



Knowledge Integration for Neighborhoods in Energy
Transition led by Inclusive Communities

EU City Lab

20 Nov 2024

Codruț PAPINA
URBASOFIA - Bucharest

KINETIC

Knowledge
Integration
for
Neighborhoods
in
Energy
Transition
led by
Inclusive
Communities



KINETIC project – Overview

Ambition

SCOPE:

KINETIC is proposing to overcome the barriers between industry (innovation) - decision-makers - users - urban environment, mitigating the Green Premium Gap, by approaching PED as subject to co-creation.

AIM:

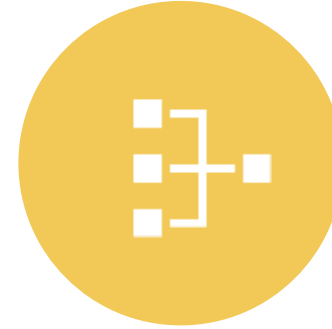
i. Allow for a sustainable and community-driven PED transformation, based on a good understanding of the flexibility options resulting from smart energy management



O1 SHARED AND ASSUMED VISION

3X8 Local Workshops

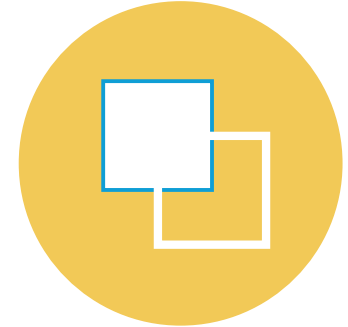
Deploy multi-level co-creation processes for achieving a shared and assumed transformation pathway based on



O2 INTEGRATED SET OF ACTIONS FOR PLANNED INVESTMENTS OF THE DEMO SITES

3 Tailored Strategies

Deploy feasible options for maximizing the already planned and future investments of the municipalities involved ->



O3 REPLICATION OF KINETIC PROJECT PHILOSOPHY AND OPERATIONALITY

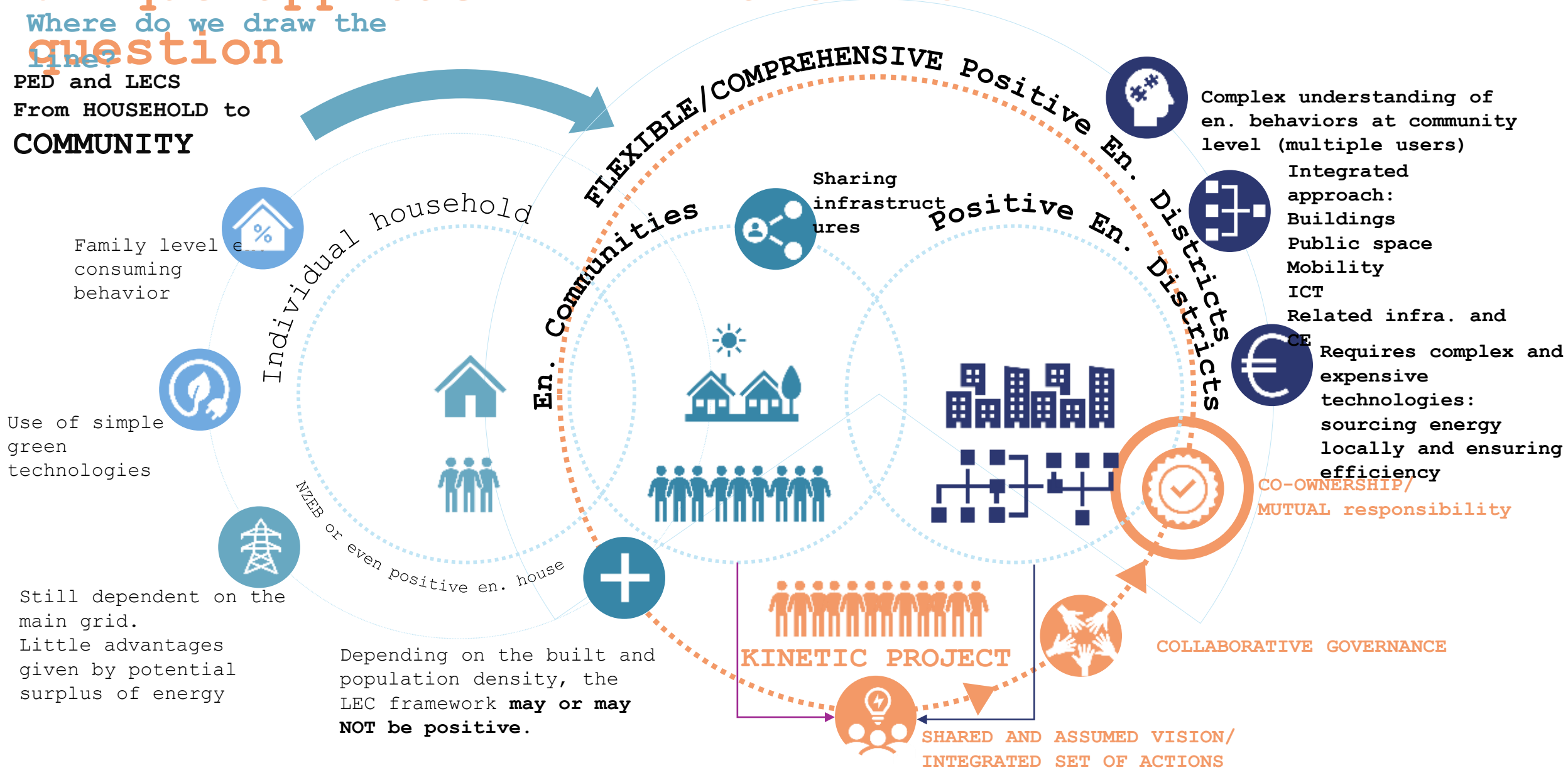
3 Webinars / 3 Workshops

The project suits 3 different contexts and goes beyond city partners, by developing instruments for replication at the

Unique approach - PED and LEC

Where do we draw the line?

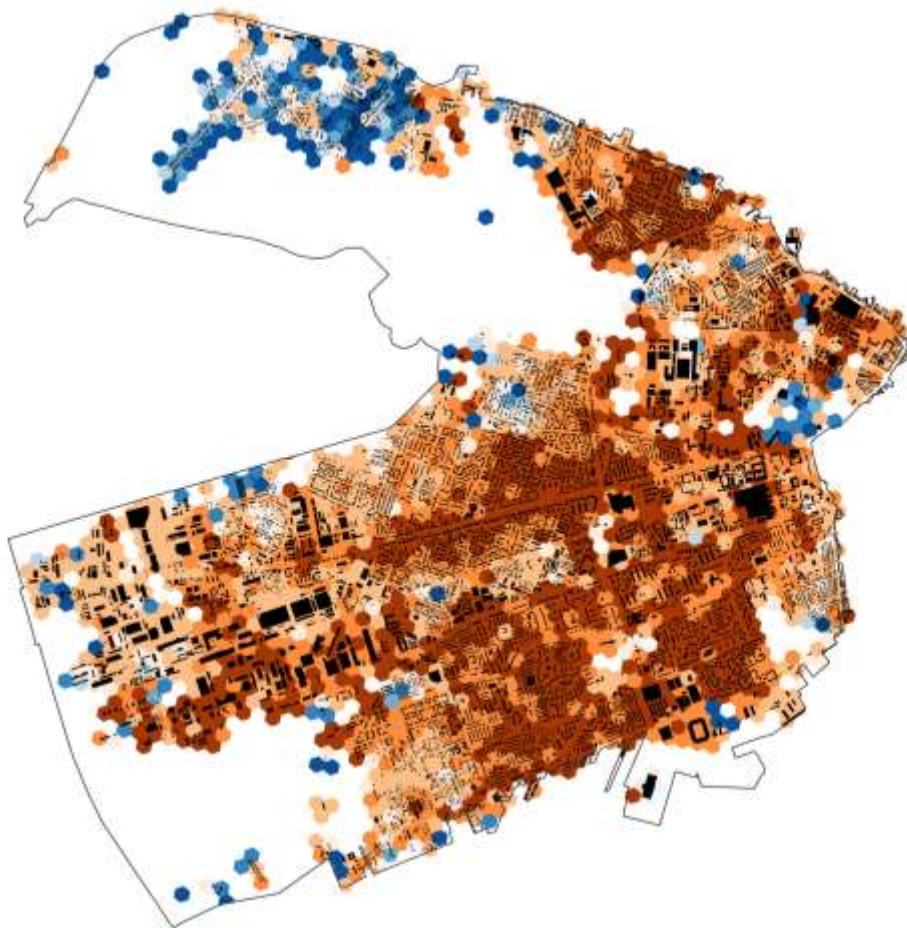
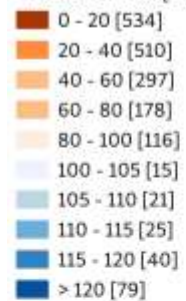
PED and LECS
From HOUSEHOLD to
COMMUNITY



Unique approach - PED mapping

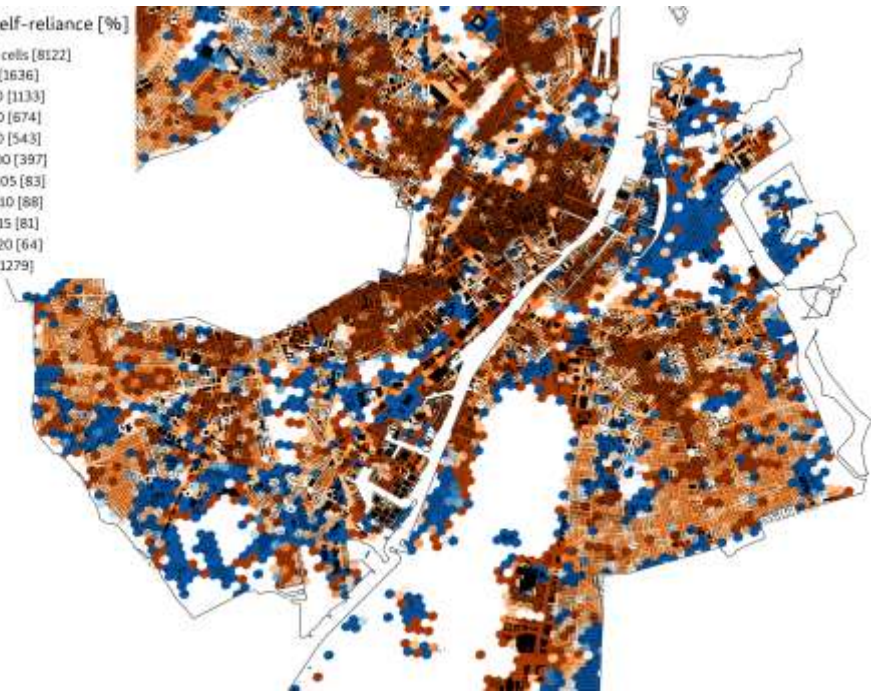
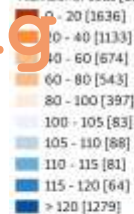
Energy self-reliance [%]

Number of cells [2633]



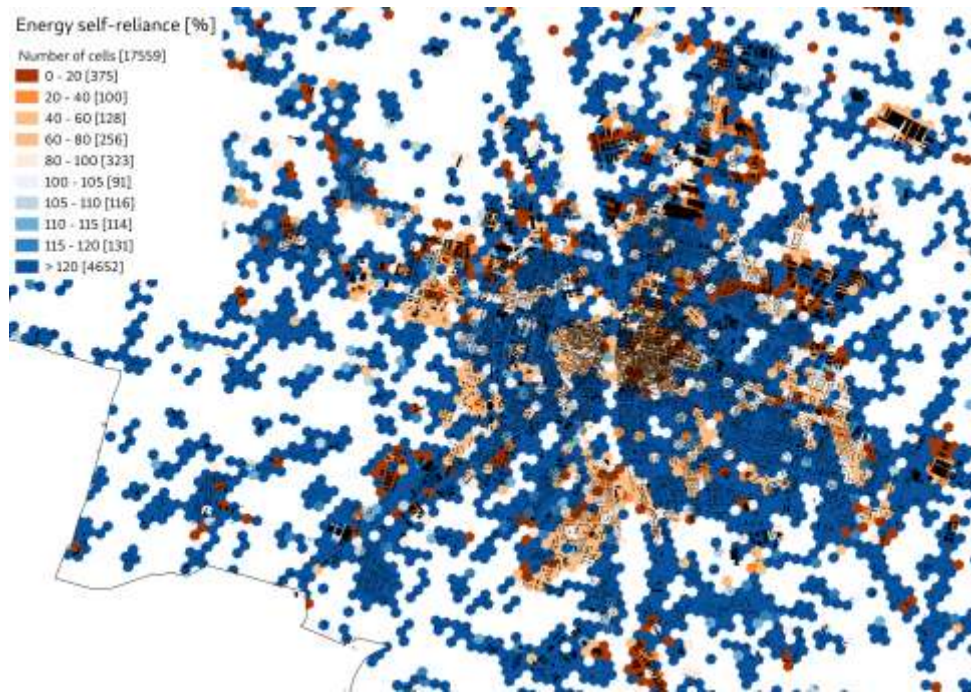
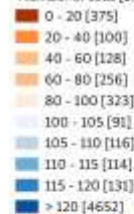
Energy self-reliance [%]

Number of cells [8122]



Energy self-reliance [%]

Number of cells [17559]



Overview of the case studies

Bucharest DC6

Buildings	Av. Year of constr.
443	1963-1984

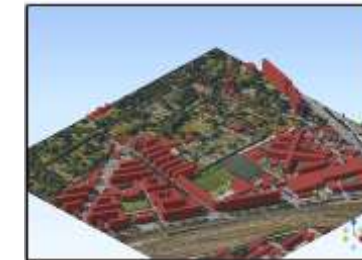
Bucharest DC6, is a densely populated area characterized by predominantly multi-story residential buildings, with thermal energy for **heating** supplied by a **methane-based district heating system.**



Copenhagen

Buildings	Av. Year of constr.
85	heterogeneous

This district of Copenhagen is characterized by the high presence of **short and tall buildings of different destination of use** (gyms, recreative areas, schools, houses) and by **district heating** system powered by **biomass.**



Parma

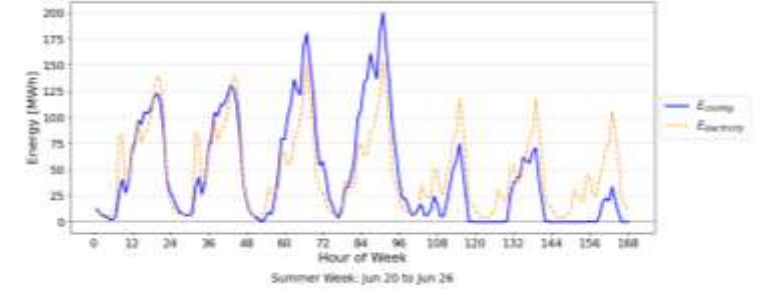
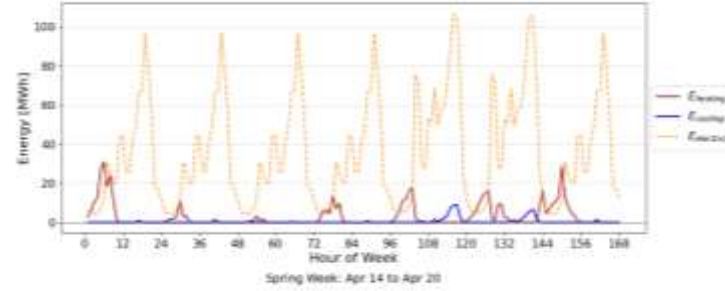
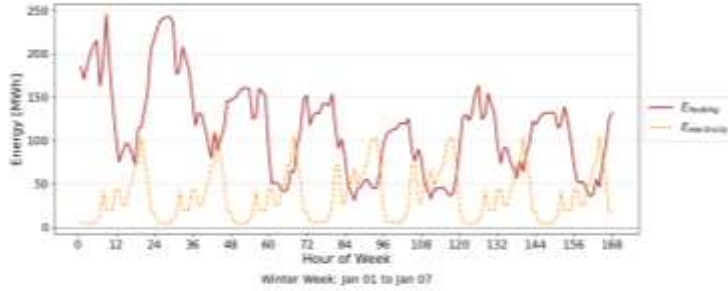
Buildings	Av. Year of constr.
1259	heterogeneous

The Parma district is characterized by buildings with **diverse uses** (residential buildings, schools, hospitals and productive buildings), each served by its **own heating system.**

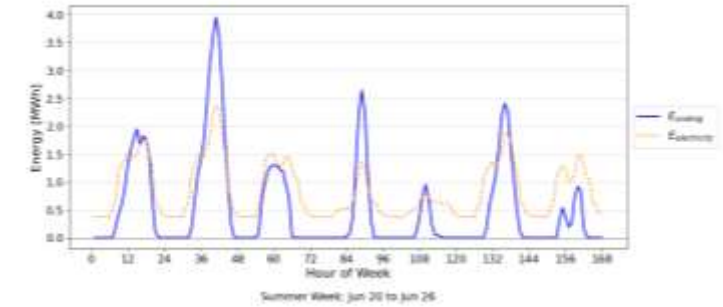
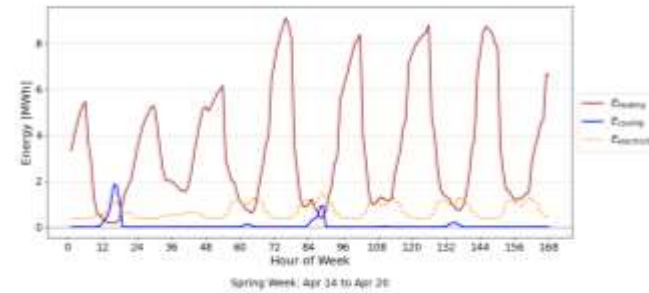
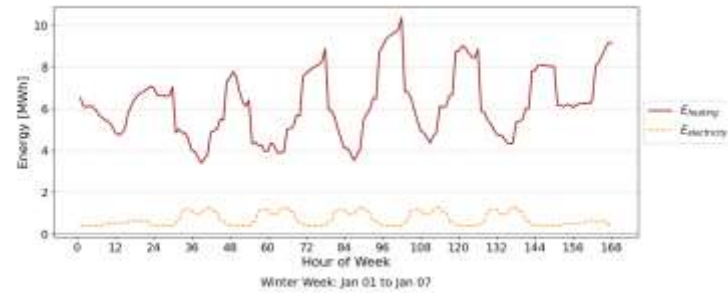


Initial state and challenges of case study

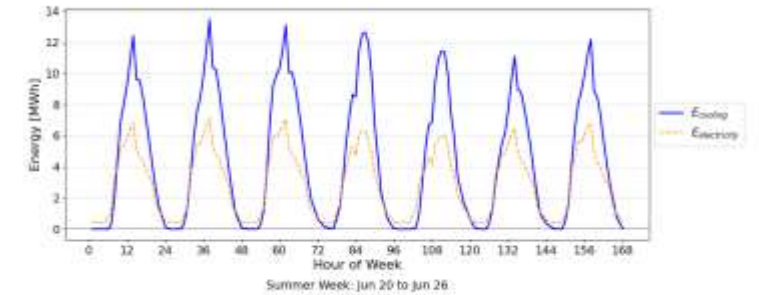
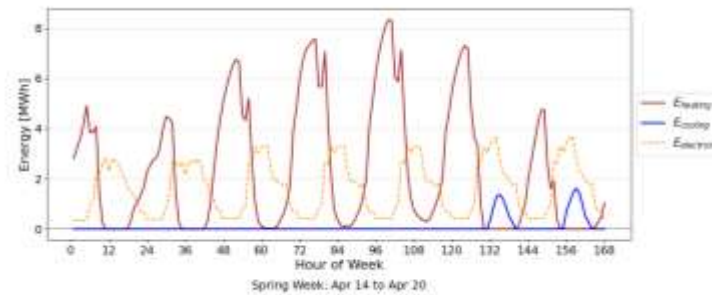
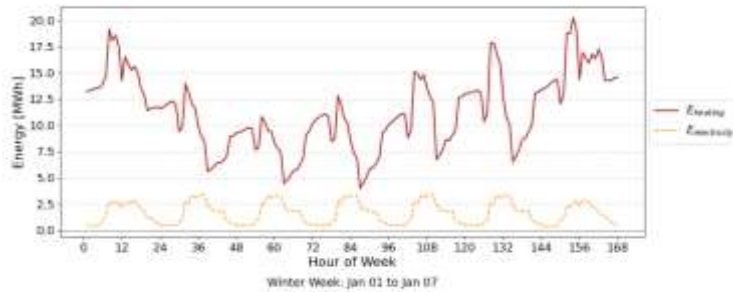
di



Bucharest



Copenhagen



Parma

KINETIC project – Overview

DEMO Cities

@AAU/KK



Bucharest Drumul Taberei

Focus: Smarter investments at building level

Achieving PED status is an almost impossible goal, without major investments to different levels of infrastructures. However, the value stands in performing renovation interventions that goes beyond the current practices, and push for



Copenhagen Baunehøj

Focus: Building a smarter DH system.

It is difficult for the heat utility to effectively promote the development of “low temperature district heating ready buildings” through is individualised market-based customer relationships. For PV there is high



Parma University Campus

Focus: Renewable Energy Communities, based on PPP

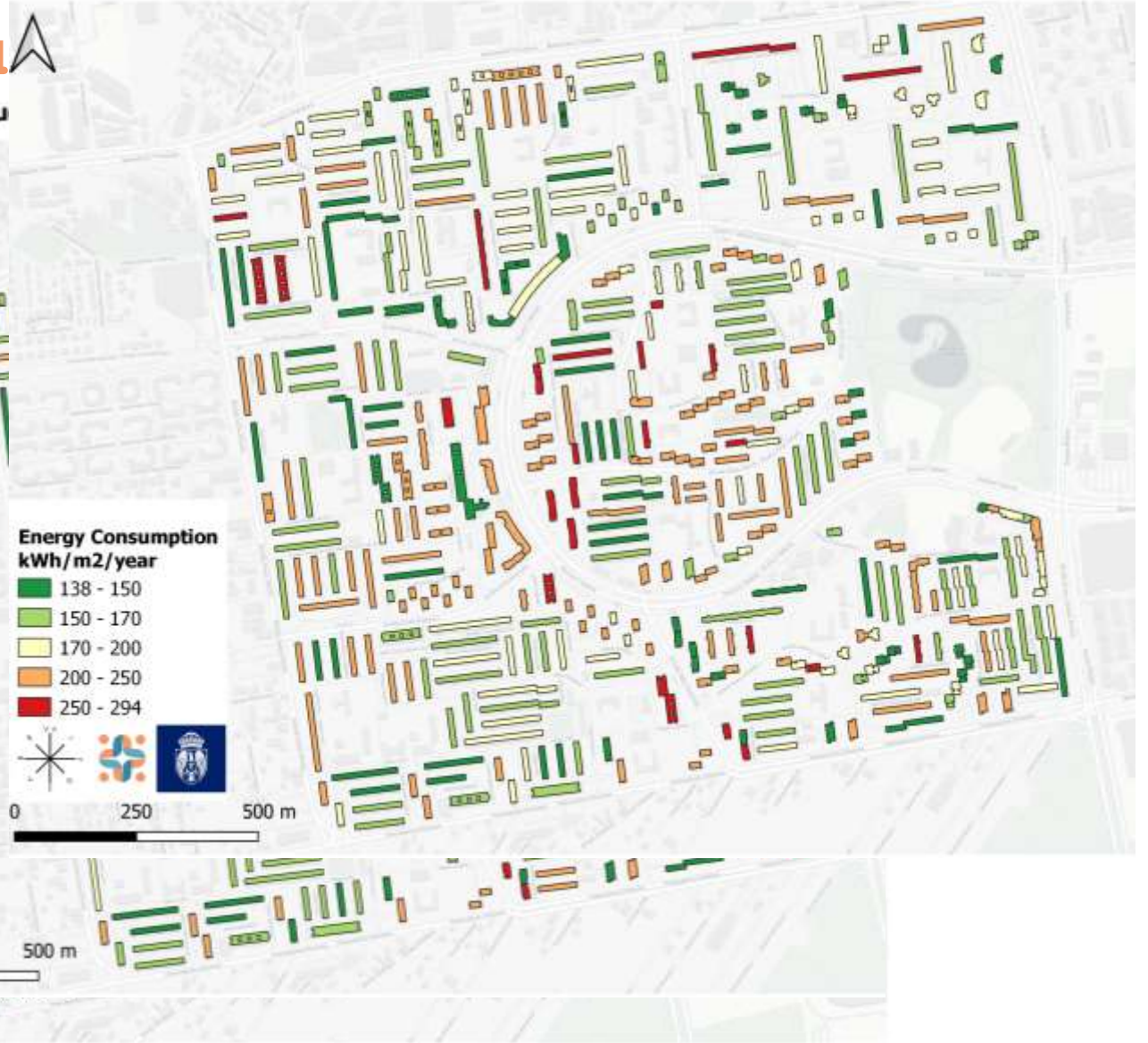
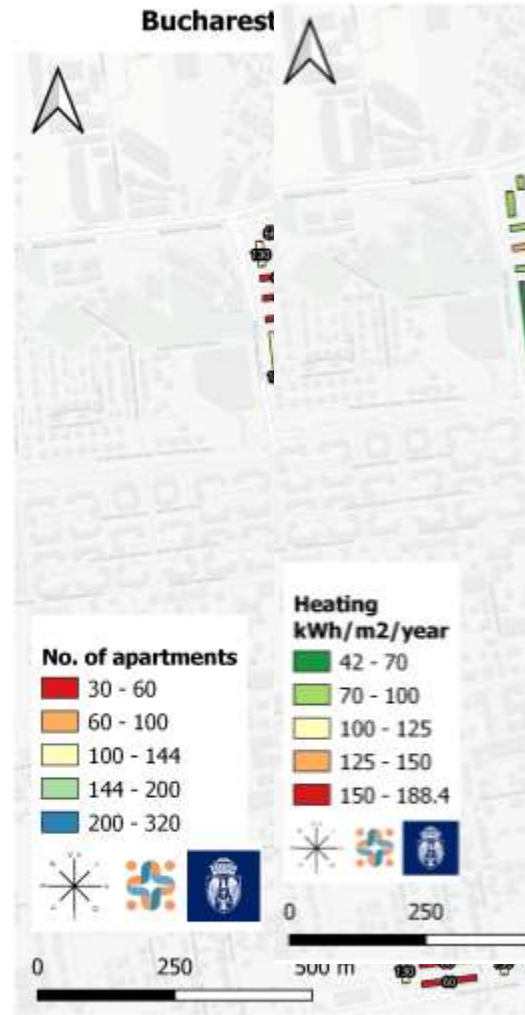
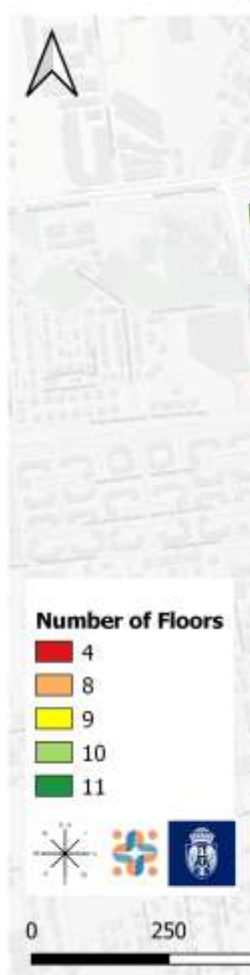
Parma successfully established one of the first REC in IT, installing a 1MW infrastructure at the CNR headquarters. KINETIC efforts for PED in the case of the Campus, and surrounding areas, is to ensure alignment with CNS and the REC with

Deep drive - S6

Drumul Taberei



Data collection (Drumu



Unique approach - PED assessment

Working with archetypes (Bucharest DEMO)



P+10 LINIE



P+10 TURN



P+8



P+4 LINIE



Facilități



Parcul Drumul Taberei

Reabilitat

Energie: 146
kwh/m2/an

CO2: 34.05 t/m2/an

Nereabilitat

Energie: 190
kwh/m2/an

CO2: 60 t/m2/an

Reabilitat

Energie: 159
kwh/m2/an

CO2: 37t/m2/an

Nereabilitat

Energie: 227
kwh/m2/an

CO2: 52t/m2/an

Reabilitat

Energie: 151
kwh/m2/an

CO2: 29 t/m2/an

Nereabilitat

Energie: 218
kwh/m2/an

CO2: 50 t/m2/an

Reabilitat

Energie: 168
kwh/m2/an

CO2: 33 t/m2/an

Nereabilitat

Energie: 242
kwh/m2/an

CO2: 56 t/m2/an

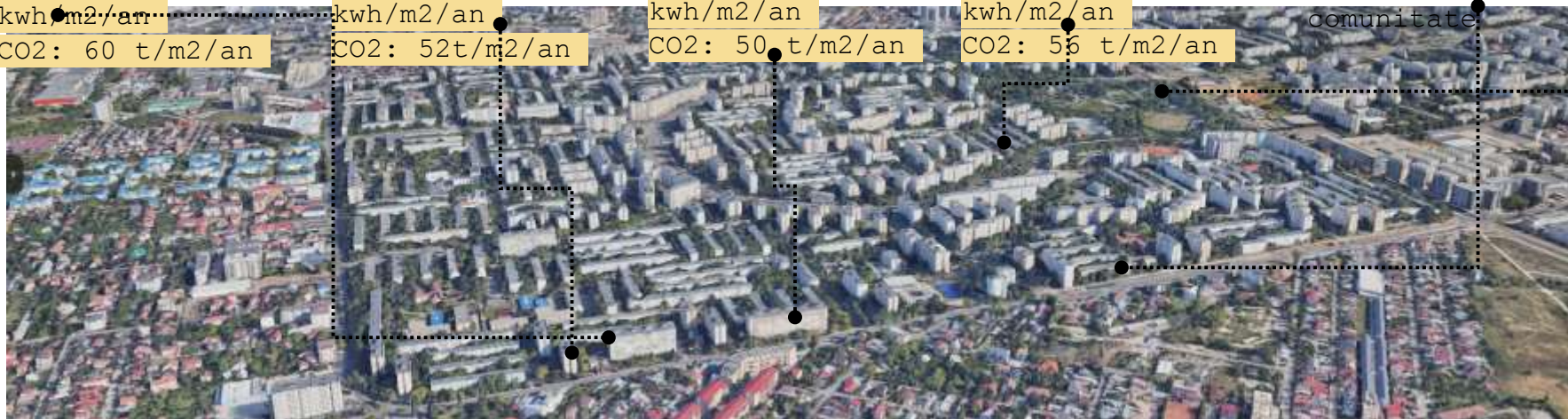
Au potențialul de a fi transformate în producătoare de energie pentru comunitate



Serele Drumul Taberei



Grădinile blocurilor

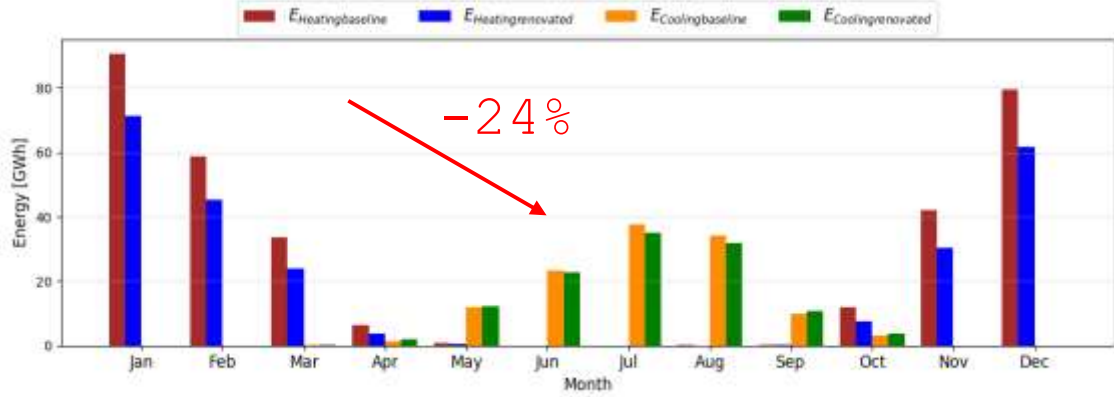


Retrofit Scenarios – Demo 1: Bucharest

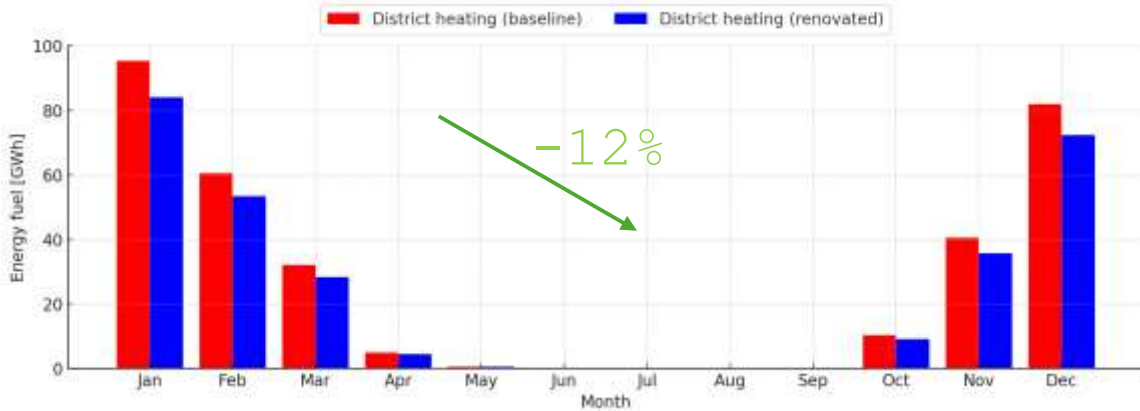
1. Enhanced building insulation

	Heating Demand [GWh]	Cooling Demand [GWh]	Electricity consumption [GWh]
Baseline	323.42	121.64	349.94
Renovated	244.43	118.11	348.93
Difference [%]	-24%	-3%	-

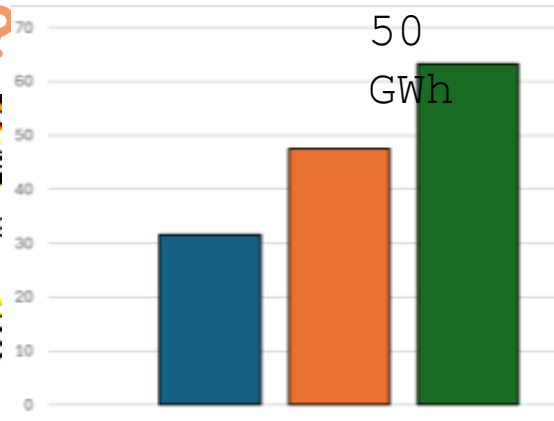
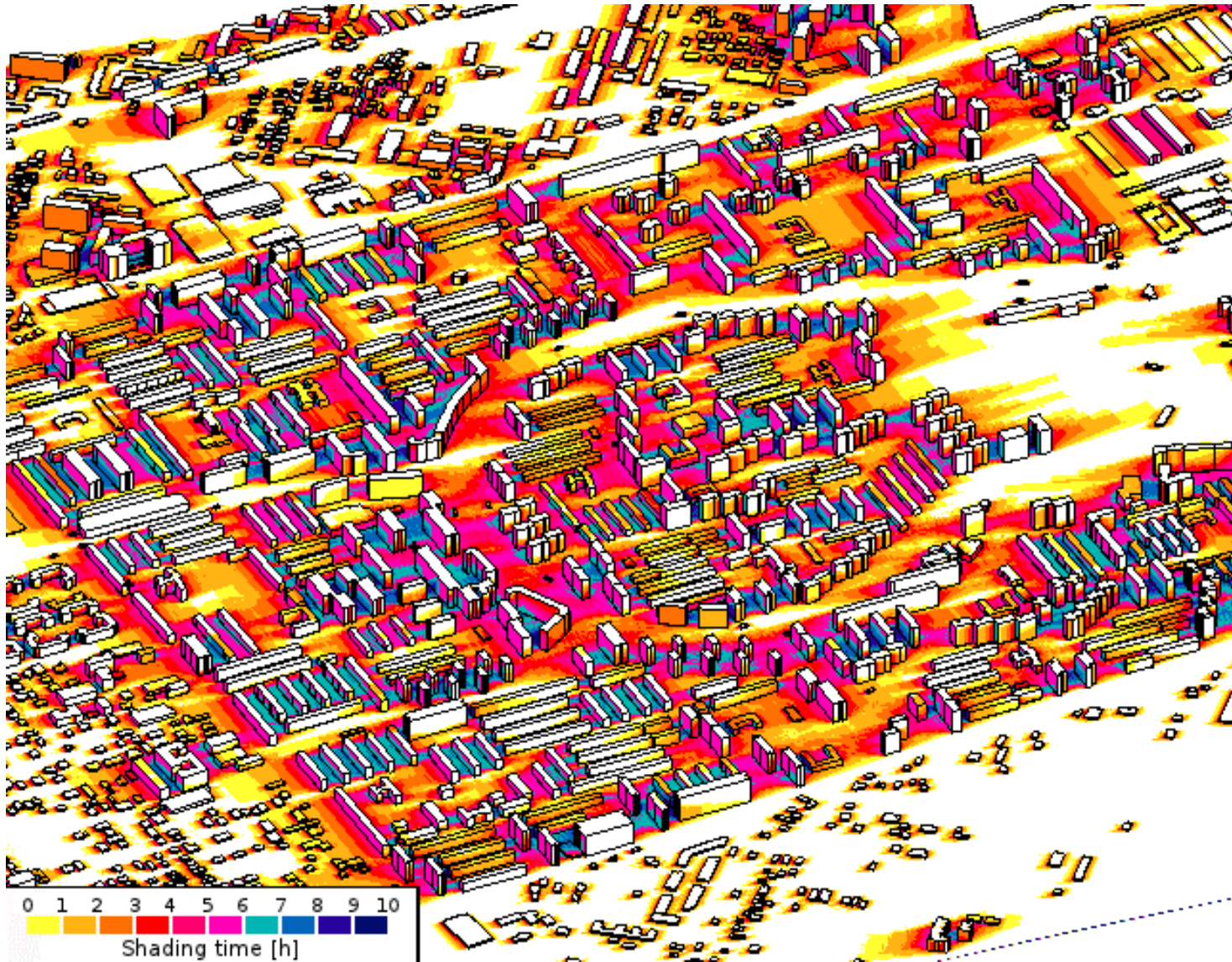
Archetype	Heating Demand (kWh/m ²)	Heating change (%)	Cooling Demand (kWh/m ²)	Cooling change (%)
Archetype 1	74.62	-31%	47.96	1%
Archetype 2	54.16	-51%	24.26	-19%
Archetype 3	86.47	-33%	37.28	-4%



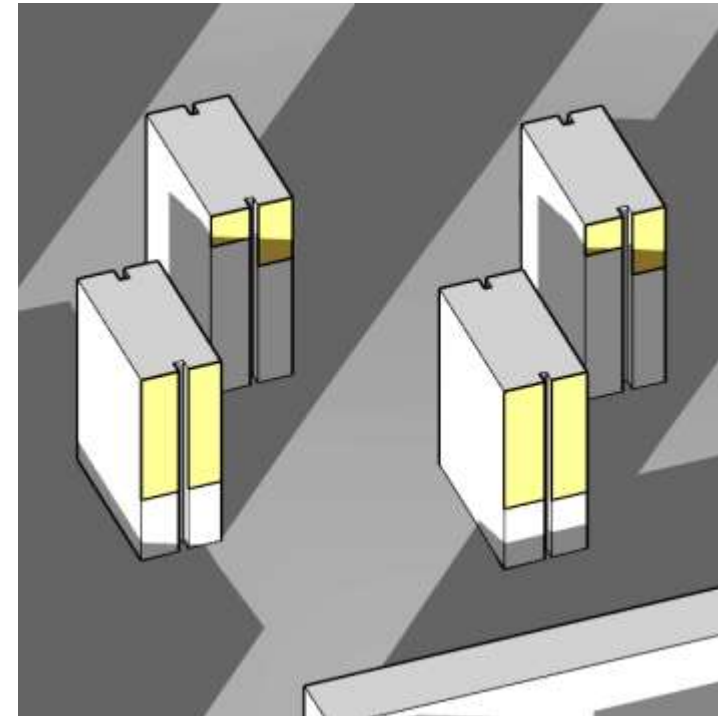
2. Efficiency improvement of the district heating system



Are roofs the only resources?



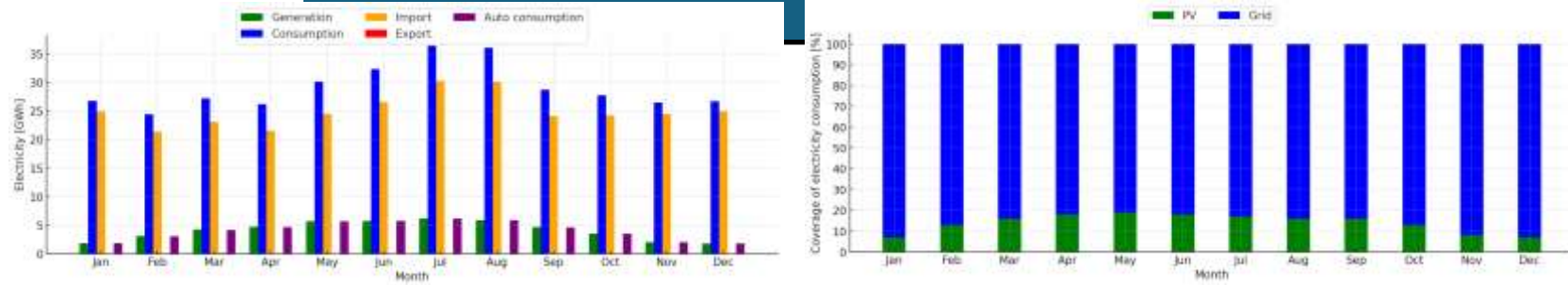
50 - 75 - 100%
coverage



Generation and PED Balance – DEMO 1: Bucharest

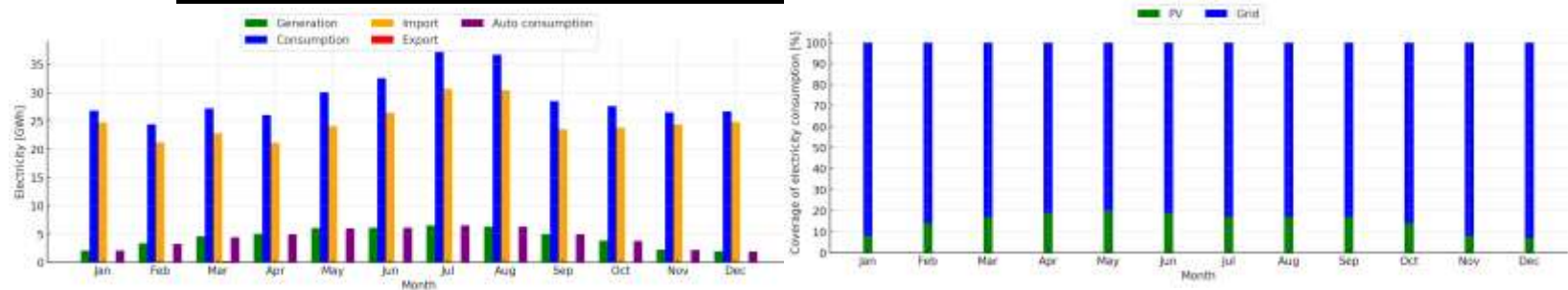
3. Photovoltaic system integrated in the buildings

Roof [m ²]	368,606
Total power installed [MW]	40.95
Electricity Generation [GWh]	49.34
Electricity consumption [GWh]	348.93
Thermal demand covered by fossil fuels	287.56



4. Integration of photovoltaic systems on buildings and public squares

Roof [m ²]	368,606
Public space [m ²]	8,600
Facade [m ²]	17,124
Power installed PV (building integrated+ Public space+ Facade) [MW]	44.39
Electricity Generation [GWh]	52.82
Electricity consumption [GWh]	348.93
Thermal demand covered by fossil fuels [GWh]	287.56



Every step is co-created

Community Powered Progress

Phase 1 : Establishing the DEMO transformation pathways



KEY TIP:
Aim for long term valuable collaborations for achieving a shared and assumed vision.

1 - Stakeholders Identification



KEY TIP:
Barriers can be drivers, be imaginative.

2 - Scenarios for Local Energy Communities



3 - Development Priorities



KEY TIP:
Start from existing resources and acknowledge technological advancements. Be open to different transformation pathways.



Phase 2 : PED strategy elaboration

DEMO PED design

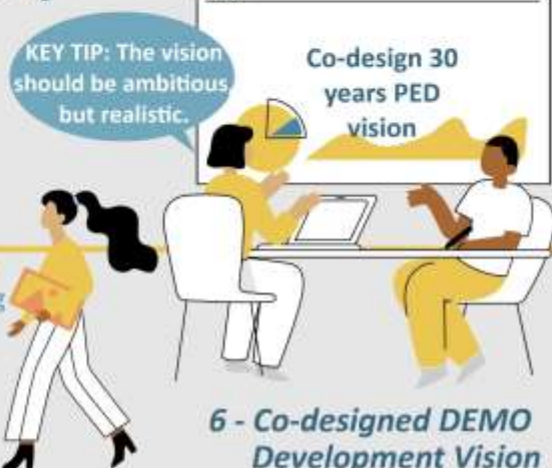


8 - Design of PED Transformation Roadmap

DEMO PED scenario building

KEY TIP: Define the motric forces to drive the transition/transformation.
Scenarios are strategic narratives for achieving the same vision.

7 - Development Scenarios



KEY TIP: The vision should be ambitious but realistic.

6 - Co-designed DEMO Development Vision

DEMO PED assesment/analysis

KEY TIP: The P in PED stands also for PEOPLE, so the overall assessment of energy and community requirements should focus on them.



4 - Data Collection and Energy Requirements

Bucharest Drumul Taberei Energy Transformation Roadmap

Ambition

The long-term ambition for Drumul Taberei's transformation into a **Positive Energy District (PED) by 2050** goes beyond achieving just energy balance. It aims to foster a community-wide spirit of innovation and collective commitment among local authorities, stakeholders, and residents. Despite challenges like high population density and limited space, the focus is on creating a comprehensive, coordinated approach to urban sustainability that can inspire similar projects across Romania.

Key Points:

- **Holistic Vision:** Prioritizes collaboration and coordinated investment to generate meaningful, long-term impacts.
- **Innovative Solutions driven by complex challenges:** Addresses complex retrofitting needs, encouraging tailored solutions for urban blocks.
- **Model for Others:** Positions Drumul Taberei as a testbed for ideas that could be replicated in other Romanian cities.
- **City-to-city exchange:** Designed to foster strategic partnerships and effective energy transition strategies through the M100 city platform.
- **Community Benefits:** Enhances quality of life, strengthens networks, and promotes climate-neutral practices.

Un-expected and valuable outcomes of KINETIC for Sector 6 SET-PED (DUT)

Synergizing PED Ecosystems

to Co-create

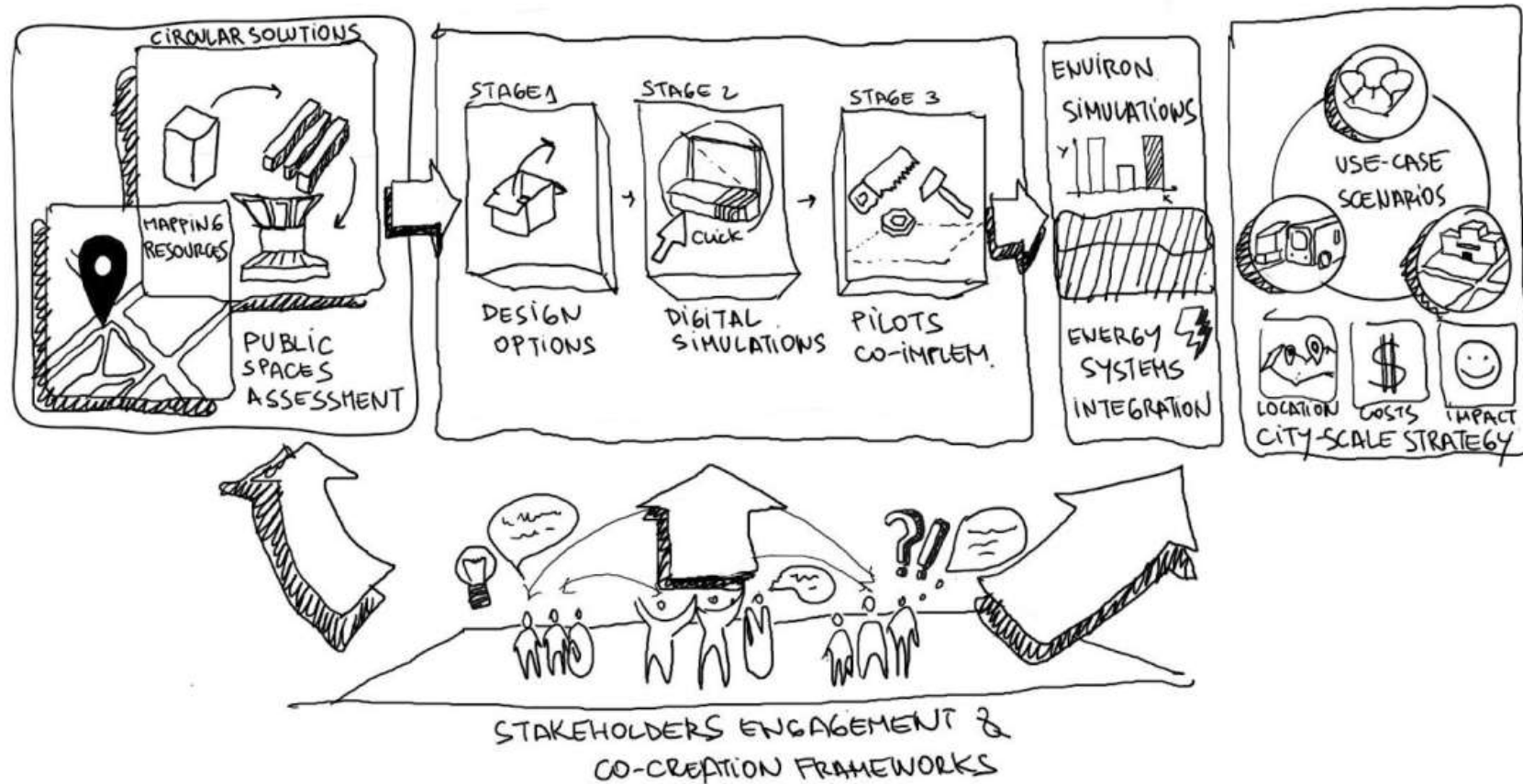
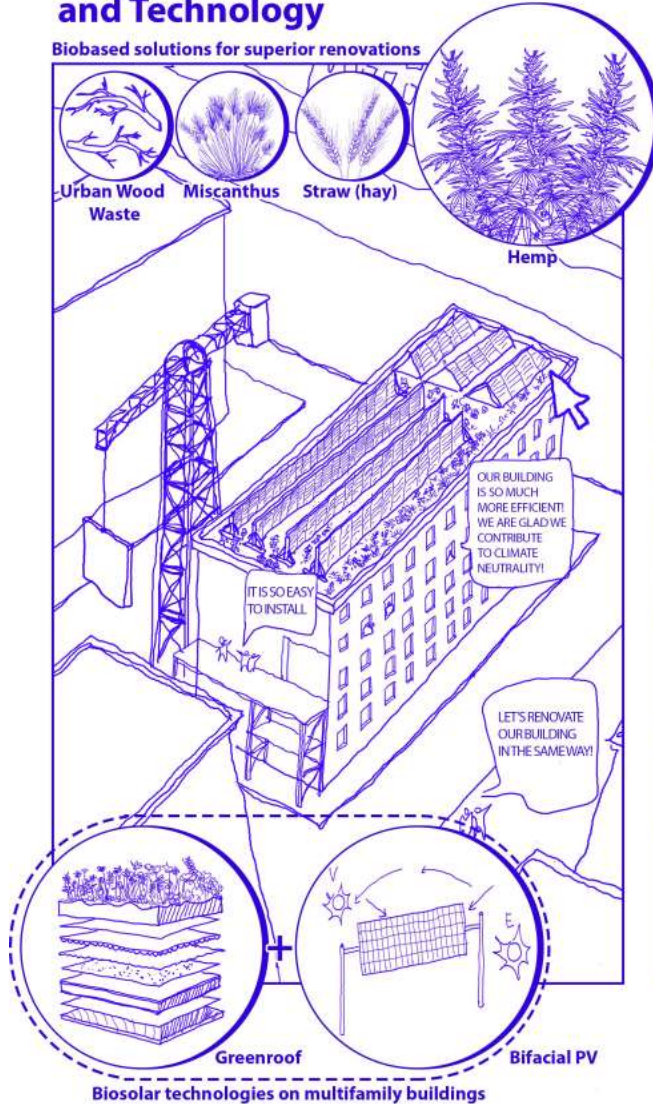


Figure 2. SET-PED sketched co-creation approach

Un-expected and valuable outcomes for

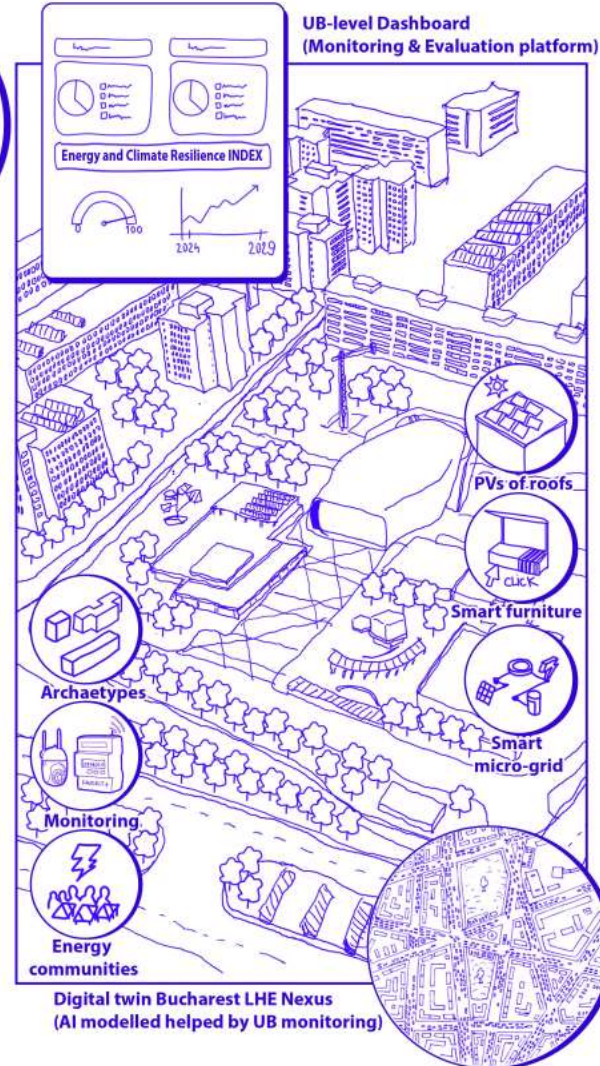
Synergy between Nature and Technology

Biobased solutions for superior renovations

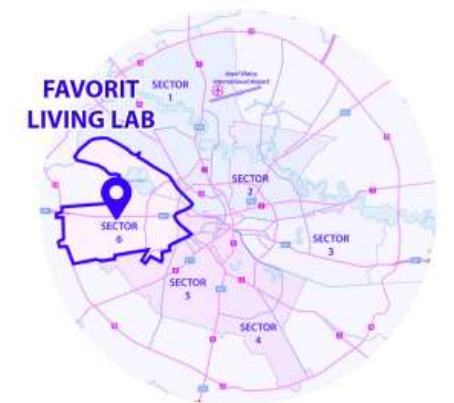
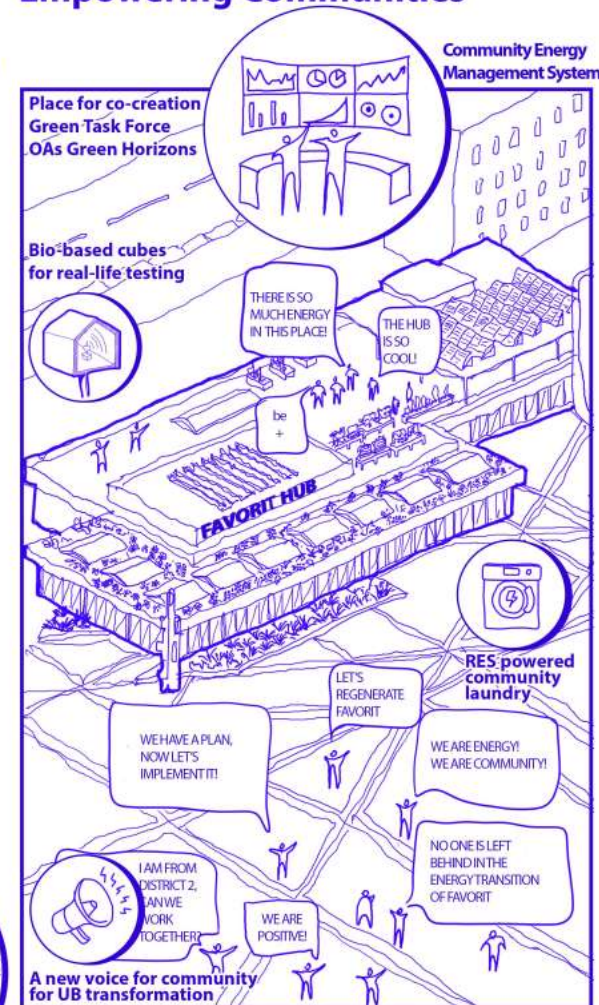


AI Digital Twinning & multilevel RES

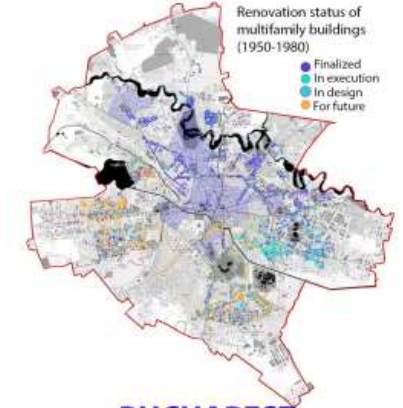
UB-level Dashboard (Monitoring & Evaluation platform)



Empowering Communities



BUCHAREST ADMINISTRATIVE DIVISION



BUCHAREST LARGE HOUSING ESTATES



FAVORIT LHE

THANK YOU

For any questions, please
engage with all KINETIC
partners in the room

Adelin, Ana, Lucian, Antonia, Enza, Jens, Erik,
Eik, Alberto, Fabio, Massimo