



Interreg
North Sea Region
ACCESS
European Regional Development Fund



Advancing Communities towards low-Carbon Energy Smart System

The European Union aims to achieve carbon neutrality in Europe by 2050.

Systems integration and coordination of a high number of different stakeholders is necessary to improve resiliency and flexibility of the current energy system and enable the transition to renewable energies.

Cities are at the core of the transition to net-zero but are facing increasing challenges related to technical, financial and governance processes.

ACCESS empowers cities to coordinate local stakeholders for supporting and investing in the transition of Europe's energy system.

ACCESS aims to advance the coordination of future low-carbon energy grids development in cities by increasing the capacity of governments to scale up and plan investments in sustainable energy systems.

**Advancing Communities
towards low-Carbon Energy
Smart System**

Local energy system innovations lack systematic planning and integration with the cities' ecosystem

The upscaling challenges

Cities around the world are developing local innovation initiatives in order to demonstrate the opportunities a smart grid can offer their entire community. However, **pilots are usually conceived as stand-alone projects tailored to the local conditions** whose low-carbon impact is relatively modest, especially at a regional level. **The critical challenge remains to enable a wider transformation of electricity grids by upscaling and replicating these niche innovations.**

Financial

The challenge

Current financial models of pilots cannot be upscaled as they are based on subsidies. The challenge is to shift from early majority and unlock investment capacity for scaled projects.

ACCESS

ACCESS will enhance cities' investment capacity through long-term planning, unlocking innovative business models that fits scale and higher involvement of communities.

Governance

The challenge

Lack of standardised processes and solutions increase development time and costs of pilots. Cities need to coordinate new stakeholders and ensure effective planning between actors.

ACCESS

The ACCESS approach will improve effectiveness of processes and de-risk smart grid investment. Innovative governance models will be tested and proven to coordinate/involve different actors through overarching planning.

Technica

The challenge

Current pilots are siloed and focus on single technologies. Scaling up requires interconnection of systems and effective planning to contribute to cities' ambitions.

ACCESS

ACCESS will focus on system integration and interaction between energy vectors to achieve cities' sustainable ambitions. Pilot projects will be developed and upscaled within the city's wider energy ecosystem.

A SYSTEM-BASED APPROACH FOR EFFECTIVE ENERGY TRANSITION PLANS

SUSTAINABLE ENERGY STRATEGIES



DEMONSTRATORS

Testing innovative energy technologies and new business models in a real-life environment in four demonstrators.



UPSCALING FRAMEWORK AND TOOLBOX

For a replicable approach to energy transition planning.



AN ECOSYSTEM OF CITIES AND EXPERTS

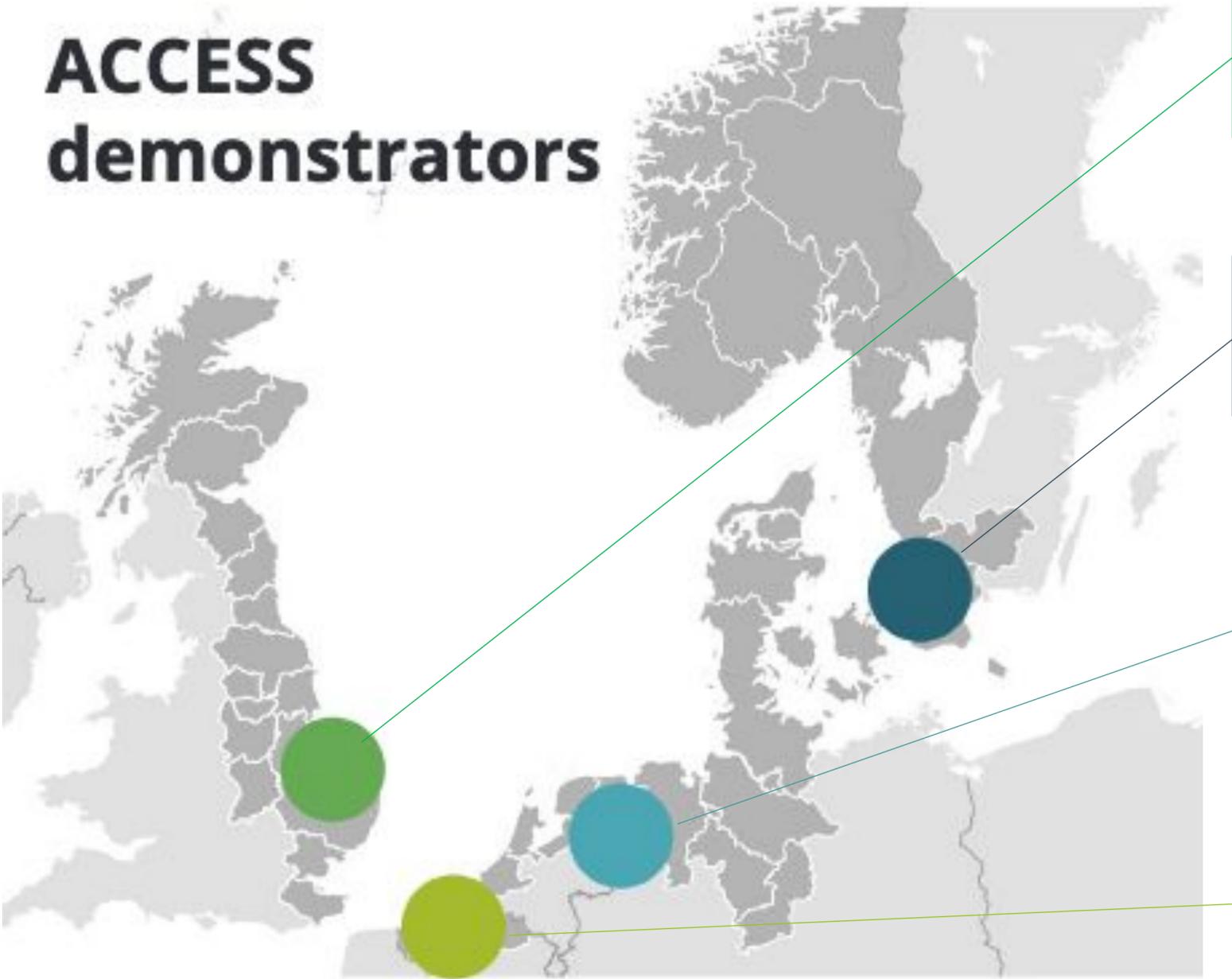
Providing the necessary expertise in technology, governance and financing models to tackle shared challenges in the local energy system transformation.



The ACCESS approach builds upon 3 core elements:

- The development of practical tools and processes to be used in urban planning practices
- 4 innovative and large-scale demonstrator projects in different conditions
- A strong consortium composed by local authorities and experts across the EU

ACCESS demonstrators



WEST SUFFOLK

60% CO₂ reduction by 2025

Multi-sector energy hub including public, commercial and industrial organisations to solve current grid constraints.



MALMÖ

Energy neutral by 2020, 100% RES by 2030

Local energy hub integrating renewable generation, EV charging infrastructure and storage in an efficient DC grid to cut power peaks and losses locally.



AMERSFOORT

Energy Neutral by 2030

Local energy trading community where prosumers and consumers are connected into a unique energy marketplace.



MECHELEN

40% reduction CO₂ emissions by 2030

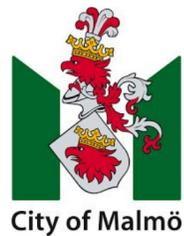
Smart mobility and energy-hub whose core is a smart energy/CO₂ neutral mobility hub whose renewable energy and V2G chargers will be used to balance the local grid and provide flexibility services.

ACCESS consortium and expertise

Upscaling the energy transition together



VIT
Project coordinator
Knowledge partner



Malmö
Local authority



IfM Engage
Knowledge partner
Leading the development of
the upscaling toolkit



Mechelen
Local authority



Johanneberg Science Park
Knowledge partner
Leading the replication
activities



West Suffolk Council
Local authority



AARHUS UNIVERSITET
Aarhus University
Knowledge partners
Leading stakeholder
engagement activities



Amersfoort
Local authority



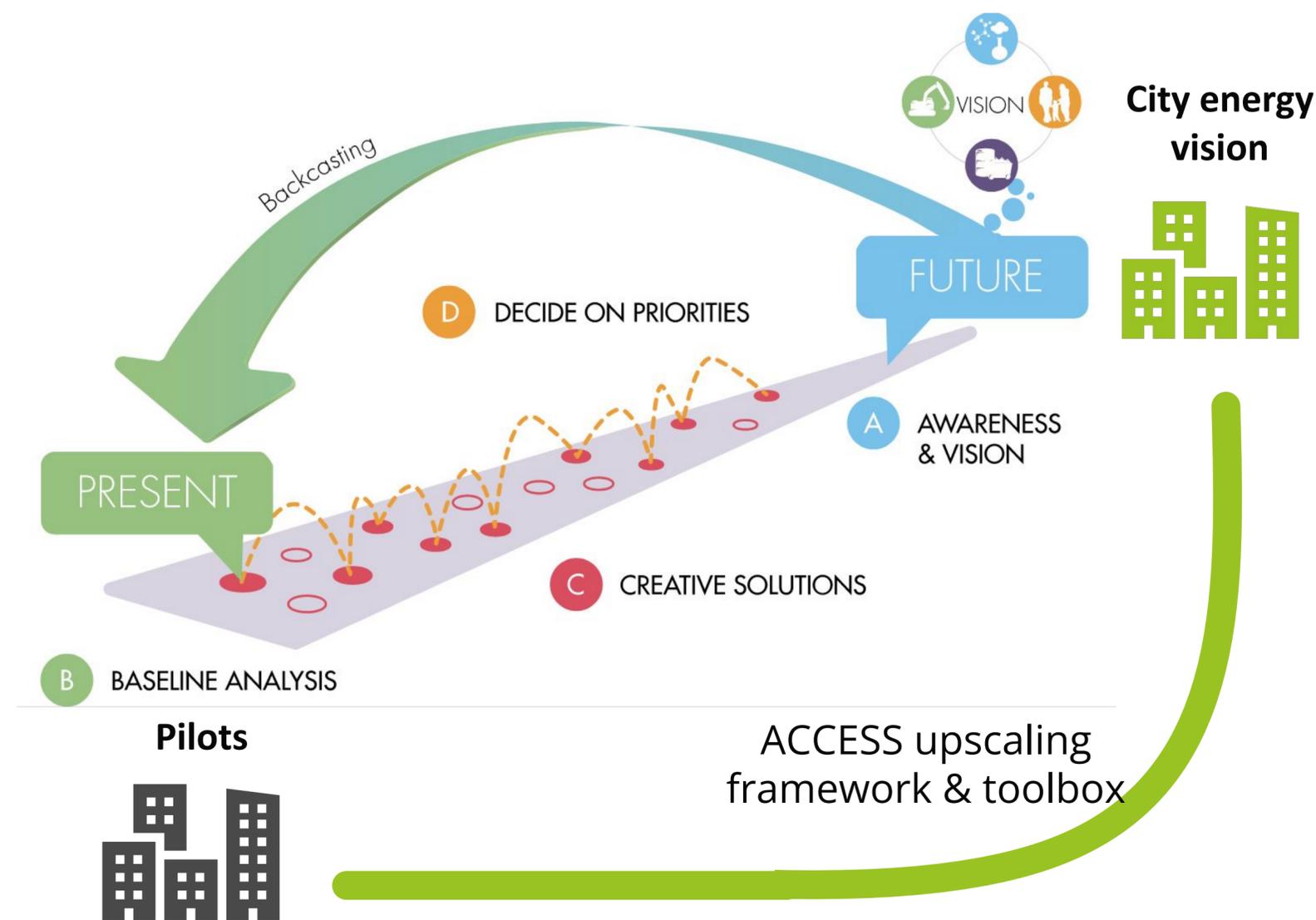
Project manager



Co-funding partner

Upscaling smart grid demonstrators towards the creation of net-zero carbon energy systems

ACCESS aims to develop a systematic upscaling approach that delivers pathways and action plans to enable the energy grid transition, transferrable to other local authorities across the EU. Pathways will turn the city vision into scaled investment approaches.



The ACCESS project will deliver urban planning methodologies and tools to connect single pilot projects (short term) with the wider energy vision to be realised (long-term) by making use of specific guiding instruments and urban planning techniques (toolkit).

The application of the toolkit in project development processes and urban planning will allow the deliverance of smart grid projects with:

-  **30%** reduction in development time
-  **20%** reduction of energy costs
-  **25%** CO₂ reduction

ACCESS best practices

Replication and roll-out

Supporting cities' decision-making process

ACCESS will develop a transnational Upscaling Framework and toolbox to be used by European cities to address their upscaling challenges and develop effective and realistic urban energy transition pathways. This, in turn, enables the large-scale adoption of low-carbon technologies, services and processes.

Local roll-out and integration in governance structures

ACCESS cities will integrate in their decision-making process ACCESS' approach. Pilots project will be rolled-out and upscaled locally and integrated with other running or future smart energy projects.

City support groups

ACCESS cities will inform and coach 2-4 peer cities on energy transition and investment planning, facilitating the adoption of the ACCESS best practices and approach.

Replication at regional level

ACCESS partners will collaborate with regional entities and look at areas within their region where pilots could be replicated for contributing to the wider energy transition.

Engage key stakeholder groups and decision-makers

ACCESS partners will disseminate the project results and raise awareness regarding its innovative approach to urban energy planning through their networks, providing to NSR and beyond with the right tools and approaches to embrace the energy transition.

Methodology: goal and scope

Development of sustainable energy pathways for the achievement of the cities' energy visions

Goal

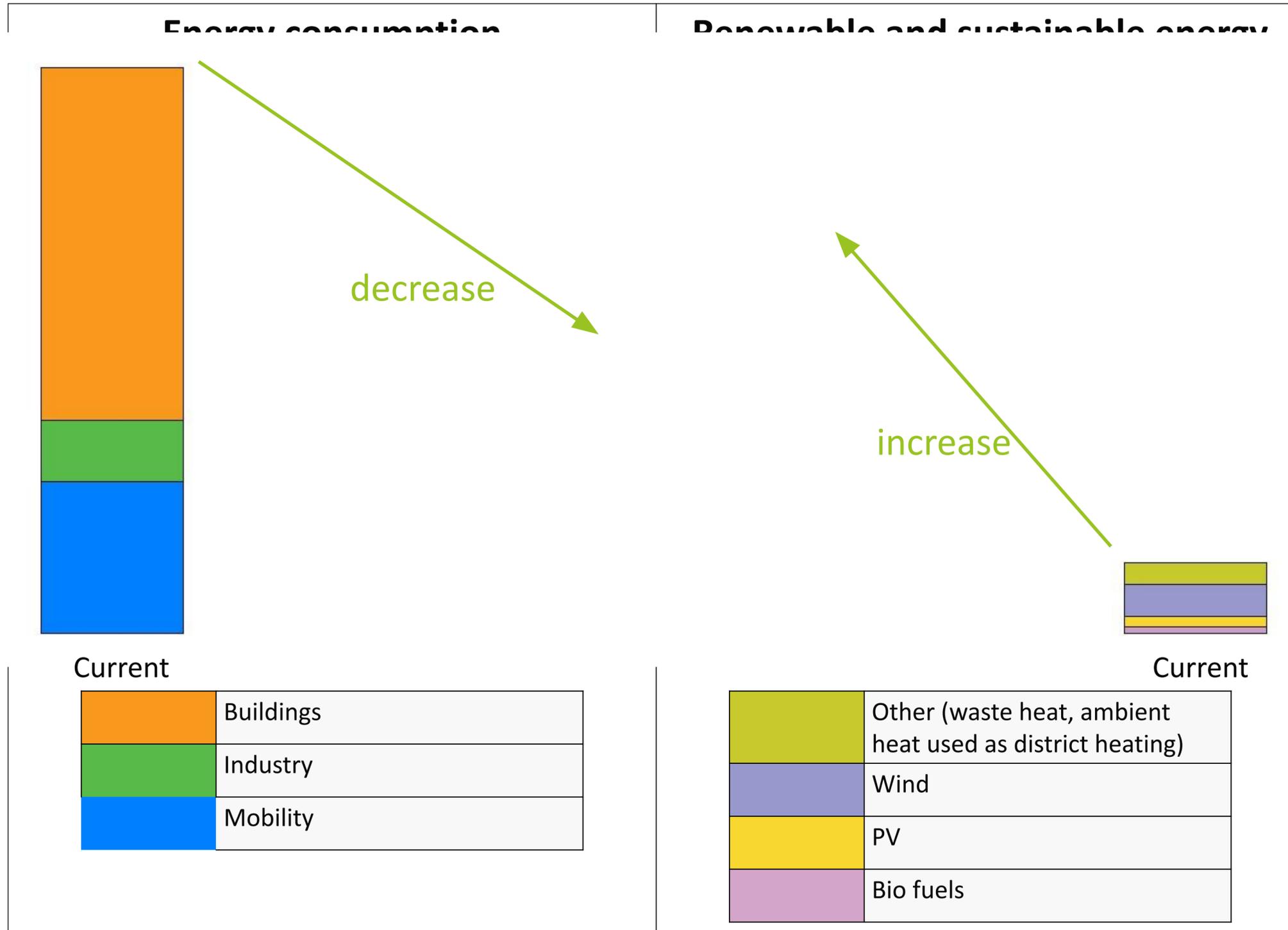
- Develop energy roadmap
- Provide insights in a comprehensible way
- Identify boundaries and manoeuvring space

Scope

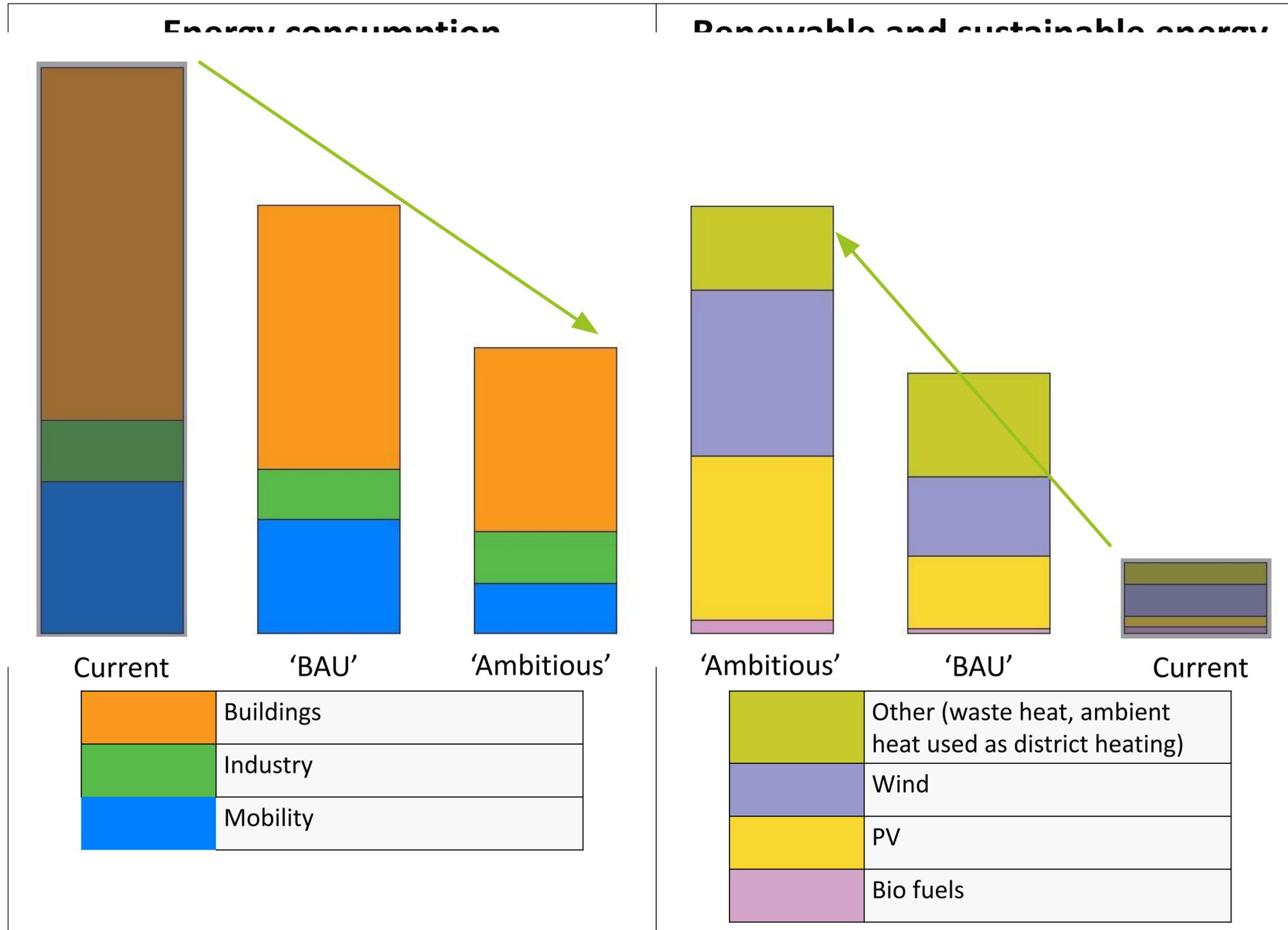
- Defined geographic region
- Energy consumption and production + CO2
- Buildings, industry, mobility
- Yearly balance

- As part of our work stream focusing on the upscaling of pilots for achieving the city's energy targets, VITO has validated with ACCESS cities an energy planning methodology for development of sustainable energy pathways.
- Starting from the current situation for both energy consumption as well as sustainable energy production and utilisation, it identifies how cities could reach carbon neutrality in their energy systems.

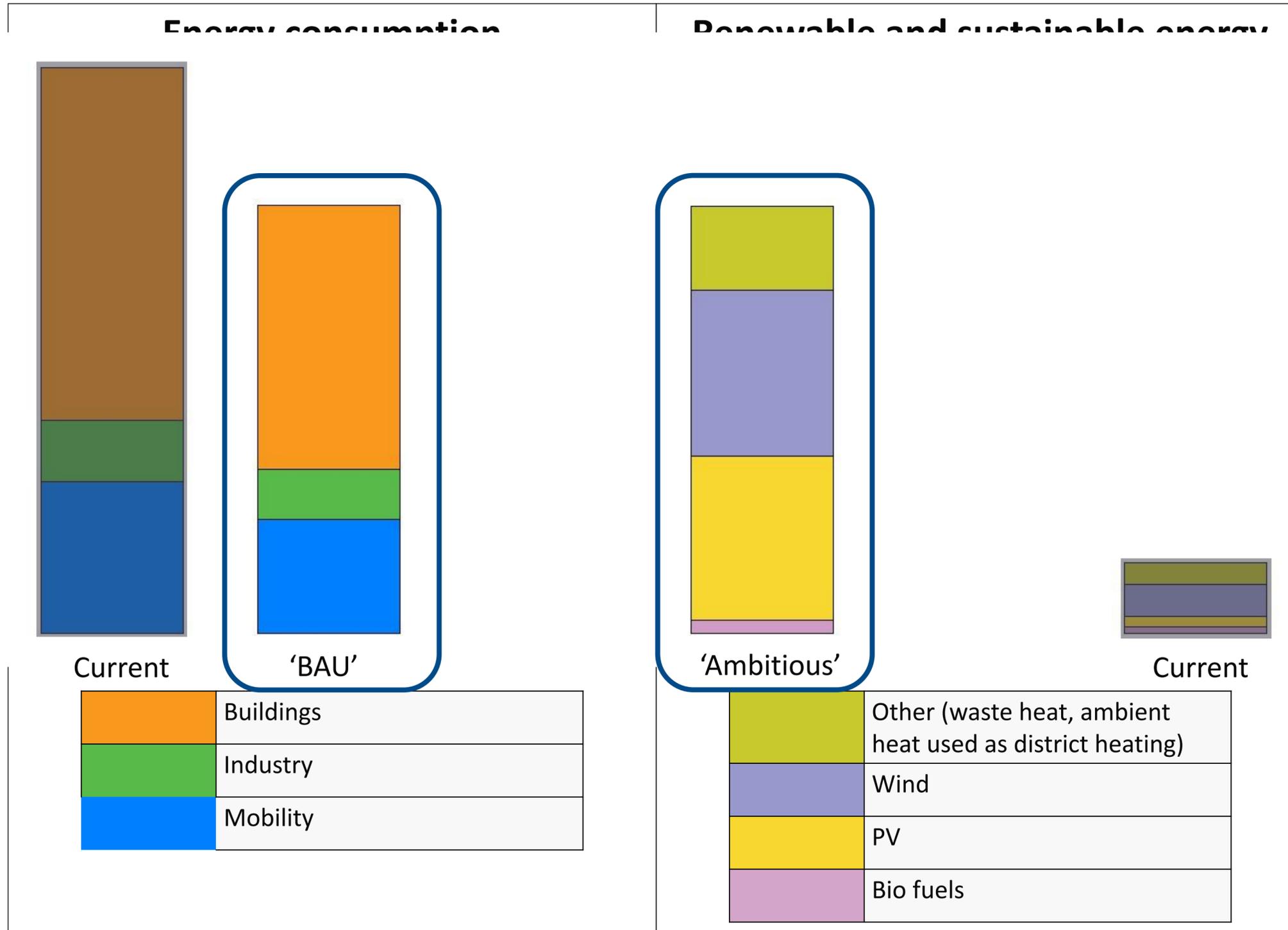
Methodology



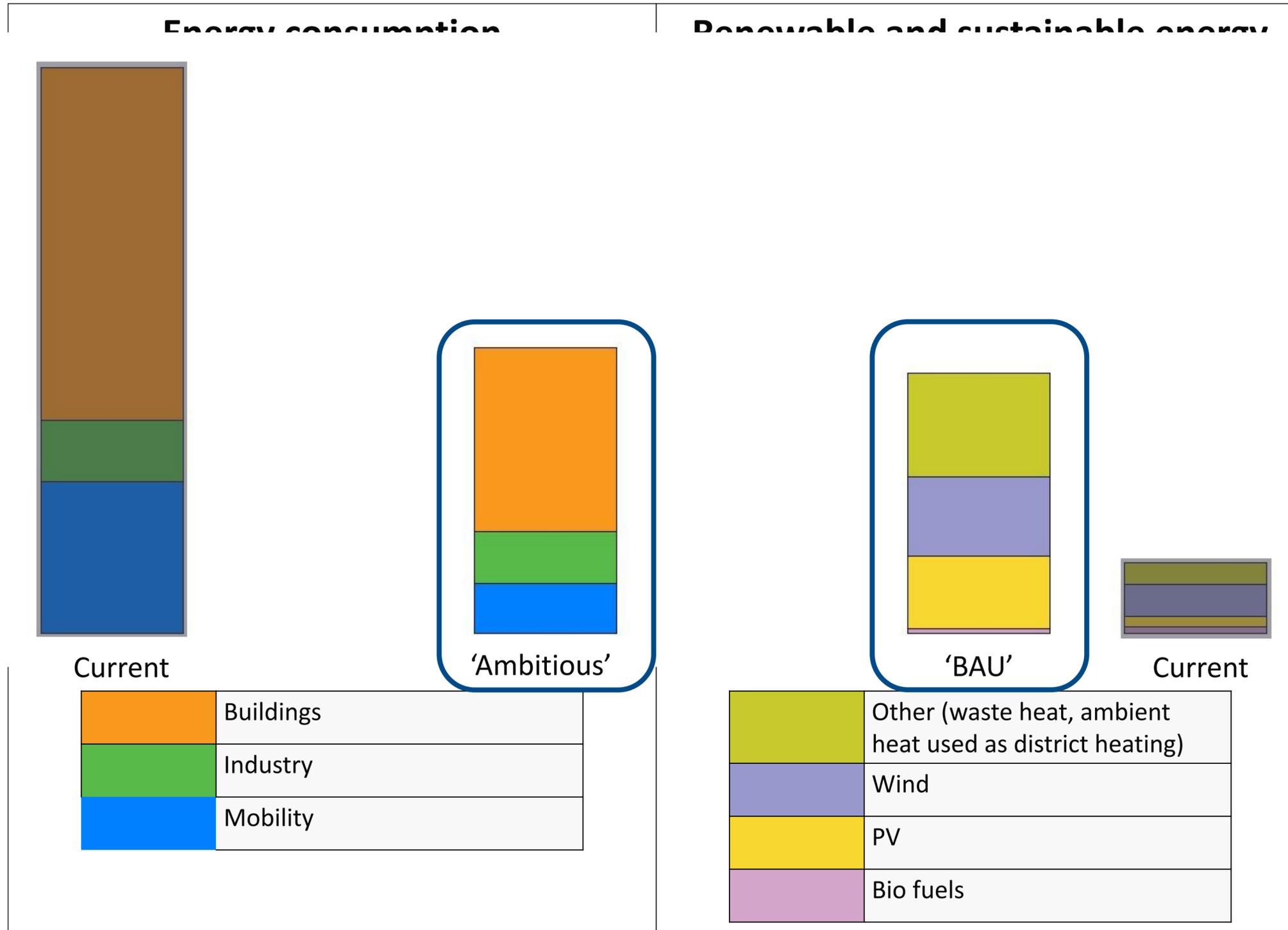
Methodology



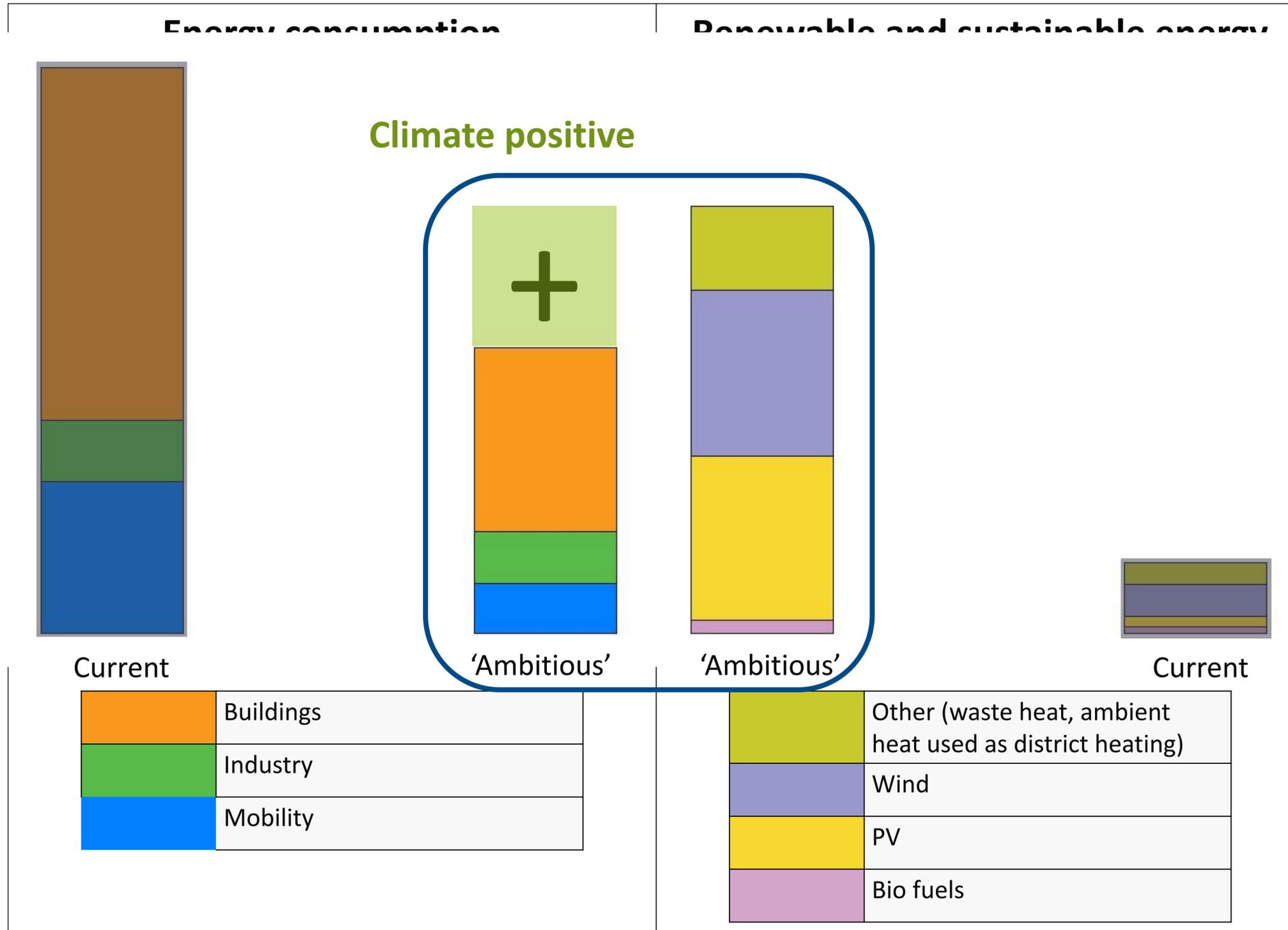
Methodology



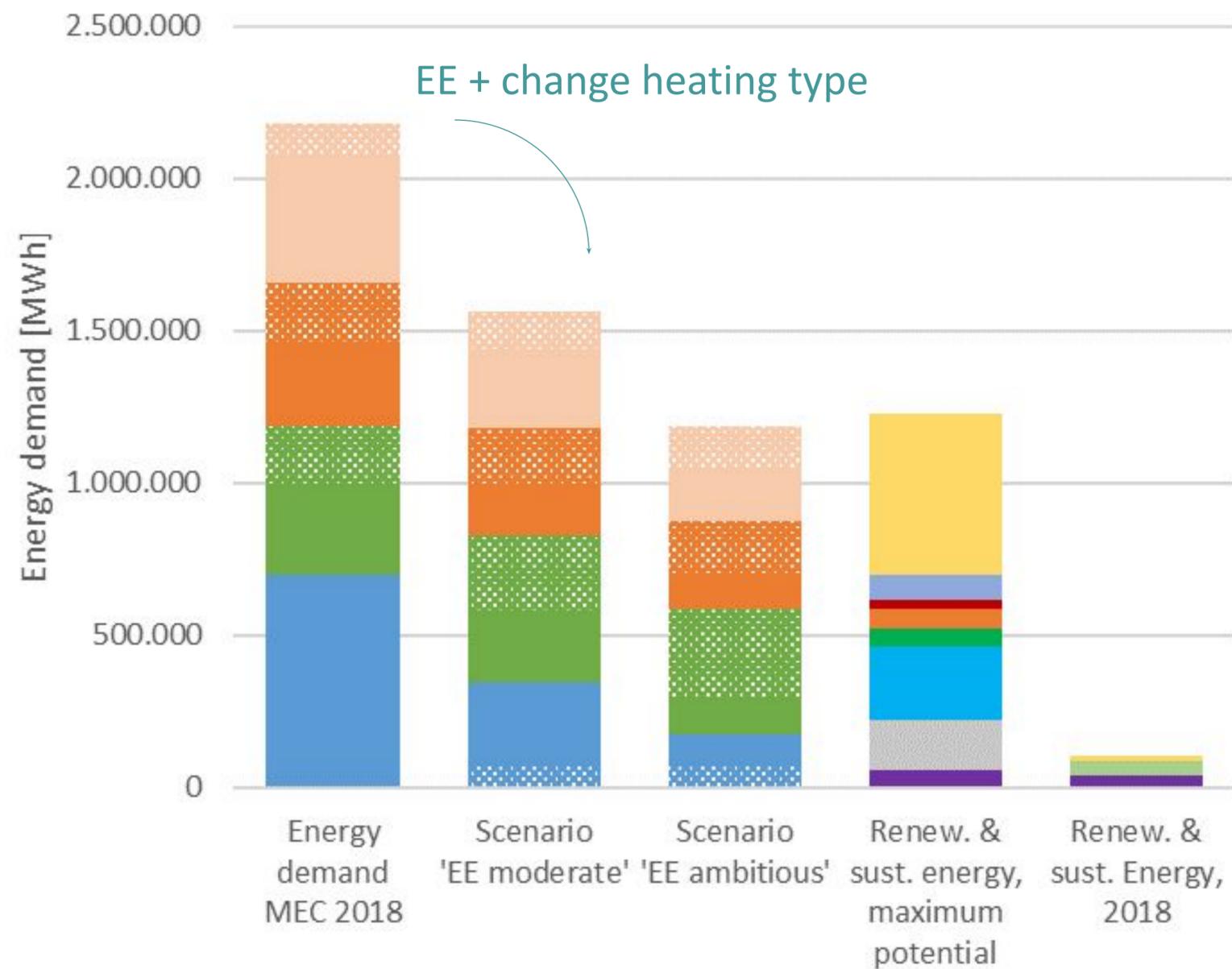
Methodology



Methodology

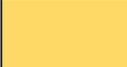
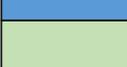


Mechelen: Roadmap definition



	Moderate	Ambitious
Buildings, heat demand	-30 %	-45 %
Heat pumps	45 %	90 %
District heating	5 %	10 %
Residential, electricity	-10 %	-20 %
Tertiary, electricity	-20 %	-30 %
Industry, energy efficiency	0 %	15 %
Industry, electrification	20 %	50 %
Mobility: modal shift	33 %	55 %
Mobility: electrification	41 %	69 %

Energy use	
	Residential buildings
	Tertiary buildings
	Industry
	Mobility

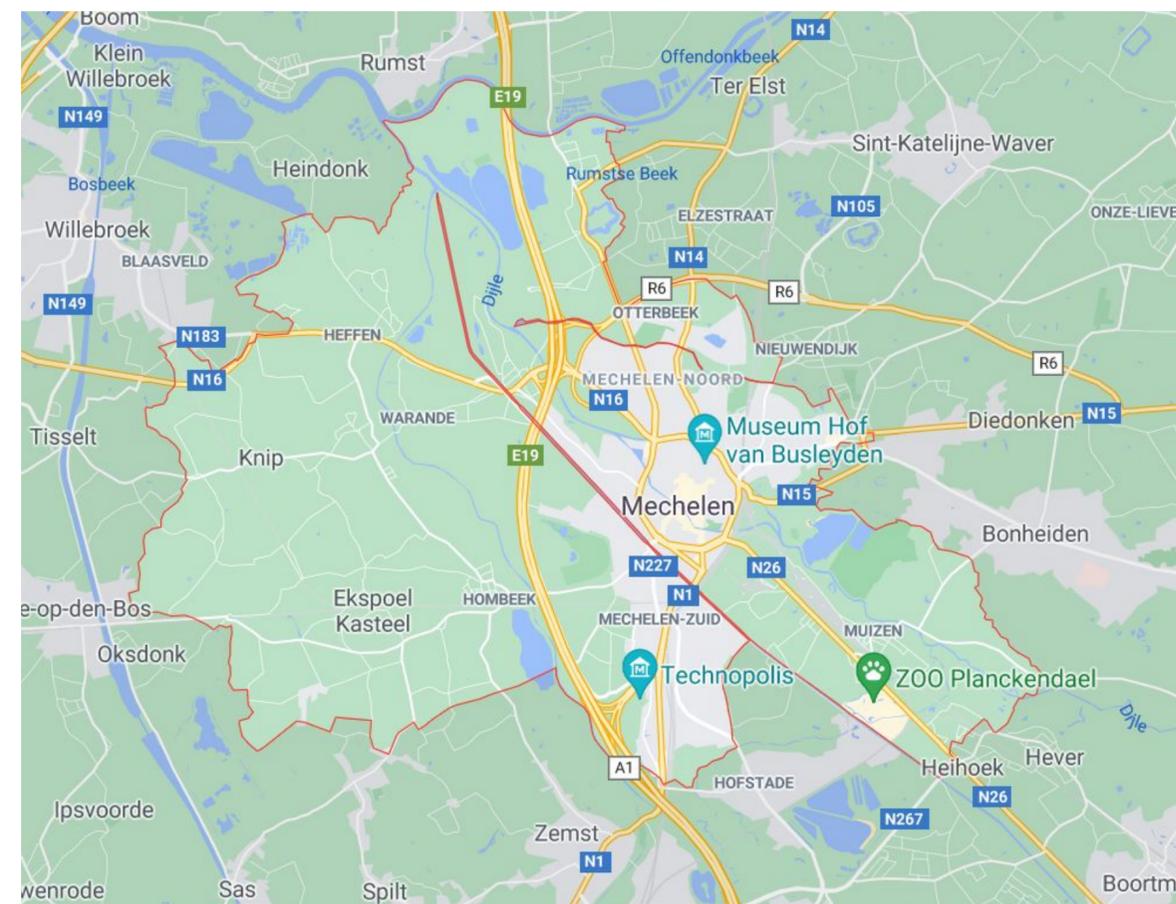
Renewables	
	Solar PV
	Wind
	Water
	Biomass
	Waste heat
	Waste incineration
	Geothermal heat
	Ambient heat
	Hydrogen
	Biofuel

Mechelen : Roadmap definition

- Even for an ambition scenario to reduce the energy demand, climate neutrality is extremely difficult to achieve
 - High ambition in all domains is needed
 - Innovative solutions are needed □ pilot case

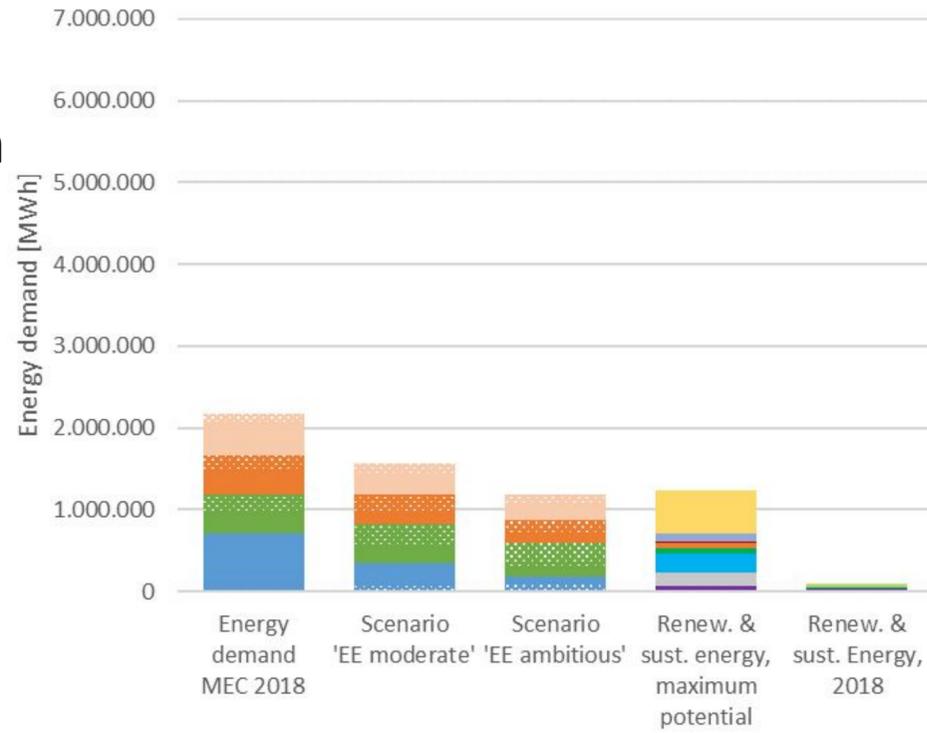
- Large potential for
 - PV: 530 MWh
 - 290 MWh industrial/commercial roofs
 - 223 MWh residential roofs
 - 15 MWh current production
 - Geothermal: 307 MWh, but not all economically feasible

SOURCES:
 Nulmeting (Covenant of Mayors)
 VEKA (Flemish Energy Agency)
 BREGILAB project (VITO)
 DEA (VITO)

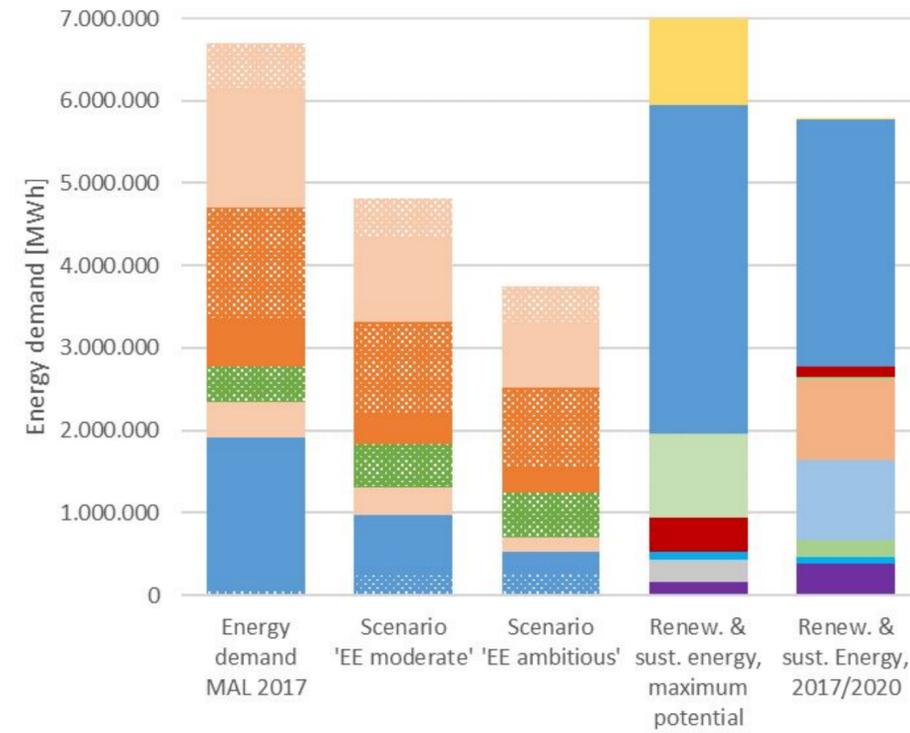




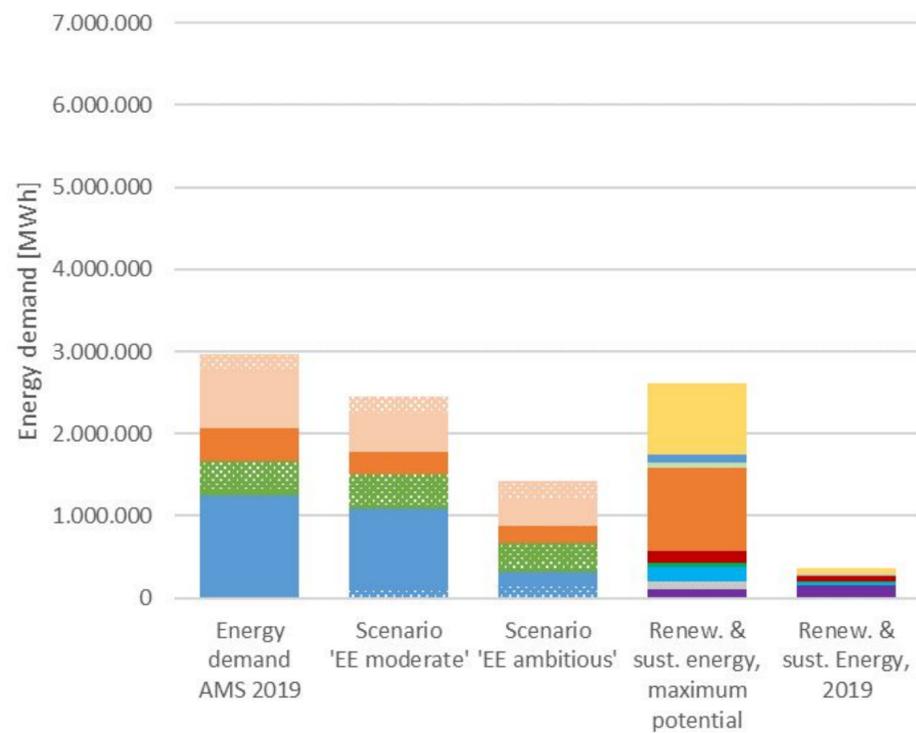
Mechelen



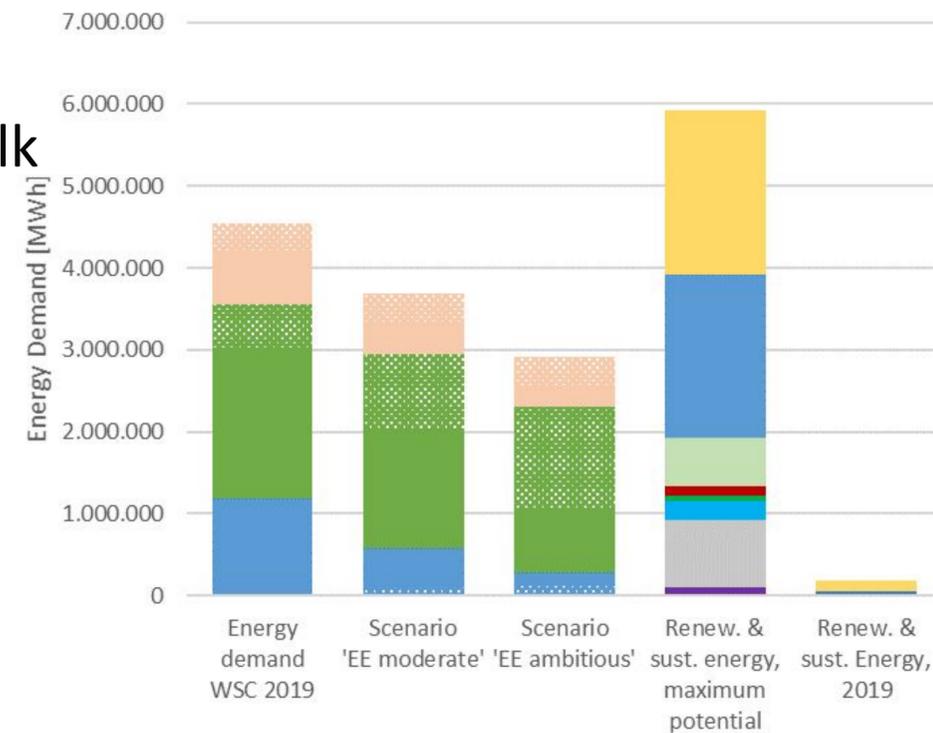
Malmö



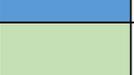
Amersfoort



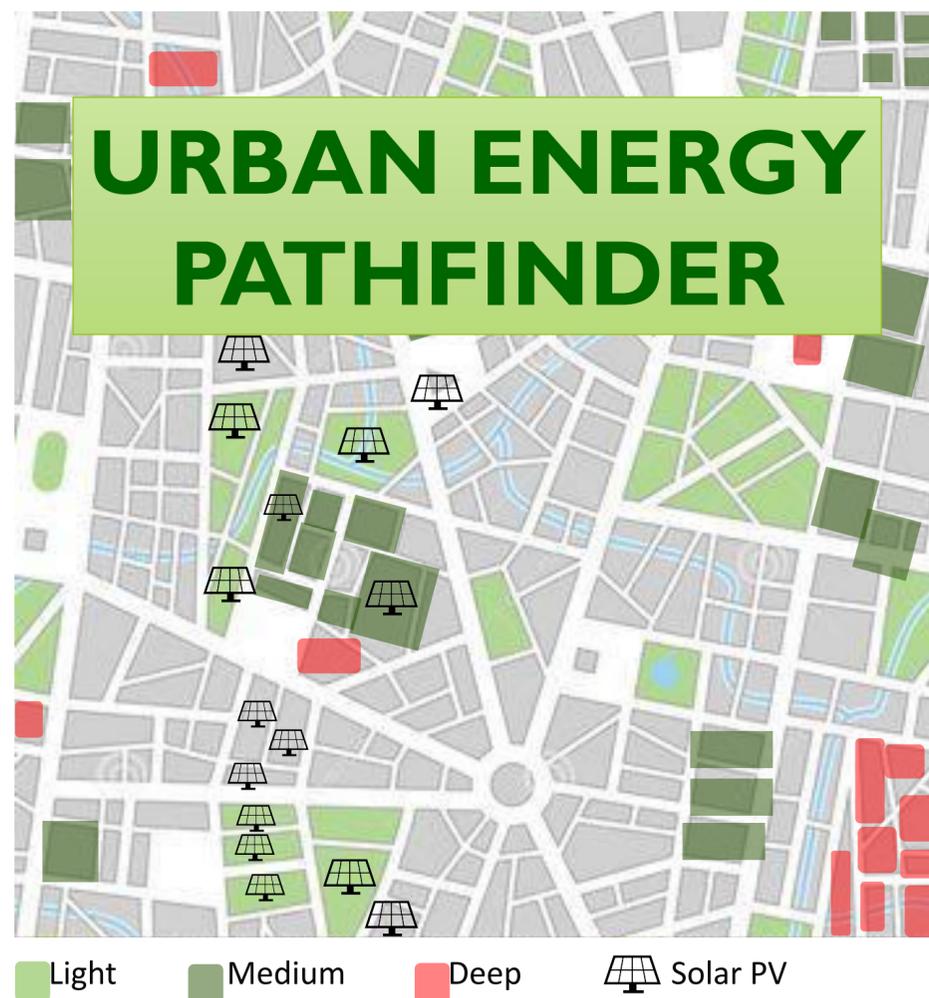
West Suffolk



Energy use	
	Residential buildings
	Tertiary buildings
	Industry
	Mobility

Renewables	
	Solar PV
	Wind
	Water
	Biomass
	Waste heat
	Waste incineration
	Geothermal heat
	Ambient heat
	Hydrogen
	Biofuel

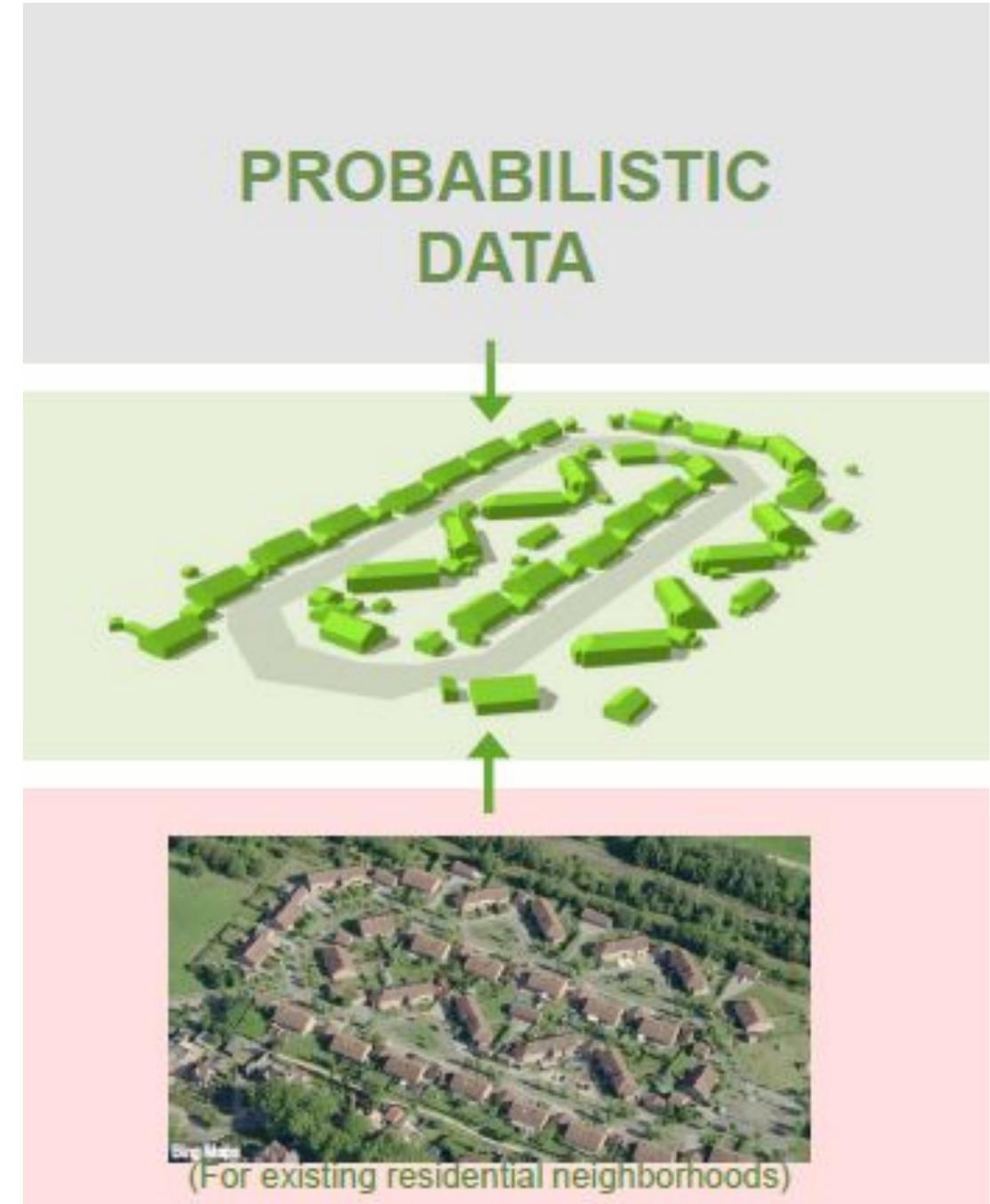
Defining actions: Renovation potential



- Planning tool to develop local energy roadmaps for district and city-level
- Detailed building level info: 3D building geometry, function, construction year, heating system, inhabitants...
- How to meet climate ambitions towards 2050
- Calculates energy, CO₂ savings, and financial conditions for renovation scenarios
- Energy technology measures at building, district and city level

UEP: Basic principle

- Modelling
 - Detailed simulations models: e.g. individual building simulation using EBECS or IDEAS
- Data
 - Bottom-up data where available (e.g. GIS building geometry, ...)
 - Top-down fallback options where needed (e.g. inhabitants per statistical sector)
 - Statistical modelling and expert assumptions in between



UEP: Basic principle

Density of heat demand of small users
(Warmtekaart 2019)

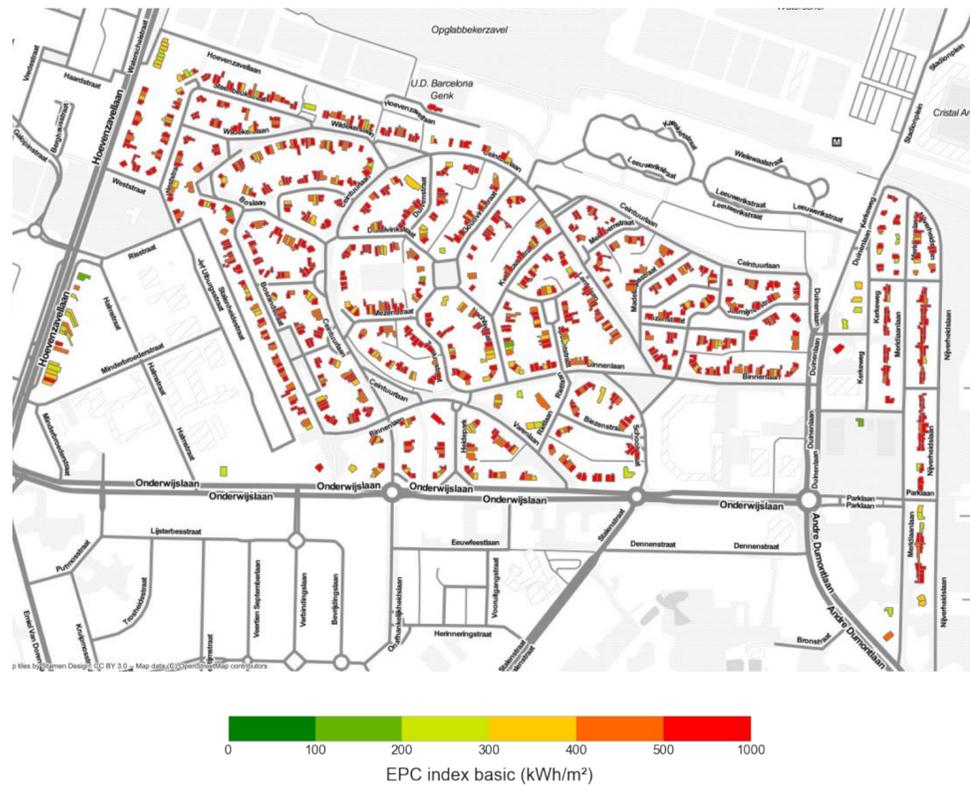


CityGML 3D model



UEP: Results

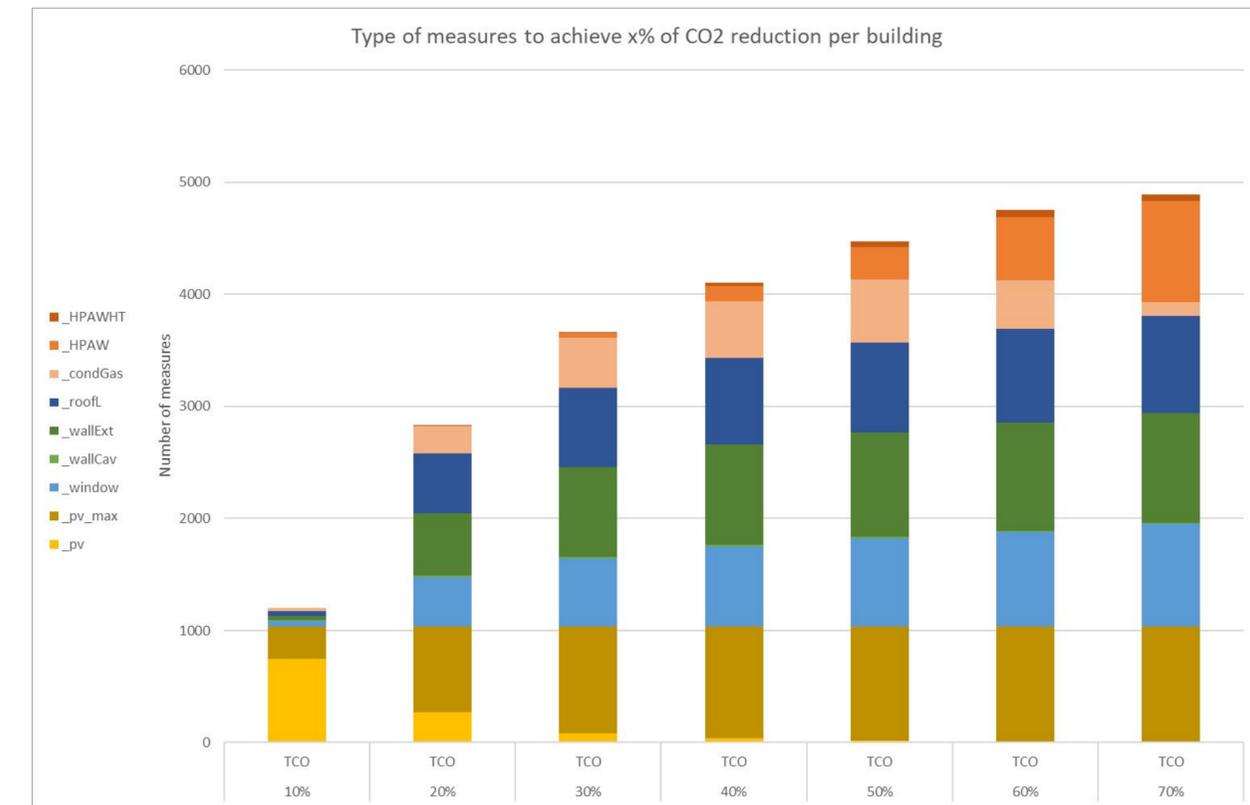
Current energy performance



District heating potential

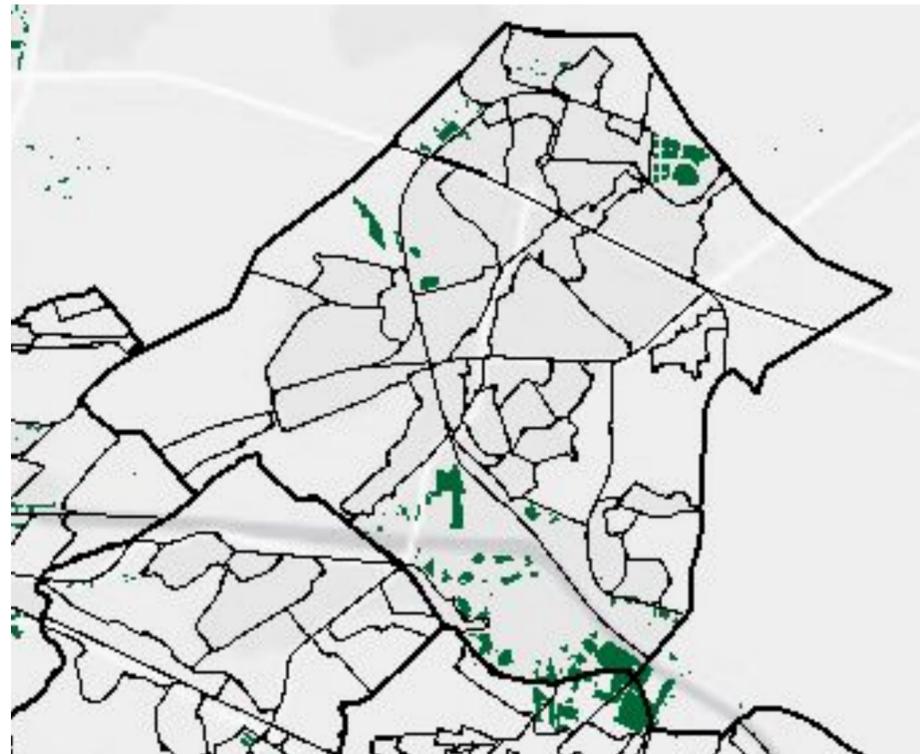


Renovation scenario's

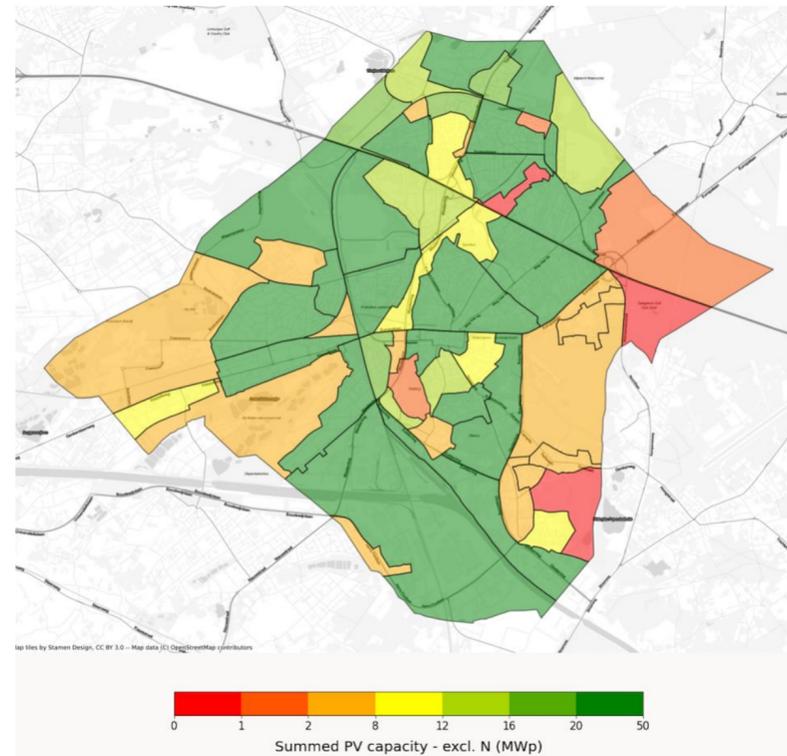


Defining actions: Renewable energy production

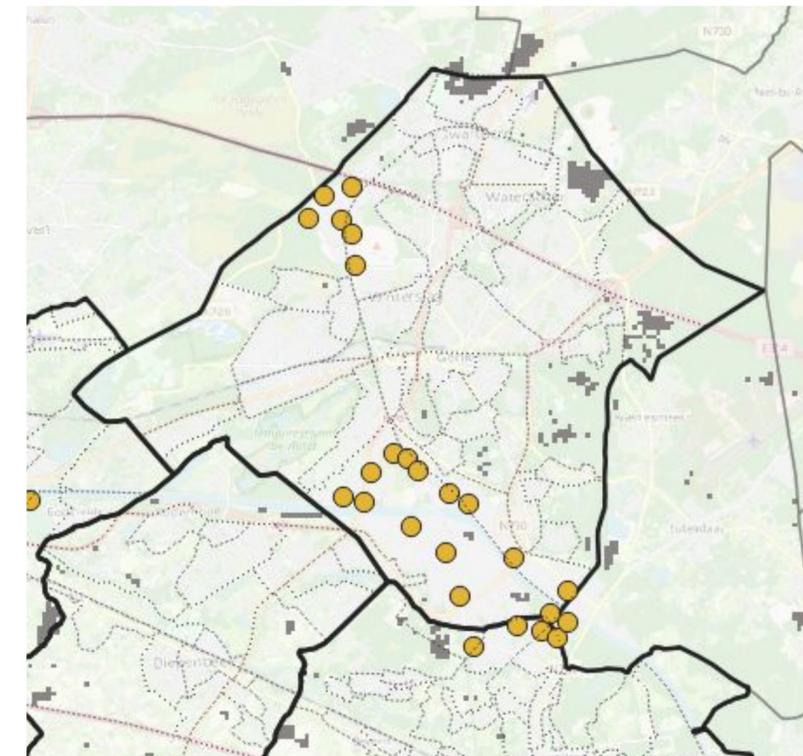
Solar parks



Solar PV on roofs



Wind turbines



Defining actions: mobility

Link between mobility and renewables e.g. parking and bus stops



Charging infrastructure



□ ACCESS Pilot case in Mechelen

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