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POCITYF: Implementing PEDs in historical cities

Sustainable Places| 15 06 2023

This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement N° 864400.

POCITYF Project

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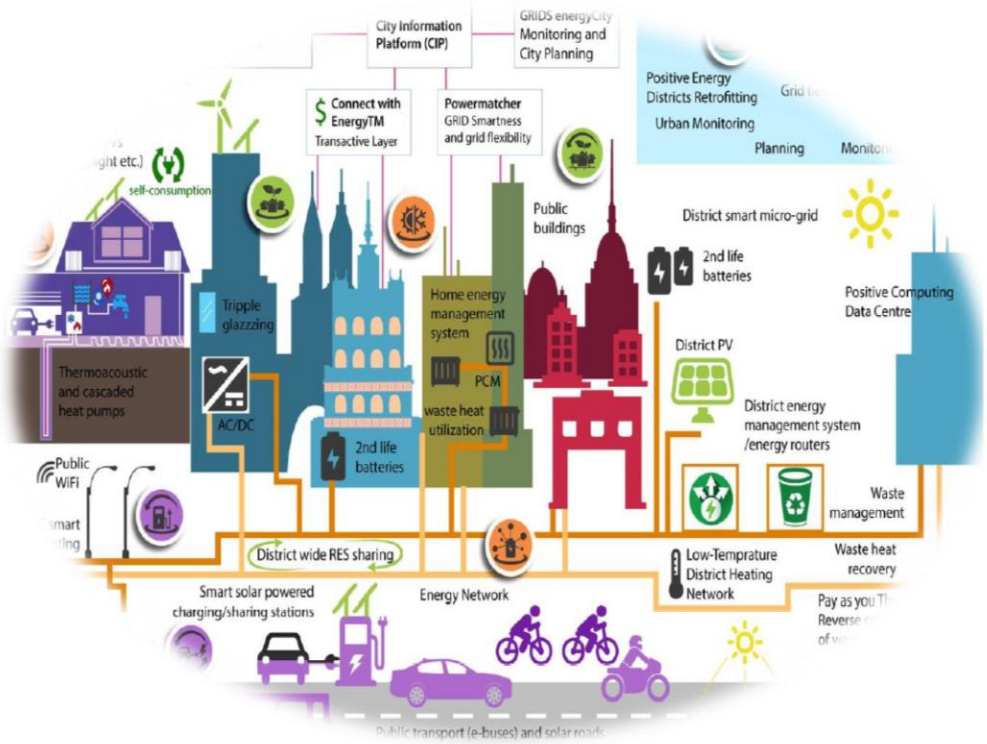
POCITYF – *Leading the smart evolution of heritage sites …*

Deliver a set of Positive Energy Blocks

Emphasis on cultural and historical protected areas: inclusiveness, sustainability and resilience

Improve, in a sustainable and citizen-driven manner, citizens' wellbeing.



… in 8 cities across Europe

- 46 partners
- 13 European countries
- **Led by EDP NEW**

Focus on historical cities

- Legal barriers
- Replication potential
- New life to historic centres

- Budget: 22,5M€
- Grant: 20M€

- **5 years' project**

Lighthouse cities

Évora

Alkmaar

Fellow cities

Bari

Celje

Granada

Hvidovre

Ioannina

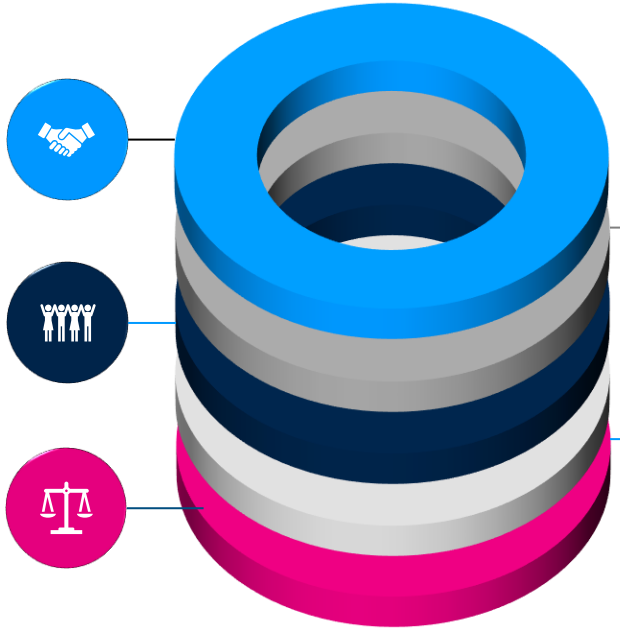
Ujpest

Positive Energy Blocks: *an integrated and multidisciplinary concept…*

Political
- Integrated planning
- Cross-department actuation

Urbanistic
- Replicable and scalable

Social
- *Leave no one behind*
- Citizen engagement



Technological
- Advanced energy management
- Local RES & storage

Economic
- Circular economy
- Financing: promote and de-risk *green* investments

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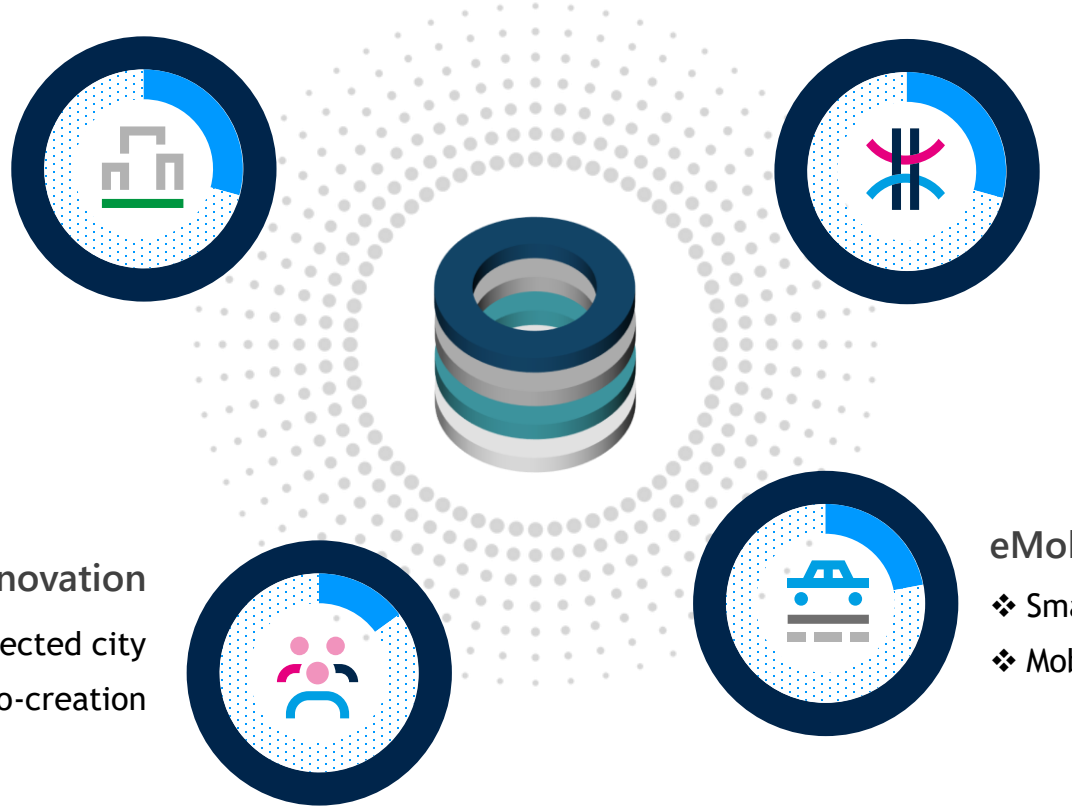
… implemented via 10 innovative solutions

Positive Energy Buildings & Districts

- ❖ Renewables and energy management
- ❖ Retrofitting

Flexible infrastructure

- ❖ Flexible grids & buildings
- ❖ Sustainable district heating and cooling



Citizen-driven social innovation

- ❖ Interoperable and interconnected city
- ❖ Citizen engagement & co-creation

eMobility

- ❖ Smart charging & V2G
- ❖ Mobility-as-a-Service

Évora

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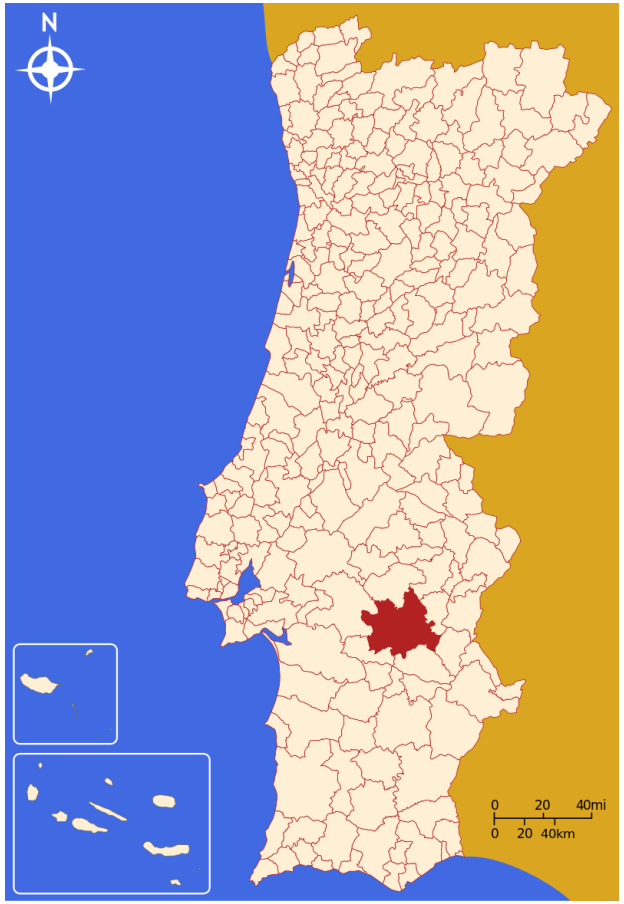

Évora characteristics:

- 53591 inhabitants
- City area 1307 km^2
- Only Portuguese city that is a member of the “Oldest European Cities Network”
- The historic center is known as the "museum city“

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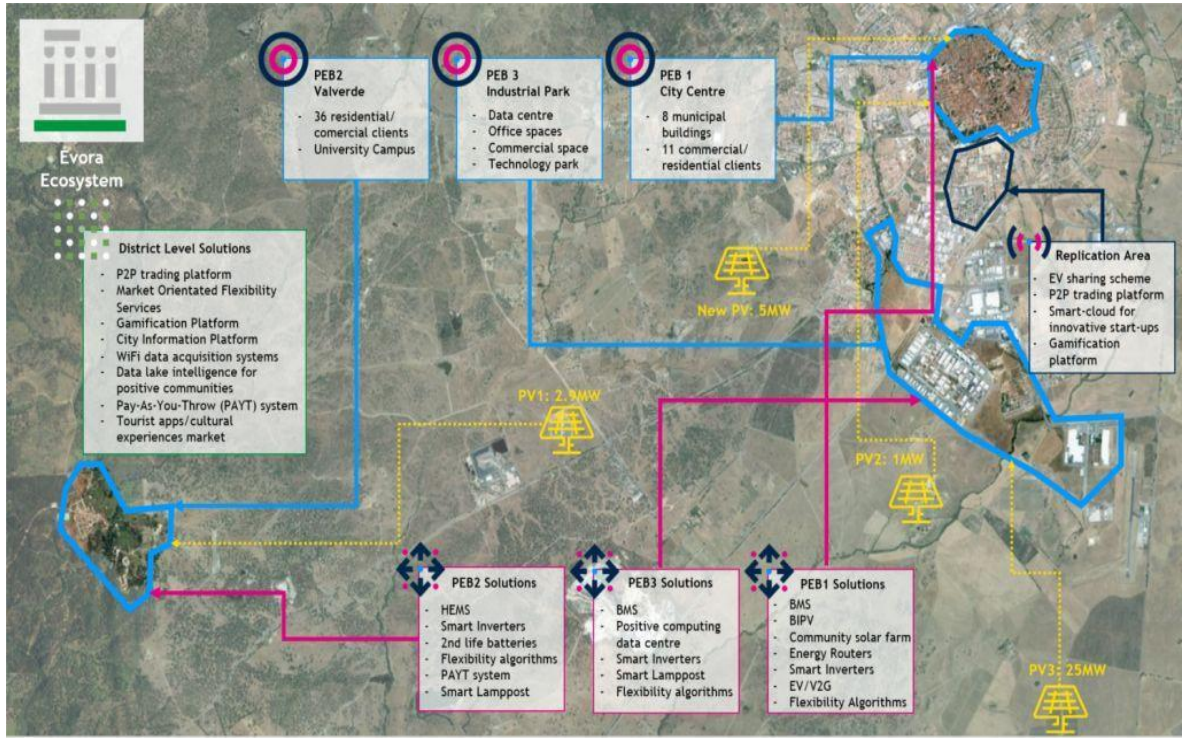
Évora demonstration activities will take place in three PEBs



Main Highlights

- 3 different blocks of demonstration, encompassing the City's main challenges
- 4 Groups of solutions: positive energy buildings, mobility, storage and flexibility, and stakeholders' solutions co-creation
- Several district-level solutions, oriented to provide the Municipality an holistic vision of the city and endow local stakeholders with new smart city solutions

Main Challenges

- PEB1 (City Centre) poses tremendous challenges, endowing anyhow, new opportunities for cultural sites
- Timeline (~2 years for developments and deployment) and coordination with local stakeholders
- COVID-19 has brought new challenges to this already daunting project

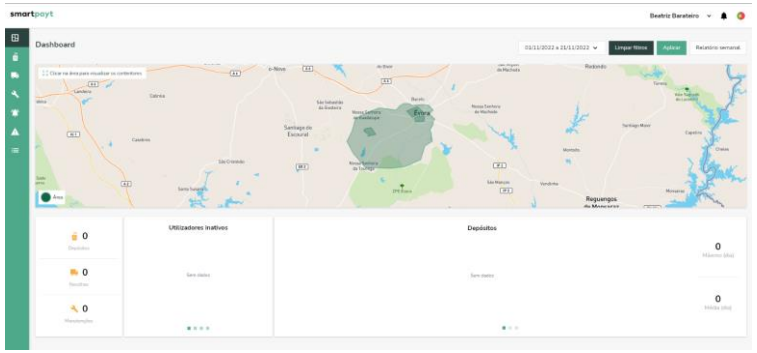
HEMS/Mobile App

Key aspects

Home Energy Management Systems (HEMS) are devices created by INESCTEC and the University of Évora for data acquisition. When connected to smart meters, through a wi-fi signal, HEMS enable the users to see energy data – such as energy production and consumption – in a dashboard of an app (MobileApp).

These systems will be implemented in 11 clients in the historical centre, that already had PV systems, and help them be more aware of their energy consumption to facilitate the change in their behaviours.

Pay-As-You-Throw



Key aspects

PAYT helps cities achieve behavioural changes to overcome challenges linked to waste management by digitising the sector and offering citizens an active part in the sustainable transformation of their towns.

This solution enables controlled access to waste **containers** to digitise the amount of garbage thrown away by each citizen, aiming to incentivise citizens to reduce the amount of waste produced with PAYT (Pay-As-You-Throw).

The **web platform** allows daily managing operations as well as access to data visualisation, insights and reports about sustainable behaviours.

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2nd Life Batteries + HEMS + Algorithms

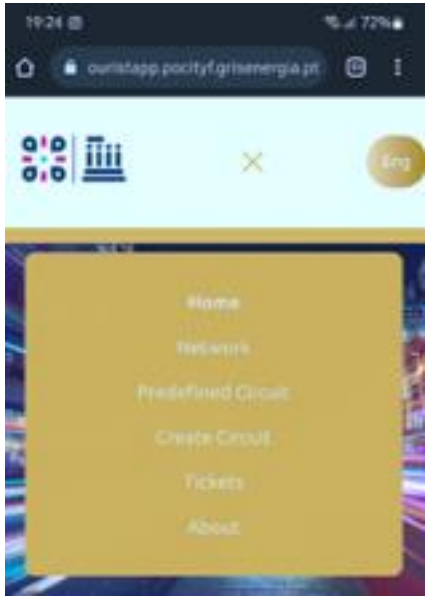
Key aspects

It will be installed, in Valverde (PED2), ten 2nd Life Batteries, three of them with cooling systems and seven without. In a city like Évora, with extreme weather, the cooling system will allow the batteries to continue to operate during Summer, in which temperatures can reach 45ºC.

Flexibility algorithms will be implemented in the batteries so that the client can have the lowest electricity cost possible at the end of the month.

The clients will have access to an app, where it will be possible to visualize the energy data to better manage their consumption.

Tourist Mobile Apps



Key aspects

This application aims to improve the engagement with tourists and citizens of the city as well as with municipal managers through an improvement of information regarding monuments and places to visit in the city. Regarding the specifications, the Tourist Web App will provide three main types of functionalities to its users (shown in the following figure), namely:

- Pre-established touristic circuits.
- List of monuments that can be included in each circuit.
- Gamification features.

Alkmaar

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Alkmaar characteristics:

- 110,000 inhabitants, 47,000 households, 8,000 companies
- City area 117 km^2
- Alkmaar has held city rights since 1254
- Alkmaar has the most sustainable district heating network in NL connected to a Bio-Energy Plant

Talking about cultural heritage … Alkmaar has:

- 17 provincial monuments
- About 400 national monuments
- 1.045 municipal monuments
- 32 windmills

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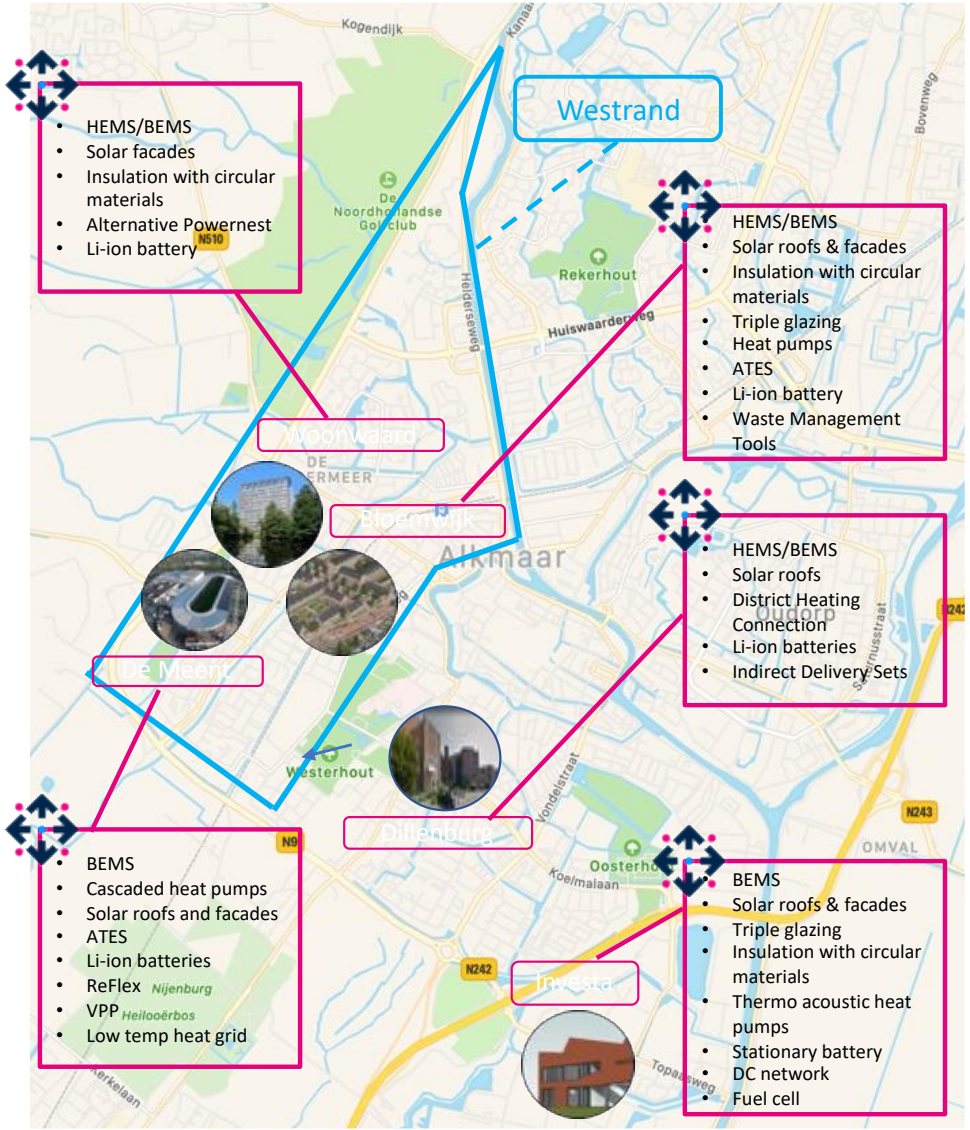
Alkmaar LHC



Demo characteristics

- **1 PED** (Positive Energy District) called Westrand
- **5 Positive Energy Blocks (PEBs)**
  - Sportscomplex De Meent by GA
  - Woonwijk Bloemwijk by Van Alckmaer (housing corporation)
  - Highrise building Van de Veldelaan by Woonwaard (housing corporation)
  - Apartment buildings (2) Dillenburgstraat by Woonwaard (housing corporation)
  - Centre of Expertise for green gas technology by InVesta
- Demonstration of > 50 **Innovative Elements** in Alkmaar

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De Meent

Building owner: Gemeente Alkmaar

Key aspects

Sports Complex De Meent is Alkmaar sports location, which includes:

- an indoor and outdoor ice rink
- a gymnasium
- an indoor sports stadium with a total floor area of 11,450 m^2.

Prior to POCITYF:

- 1750 solar panels on top of the outdoor rink and the building itself
- usage of over 200,000 m^3 of natural gas per year for heating the complex and maintaining (the quality) of the ice

As part of POCITYF, De Meent will:

- increase renewable energy production
- recover heat from the ice machines to feed a heat network that can provide heat not only for the sports complex itself, but also for surrounding buildings
- store heat underground for later use (Aquifer Thermal Energy System)
- replace natural gas usage with an electrified heating system

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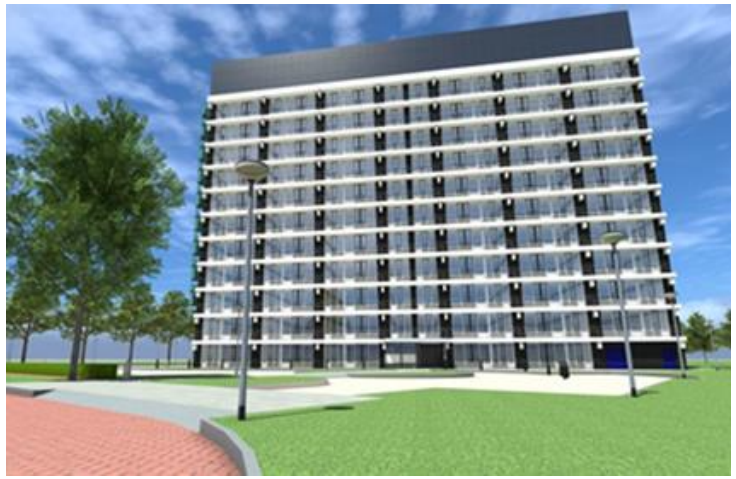
Woonwaard Highrise

Building owner: Woonwaard



Key aspects

The Highrise building, owned by Woonwaard, is an 11-story building with 130 dwellings and a total floor area of 10,000 m2.

As part of POCITYF, the building has been:

- Retrofitted with circular roofing material (recycled polyvinyl butyral)
- Equiped with a solar PV production installation on the roof and solar panels on the southern façade to produce sustainable electricity that can partially and temporarily be stored in two stationary batteries.

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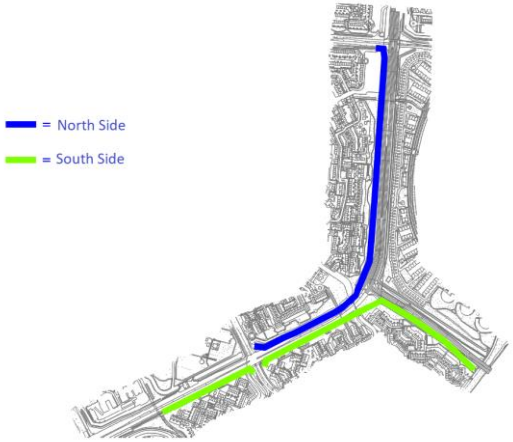
Other non-building-related IEs

Key aspects

- **Smart lamppost** with charging stations for cars and boats integrated into a historically designed lamppost.
- **Energy-producing noise barrier** consisting of 5,000 PV panels placed on the ring road of Alkmaar.
  - Production 1,000 MWh (enough to power approximately 420 households)
- **Hydrogen-powered HD vehicles**



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Thank you for your attention!

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