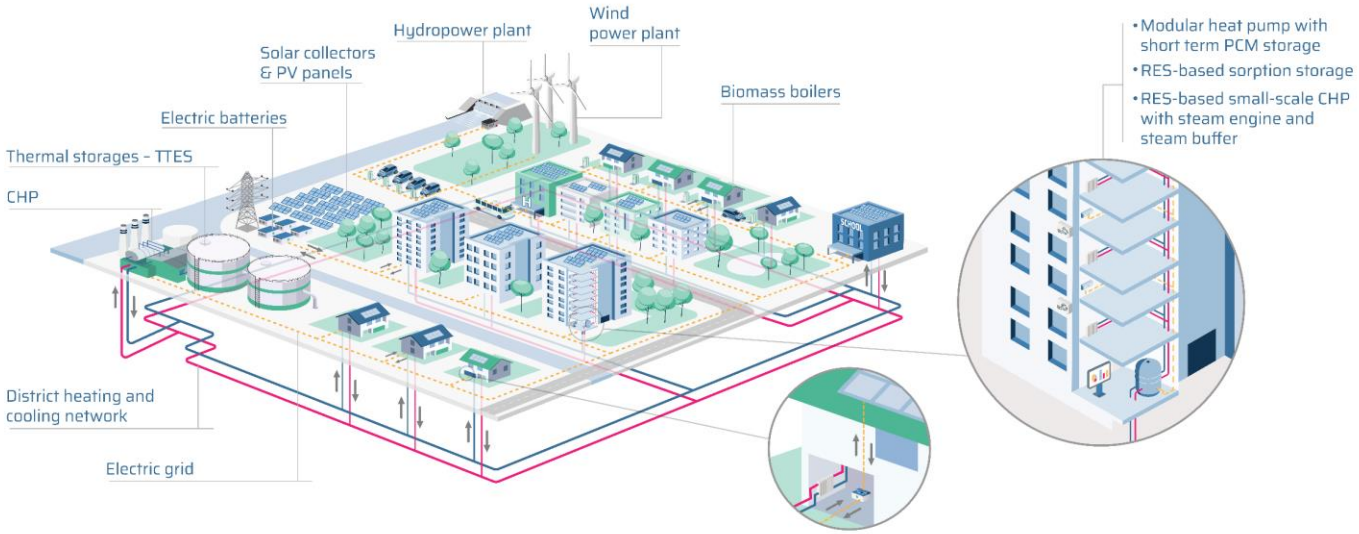
TRL: 3-5

Coordinator: ARCbcn.
Francesco Milani (f.milani@arcbcn.cat)

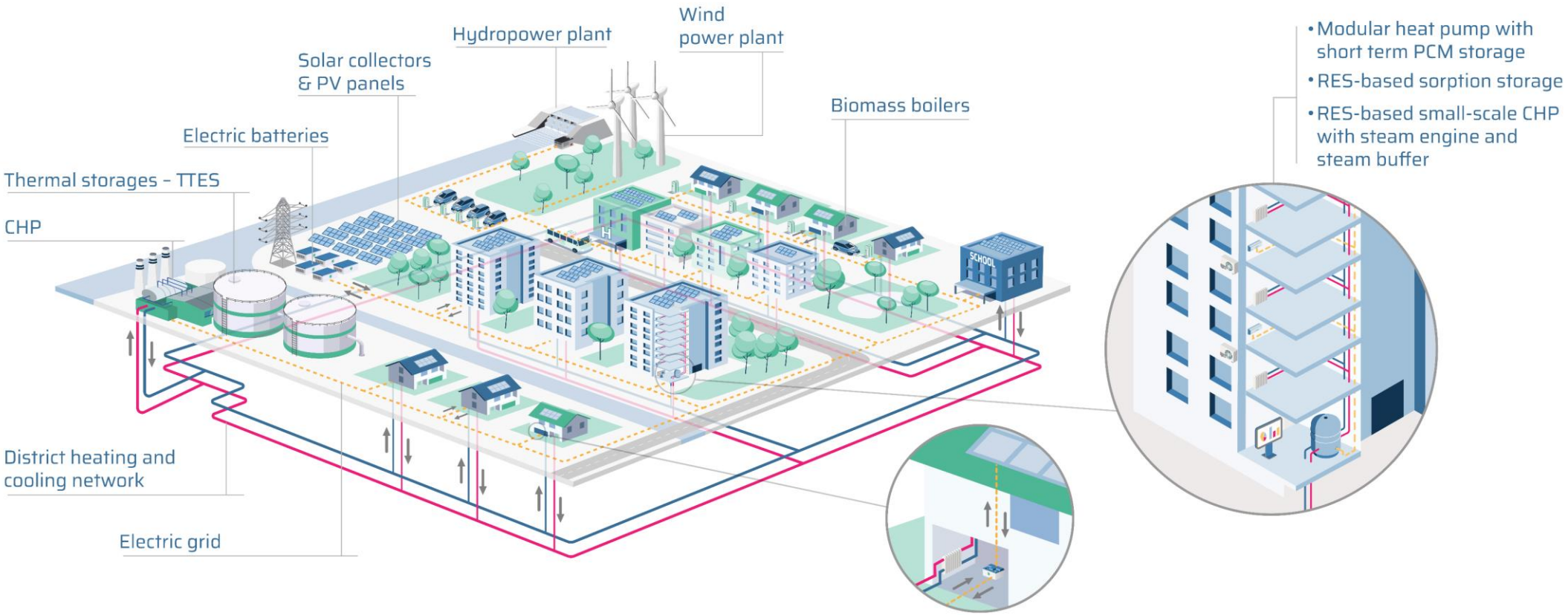
Website:
https://hypergryd.eu/

PROJECT OBJECTIVES

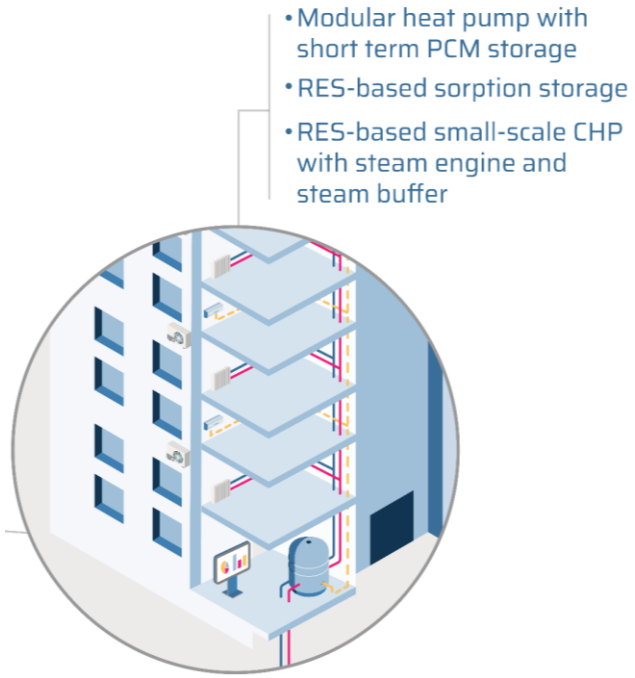
- Develop and integrate renewable-based solutions to empower the deployment of **smart hybrid energy networks**
- Optimize system design and operation
- Ensure flexibility and rapid deployment and guarantee robust and secure energy supply
- Enhance users' participation in the overall grid energy management
- Develop a single platform functioning as hub for hardware and tools testing

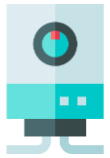


OVERALL CONCEPT



HARDWARE





Modular Reversible Heat Pump with short term PCM storage

- Bridge between electric and thermal worlds
- Heat and cool booster allowing lower temperature in the main DHC network
- Flexible operation: can be operated with surplus from renewables or external grid, following dynamic pricing model

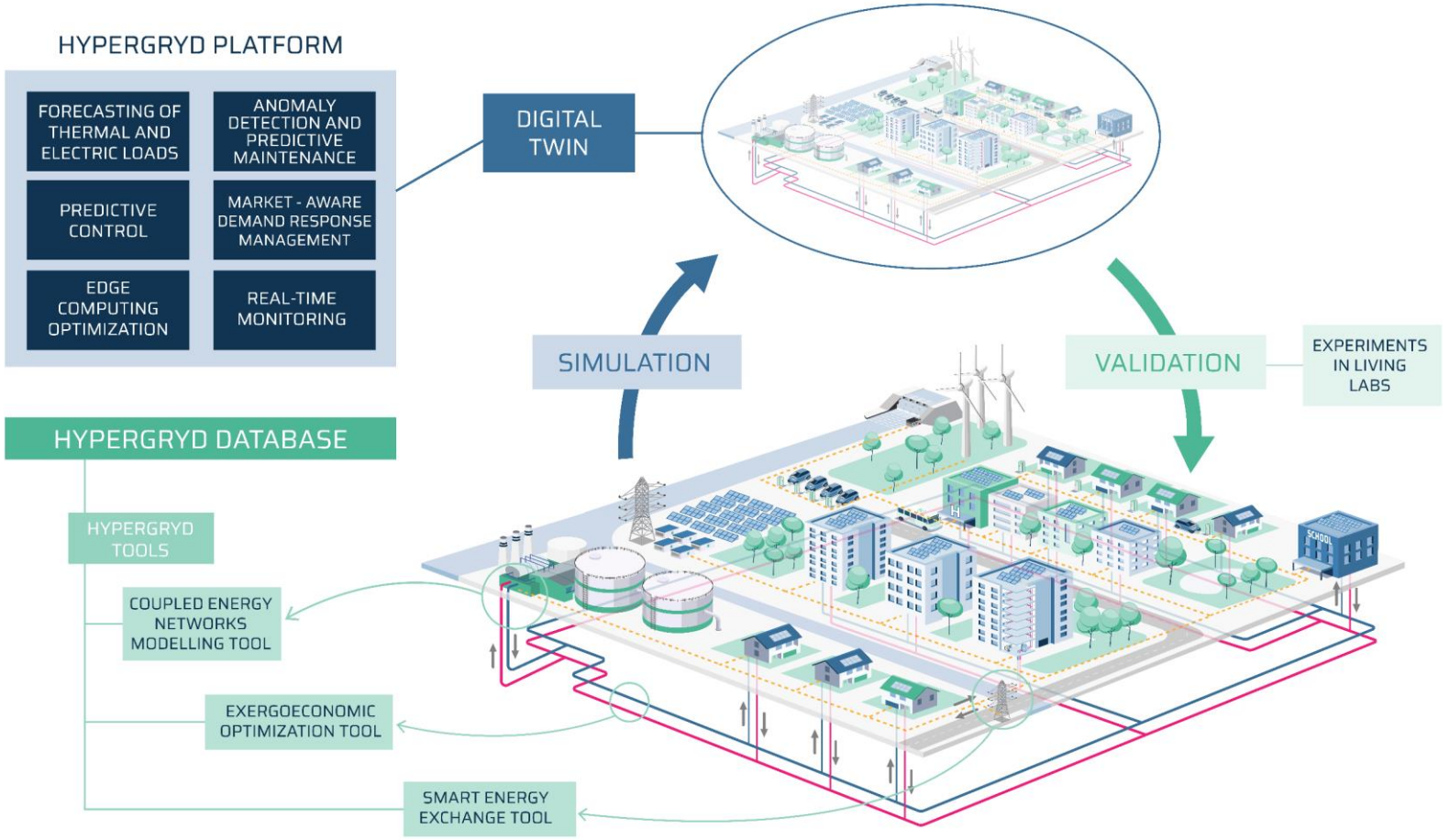
Sorption Storage

- Monthly to seasonal storage applications
- Can provide heating and cooling at both high and low temperatures
- Can provide grid flexibility (ex. by storing cold during summer in combination with the heat pump)

Micro-CHP with steam engine and steam buffer

- Flexible operation
- Can be used in reversed mode

TOOLS AND SERVICES



DEMONSTRATION

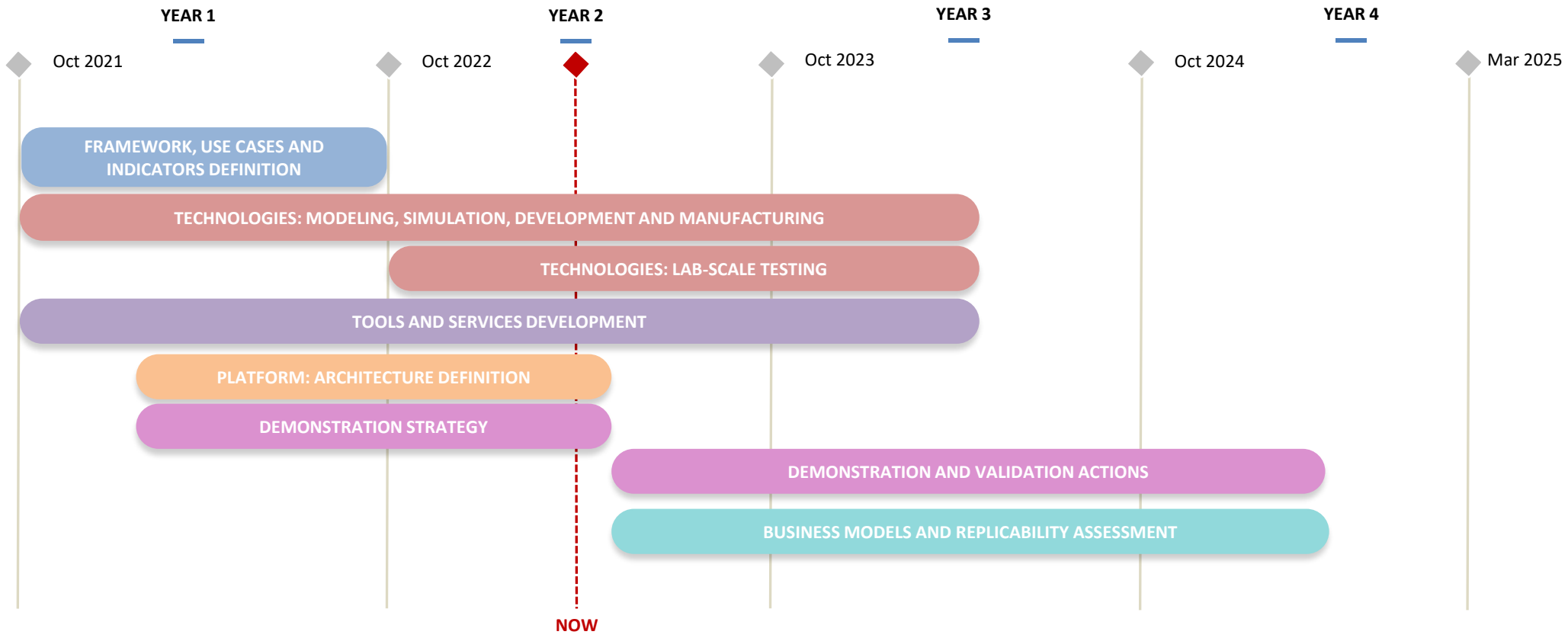
Turin (Italy) – ENVIPARK
LiL Type: Office District
Solution: ENCO dynamic simulation tool and Digital Twin

Großschönau (Austria) - SONNENPLATZ
LiL Type: Biomass-based District Heating System
Solution: GIS-BIM tool, exergoeconomic model, dynamic simulation tool and local energy marketplace

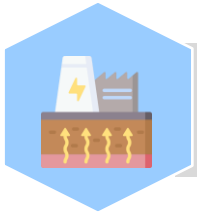
Jablonna (Poland) – KEZO Research Center
LiL Type: Laboratory and office buildings
Solution: HP with PCM storage, sorption storage, algorithms for heat pump and DHC management

Bozen (Italy) - EURAC
LiL Type: Research Lab
Solution: micro-CHP with steam engine and steam buffer

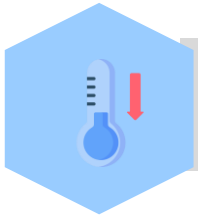
PROJECT STATUS



FUTURE OF DHC

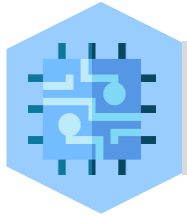


GENERATION: RES-based



GRID DISTRIBUTION: Low temperature, relatively close to the temperature of the ground (to use uninsulated pipes)

END-USER DISTRIBUTION: Combination of small individual heat pumps and large heat pumps to boost/decrease temperature from DHC



Tools orchestration: Exploit synergies with electric grid

Energy efficiency improvements in buildings should keep pace with DHC developments

DHC role in future EU energy sector

The EU energy sector is moving towards electrification

DHC role in future EU energy sector

Solution: DHC

- Higher efficiency compared to individual H&C solutions
- Possibility to reuse waste heat-cool
- Sector coupling

End-users involvement and challenges

- Facility managers, district and construction manager: define future investment for the transition to a 4th-5th generation DHC with high-RES share

- Building owners, tenants, occupants: looking at the project's developments and impact on daily life (thermal comfort, air quality etc).

Challenges:

- Interest
- Understanding of technologies, tools, policies
- Being open to a change of paradigm

Future possible common activities

- **Policy workshop**: could address issues such as incentives and subsidies, grid integration, decarbonization targets, and building codes and standards.
- **Business Models and Financing Workshop**: An interactive workshop exploring innovative business models and financing mechanisms for district heating and cooling projects.
- Discussion on **technical challenges for feed-in** of local heat/cold into DHC networks (temperatures, pressures.)

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Thank you for your attention

HYPERGRYD