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Optimizing the development process of a hybrid energy supply system based on renewable sources using the LEAN Methodology

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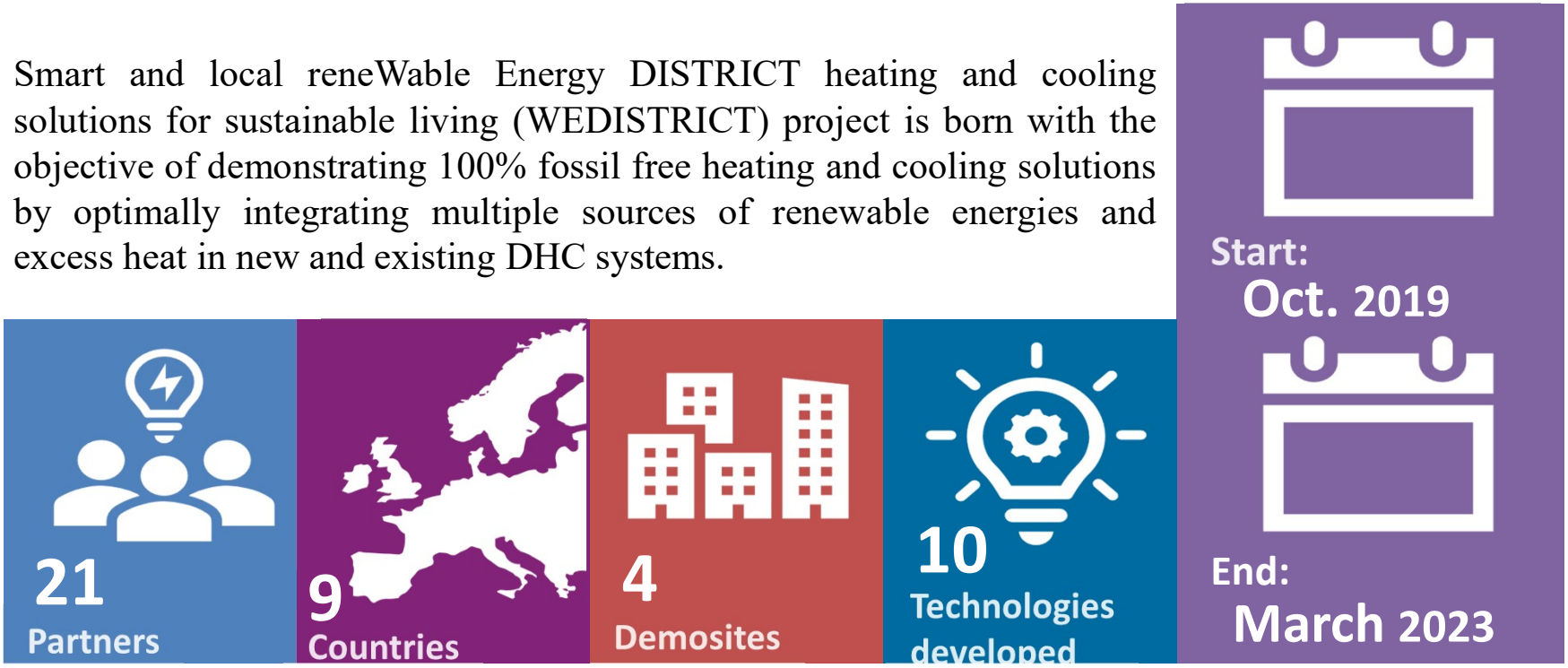
WEDISTRICT MAIN DATA

Smart and local reneWable Energy DISTRICT heating and cooling solutions for sustainable living (WEDISTRICT) project is born with the objective of demonstrating 100% fossil free heating and cooling solutions by optimally integrating multiple sources of renewable energies and excess heat in new and existing DHC systems.



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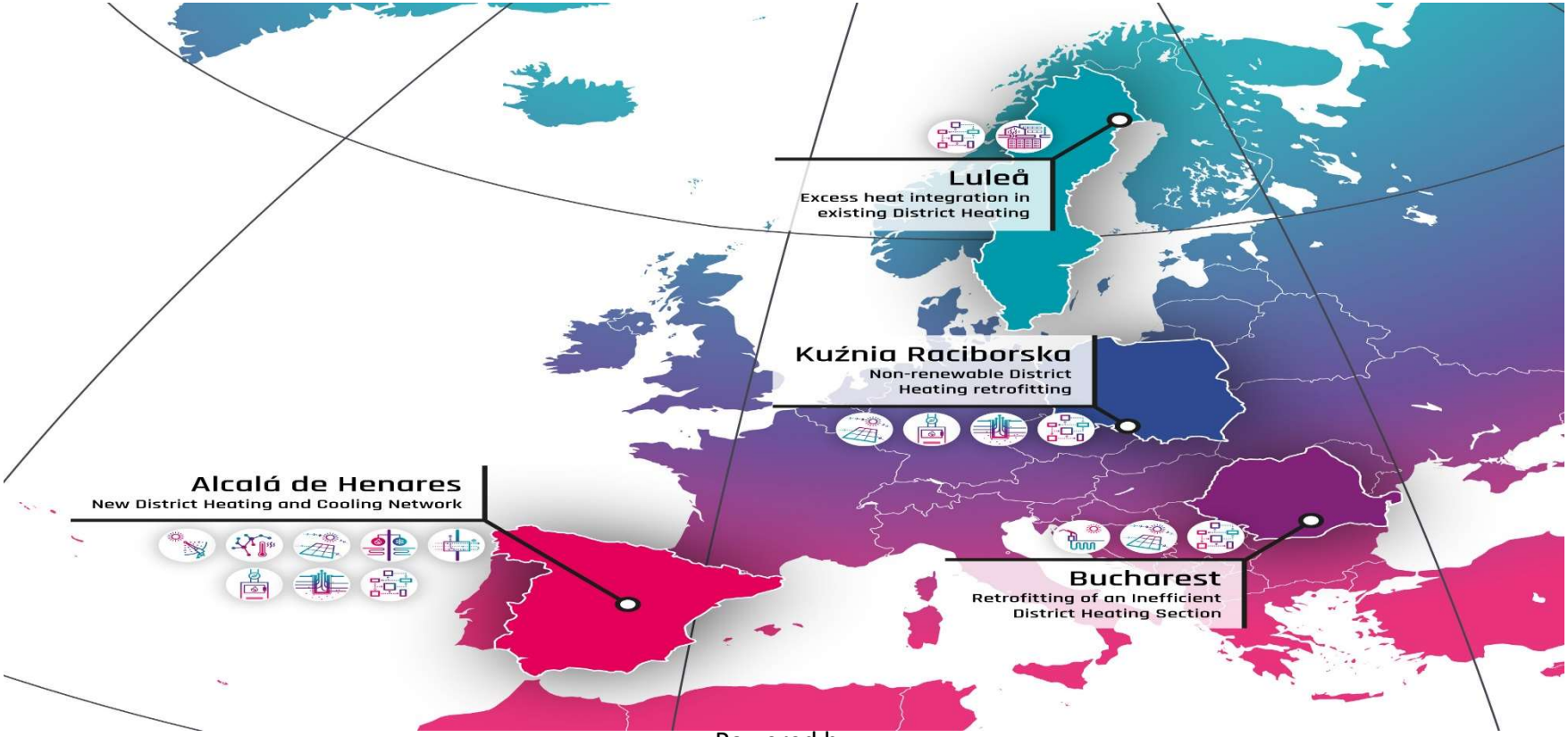

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BUCHAREST DEMO SITE

Retrofitting of an inefficient district heating section

TECHNOLOGIES PLANNED: 

- **Photovoltaic panels** installed on the rooftop of two buildings.
- **Hybrid photovoltaic-thermal panels** for domestic hot water production, connected to the buffer tank.
- **Geothermal heat pump** to provide the heating and cooling of the building.
- The cooling demand will be assured by a **passive and active cooling system** using the borehole heat exchangers and fan coil units connected through a heat exchanger.
- The equipment operation and control will be integrated into an **intelligent energy management system.**

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LEAN METHODOLOGY – BACKGROUND

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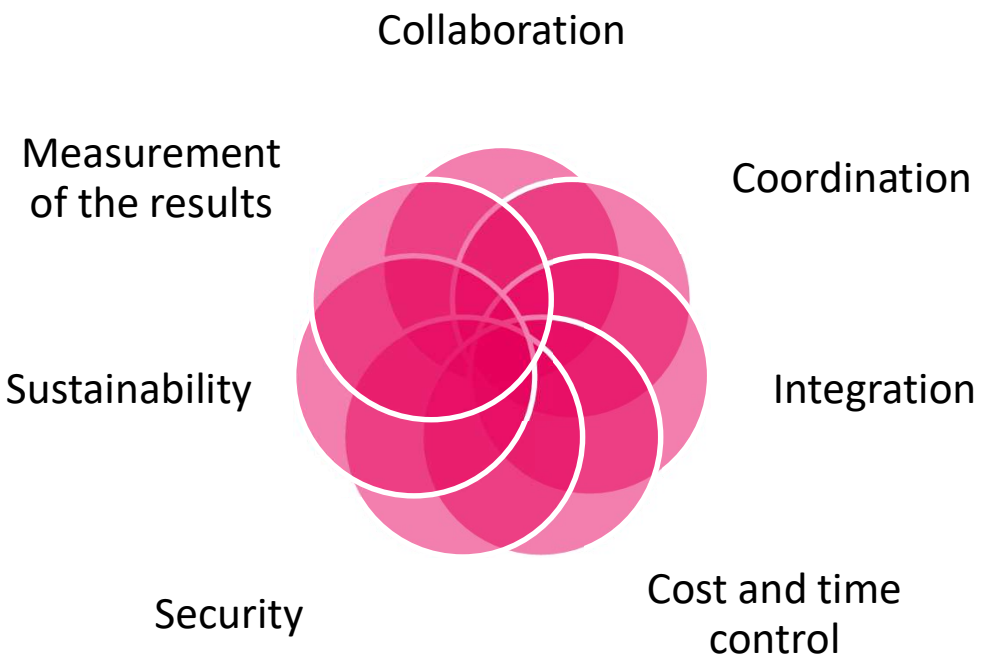
LEAN METHODOLOGY –OBJECTIVES



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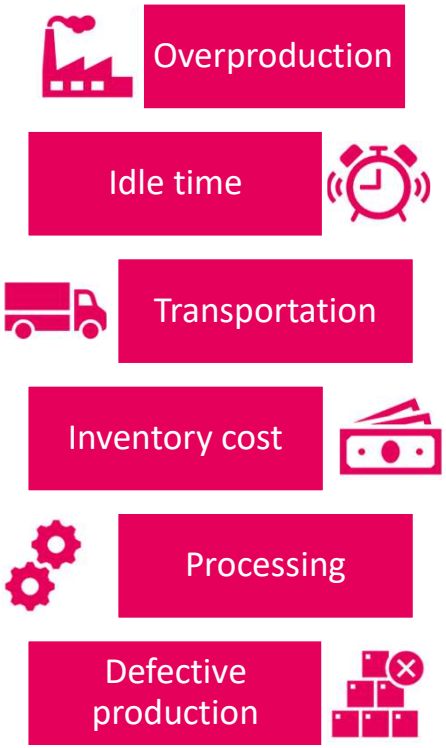
LEAN METHODOLOGY –TYPES OF WASTE



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IMPLEMENTATION STRATEGY OF DEMO SITE

LEAN Methodology phases: **Planning, Procurement and Design**

Pre-investment stage

- Due diligence and feasibility analysis
- Development of Geothermal-PV Hybridization
- Design, engineering and integration of DH
- Advanced digitalization
- Simulation models

LEAN Methodology phases: **Construction and Operation & Maintenance**

Investment stage

- Equipment and material acquisition
- Preparatory works for demo site
- Installation works
- Commissioning

O&M stage

- Monitoring and performance evaluation

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MATERIAL RESOURCES

- **For the thermal subsystem**: heat pumps, geothermal heat exchanger, storage tanks, heat exchangers, fan-coil units, PVT panels, circulation pumps, sensors, pipes, insulation, fluid distributors/collectors, 3-way valves, fittings etc.

- **For the electrical subsystem**: PV panels, battery, inverters, convertors, electrical panels and cubicles, various cables, support systems for PVs, various equipment and materials for monitoring and control (electrical meters, current and voltage transducers, small computers for IoT implementations, redundant power supplies etc.).

- **Advanced digitalization**: SCADA servers and their accessories.

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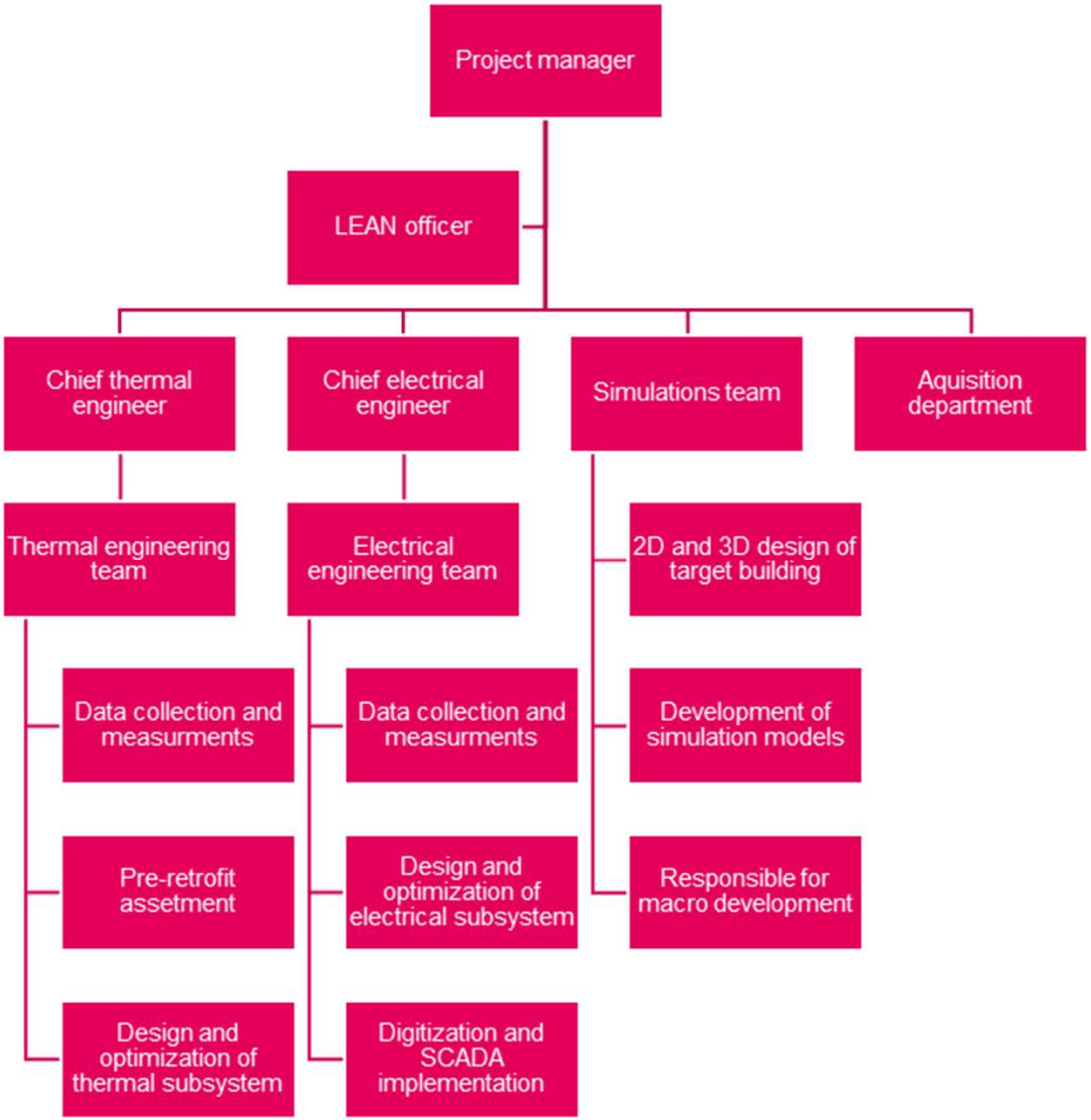
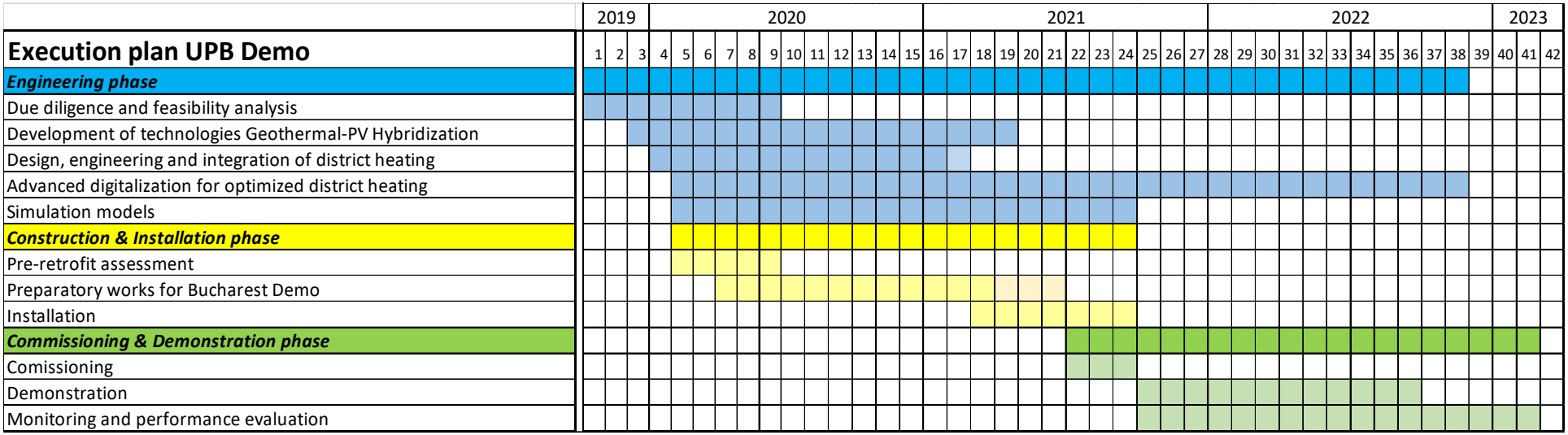
STRUCTURE OF HUMAN RESOURCES



EXECUTION PLAN

To fulfill the objectives and to dimmish the waste, an execution plan is mandatory.



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CONCLUSIONS

- The present paper aims to customize the application of LEAN Methodology in implementing a hybrid power supply system, in specific conditions regarding the location, while considering the peculiar factors of economic-financial, administrative, socio-political and legislative nature.

- The application of the methodology allows an optimal planning and management of the resources of any kind (material, human, financial) so that the performance indicators (energy, ecological, economic-financial, social) reach the default values.

- The phases of implementing an investment project in the energy field in the stages of the LEAN Methodology are correlated and integrated, thus validating the applicability and the wide beneficial effects of using this method.

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