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Positive Energy Communities in heritage sites: BiPV solutions and the role of (community) Solar Parks and collective Self-consumption

Sustainable Places| 15 06 2023

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Agenda

W P 6

1. PEDs description (PED 1, PED 2, and PED3)
2. Building integrated Photovoltaics (BiPV)
    a) ONYX solutions
    b) Tegola solutions
3. Community Solar Farm (CSF)

Évora

1. PEDs description

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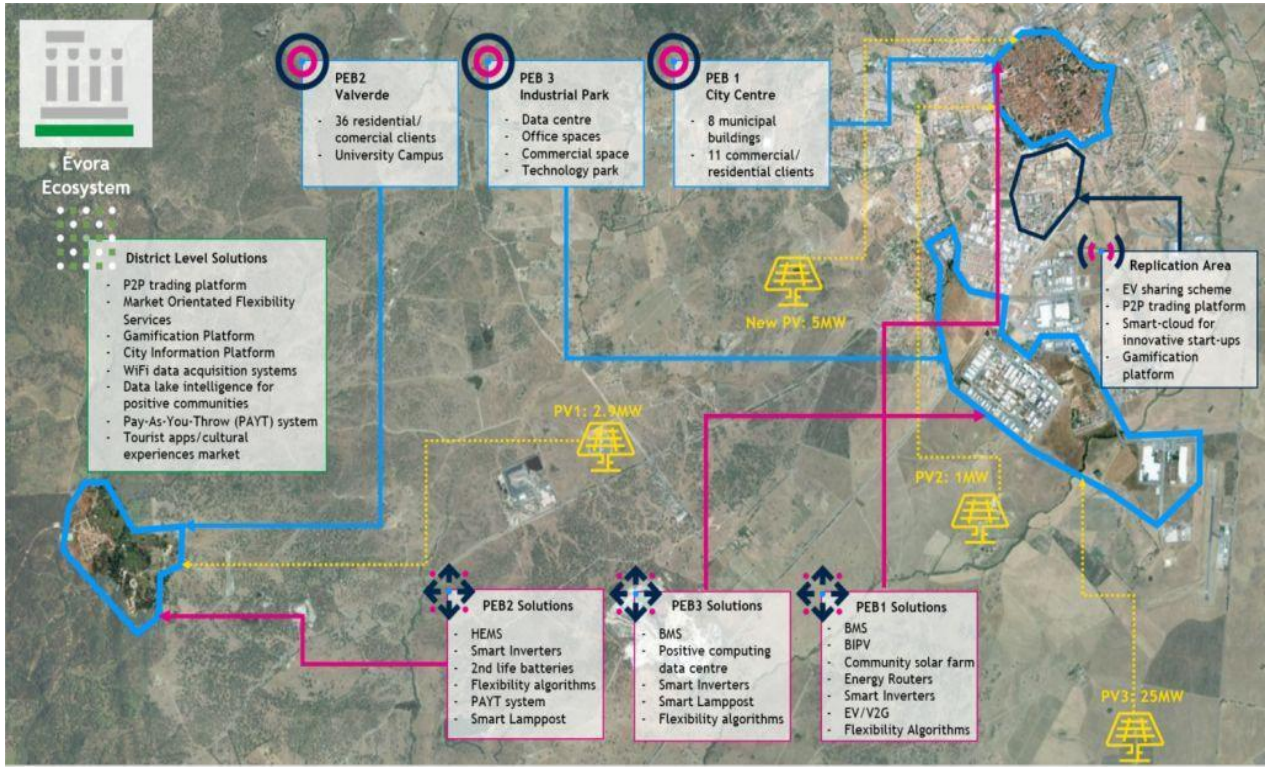
1. PEDs description

In Evora, 3 PED will be implemented



Évora (CH) Lighthouse city

Different demonstration areas (Positive Energy Blocks), covering **diverse challenges** to solve and showcasing different barriers/constraints:

- **City centre: UNESCO World Heritage Centre**
  - 8 municipal buildings
  - 11 residential/commercial houses
- **Residential area (Valverde)**
  - 36 residential or commercial houses
  - University Campus
- **Industrial park**
  - Data centre
  - Office and commercial buildings
  - Technology park

1. PEDs description

Évora (CH) Lighthouse city

PEB 1: City centre

PEB1, is a UNESCO World Heritage Site, which entails significant restrictions in terms of deploying solutions that alter the façades and the roofs of the buildings.

Challenges:

Legal and regulatory barriers due to heritage protection.

Tendering processes.

Land constraints.

Baseline KPIs assessment.

1. PEDs description

Évora (CH) Lighthouse city

PEB 2: Valverde village

Valverde is a small rural village in the outskirts of Évora. It has around 450 inhabitants and 200 buildings, most of them residential and connected to the LV grid. There is only one MV client in Valverde, which is Évora University.

Innovation hub in what concerns energy-oriented projects (H2020 SENSIBLE and InteGrid projects), which equipped Valverde's clients with advanced devices and software tools that concern local energy production, consumption, monitoring and control.

Challenges:

No land restrictions or legal barriers for the installation of materials.

1. PEDs description

Évora (CH) Lighthouse city

PEB 3: Industrial and commercial park

PEB 3 consists of three buildings which form the industrial and commercial park: SONAE (retail and commercial building), PACT and DECSIS (mainly office buildings).

Challenges:

Major consumption values: fridge storage, data centres.

Different patterns of consumption than PEB 1 and 2.

No land restrictions: we can take advantage of the surrounding áreas to install PV systems.

Data management and data security in the interoperability of solutions from different partners.

Évora

2. Building integrated PhotoVoltaics (BiPV)

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Why was it necessary to find BiPV solutions?

- Cultural Administration (DRC) strict policies regarding the buildings' façade and roofs led to exhaustive analysis and adjustments regarding the envisioned solutions in the Grant Agreement (GA).
- After several interactions between the municipality, technical partners, users (school population), DRC and Energy Administration (DGEG), the (final) design of the BIPV solutions for the municipal buildings was accomplished.
- Several innovative elements were selected to be integrated into the buildings of PEB 1 City Centre that comply with legal restrictions and the design/architecture of the buildings.

ONYX solutions

Figure 1 – Skylight PV

Figure 2 – Canopy PV

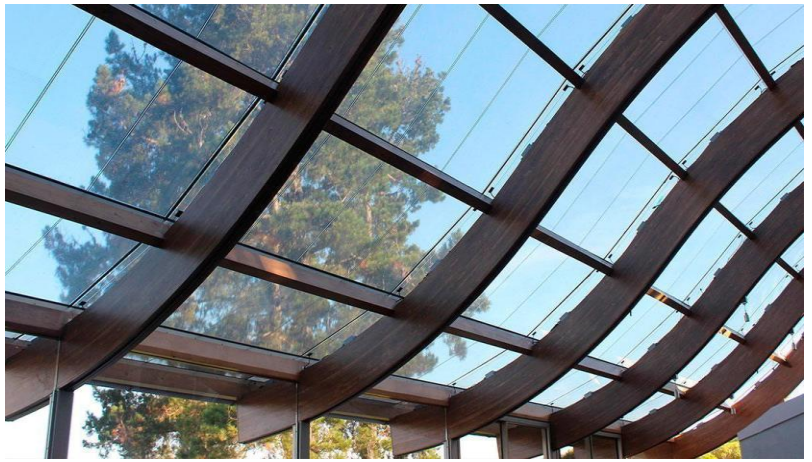

Figure 3 - PV Glass

ONYX solutions

Évora Buildings

Figure 4 – 1st May Market Building (Skylight PV)

Figure 5 – City Hall (Skylight PV)

Figure 6 – S. Mamede School (PV Glass and Canopy PV)

ONYX solutions

1st May Market Building

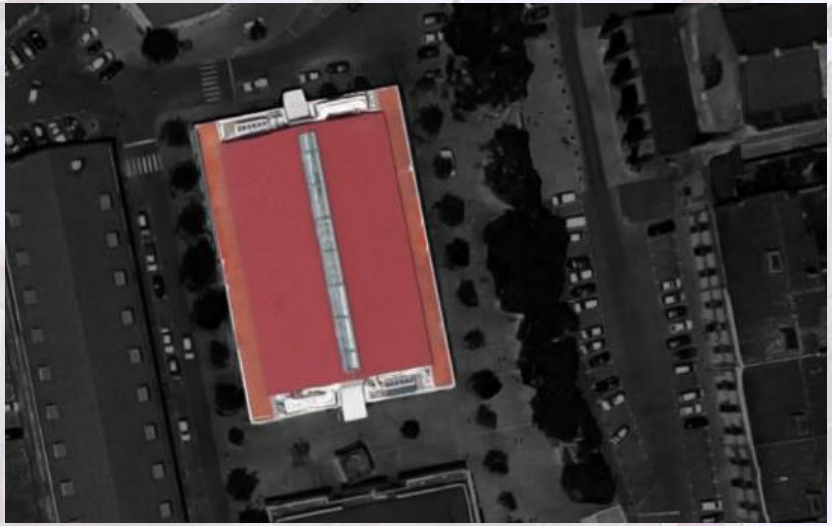

Figure 7 – Top view from the building

Type BiPV: Skylight PV

Units installed: 74

Power per unit: 236 Wp/275 Wp

Total power installed: 17,93 kWp

Surface covered: 124,49 m^2

ONYX solutions

City Hall

Figure 8 – Top view from the building

Type BiPV: Skylight PV

Units installed: 193

Power per unit: various

Total power installed: 33,2 kWp

Surface covered: 260,77 m^2

ONYX solutions

S.Mamede School

Figure 9 – Top view from the building

Type BiPV: PV Glass

Units installed: 12

Power per unit: 23 Wp/32 Wp

Total power installed: 294 Wp

Surface covered: 8,68 m^2

ONYX solutions

S.Mamede School

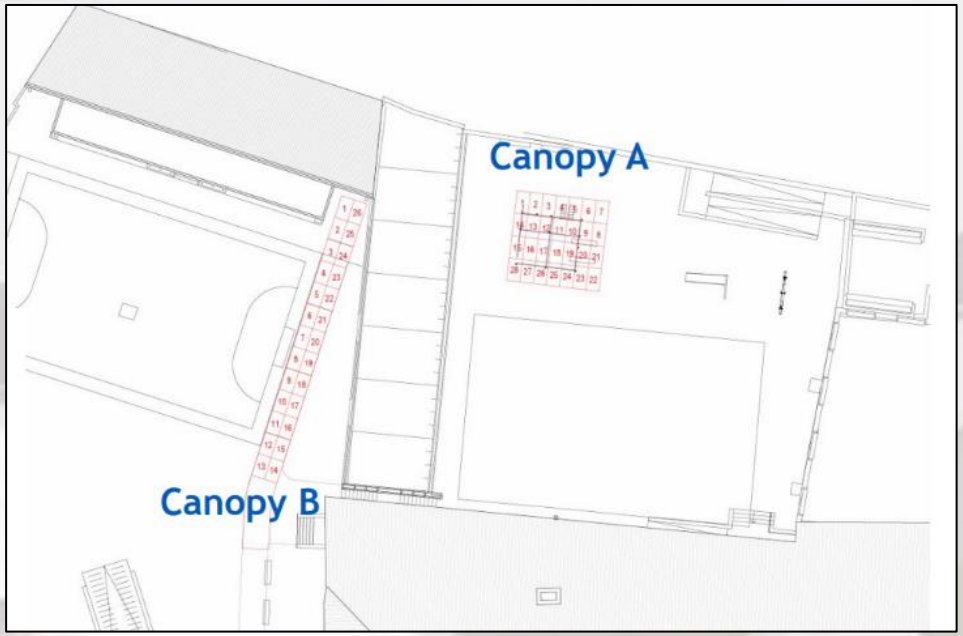

Figure 10 – Top view from the structures

Type BiPV: PV Canopy

Units installed: 54

Power per unit: 295 Wp

Total power installed: 15,93 kWp

Surface covered: 91,80 m^2

Tegola solutions

Figure 11 – Tegosolar PV

Figure 12 – Traditional PV Shingle

Tegola solutions

Évora Buildings

Figure 13 – Évora Arena (Tegosolar PV)

Figure 14 – City Hall (Traditional PV Shingle)

Figure 15 – Parking Lots (Tegosolar PV)

Tegola solutions

Évora Arena

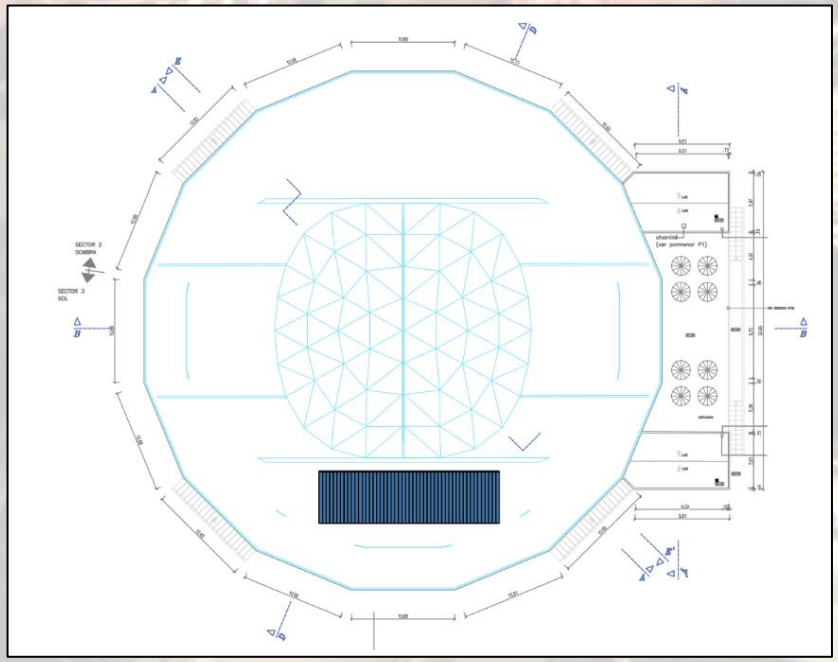

Figure 16 – Top view from the building

Type BiPV: Tegosolar PV

Units installed: 50

Power per unit: 144 Wp

Total power installed: 7,2 kWp

Surface covered: 100,8 m^2

Tegola solutions

City Hall

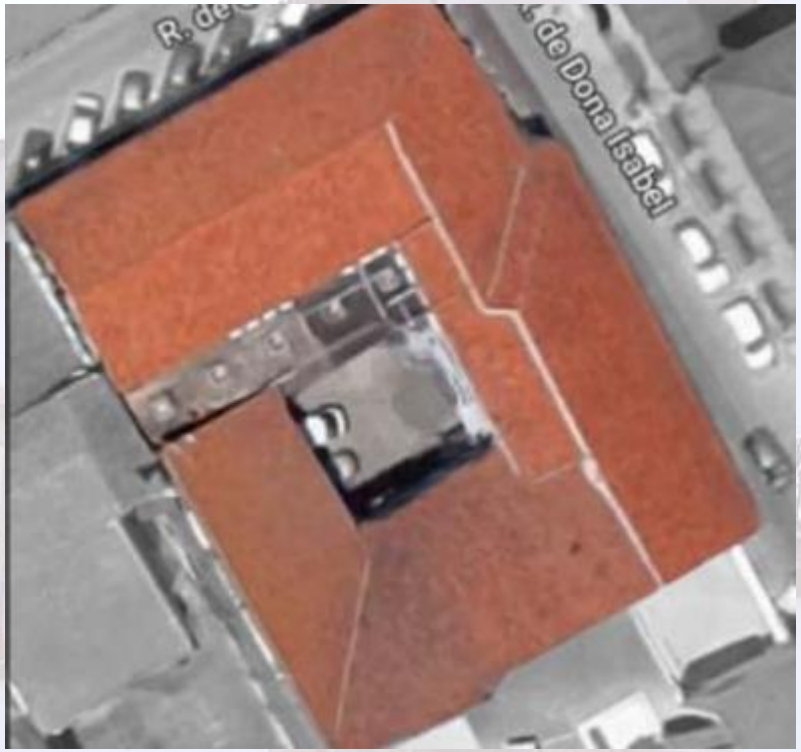

Figure 17 – Top view from the building

Type BiPV: Traditional PV Shingles

Units installed: 3350

Power per unit: 7,57 Wp

Total power installed: 25,36 kWp

Surface covered: 250 m^2

Tegola solutions

Parking Lots

Figure 18 – Top view from the building

Type BiPV: Tegosolar PV

Units installed: 448

Power per unit: 144 Wp

Total power installed: 64,51 kWp

Surface covered: 881 m^2

Évora

3. Community Solar Farm

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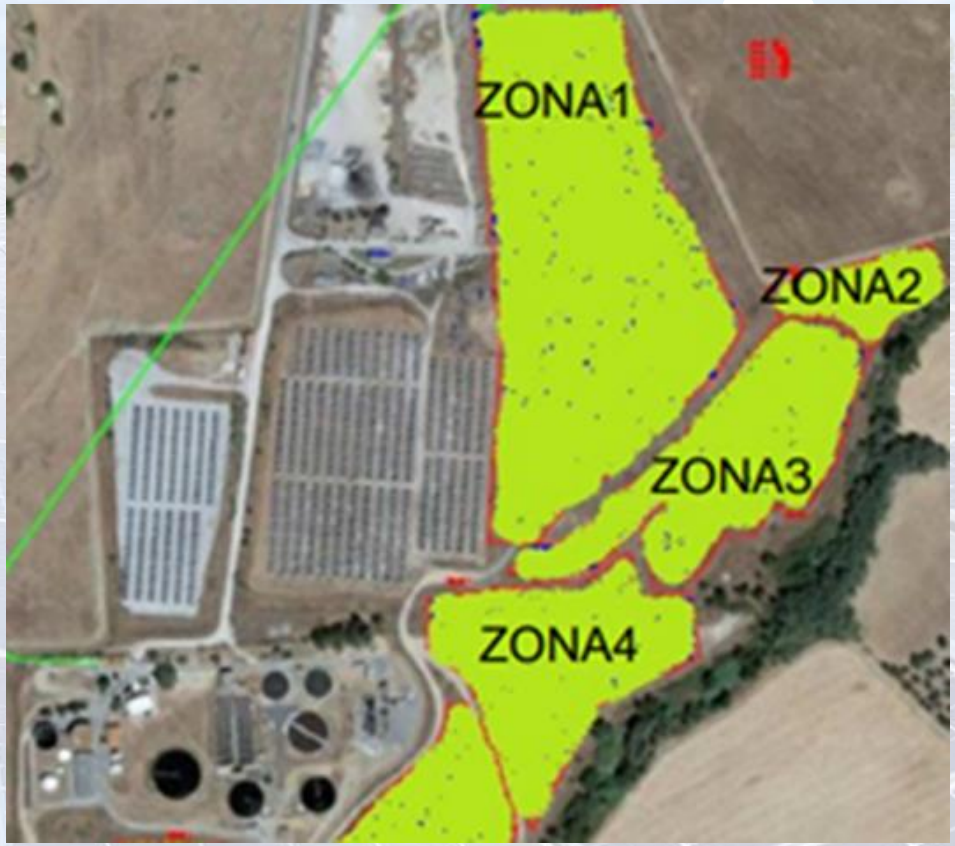
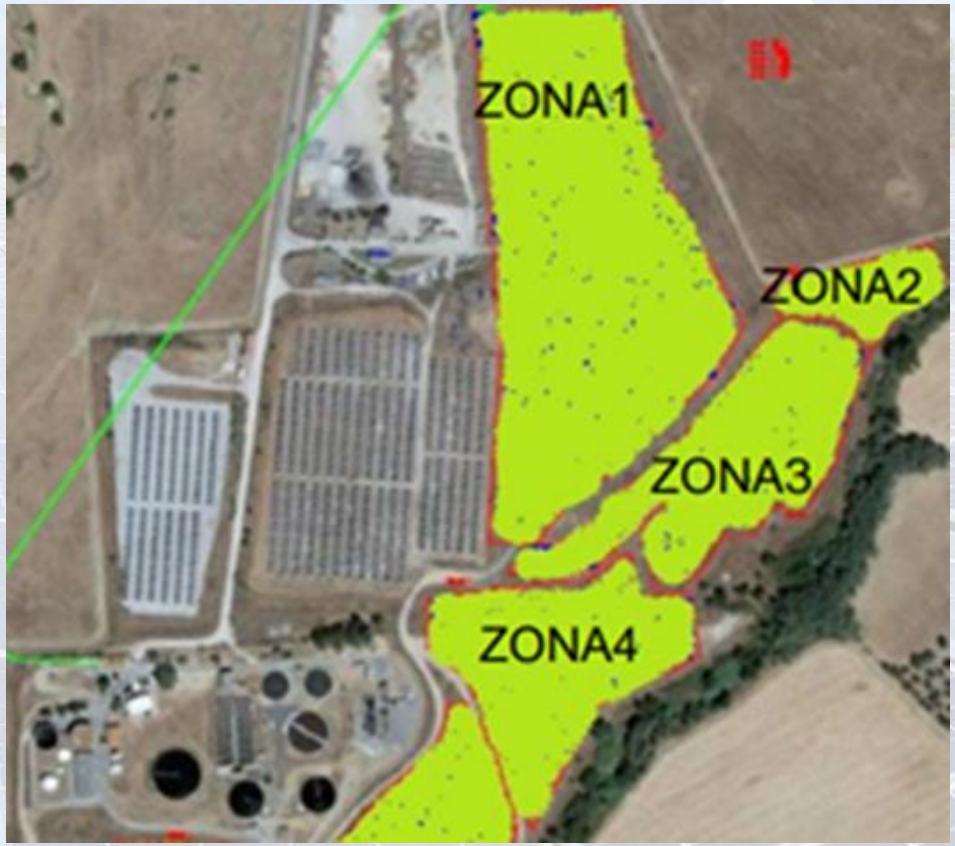
3. Community Solar Farm



The CSF will be implemented outside the limits of the historic centre of Évora and will allow citizens that live in protected areas to consume their energy from a renewable source.

Whenever it is legally impossible to install photovoltaic equipment in buildings in the historic centre of Évora, citizens can access the energy production from the CSF, from where they will use that energy for self-consumption, as if they had equipment installed on the roofs of their buildings.

3. Community Solar Farm



This will benefit the citizens from the city centre as they will have “priority” over the over living outside the city centre and therefore will have priority in benefiting from lower energy prices. This is a measure taken by the municipality has high priority to promote household occupation in the city centre, since city centre households are more complex and costly to convert is more energy efficient spaces due to the legal restrictions of refurbishing buildings’ facades.

3. Community Solar Farm

The Municipality of Évora will grant the **concession of municipal lands** to install self-consumption production units for the CSF. **The entity that will exploit** the CSF will have an obligation to:

- **establish** itself as a Renewable Energy Community (REC) for the management of collective self-consumption production units;

- **financing, supplying and installing** collective self-consumption production units on concession land, as well as carrying out all procedures with the licensing authority;

- elaborate all the **legal procedures for the installation** of the collective self-consumption production units in the concession lands, with the objective of producing electric energy to be consumed by the members of the REC.

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Thank you for your attention!

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