

SUSTAINABLE PLACES 2024

Panel discussion:


Empowering Cities Through Positive Energy Districts (PEDs)

Strategies & Implementation



 Cecilia Sanz
Montalvillo



 Laura Bordo
REN+HOMES



Xingxing Zhang




 Lorena Sanchez
Relaño



Julia Schließauf
 SPARCS



 Mohaddeseh
Maktabifard



MODERATOR



Beril Alpagut




Adaptable technological solutions based on early design actions for the construction and renovation of Energy Positive Homes



Beril Alpagut



**Co-funded by
the European Union**

This project has received funding from the European Union's Horizon Europe research and innovation programme under Grant Agreement No 101104058

- ❖ The project aims to design, implement and validate an adaptable and dynamic integration approach to accomplish **Energy Positive Homes** designed for renovations and new constructions.

19+1

Partners

10

Countries

5

Demo site

6 M€

Budget

4

Years



Key points and objectives :

- Lifecycle energy performance tracking.
- Making energy-positive homes in new construction or renovations
- Integration of active/passive strategies, NBS with smart tech in BIM
- Minimizing environmental impact through smart reuse/recycling
- Promoting local funding for renewable energy and NBS
- Engaging with building occupants
- Enhancing replicability and scalability for energy-positive homes
- Developing the LEGOFIT Positive Residential Building logbook

1. EPHs Design Process**2. User-friendly Platform****3. MDCM Methodology****4. Circular Economy****5. Co-financing****6. Control and Optimization****7. Users Acceptability****8. Scalability and Replicability**

LEGOFIT Implementations & Impacts

- Faster transition to new constructions and renovations
- Integration of smart technologies and renewable energy
- Adaptable buildings for different user profiles
- Skilled workforce for Energy Positive Homes
- PEB → PED

5 Physical + Digital EHPs



SPAIN /
VALLADOLID



TÜRKİYE /
İSTANBUL



LUXEMBURG /
BETZDORF



NETHERLANDS /
WATERVLIET



HUNGARY /
PÉCS



TECHNICAL



Reducing construction and renovation time
Reducing performance gap between design and operational phases
Reducing energy consumption

SOCIAL



Increasing occupants/building owners acceptance
Increasing civil society interest and participation

ECONOMIC



Saving in electricity bills
Decision-making algorithm based on user financial availability
Integrated cost-benefit analysis

ENVIRONMENT



Emissions reduction
Reduction of building carbon footprint
Fulfilment of the set of control parameters

CIRCULARITY



Reused components from deconstruction
Reduction of up to 30% water consumption

REGULATORY



Suggestion for certification procedures improvement
Creation of one Digital Building Logbook per pilot
Performance-based crowdfunding campaigns

THANK YOU!

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CONSORTIUM





**Cecilia Sanz
Montalvillo**



MAKING CITY

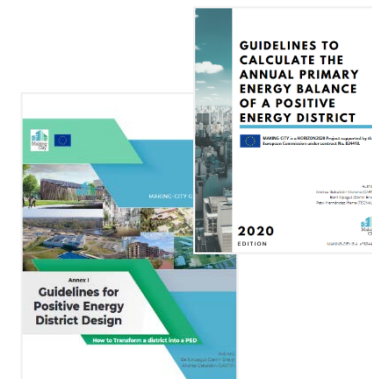
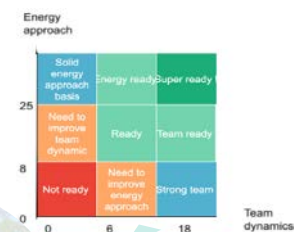
Energy efficient pathway for city transformation, enabling a positive future

City level
demonstration
approach

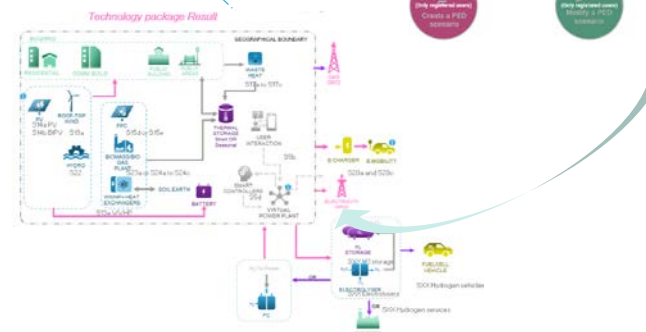
Guidelines & Tools
to maximize
replication



3 PEDs implemented
in our LHCs



6 PEDs designed
in our FWCs



Demo PED in MAKING-CITY



OULU

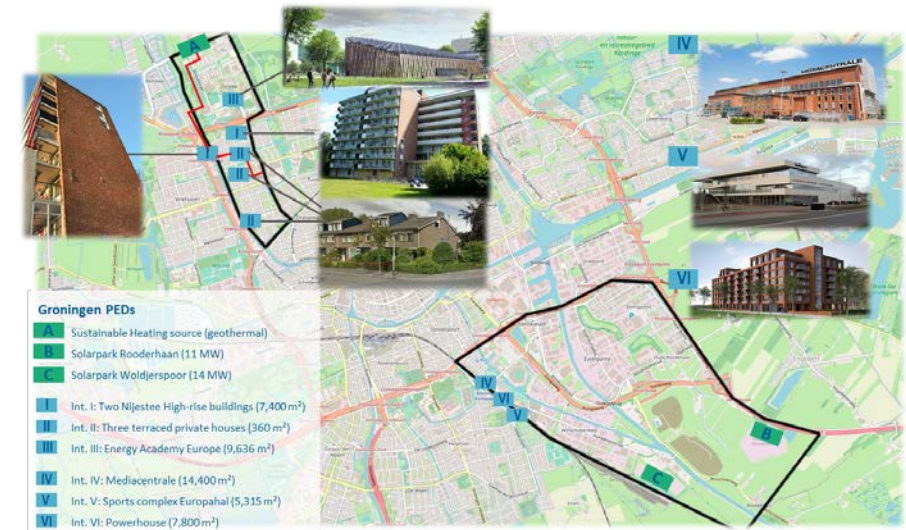
KAUKOVAINIO
district



GRONINGEN

Groningen
NORTH

Groningen
SOUTHEAST



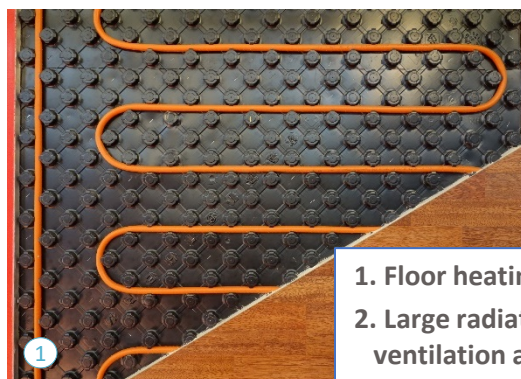
Solar Footpath [Groningen]



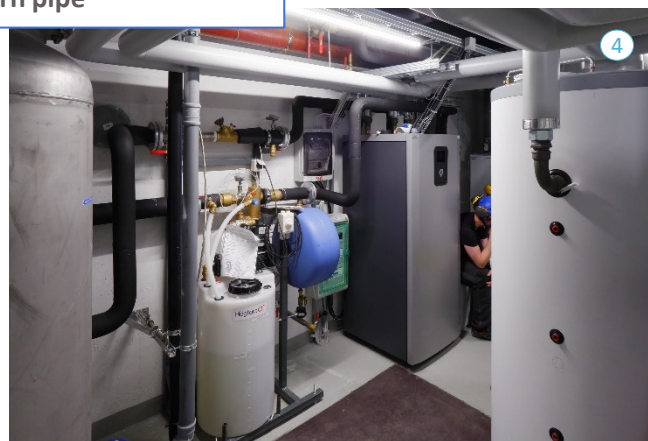
400 m2 Solar footpath at Europapark
2,544 tiles of 35 by 35 cm
Solar tiles made of recycled plastic
(PLATIO)

Annual electricity production: 53,000 kWh
Connected to the New HarmBuitenplein Building

Solar heat pumps in district heating [Oulu]



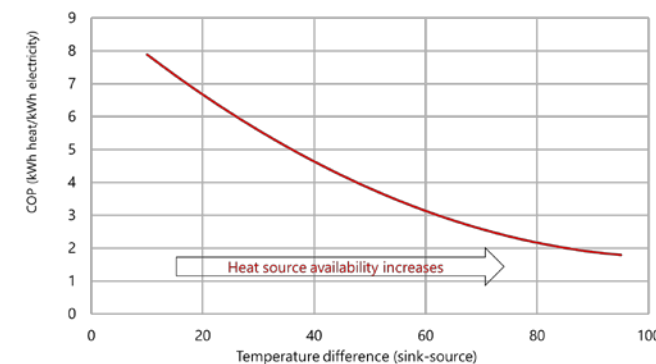
1. Floor heating
2. Large radiators and ventilation air heaters
3. Stepwise heating of DHW
4. Heat pump in supply or return pipe



Background of many Making-City-solutions lies in the evolution of the "good" heat source temperatures. The direction is closer to the ambient temperature.

How to use $<40^{\circ}\text{C}$ heat in buildings: larger heat transfer area and/or higher speed of flows \rightarrow higher heat transfer coefficient

Heat pump CoP as a function of the temp difference between source and sink



Thank you

Get in touch for more information!



Cecilia Sanz Montalvillo, cecsan@cartif.es
MAKING-CITY Project Coordinator



Follow us on Twitter & LinkedIn!
[@MakingCity_EU](https://twitter.com/MakingCity_EU)



Project information available on the
MAKING CITY website: www.makingcity.eu
Contact us: contact@makingcity.eu



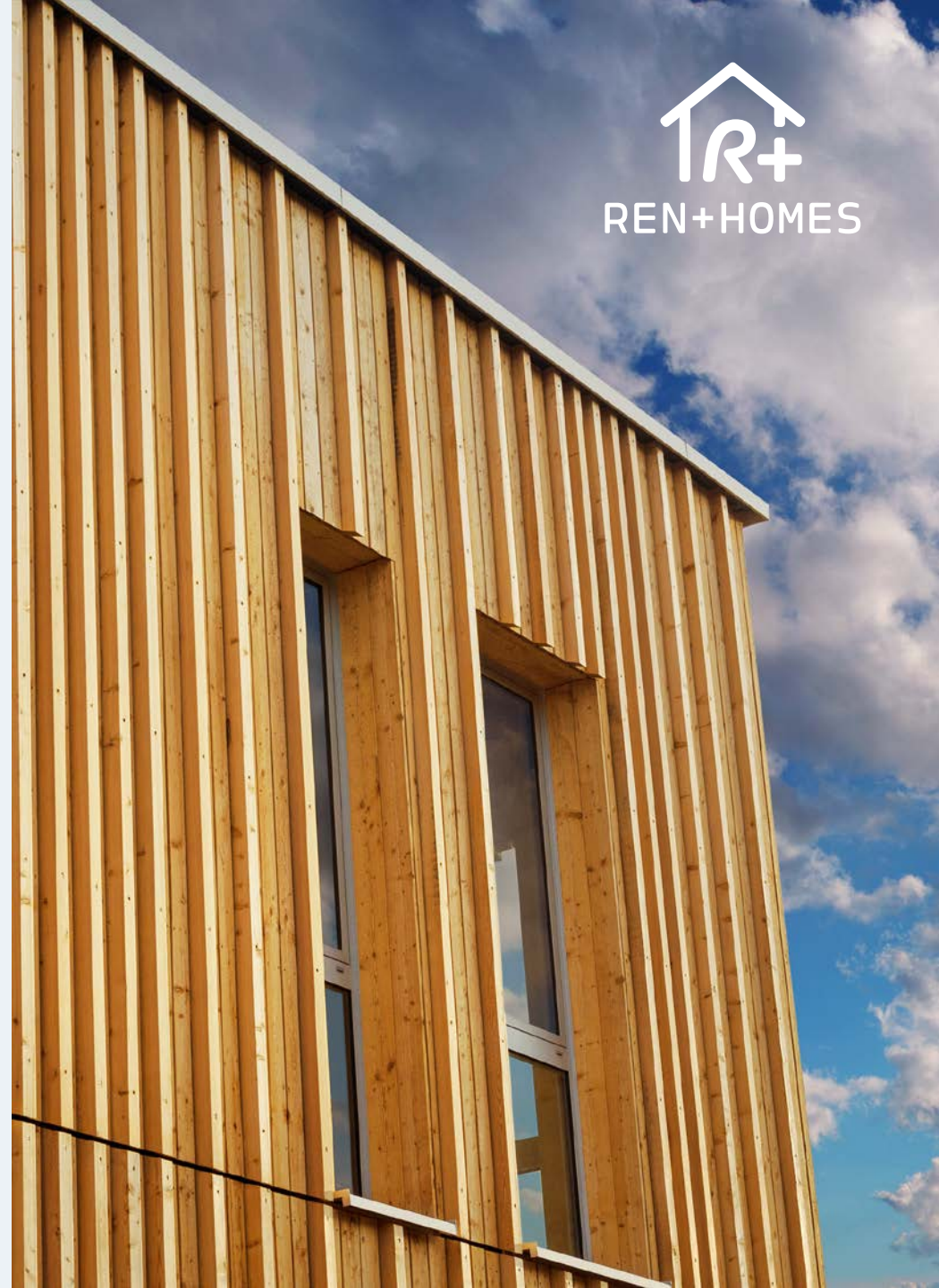


Laura Bordo

*+ More Energy
- Less Emissions
= A new method
for positive buildings*



Funded by
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REN+HOMES in a nutshell

Our ambition is to **develop a universal methodology** for positive energy homes and residential districts.

We aim to contribute to a sustainable transition by **reducing carbon emissions while addressing resource scarcity and energy poverty.**

Key technologies

The project focuses on deploying a range of widely available and affordable **key technologies**, developing highly replicable technology packages, and integrating software solutions to streamline processes.

REN+HOMES has set a goal to develop and test **23 solutions**, including:

+ 9

**Hardware
solutions**

+ 7

**Software
solutions**

+ 7

**Circular plus
energy homes
methodologies**

Demonstrators

The technologies will be adopted in **four pilot sites** across Europe.



Innsbruck (Austria)

Young living apartment blocks



La Garriga (Spain)

Private Apartment Blocks



Tallin (Estonia)

Renovation of students dormitories



Cluj (Romania)

Students accommodations

Challenges

Replication and upscaling from positive energy buildings to PEDs:

Applying the same solutions and technologies to a big number of buildings and connecting them

End-users engagement:

Understanding the needs, meeting the expectations, co-creating solutions and keeping the future tenants informed about the advantages, functionalities and progresses of their positive energy building

Thank you for your attention!

R&D Project Manager
Laura Bordo

Visit our website:
www.renplushomes.eu



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Auto characterization of PEDs for digital references towards iterative process optimisation

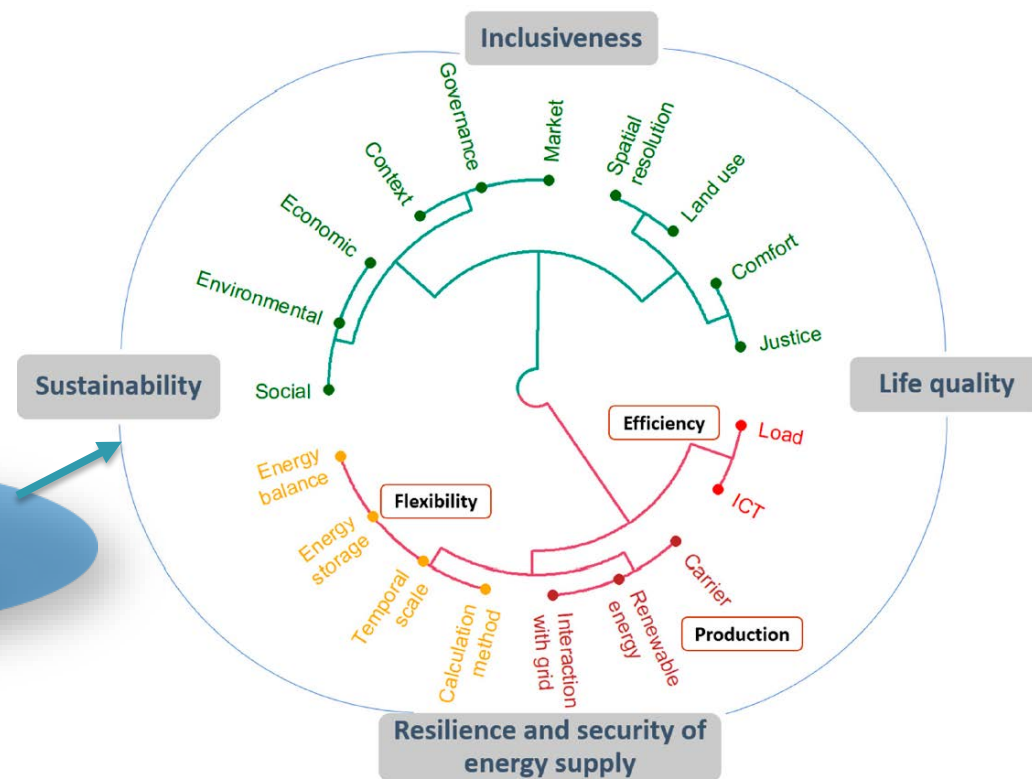
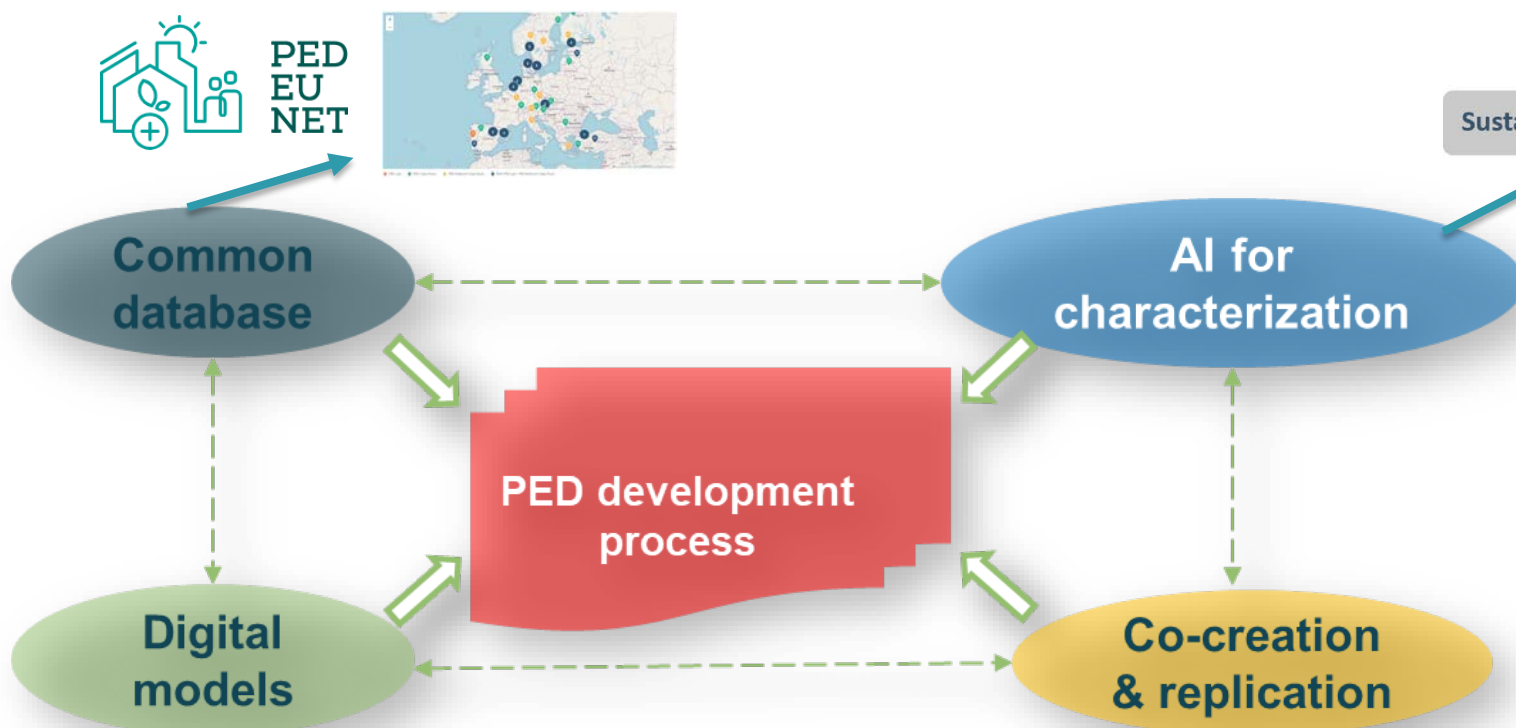


Xingxing Zhang



Main Goals

Our main contributions

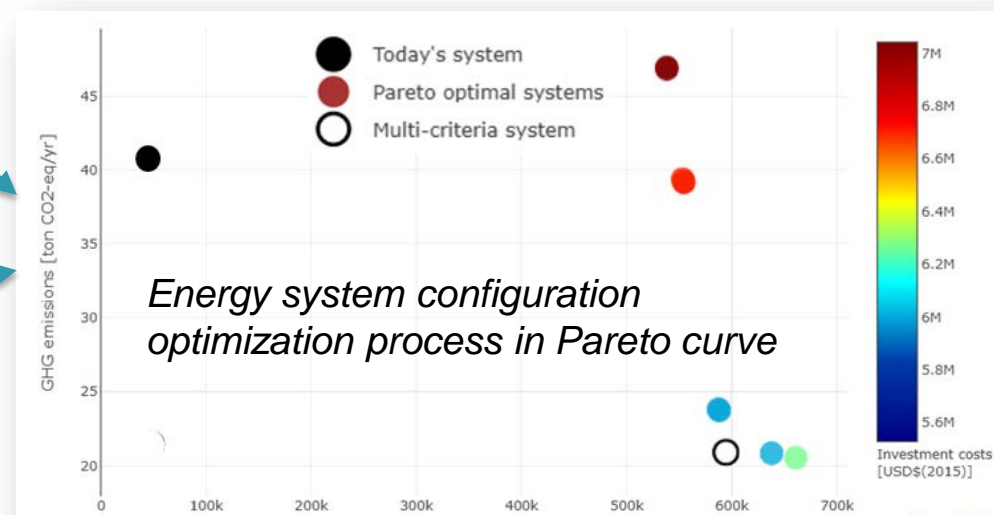
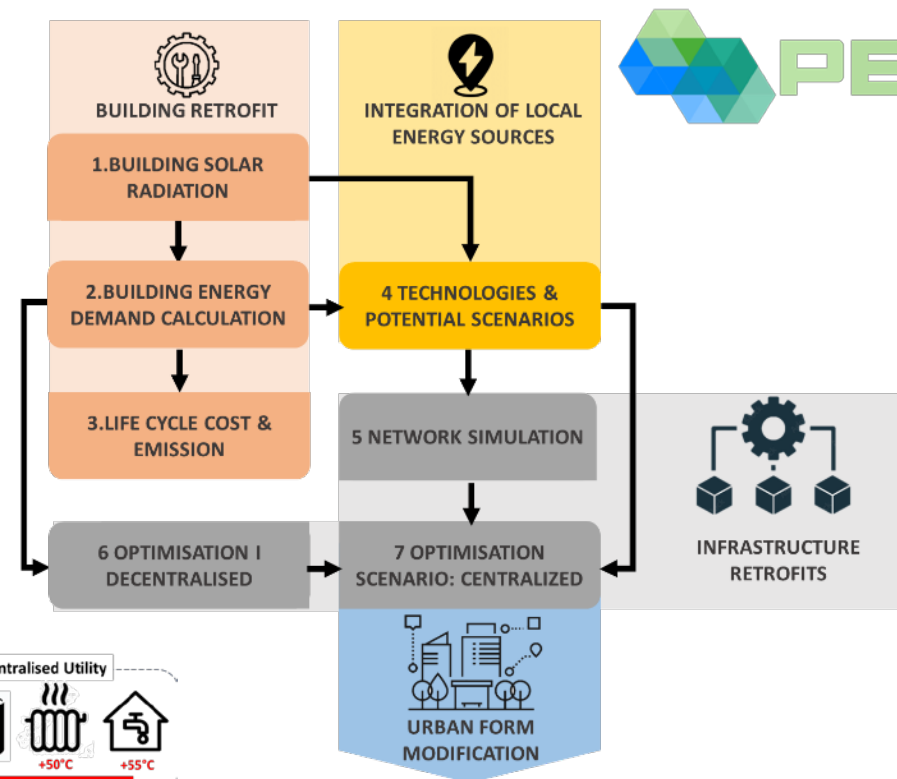
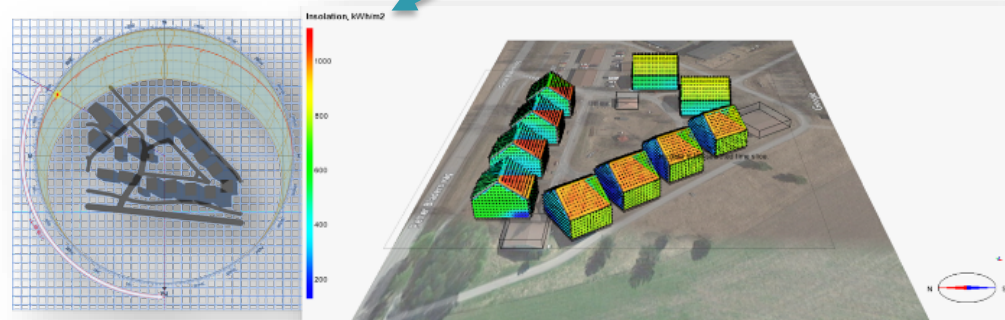
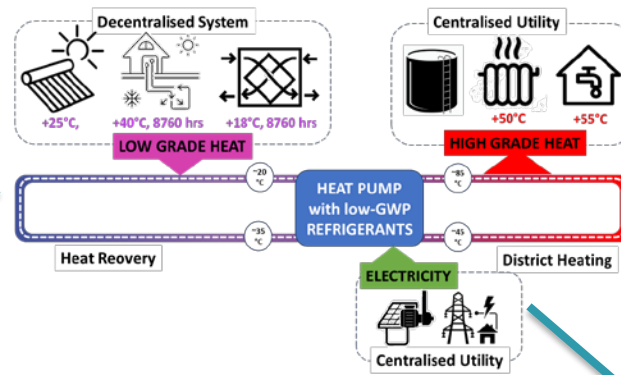


PED elements and guiding principles



Main findings

- Pathway to evaluate the possibility of existing districts for being PEDs





Challenges

Identified Challenges:

- Due to the possible delay in municipality's action on supply data of the target district, there is a risk in **delaying the development of digital models**.
- Different methods in development of digital models for simulation.
- Delay in the Turkish partners' funding.
- **Continuous passion and interest** in developing the project, especially for the co-creation of PED.
- Variation of contact person from partners, such as municipality.
- Although we have regular project meeting every two months, it is not enough to exchange the practical information from local demo cases.



Co-creation: this PED manifesto outlines a vision for transitioning to Positive Energy Districts (PEDs) through a holistic and inclusive approach. Show your support for the manifesto by signing it at [PED-ACT](#).



INTERPED

InterPED: INTERoperable cloud-based solution for cross-vector planning and management of Positive Energy Districts

Sustainable Places Conference, Luxembourg, 25th September 2024

Lorena Sánchez Relaño, R2M Spain



**Lorena Sanchez
Relaño**



Co-funded by
the European Union

The Project – Quick Facts

Project Coordinator:

Raymond Sterling - Lorena Sánchez Relaño

R2M Solution Spain SL

Project number: 101138047

Project name: INTERoperable cloud-based solution for cross-vector planning and management of Positive Energy Districts

Project acronym: InterPED

Start: 01/01/2024

Duration: 36 months

Costs: €6,978,353

Funding: €4.884.847

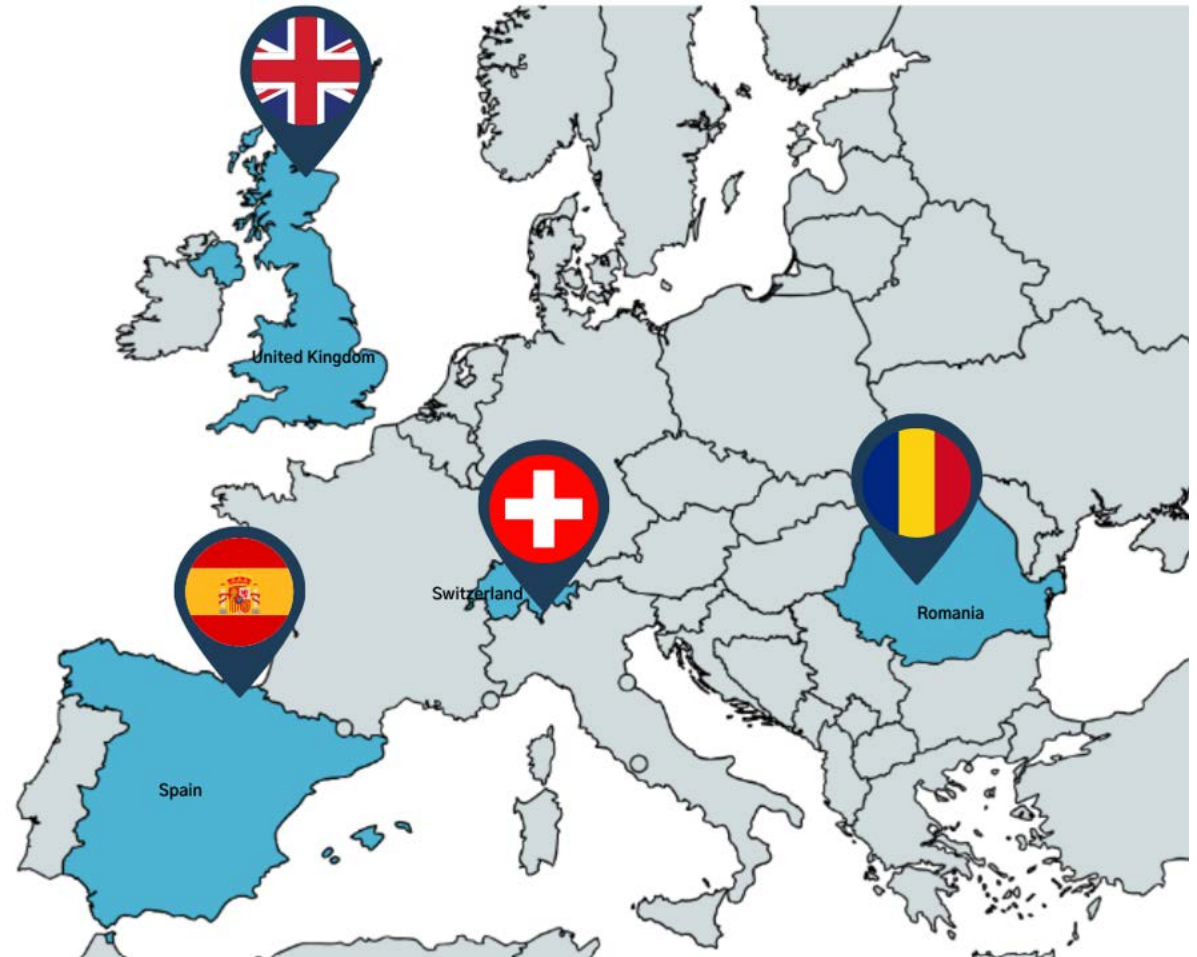


InterPED's Objectives

Integrating ICT for PEDs: Deploy a cloud-based solution enhancing sector coupling and demand flexibility.

Large-Scale Validation: Demonstrate the InterPED solution in diverse pilots, targeting a 30% unlock in demand flexibility.

Replicability Plans: Extend InterPED's impact beyond the project with strategies for adoption in 'follower' districts.





Innovative Aspect



**Cross-Vector
Planning Toolbox**



**Cross-Vector
Optimization**



**Life-Cycle
Assessment (LCA)**



**Predictive Data
Analytics for Demand
Flexibility**



**Improved
Integration and
Interoperability**



**Active Community
Participation in
Demand Response**



**Community
Energy Trading
with Advanced
Technologies**

Benefits of InterPED

- ✓ Reduced reliance on fossil fuels and greenhouse gas emissions.
- ✓ Increased energy security and independence for cities.
- ✓ Lower energy costs for residents and businesses.
- ✓ Engaged and empowered communities taking ownership of their energy future.

Potential challenges: Difficulties engaging users, regulation and system's interoperability.



Thank you!

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GS-y
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& TECHNOLOGY ALLIANCE

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CITADEL IN ROMANIA

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SOLUTION

University of Applied Sciences and Arts
of Southern Switzerland
SUPSI

HERIOT
WATT
UNIVERSITY



Julia Schließauf

Leipzig: creating sustainable neighborhoods as blueprints for a climate-neutral Leipzig

Julia Schließauf
Smart City Unit, City of Leipzig



3 demonstration areas for climate-neutral neighbourhoods Leipzig



Duncker neighborhood



Solar Thermal Plant



Leipzig-West

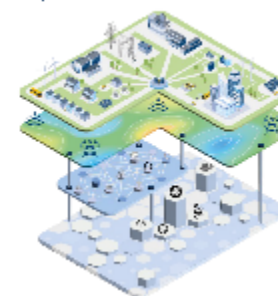


Baumwollspinnerei



SPARCS Virtual Powerplant

- Intelligent EV Charging**
Remote stopping of the charging process in the event of grid fluctuations
- District Heating**
Efficiency increase of the district heating system through IoT and AI-based algorithms
- Use Trade Simulation**
Use of trade simulation for energy management and optimization
- Weatherboards**
Decision-making interface for the integration of energy resources by means of weatherboards



- Live visualization**
Real-time visualization of the energy generation and consumption
- Smart Sockets**
Remote control of the energy consumption of individual devices
- B2B Energy Storage**
Storage of excess energy for use during peak demand
- Solar Thermal Plant**
Integration of the solar thermal plant into the energy system



Virtual energy district

Objectives & key innovations



Main Objective(s)

- ❖ Demonstration of solutions for PED incl. RES integration, integration of RES in existing district heating network, virtual power plant, energy storage system, e-mob. & bi-directional charging in existing housing blocks and mixed use areas
- ❖ 3 demo districts: Leipzig-West (incl. Duncker Neighbourhood), Baumwollspinnerei, Virtual Energy District
- ❖ Include all relevant stakeholders from citizens to local businesses



Key innovations

- ❖ Create tools for municipality for faster and more effective planning and implementation of climate neutral districts (Leipzig Energy Map, Standard model)
- ❖ Dynamic heat controll and new Business Modell for „Mieterstrommodell“
- ❖ Implementation of a Virtual Power Plant

Challenges



❖ Regulatory and legal challenges

Complex, innovative microgrid solutions were difficult to implement due to rigid regulations

❖ User engagement and acceptance

Technical solutions are difficult to explain

Sustainable energy Positive & zero cARbon CommunitieS

<https://www.sparcs.info/>

  @SPARCSeu

Julia Schließauf
City of Leipzig
Smart City Unit

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ESP00



Stadt Leipzig



KLADNO



ΔΗΜΟΣ ΚΗΦΙΣΙΑΣ



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SIEMENS



Citycon

ril

Adven

Fraunhofer

BABLE



Leipziger
Stadtwerke

CEN[ER]O

seecon
Ingenieure



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LEIPZIG

spí
Sociedade Portuguesa de Inovação



OR
Reykjavik
Energy



Suite5
We Deliver Intelligence



АВИАВТОДОР

MOTOR OIL

GOPA.com.





Accelerate poSitive
Clean ENergy Districts



 Mohaddeseh
ASCEND Maktabifard

ASCEND

Accelerate poSitive Clean ENergy Districts

Mohaddeseh Maktabifard, EU Project Manager &
Business Developer, Architect (R2M)

25.09.2024



Funded by
the European Union

In a nutshell



Duration: 2023 – 2028



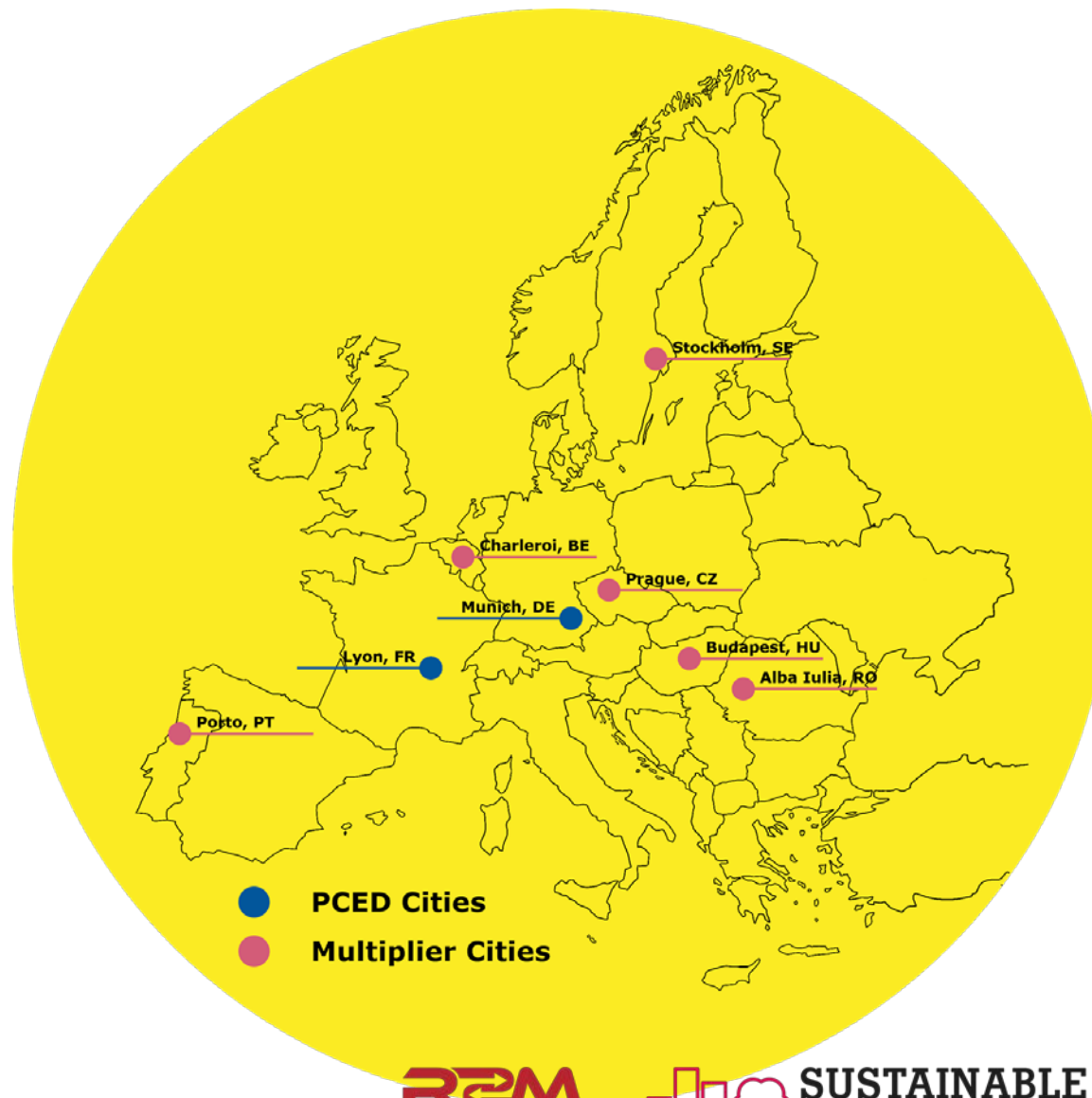
Coordinator: SPL Lyon Confluence



8 demo areas for Positive and Clean Energy Districts (PCEDs)



39 partners in Europe



Objectives



Create PCEDs across Europe to **mitigate the effects of climate change**



Make cities **healthier, smarter**, more **sustainable** and **inclusive**



Deliver two **PCEDs** in the Lighthouse cities (LHC) **Lyon** and **Munich**.



Bolster PCEDs by 6 Multiplier cities (MC) in **Porto, Charleroi, Prague, Stockholm, Budapest** and **Alba Iulia**.

Key Innovations: How do we deliver the PCED through SPs?

ASCEND uses **6 solution packages (SPs)** to design and implement inclusive, cost-effective PCEDs that aggregate **technical, business model** and **financing components**.

SPs are standardised and **adapted to suit the local context** and the **needs** of each districts.



SP1

Digital infrastructures and ICT



SP2

Deployment of energy communities and prosumer services



SP3

Deployment of energy-efficient buildings integrating RES and storage



SP4

Decarbonised mobility & freight



SP5

Citizen-centred solutions



SP6

Urban orchestrator

Value propositions: Impacts at the end of the project



2 large-scale PCEDs fully delivered

25 planned and started by 2028
in both LHCs and MCs



6 Solution Packages (SP)

validated by the market including
innovation in governance and
PCEDs data platform.



Repository of solutions

in GitHub



City Investment plans

relying on innovative
financial schemes generated by
the SP implementation



KPI engine

an innovative monitoring
methodology to support PCED
implementation



City Multi Criteria Decision Analysis (MCDA) tool

Challenges:



Insufficient Financial Instruments

Traditional instruments are not equipped, this led to increasing reliance on private equity, resulting in higher financial costs & gap in equity capital.



Weak Financial Capacities of City Representatives

City representatives sometimes lack the financial expertise needed to structure funding scheme effectively. This deficiency is compounded by lack of interest from institutional investors.



Lack of Bankability Assessment

Difficulty to attract necessary investments as projects lack documented business models and revenue streams, which further hinders their appeal to investors.



Need for Innovative Financing Approaches

Current landscape lacks standardised & scalable models, which complicates investment. A more innovative approach is necessary to engage key market players

Thank you

<https://ascend-project.eu/>



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Empowering Cities Through Positive Energy Districts (PED)

Discussion part:

Q1: How have you engaged local communities in your PED project, and what strategies have been most effective in gaining their support?

Q2: What economic models or funding mechanisms have proven successful in making your PED project financially sustainable?

Q3: What technological innovation from your project has had the most impact on achieving positive energy balance?

Q4: Could you generate any policy recommendations based on the design/implementation of PEDs in your project? How should be the optimum political, legal environment for encouraging PED developments?

SUSTAINABLE PLACES 2024

Empowering Cities Through Positive Energy Districts (PED)

Closing Remarks




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THANK YOU!