tablishing a synergy between communist industrial sites residential areas in the context of energy transition

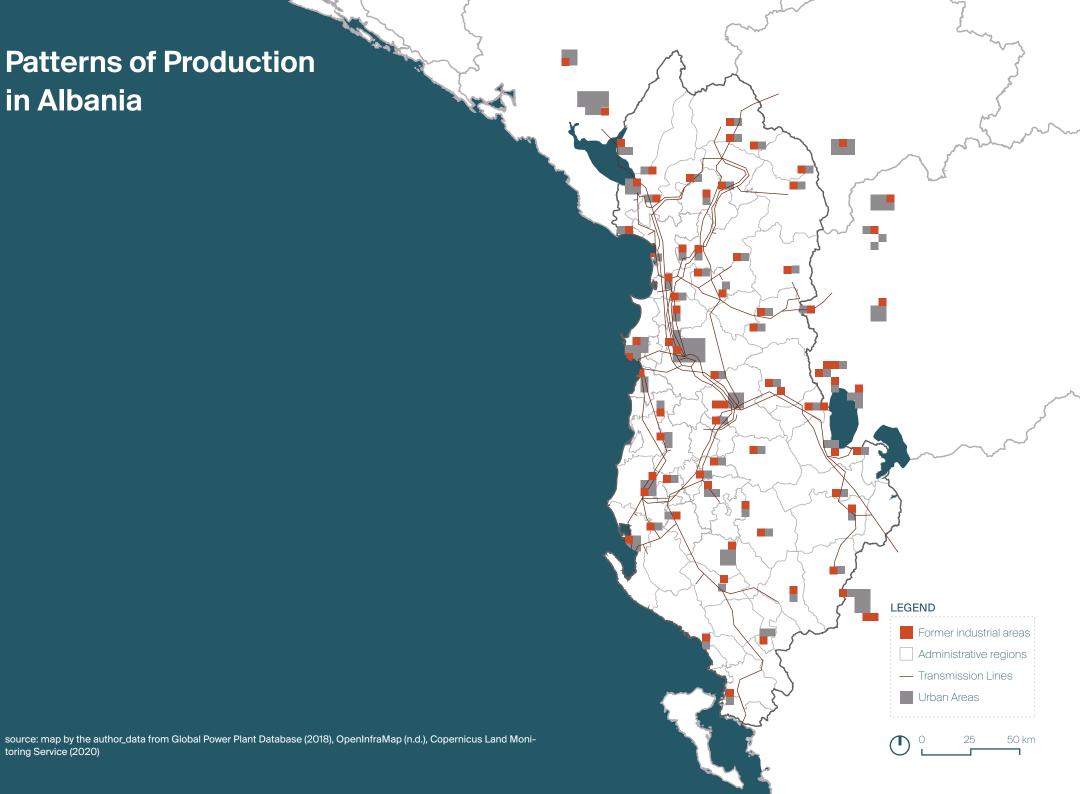
Re-Defining **Energy Scapes** in Elbasan, Albania



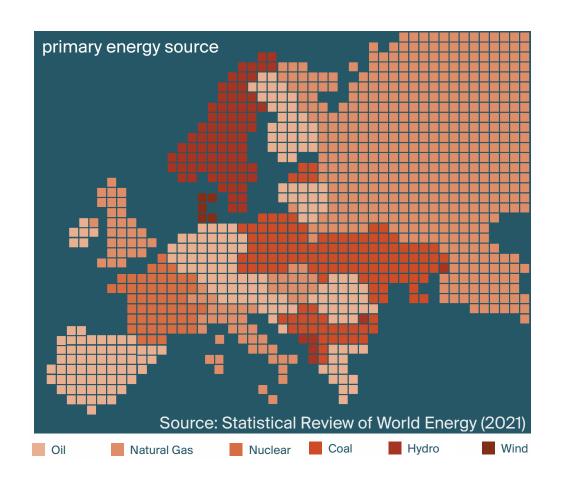


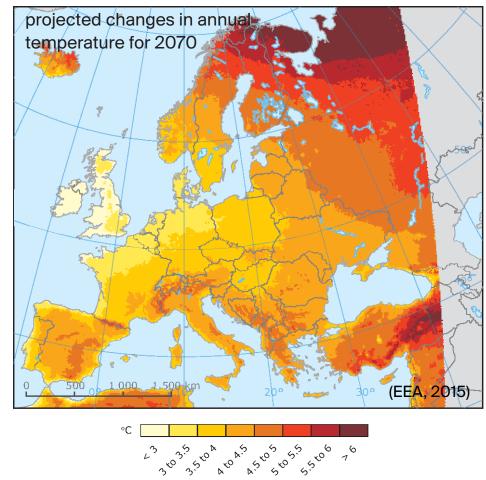
## **Patterns of Production** in Albania

toring Service (2020)



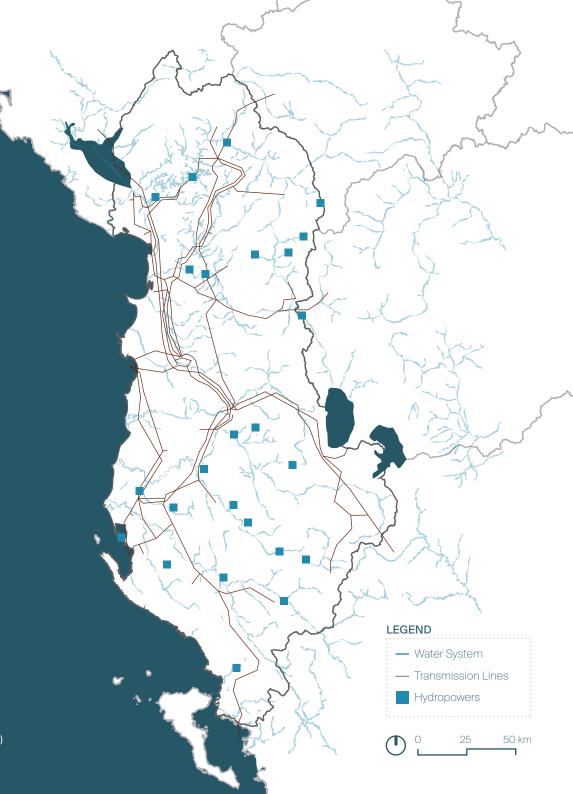
## climate change challenge



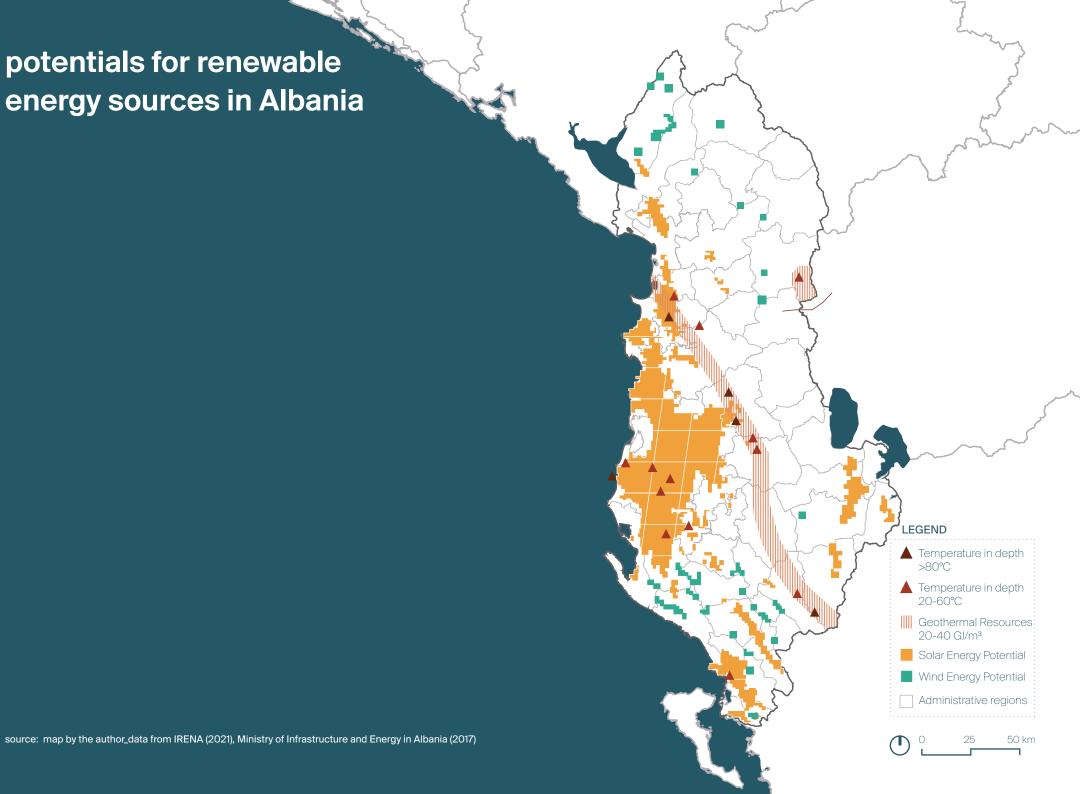


## big hydropowers in Albania

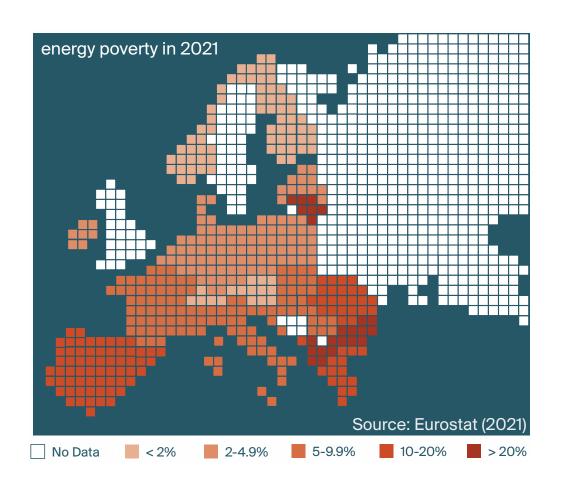
Energy produced from hydropower sector **dominates the electricity production** in Albania, with river Drin alone being responsible of 90% of the country's electricity supply (IRENA, 2021).



potentials for renewable energy sources in Albania

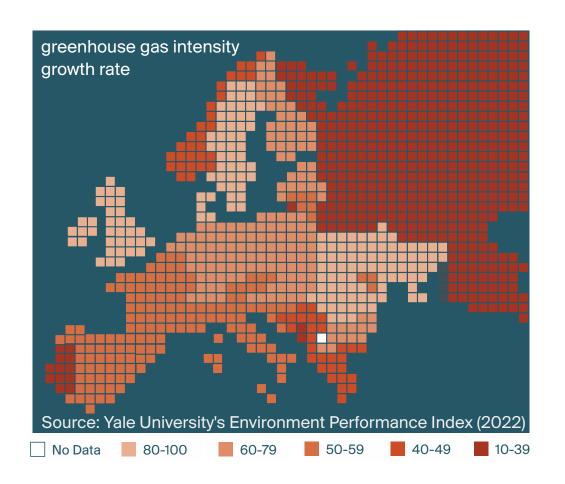


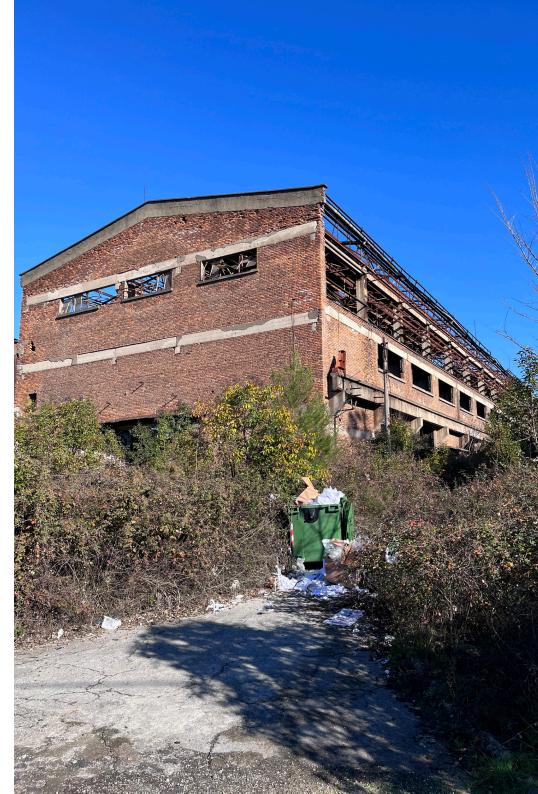
## energy poverty challenge



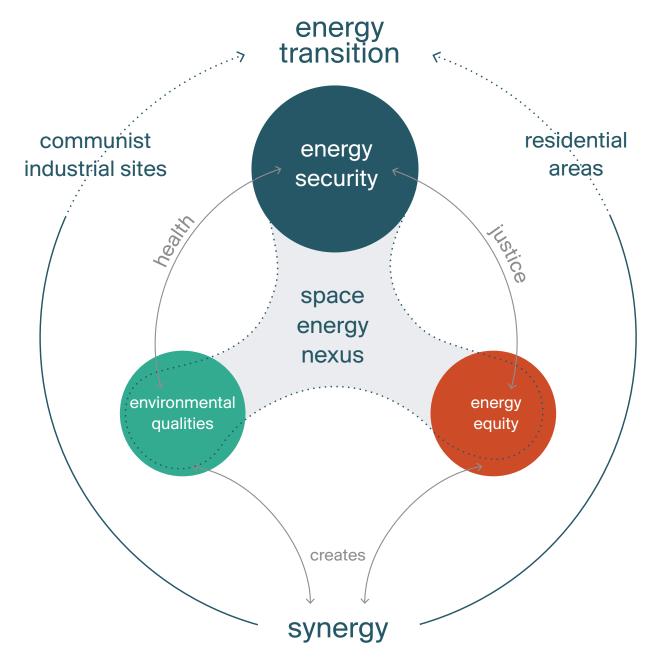


## environmental challenge

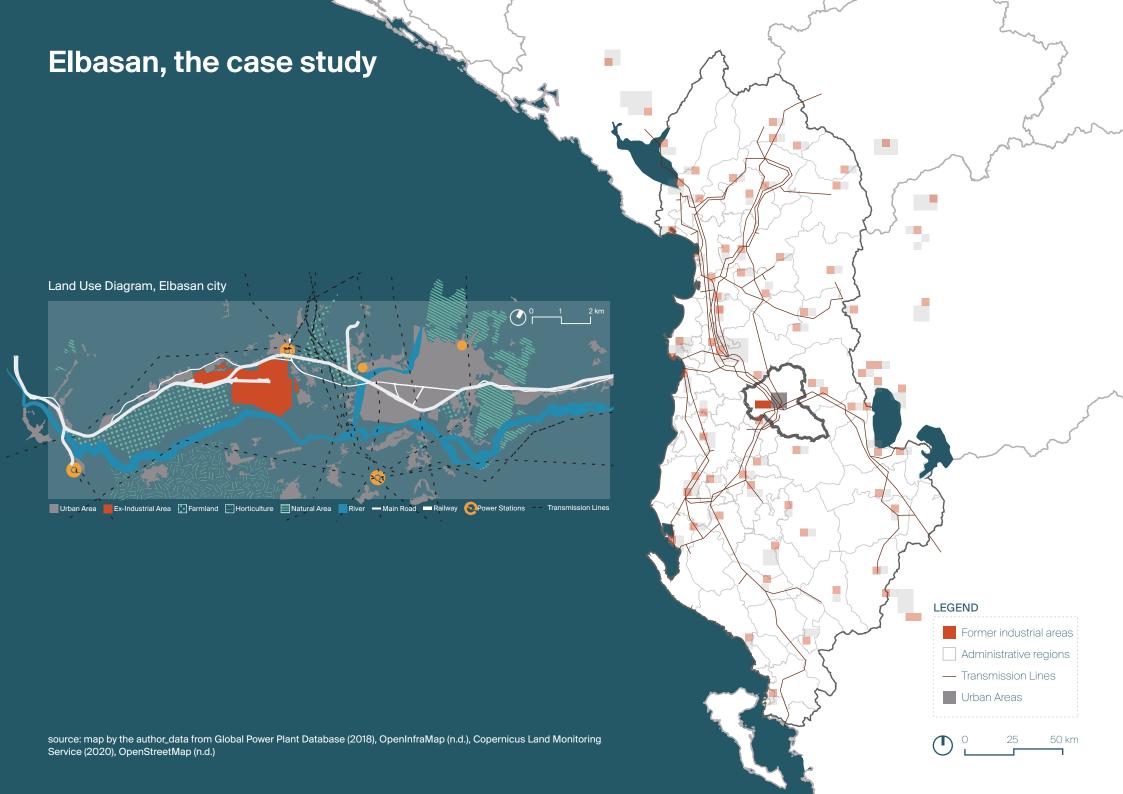




## conceptual framework



"How can the establishment of an **energy-space nexus** in the **Pattern of Production** contribute to **energy security** for a social and environmental sensitive transition in Elbasan?"



#### analysis

#### Elbasan region

Problem 1. Climate vulnerability of local vision

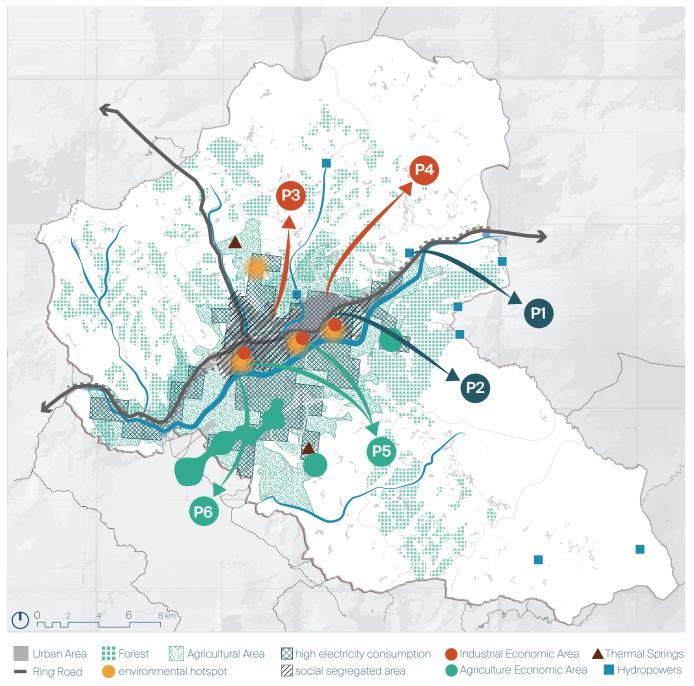
Problem 2. **Increase of electricity demand** 

Problem 3. **Energy-social segregation** 

Problem 4. **High usage of wood as energy source** 

Problem 5. **Environmental 'hostspots'** 

Problem 6. **Social sensitivity of the industrial area** 

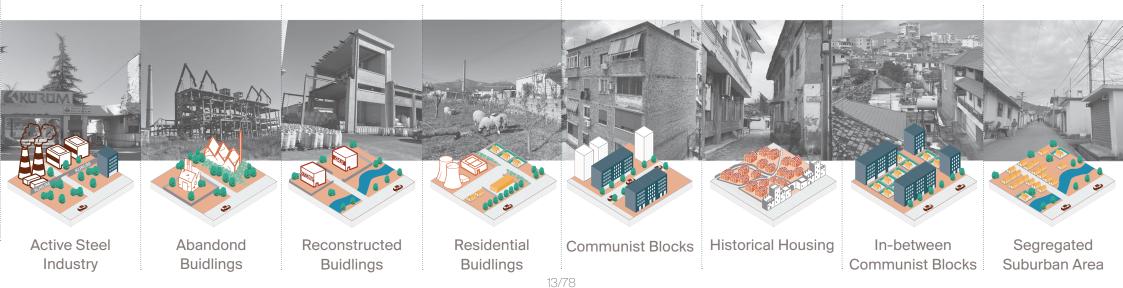


## analysis

#### pattern of production







## analysis

#### pattern of production

#### MAIN NEEDS

#### **Energy Security**



reliable energy grid and infrastructure



diversify energy sources



increase energy efficiency

#### **Energy Equity**



access to clean energy sources



affordable clean energy for all



participate in decision-making

#### **Environmental Qualities**



resilient from extreme weather conditions

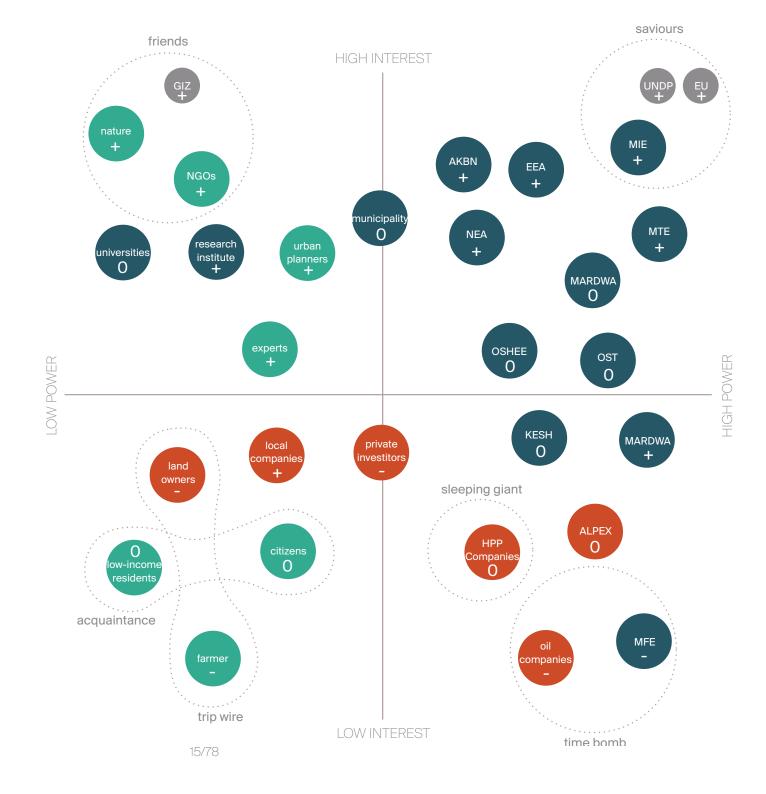


mitigate air, soil, water pollution from industrial area

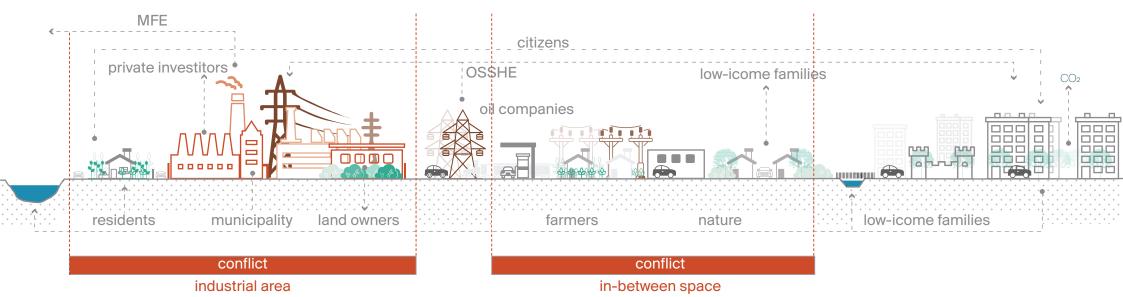


green and better neighborhoods conditions

## **analysis** stakeholders

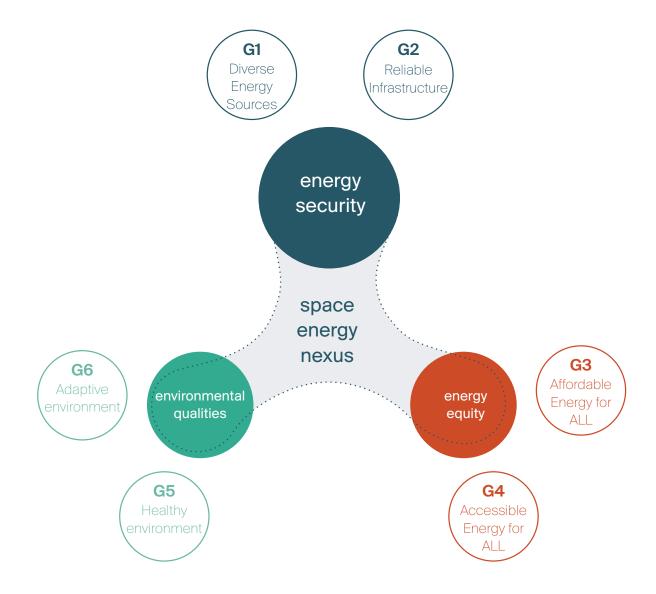


# **analysis** stakeholders

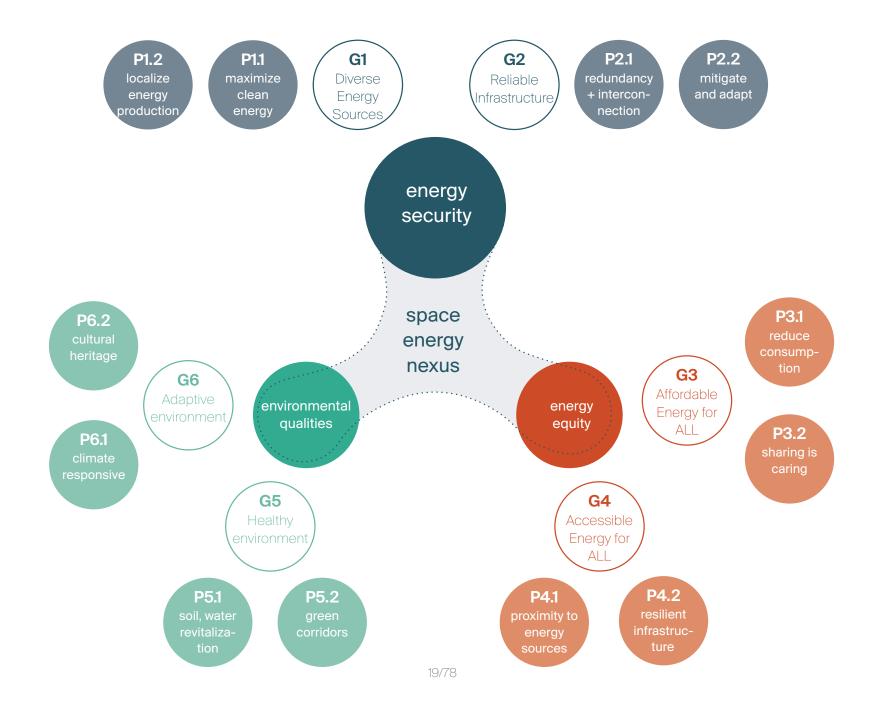




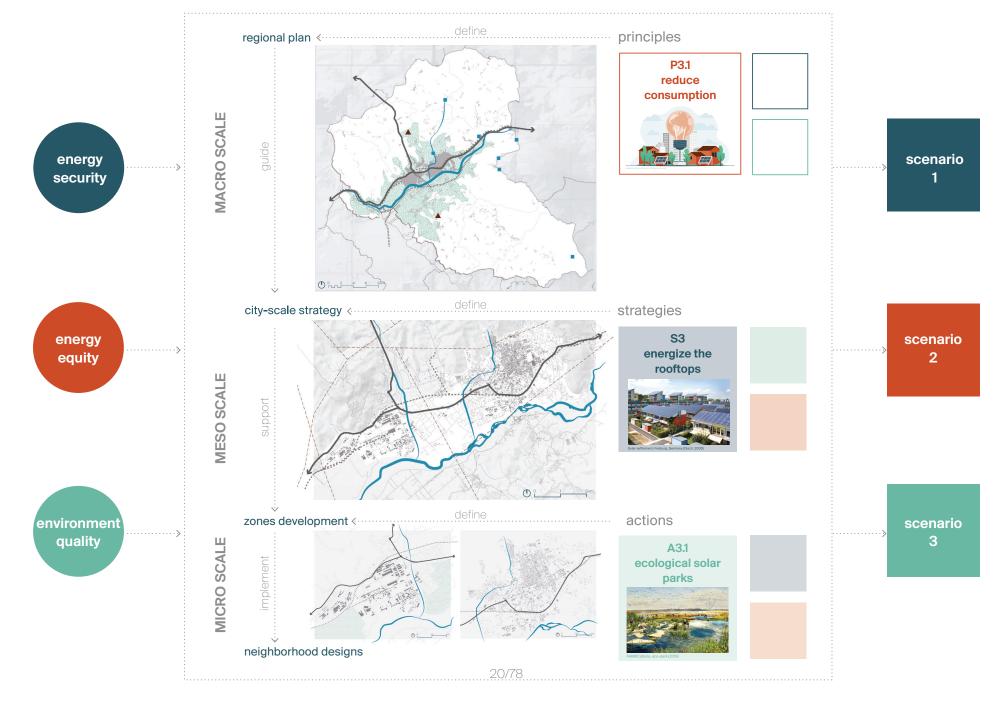
#### structure



#### structure



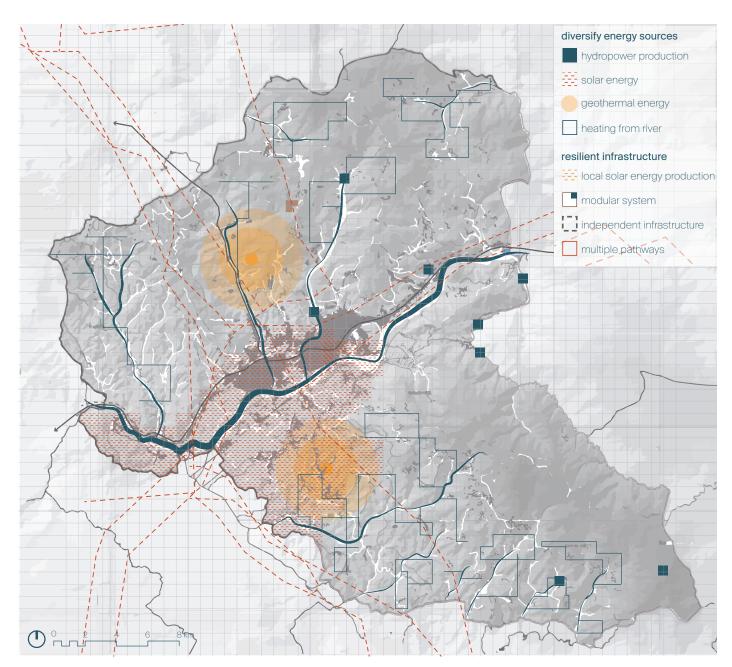
## multi-level perspective framework



macro scale

high potential to harness clean energy sources

**P1.1** maximize clean energy



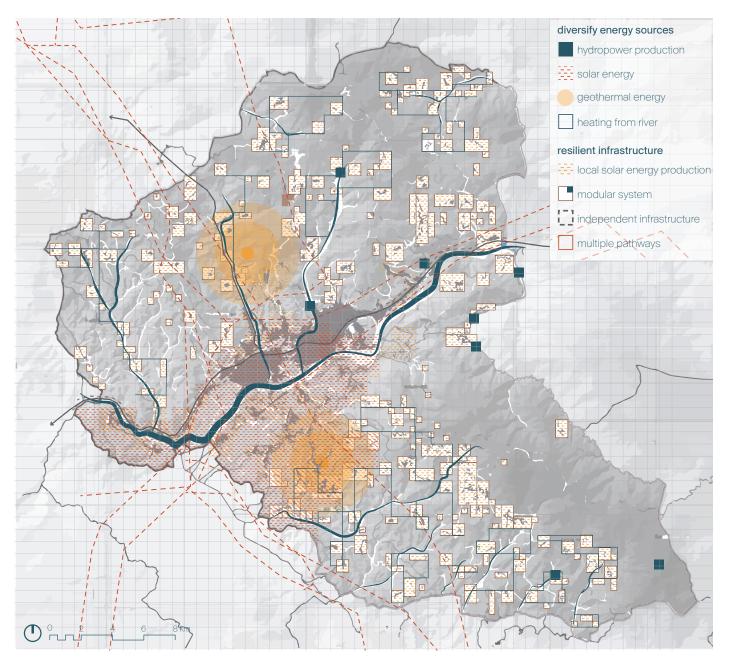
macro scale

high potential to harness clean energy sources

P1.1 maximize clean energy

wood as primary energy source for heating

P1.2 localize clean energy production



macro scale

high potential to harness clean energy sources

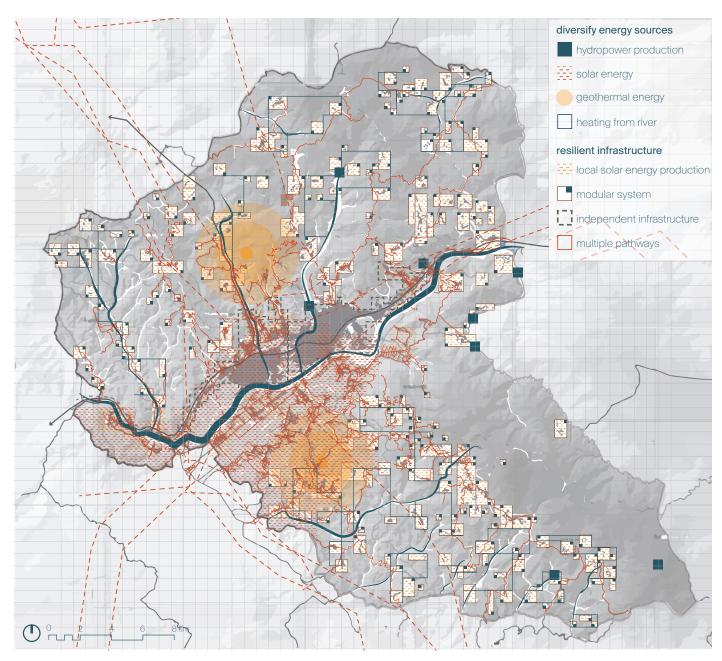
P1.1 maximize clean energy

wood as primary energy source for heating

P1.2localize cleanenergy production

strategic location in the national energy infrastructure

**P2.1** redundancy and interconenctions



macro scale

high potential to harness clean energy sources

→ P1.1 maximize clean energy

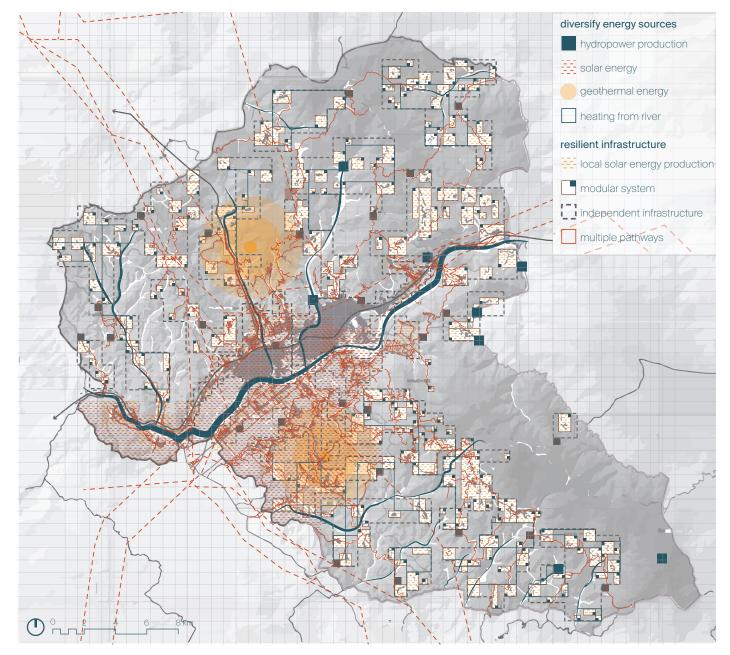
wood as primary energy source for heating

→ P1.2 localize clean energy production

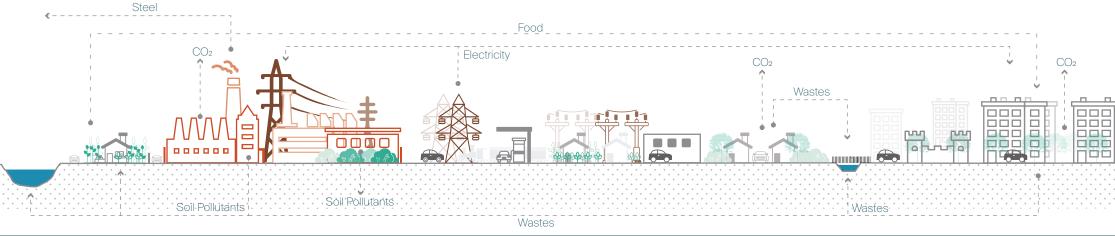
strategic location in the national energy infrastructure

**P2.1** redundancy and interconenctions

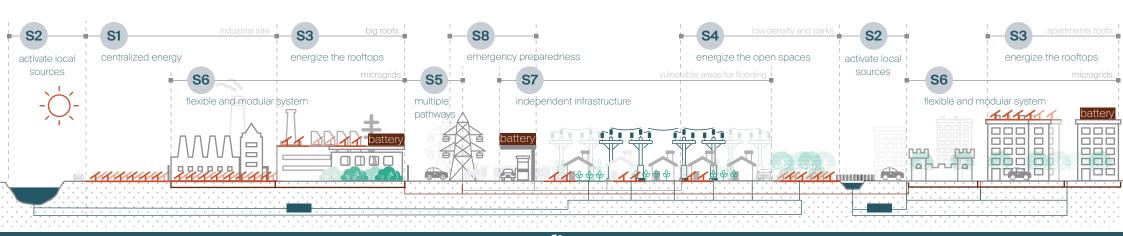
increasing energy demand due to rising temperatures P2.2 mitigate and adapt



#### meso scale

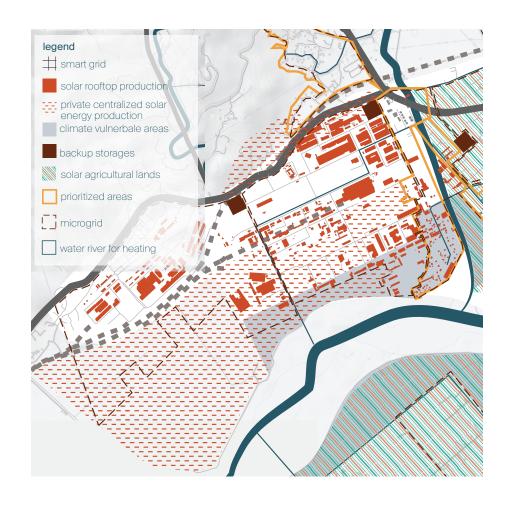


#### before



#### after

#### micro scale





**A1.1** 









A2.2 every sunray counts



**A3.1** start with public roofs





**A4.1** 

**A4.2** solar agriculproduce on



**A5.1** upgrade







A6.1







**A7.1** community microgrids



A7.2 close to energy sources





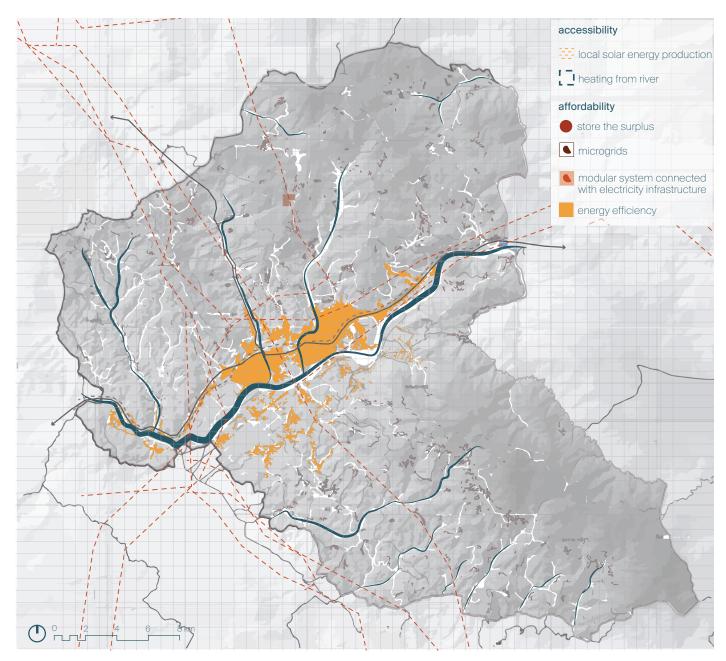


macro scale

W3.

lack of energy
efficiency within
urban areas

P3.1 reduce consumption

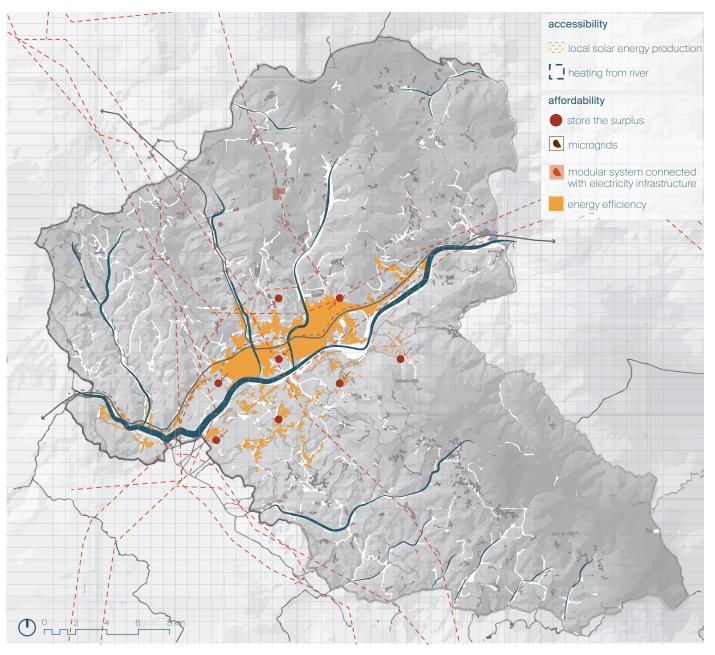


macro scale

W3.
lack of energy
efficiency within
urban areas

P3.1 reduce consumption

W1. — P3.2
energy - social sharing is caring segregation



macro scale

W3.
lack of energy
efficiency within
urban areas

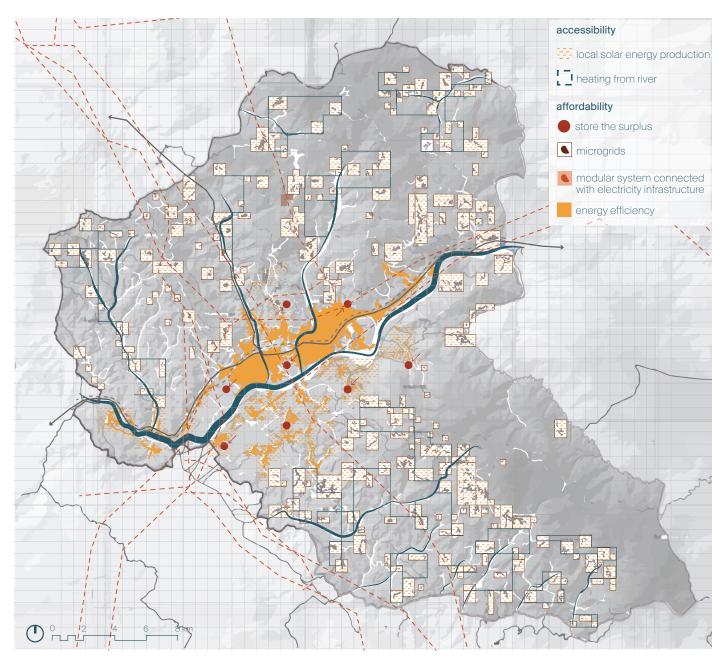
P3.1 reduce consumption

w1. energy - social segregation

P3.2 sharing is caring

proximity of Communist industrial sites to residential areas

**P4.1** proximity to energy sources



macro scale

W3.
lack of energy
efficiency within
urban areas

P3.1 reduce consumption

w1. energy - social segregation

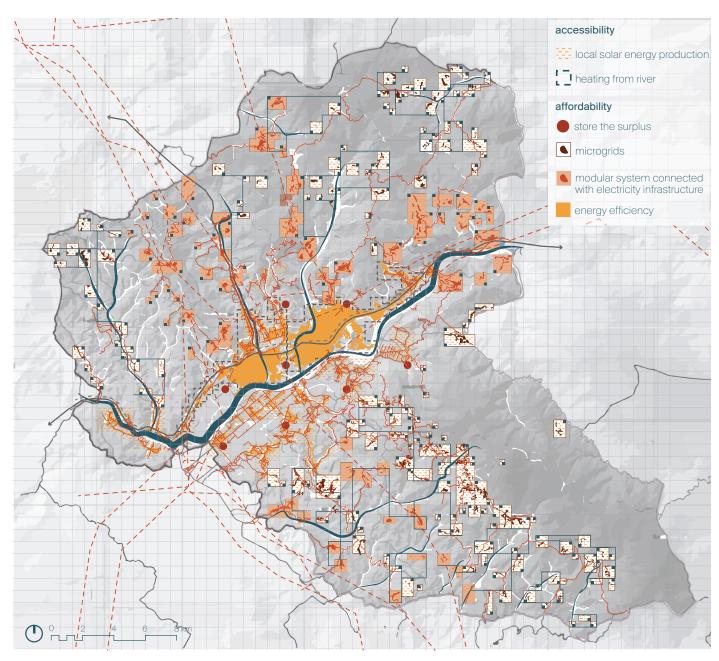
P3.2 sharing is caring

proximity of Communist industrial sites to residential areas

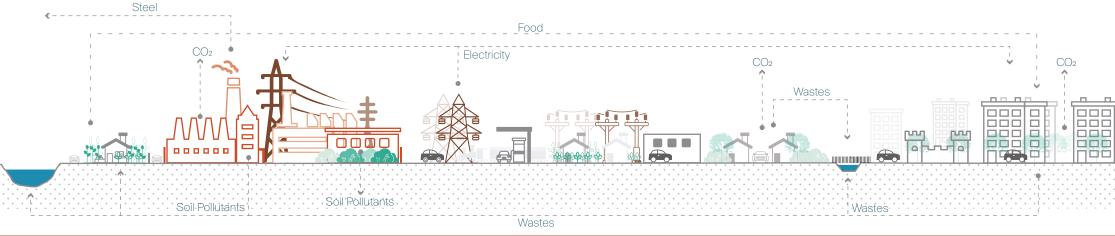
**P4.1** proximity to energy sources

w6. the existence of off-grid residential areas

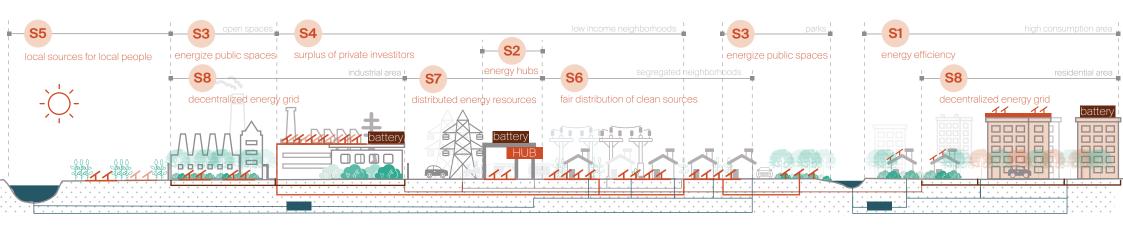
P4.2 resilient infrastructure



#### meso scale



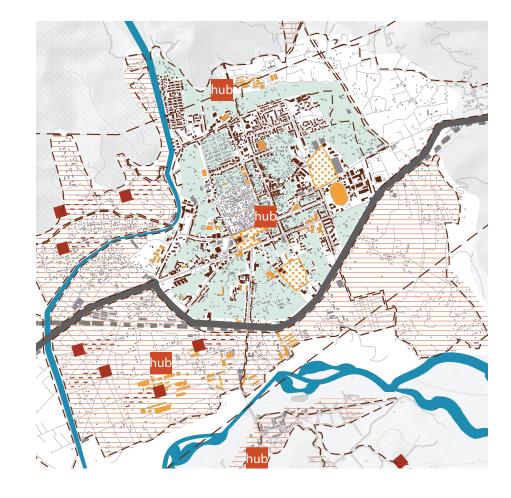
#### before



#### after

#### micro scale





**A1.1** insulating



A1.2

facade

**A2.1** shading the shared solar parks

A2.2 localized

**A3.1** energy parks energy supply open to public energy

A3.2 share public rooftops



**A4.1** 

private

storages for

**A5.2 A5.1** community water for heating production



**A6.1** prioritize marginalized



A6.2 vulnerable communities

**A7.1** store local solar energy

fossil fuels storages

A7.2

**A8.1** community microgrids



A8.2 community owned projects



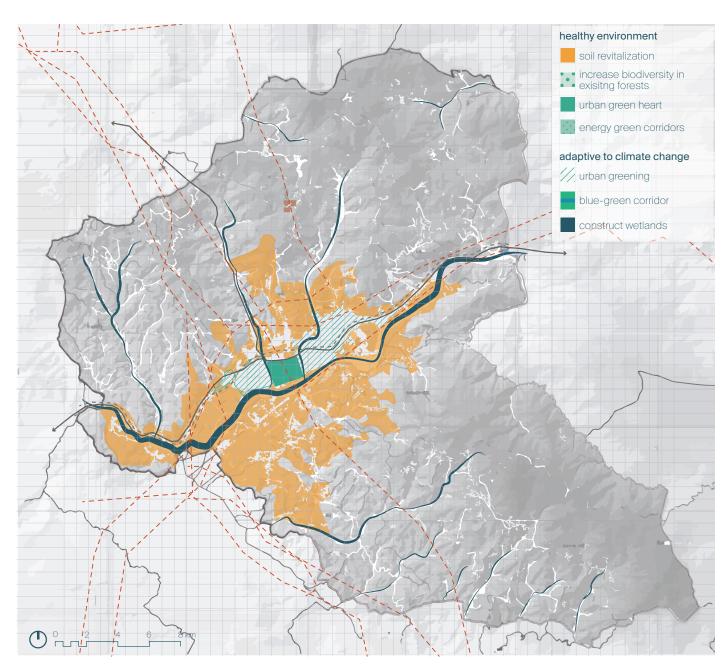




macro scale

environmental hotspots caused by pollution

**P5.1** soil and water revitalization

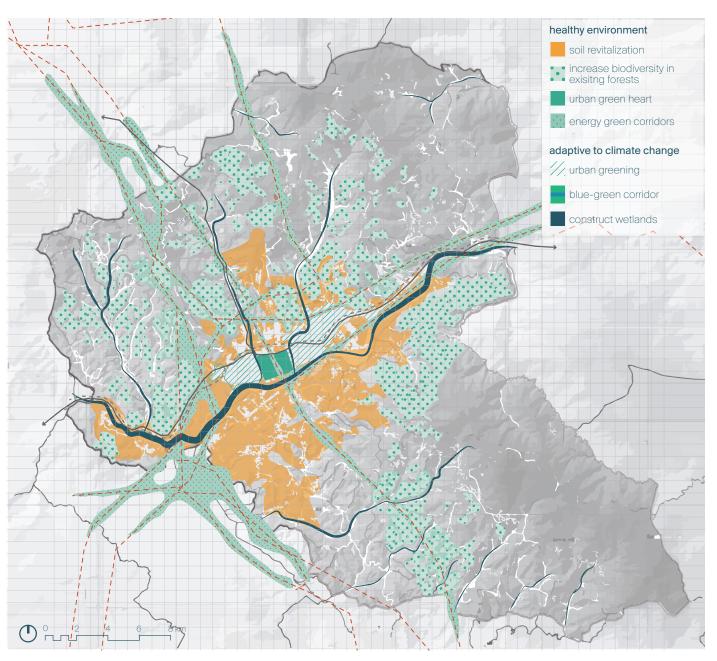


macro scale

environmental hotspots caused by pollution

**P5.1** soil and water revitalization

**S4.**  $\longrightarrow$  **P5.2** presence of green corridors green spaces



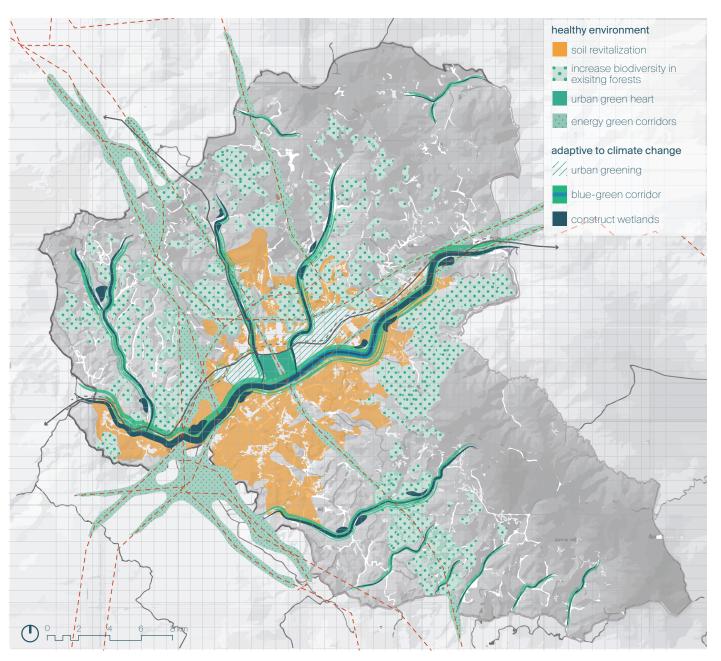
macro scale

environmental hotspots caused by pollution

**P5.1** soil and water revitalization

**S4.**  $\longrightarrow$  **P5.2** presence of green corridors green spaces

T1. — P6.1 climate responsive ability of the energy system



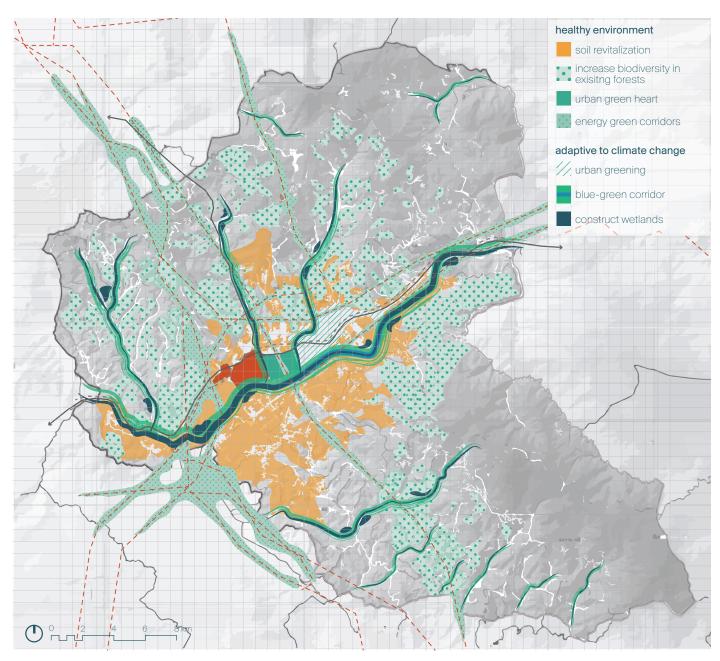
macro scale

environmental hotspots caused by pollution

**P5.1** soil and water revitalization

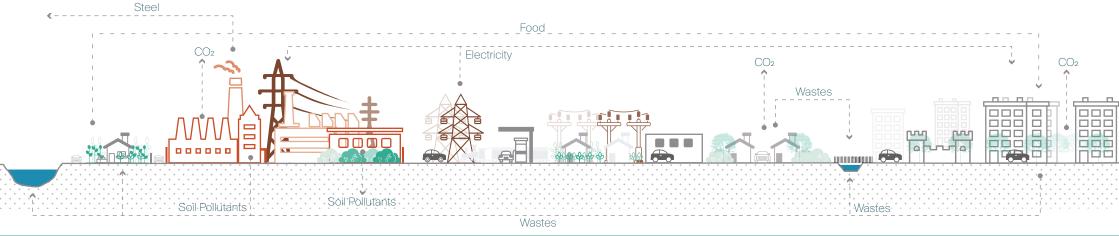
**S4.** — **P5.2** presence of green corridors green spaces

T1. — P6.1 climate responsive ability of the energy system

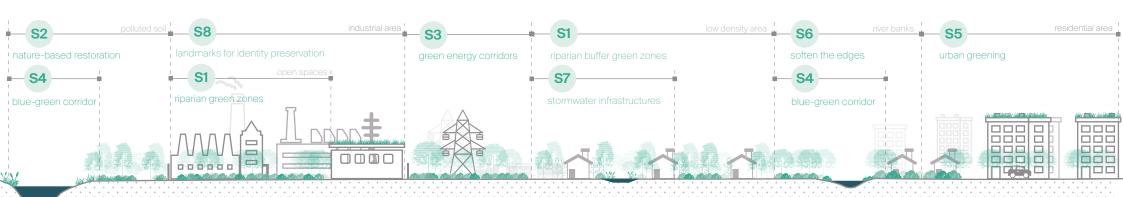


# maximize environmental qualities

## meso scale



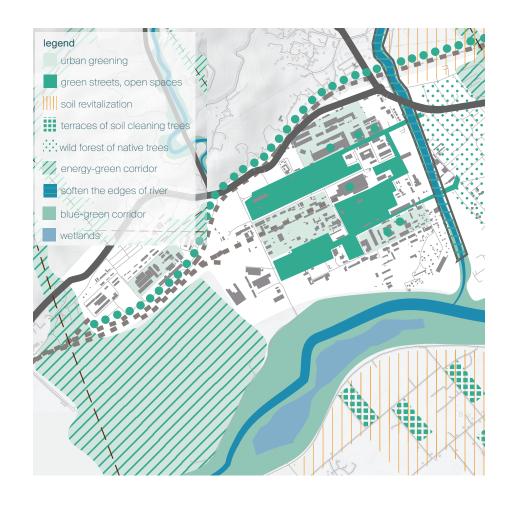
## before



## after

# maximize environmental qualities

### micro scale





**A1.1** 

A1.2

**A3.1** 

**A4.1** 

recreational A4.2

**A5.1** 

A5.2

**A6.1** 

A6.2

**A7.1** 

**A8.1** 

A8.2

































# pattern field

A1.2

**A2.1** 

A2.2

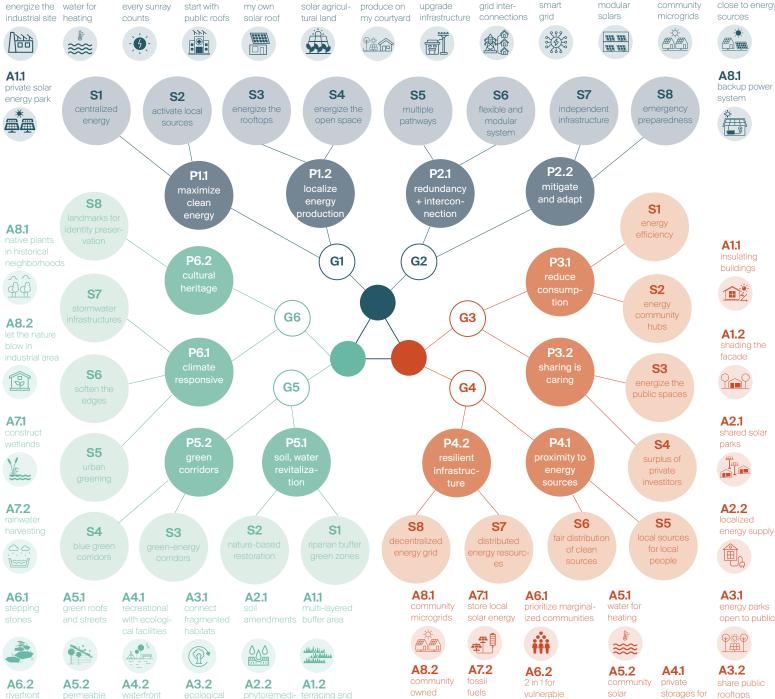
A3.1

A3.2

**A4.1** 

A4.2

A5.1



A7.2

community

**A7.1** 

**A6.1** 

A5.2

storages

production

people

energy

projects

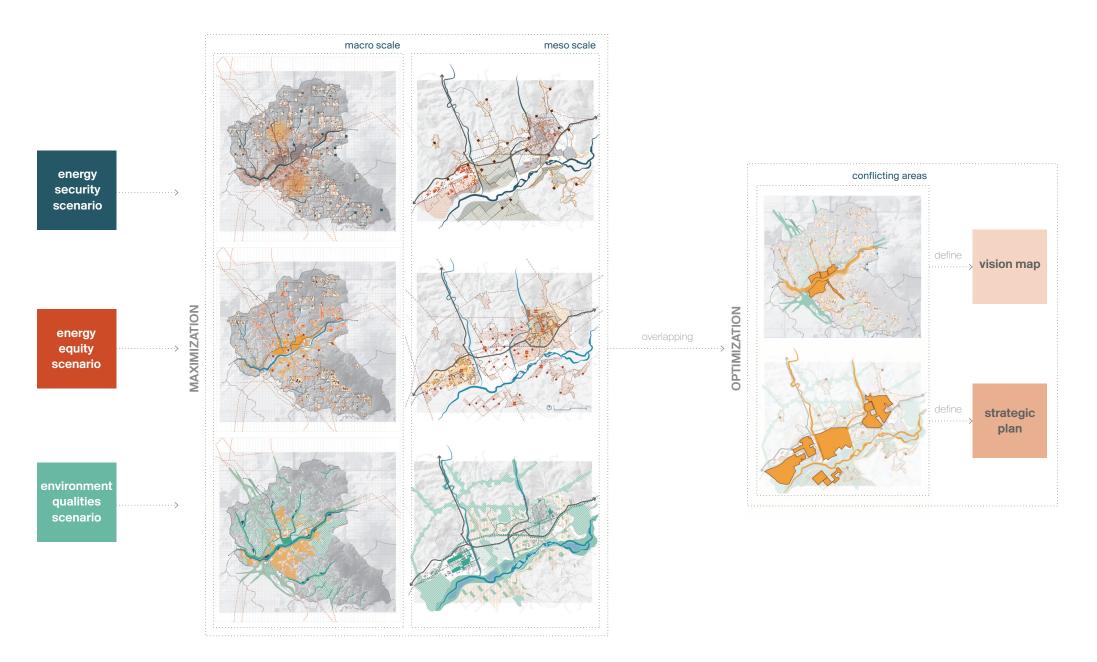
A6.2



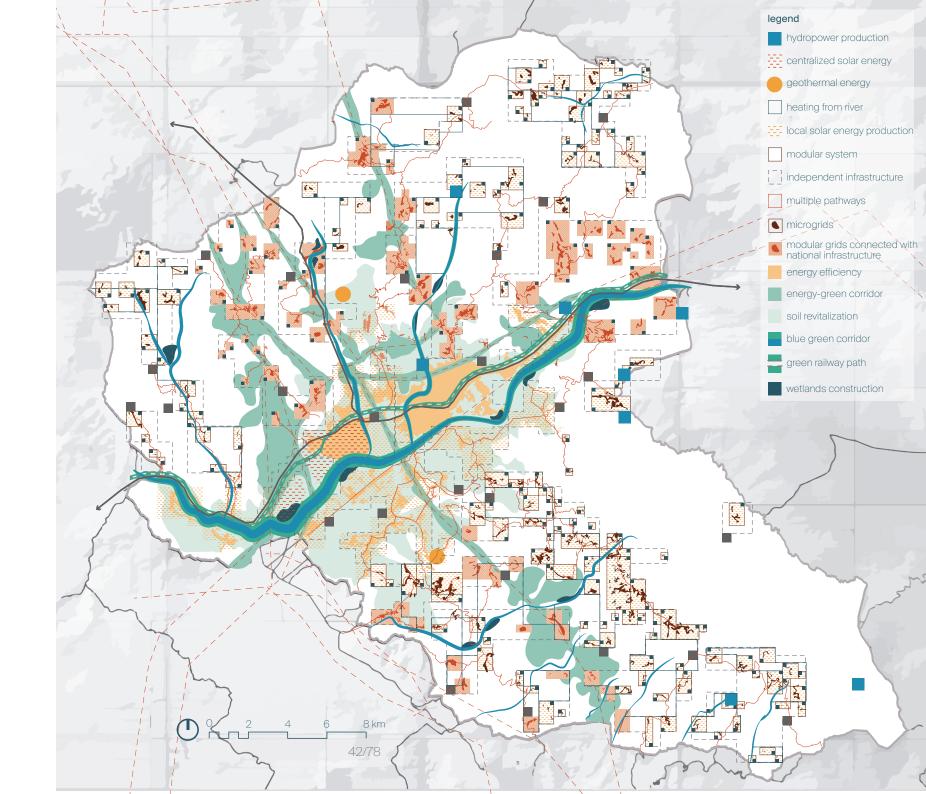
A1.1



# optimization



## vision



macro scale

#### conflict 1

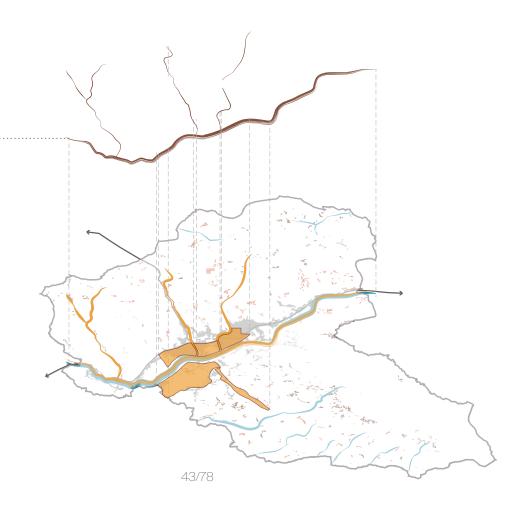


maximize clean energy

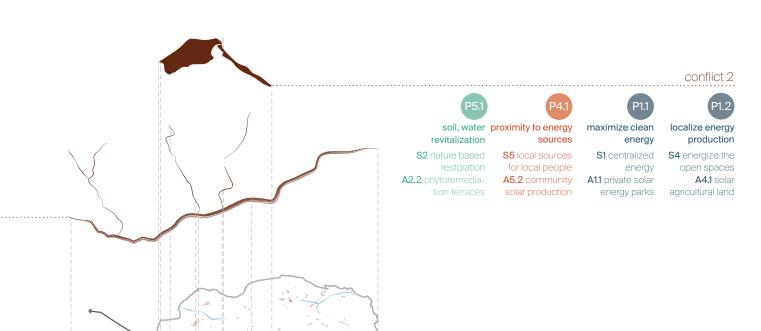
**A2.1** water for heating



corridors
S4 blue-green



## macro scale



44/78

#### conflict 1

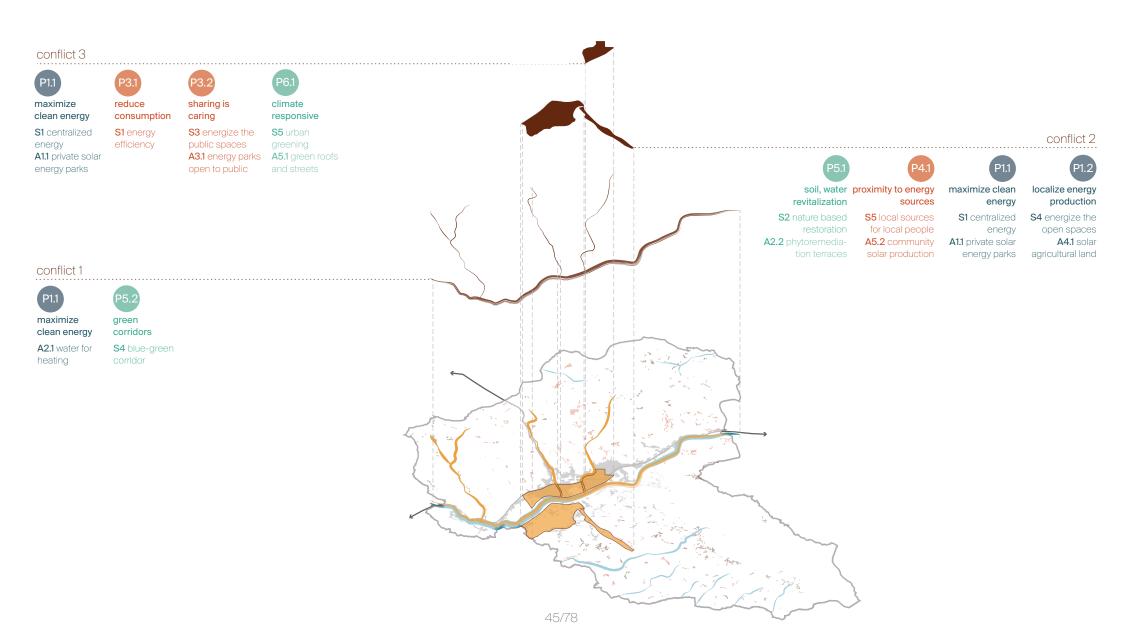


maximize clean energy

A2.1 water for heating

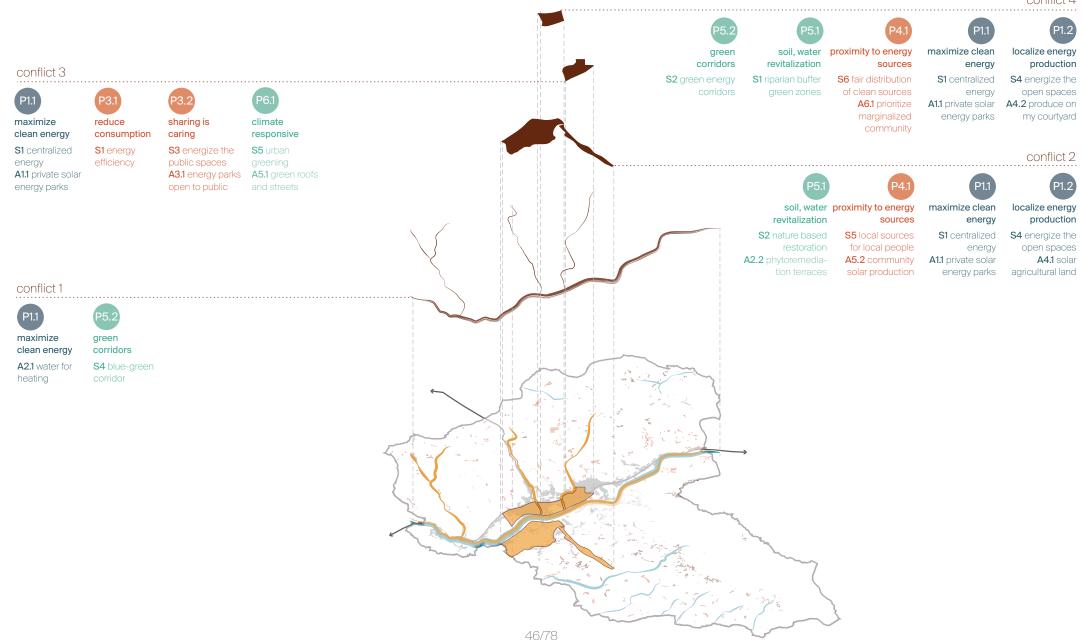
green
corridors
S4 blue-green

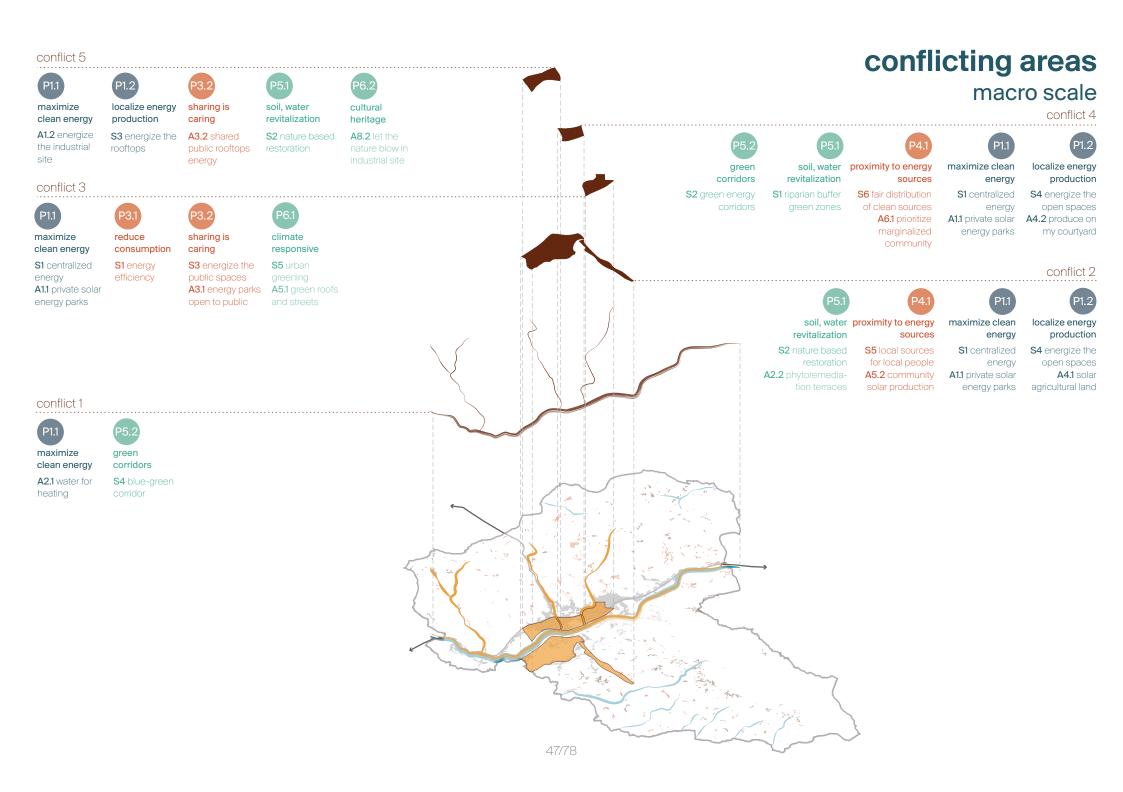
## macro scale



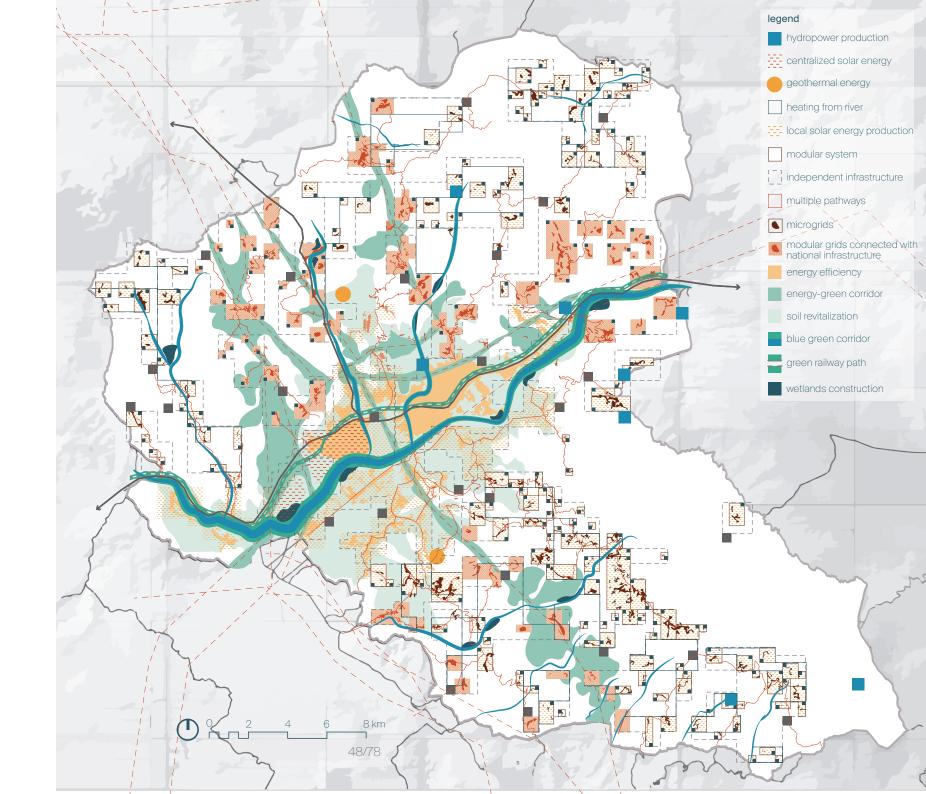
## macro scale

conflict 4

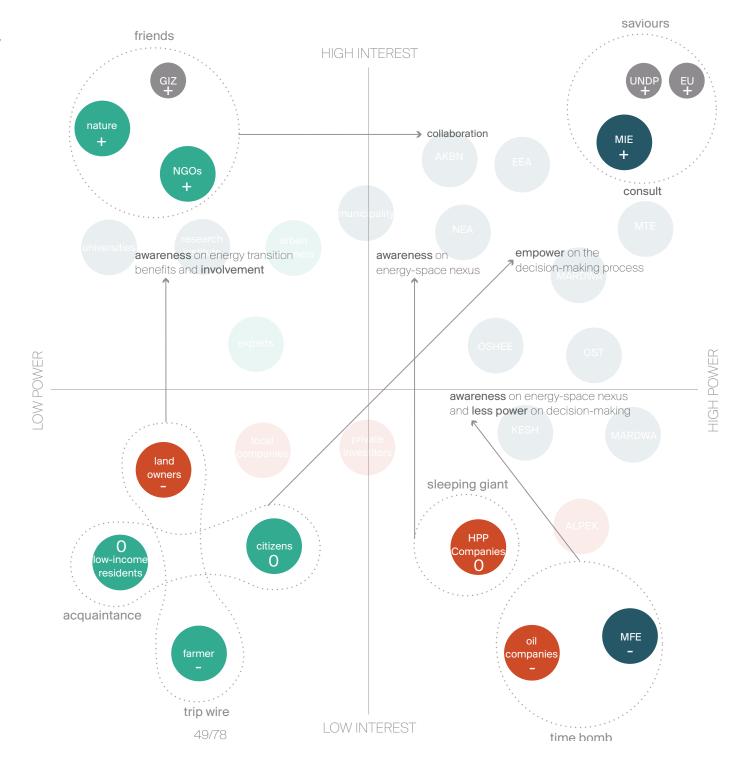


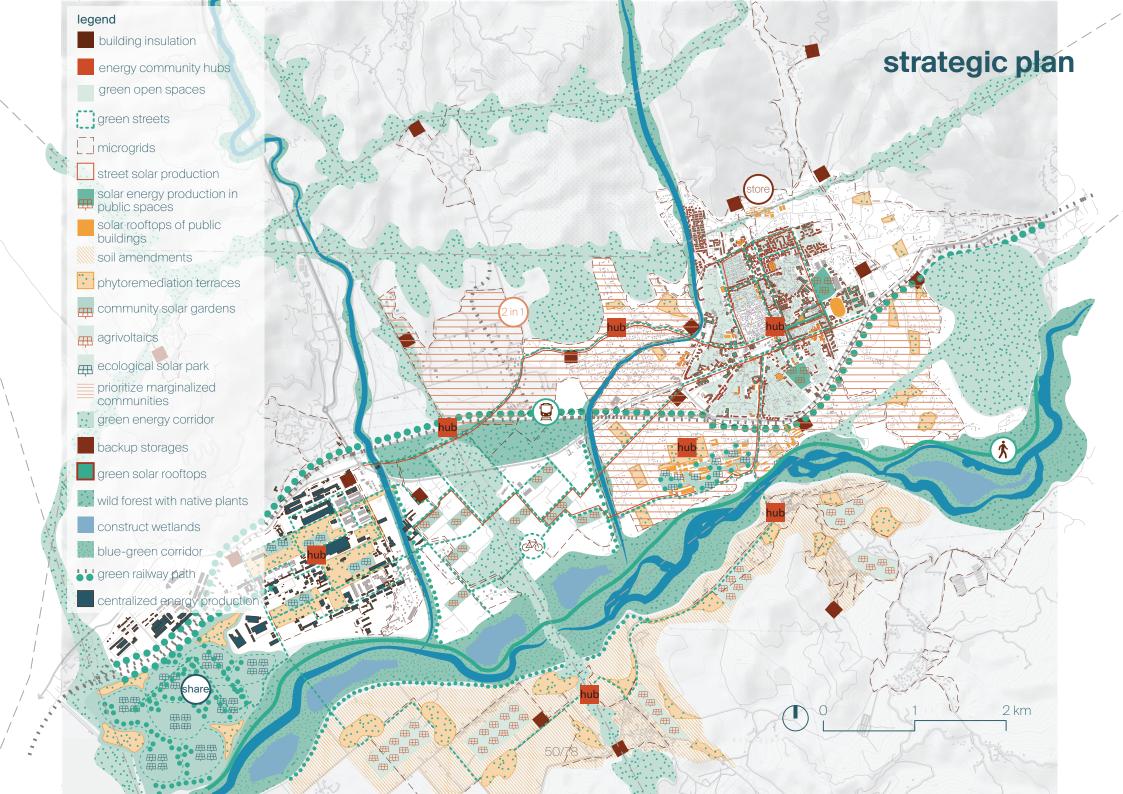


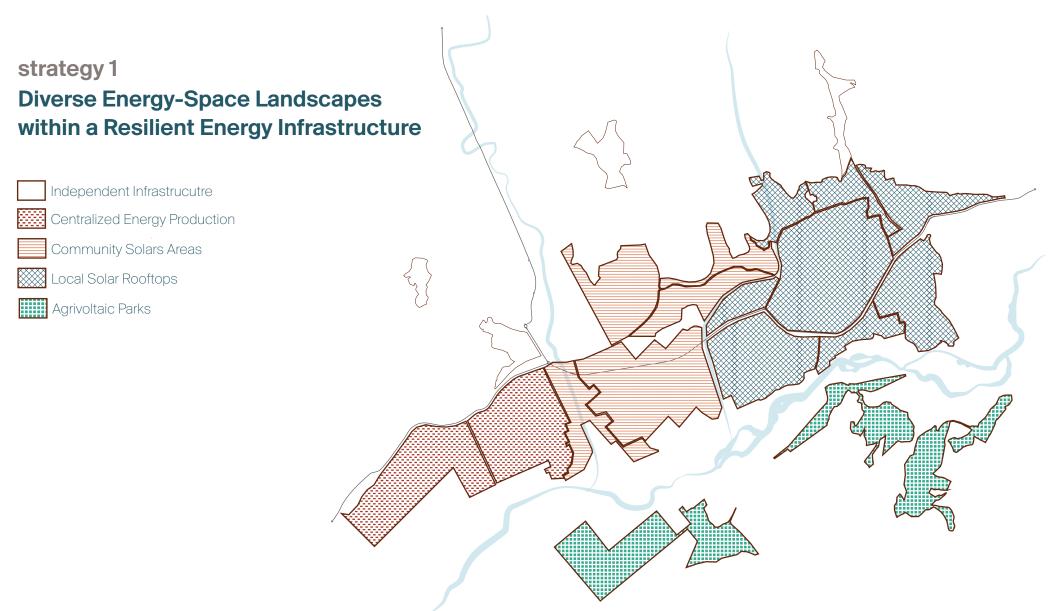
## vision

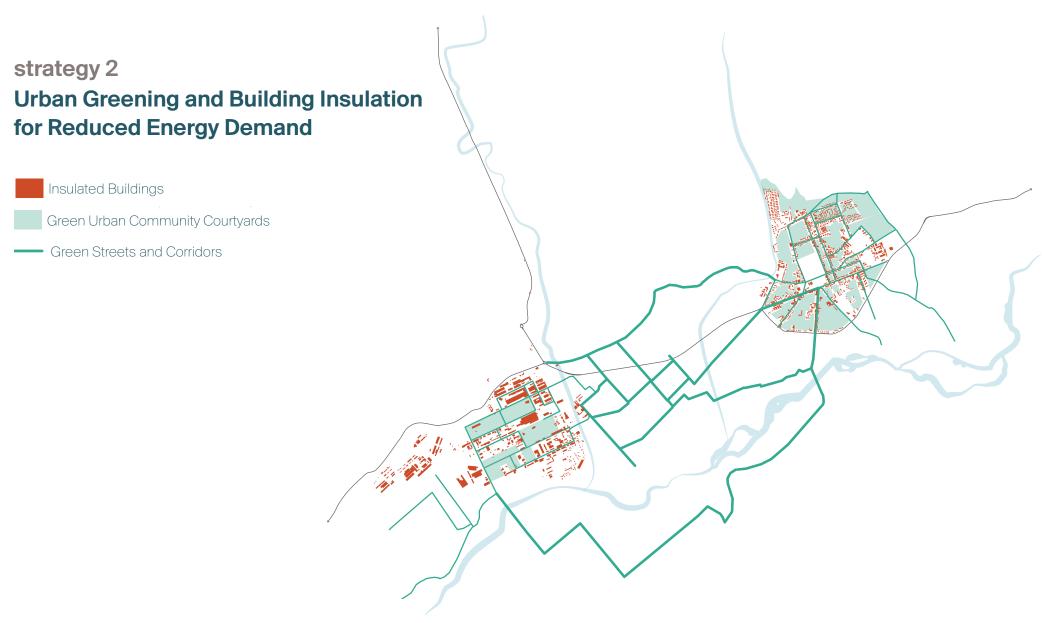


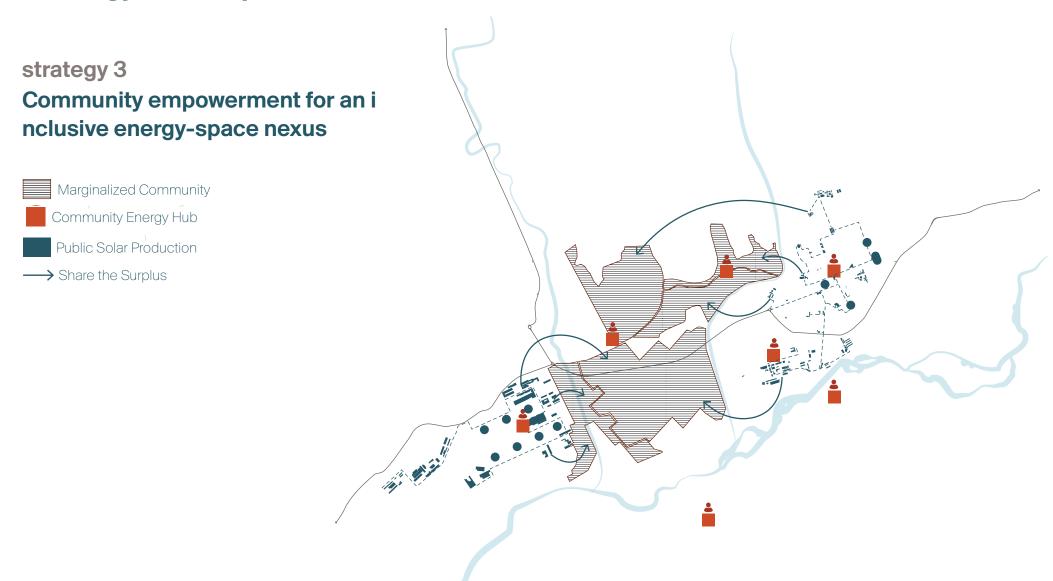
# stakeholders strategy

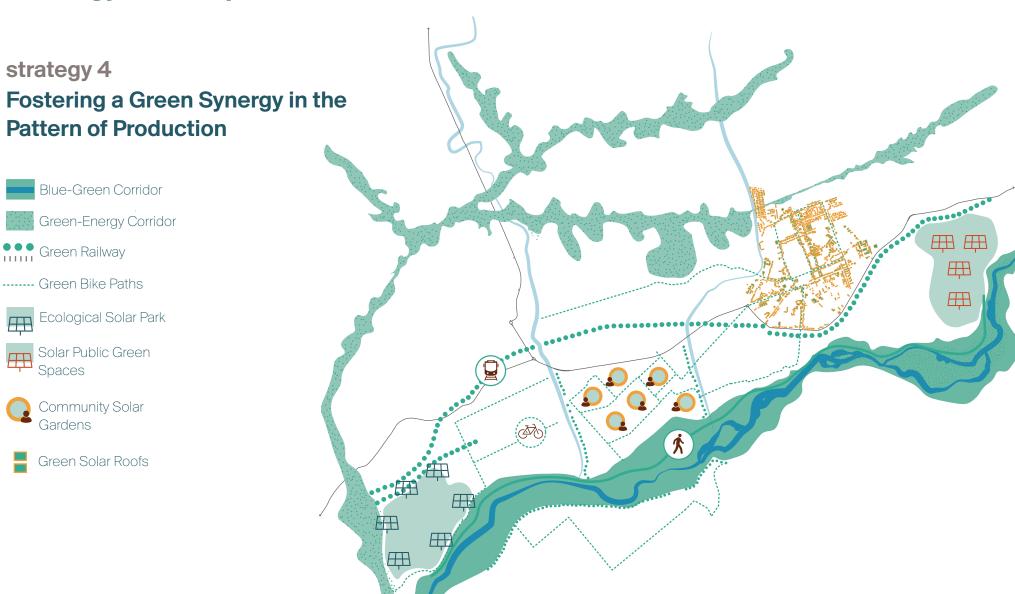














## meso scale









**A3.1** 





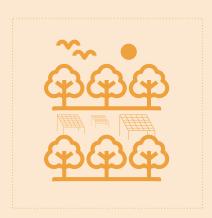








## P1 ecological solar parks



Solar panels integrated into parks do not disrupt ecological values of these natural landscapes and provide clean energy production.

#### Eco-park by FABRICations, 2019





### meso scale









A3.1

energy

parks open











# P2 centralized energy open to public



#### hypothesis

Designing centralized solar energy production areas as a public space for the residents increases the environmental qualities of the city and this energy scape specifically.

#### CopenHill Energy Plant, Copenhagen







centralized energy open to public













A2.1

A5.1 green roofs and streets





A8.2

#### meso scale









A3.2

my own

solar roof

A3.1

energy





A3.2

rooftops energy

A3.1

share public





**A2.1** 





**A5.1** 

## P3 symbiotic landscape



Providing structures for the marginalized community to have their own solar green garden increases energy equity and environmental qualities.

Derbyshire Community Garden (Photo by Embry-















solar agricul-

tural land

A1.2

energize the

industrial site















communities



A8.2









#### meso scale









A3.1

energy

A3.2

my own

solar roof







**A2.1** 

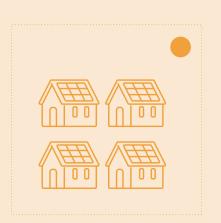
A1.1





**A5.1** 





Using the rooftop for solar energy production and greenery gives people direct access to clean energy and reduces the risk of high urban island effect in the densified areas.

"Biosolar" roof by Vegetek, France (Puthod, 2024)













**P3** 









A3.2





A8.2













A4.2

produce on

my courtyard



A3.1

energy parks

open to public



A5.2

solar

community



A6.2

2 in 1 for









productive rooftops and solar public spaces

**P4** 









A4.2













**A2.1** 



#### meso scale









A3.2

my own

solar roof

A3.1

energy





A3.2

rooftops energy

A3.1

share public



**A2.1** 





**A5.1** 

A6.2

2 in 1 for

vulnerable

## P5 blue-green corridor



Transforming the river into a blue-green corridor will increase ecological values, biodiversity and protect from flooding in extreme weather condi-

Public Space Merwede in Utrecht, NL (LOLA, 2023)













centralized energy open to public

**P3** 



A1.2

energize the

industrial site

symbiotic landscape





**P5** 

blue-green corridor









A4.2



A4.2

produce on

my courtyard



energy parks

open to public



A5.2

solar

community

production



















A4.1

A2.1

parks



shared solar



A3.2

share public



A5.2 solar





A8.2







#### meso scale





solar park





A3.1

energy













A5.1

A6.2

vulnerable

## **P6** agrivoltaic restoring landscape



Elevated solar panels integrated with trees that remove heavy metals from the soil in agricultural lands contribute to healthier soil and food for locals, while also producing clean energy.

Solar farm in Kenya. Photo is by Chloride Exide









centralized energy open to public









A3.2

my own

solar roof



share public

A3.2



**A2.1** 





A8.2







landscape









A2.1

parks

A3.1

energy parks

open to public



A5.2

























































agrivoltaic restoring landscape

61/78







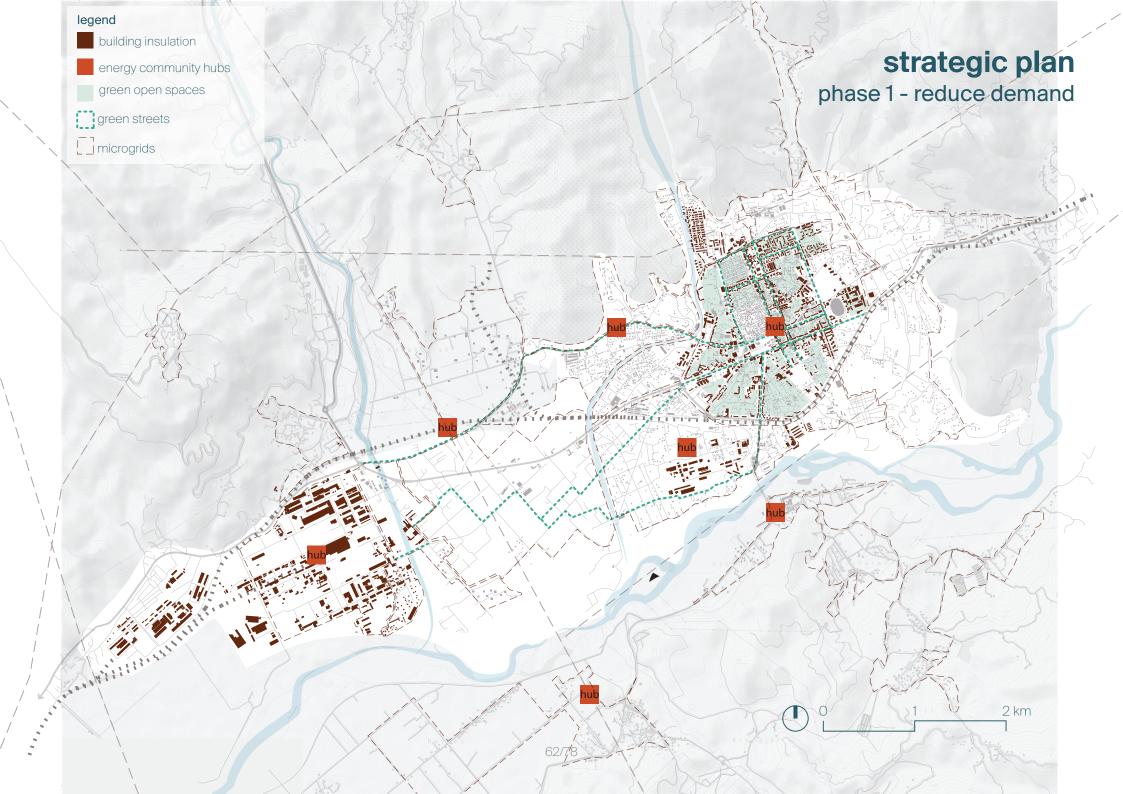


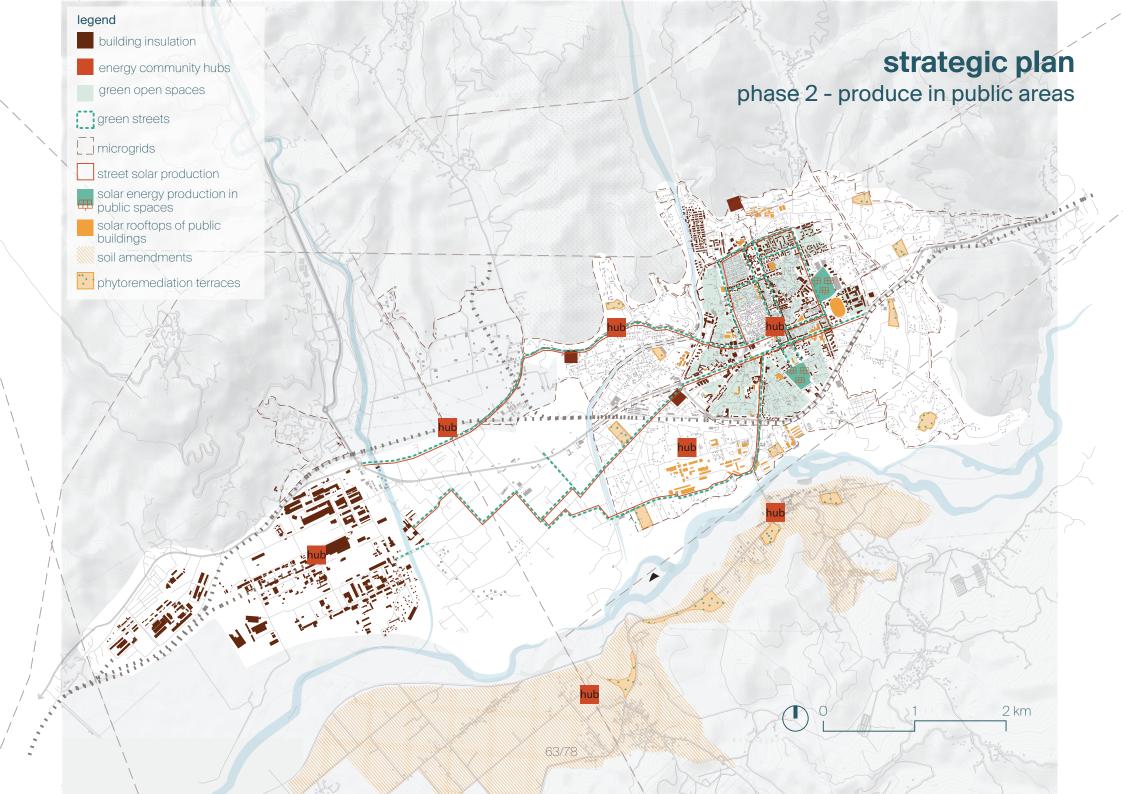


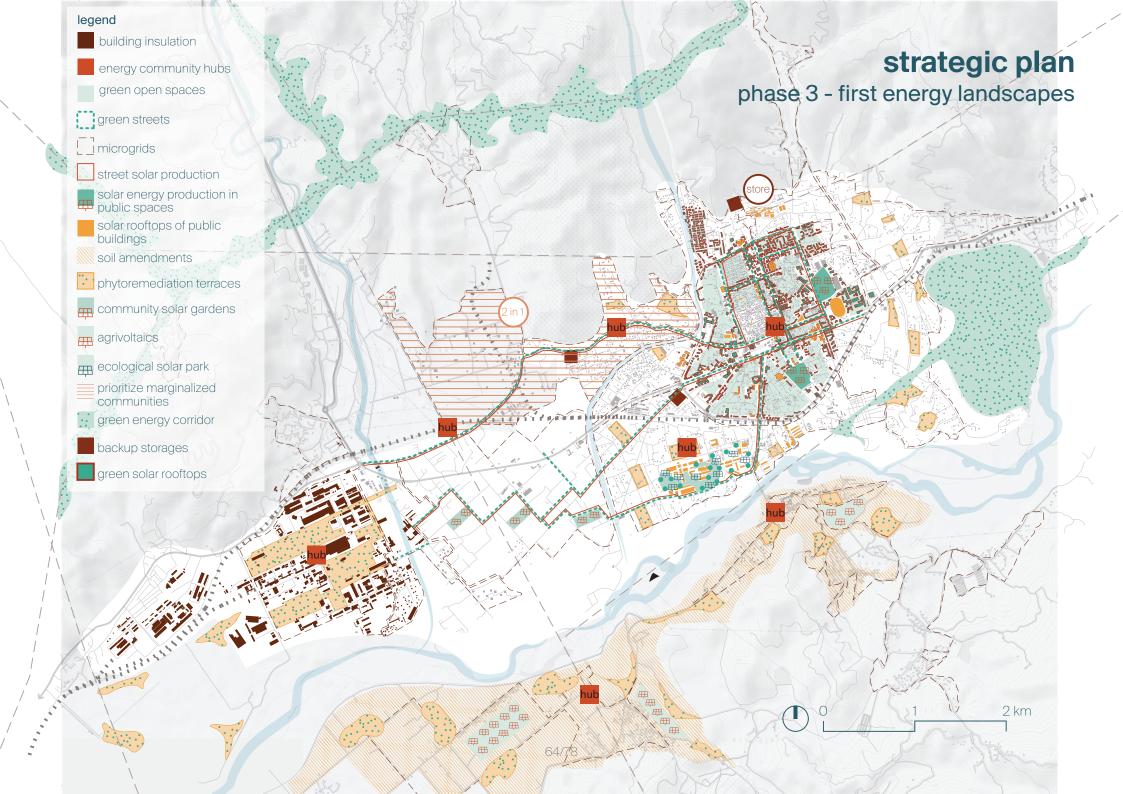


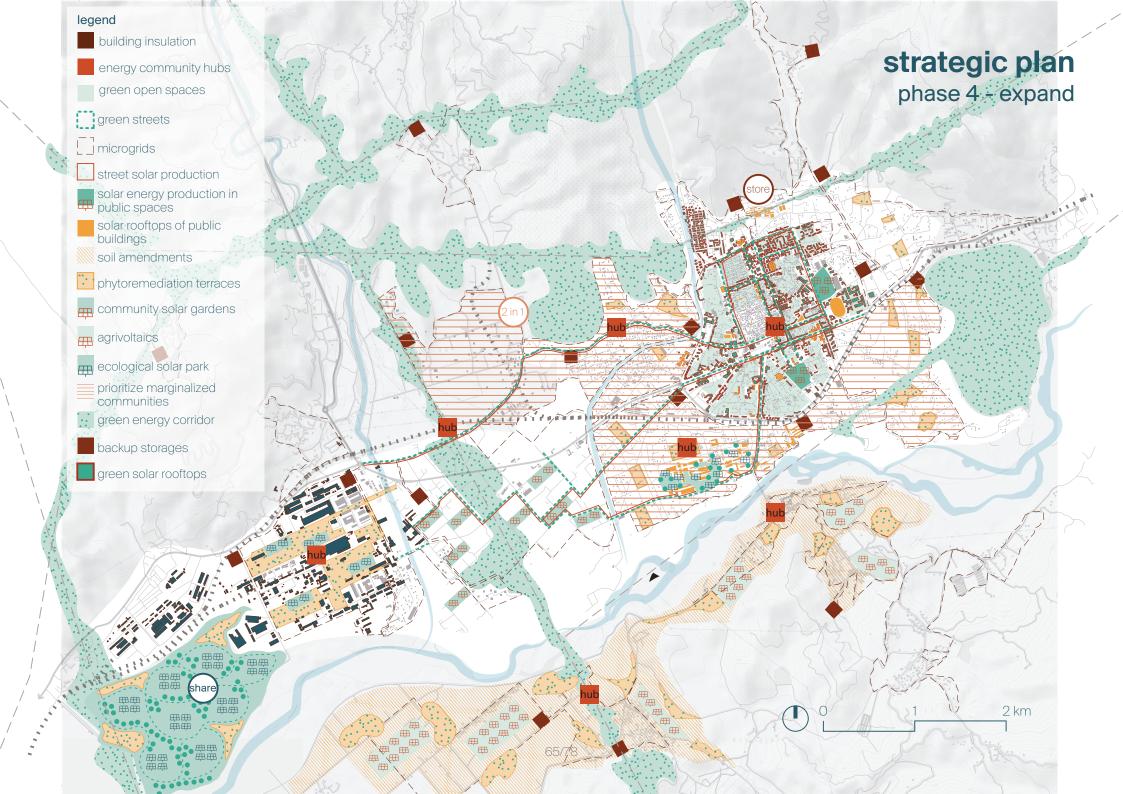


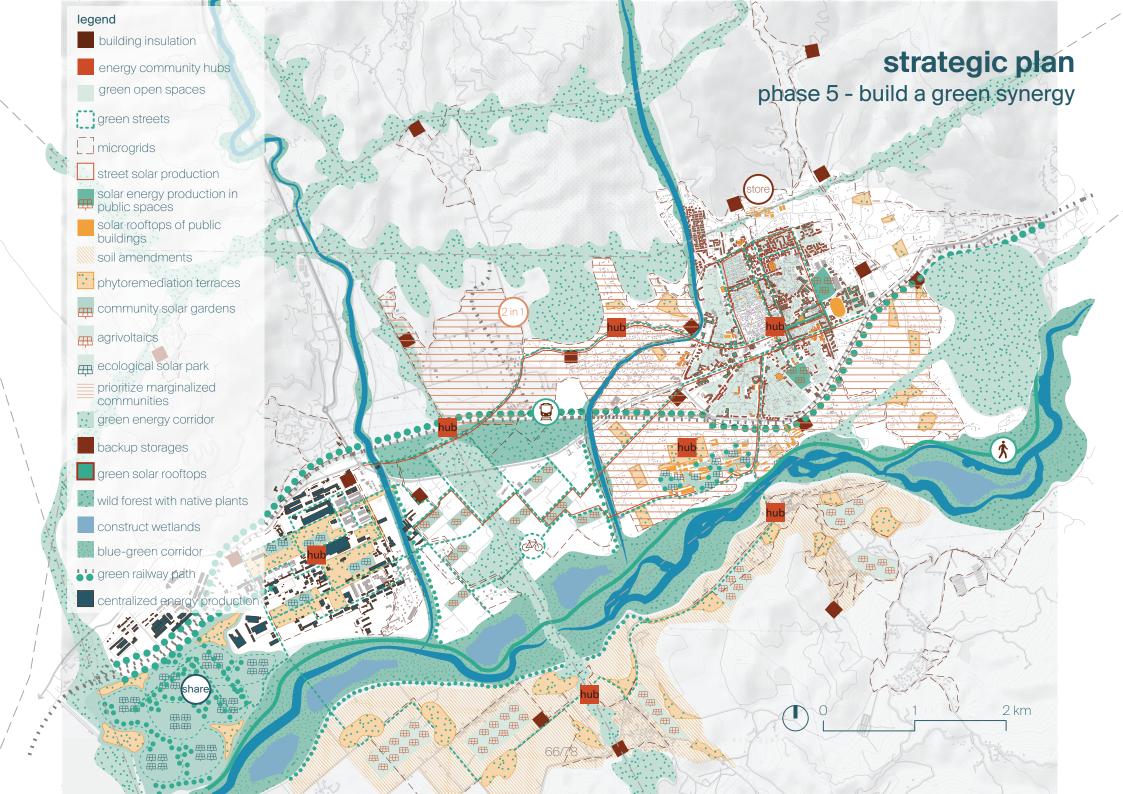












# BEFORE - Metalurgjiku open lands







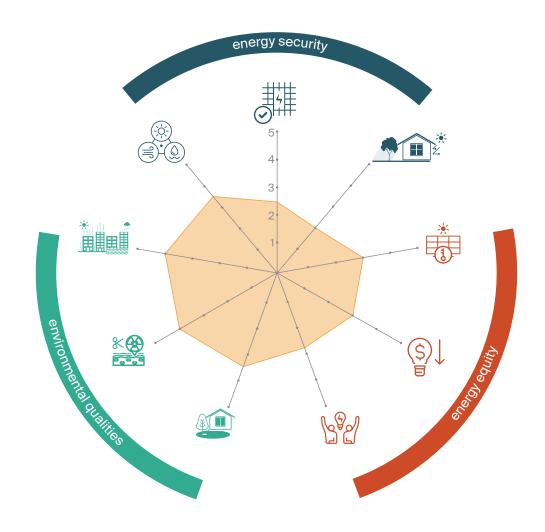








## assessment







diversify energy sources



increase energy efficiency



access to clean energy sources



affordable clean energy for all



participate in decision-making



resilient from extreme weather conditions



mitigate air, soil, water pollution from industrial area



green and better neighborhoods conditions

## conclusions

"How can the establishment of an **energy-space nexus** in the **Pattern of Production** contribute to **energy security** for a social and environmental sensitive transition in Elbasan?"

## conclusions

