Clean, accessible and secure energy for all: introducing the CRETE VALLEY project

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What is CRETE VALLEY?

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Accelerating the energy transition

CRETE VALLEY is a project that will turn Crete into a **sustainable, decentralised energy system**, enabling the island to meet its energy needs through renewable sources.

- **41** partners
- **4** Community Energy Labs (CELs)
- **6** Renewable Energy Sources
- **320+** Facilities and households benefiting
- **5Y** duration

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Our vision for a sustainable future

Establish Crete as a pioneering **Renewable Energy Valley**, combining ICT technology, interoperable digital solutions, social innovation processes and economically viable business models.

Composed of four **Community Energy Labs (CELs)** across Crete, the REV-Lab will contribute to the **European green transition** and foster **energy democracy**.

Follower Communities

- Devoluy (France)
- Dingle (Ireland)
- Terni (Italy)
- Graciosa (Portugal)

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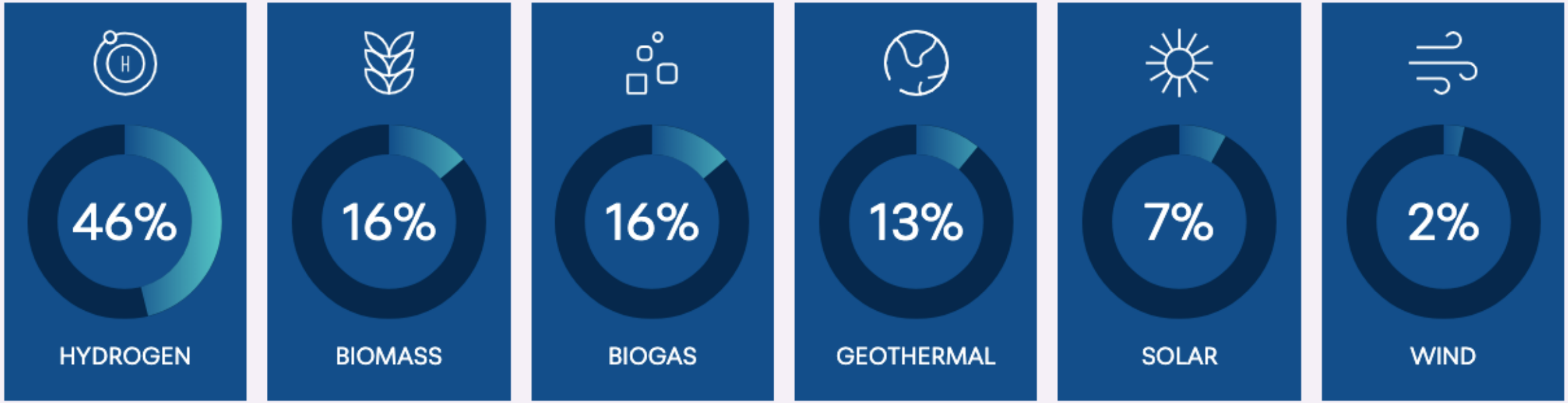
Addressing local energy needs with clean sources

22,840 MWh: total annual energy production to satisfy the communities involved



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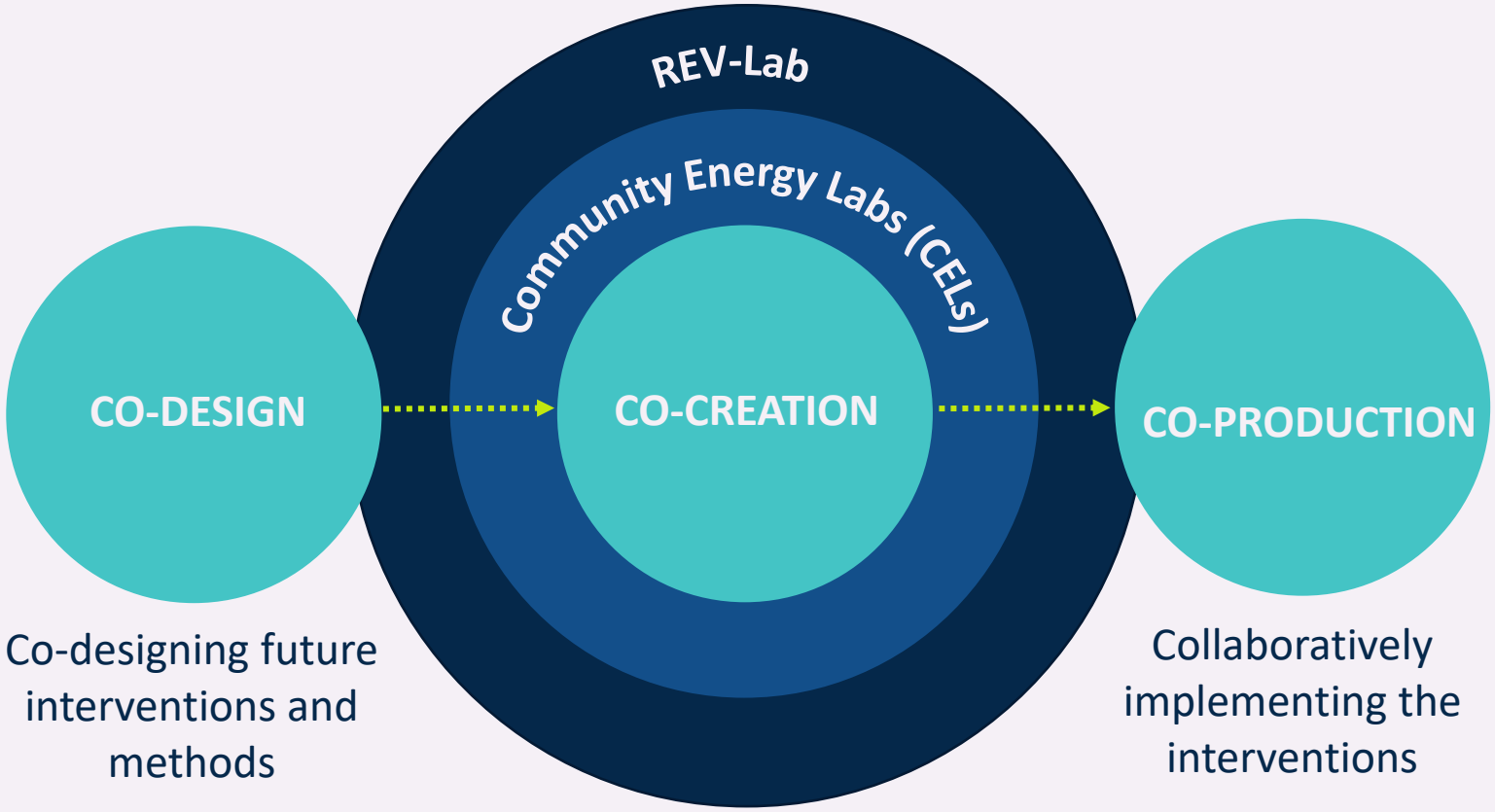
Collaborative processes to boost participation



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Technological services for efficient energy management

System-of-systems Digital Twin
A unified digital environment integrating all individual systems to coordinate, manage, and operate the energy grids of the REV-Lab.

Data-driven services and apps
Energy management tools enabling consumers to make informed decisions and facilitating renewable energy consumption.

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Building a Renewable Energy Valley

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The change we aim to achieve

Renewable Energy Valleys (REVs) help communities **generate, distribute and use renewable energy** within the same geographical area.

REVs characteristics

- Economic revitalization
- Innovation and research centres
- Manufacturing and production
- Policy and investment support
- Community involvement and training

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Revolutionising the energy sector

Traditional	ENERGY SECTOR	REV-Lab
centralised	MARKET	decentralised
few power plants	PRODUCTION	many power producers
top to bottom	DISTRIBUTION	bi-directional
passive	CONSUMER	active
large power lines	TRANSMISSION	small-scale transmission

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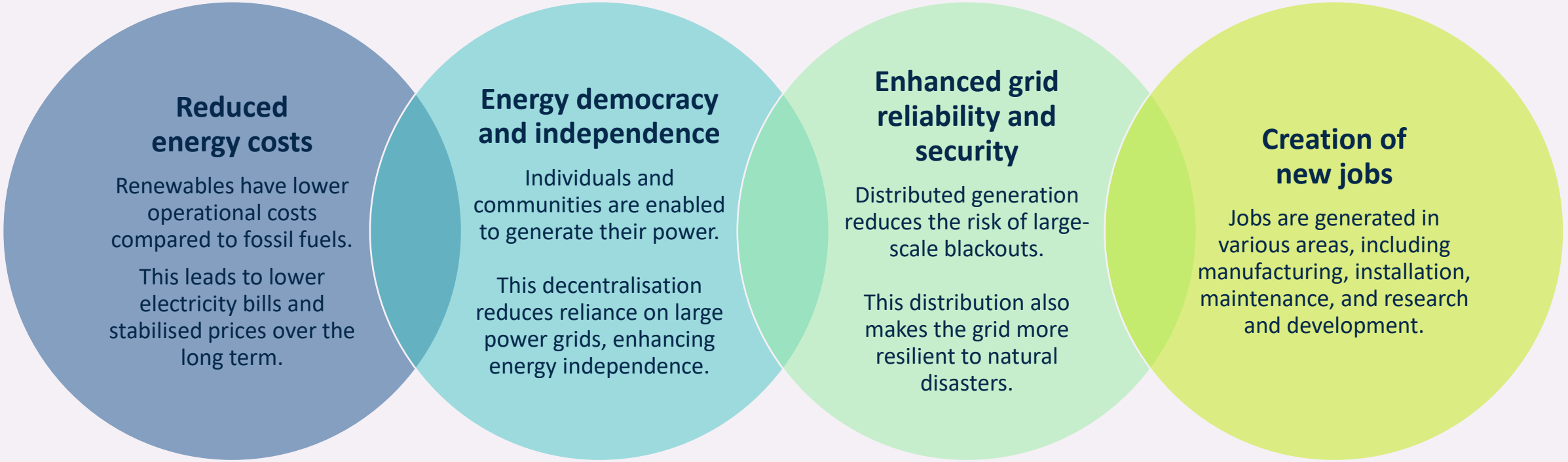
The benefits of renewable sources

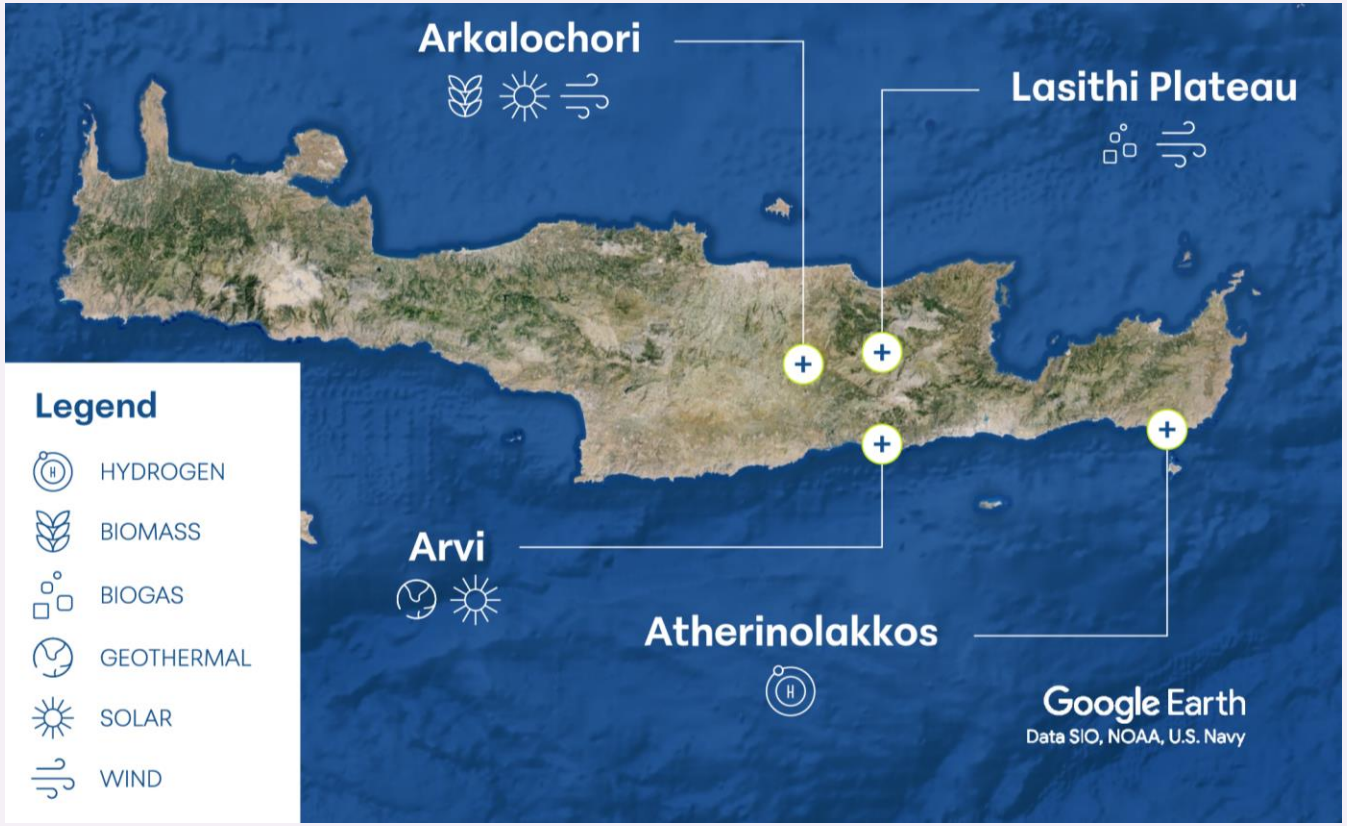


Where the journey begins

Conceived as **innovation hubs,** each Community Energy Lab (CEL) will rely on different renewable sources and promote **local communities' active participation**.

Objectives:

- Demonstrate a **data-driven, multi-carrier grid system** for the sustainable and cost-effective production and storage of energy
- Achieve **energy independence** and **energy democracy**



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Community Energy Labs (CELs)

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Arvi

Thanks to the installation of an **open-loop geo-exchange plant** and **solar panels**, the community can now enjoy cooler public and private buildings while reducing their utility expenses.

CELs Manager: SYCHEM

Geothermal

Solar

CRETE VALLEY in Arvi

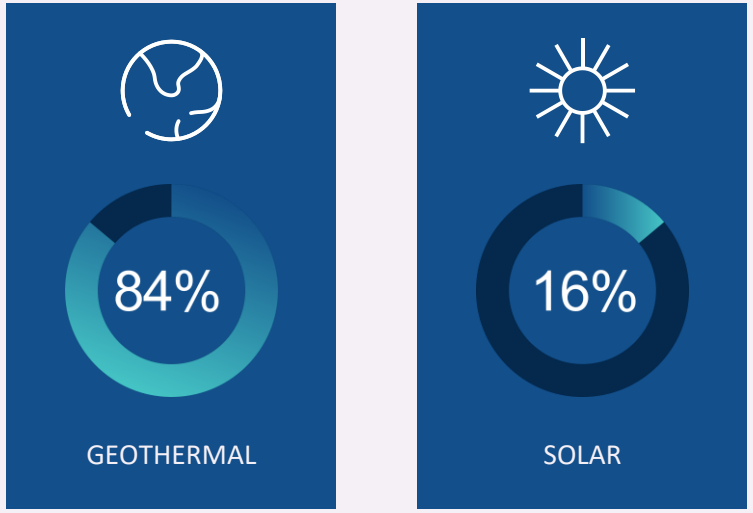
Need
Indoor space cooling

Our solution
- open-loop geo-exchange plant and a district cooling hydraulic network
- electricity production using PV

Community
- One public school
- 20 residential buildings
- One hotel

Benefits
- - 40-50% electricity consumption
- - 70% electricity bill expenses

4,160 MWh/y



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Lasithi Plateau

The residual materials of agricultural and livestock activities will contribute meeting the **heating needs** of the community. Additionally, windmills will help reduce **electricity costs**.

CELs Manager: MINOAN

Biogas

Wind

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CRETE VALLEY in Lasithi Plateau

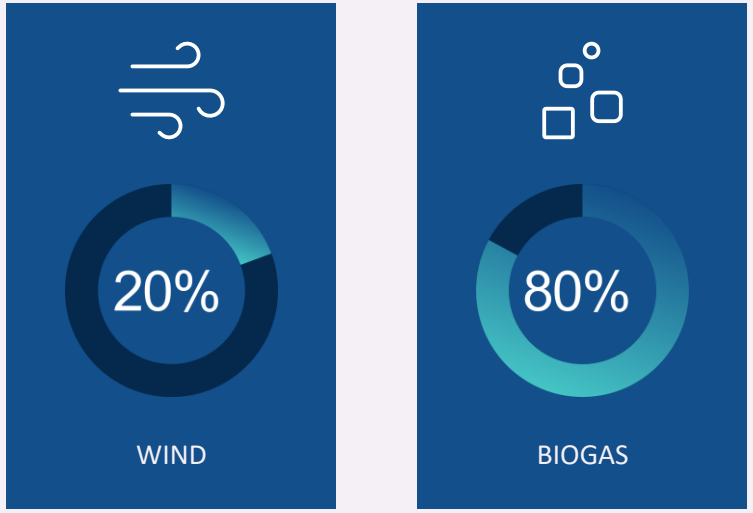
Need
Indoor space heating

Our solution
- biogas plant to process organic waste from households, used fats and vegetable oils, stock-farming manure
- 50 small windmills

Community
- 20 residential buildings
- 175 households

Benefits
- - 50% heating cost
- - 70% electricity bill expenses

870 MWh/y



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Arkalochori

Renowned for its olive oil industry, Arkalochori will utilise olive tree trimmings to power a **biomass plant**, offering **heating and cooling** solutions to the community.

CELs Manager: MINOAN

Biomass

Wind

Solar

CRETE VALLEY in Arkalochori

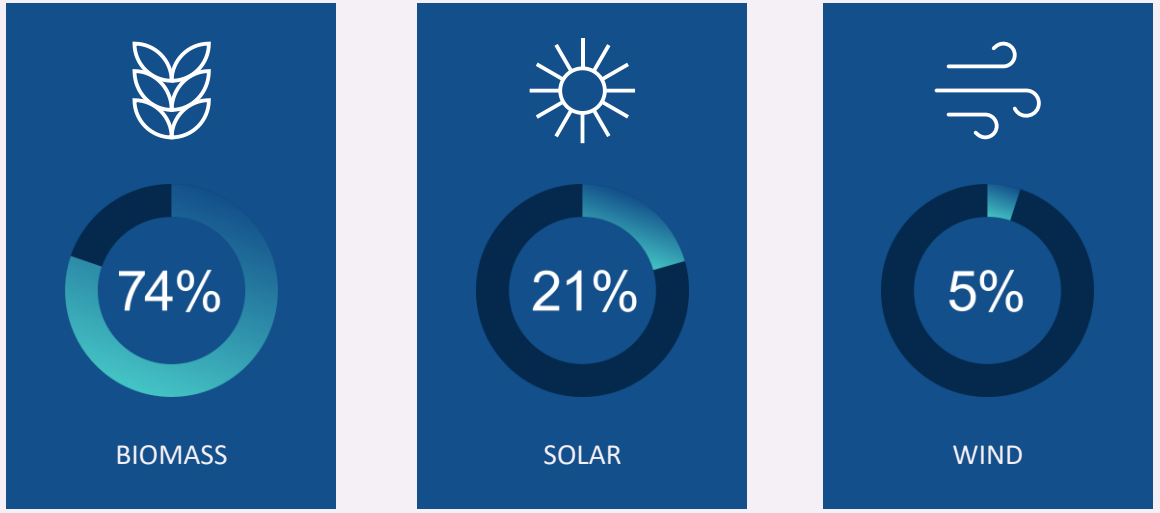
Need
Heating and cooling

Our solution
- biomass plant to process olive tree trimmings
- decentralised electricity by PV
- a small wind turbine station

Community
- 50 final users including residential, commercial, industrial (olive oil mills and wineries) and municipal facilities.

Benefits
- - 70% electricity bill expenses

5,660 MWh/y



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Atherinolakkos

Atherinolakkos stands out for its transition into a **Green Hydrogen Valley**, a transformation led by the project Crete-Aegean Hydrogen Valley (CRAVE-H2), that we actively contribute to, enhancing efficiency and effectiveness.

CELs Manager: EUNICE

Hydrogen

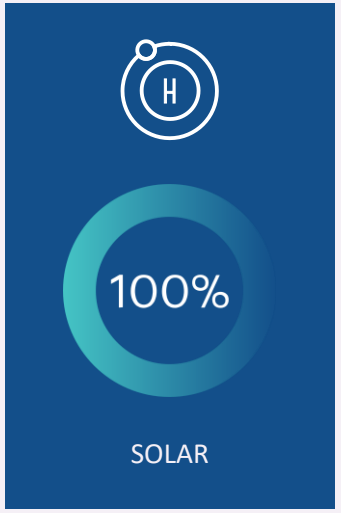
CRETE VALLEY in Atherinolakkos

Need
Indoor space heating

Our solution
- expand the potential applications of green hydrogen generated by the CRAVE-H2 project by securing additional hydrogen fuel cell electric buses
- EV chargers to support vehicle-to-grid (V2G) applications.

Community
- 60 residential and commercial buildings

12,150 MWh/y



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The Digital Twin

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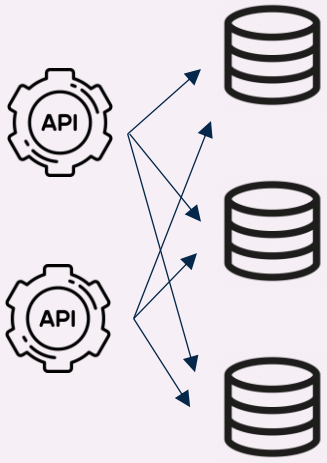
System-of-system Digital Twin for multiple carrier grid management & operation

External Data

Digital Twin Data

Data Space Connector



Blockchain Based Platform

- Open loop, geo exchange plant
- District cooling hydraulic network
  - 1 public building
  - 20 residential buildings
  - 1 hotel

- Biomass plant
- 2 wind turbines of 60 kW
  - 50 final users (residential, commercial, industrial)

CEL1 Arvi

CEL2 Lasithi Plateau

CEL3 Arkalochori

CEL4 Atherino-lakkos

- Biogas plant and CHP engine
- 50 small windmills
  - 20 residential buildings
  - 175 households

- Hydrogen fuel cell electric buses
- EV chargers for the electric cars of nearby communities
  - 60 residential and commercial buildings

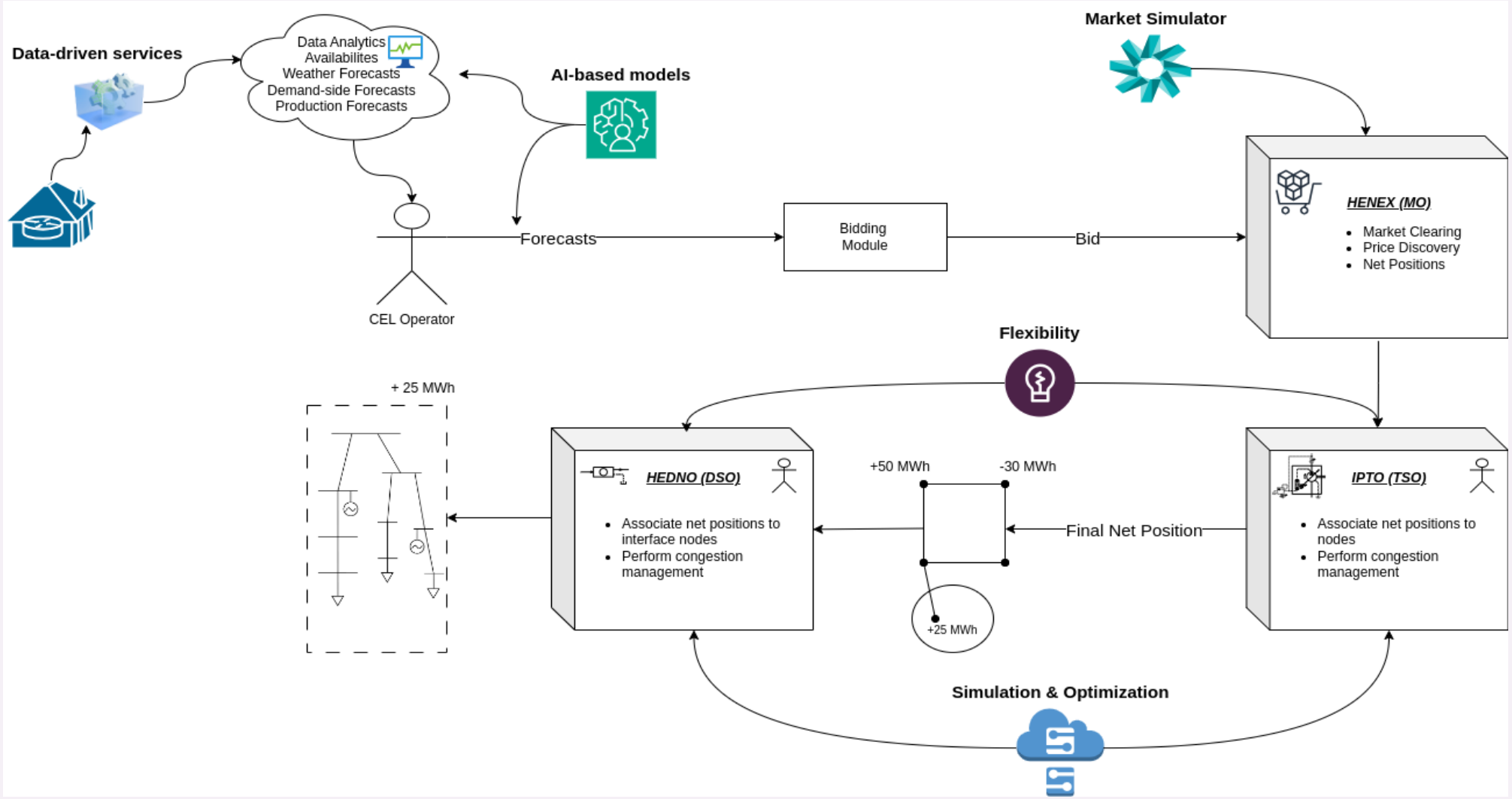
CRETE External

DSO/TSO

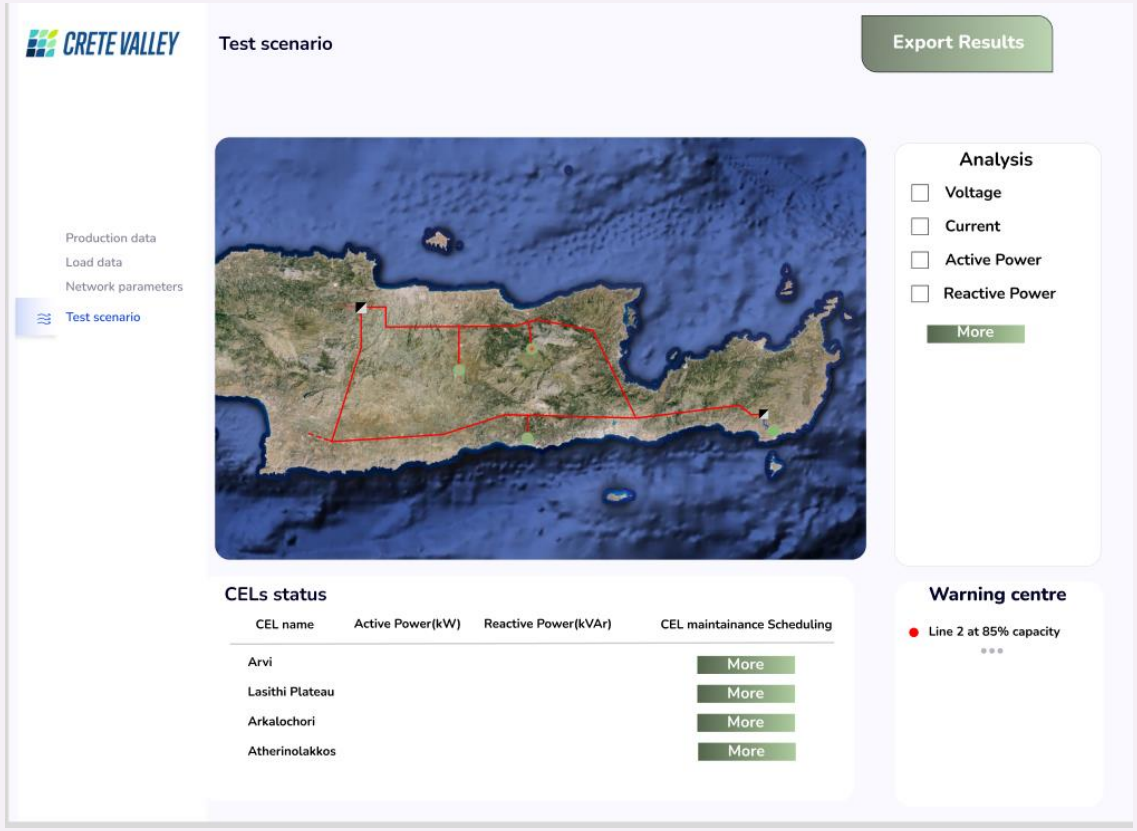
Transactions

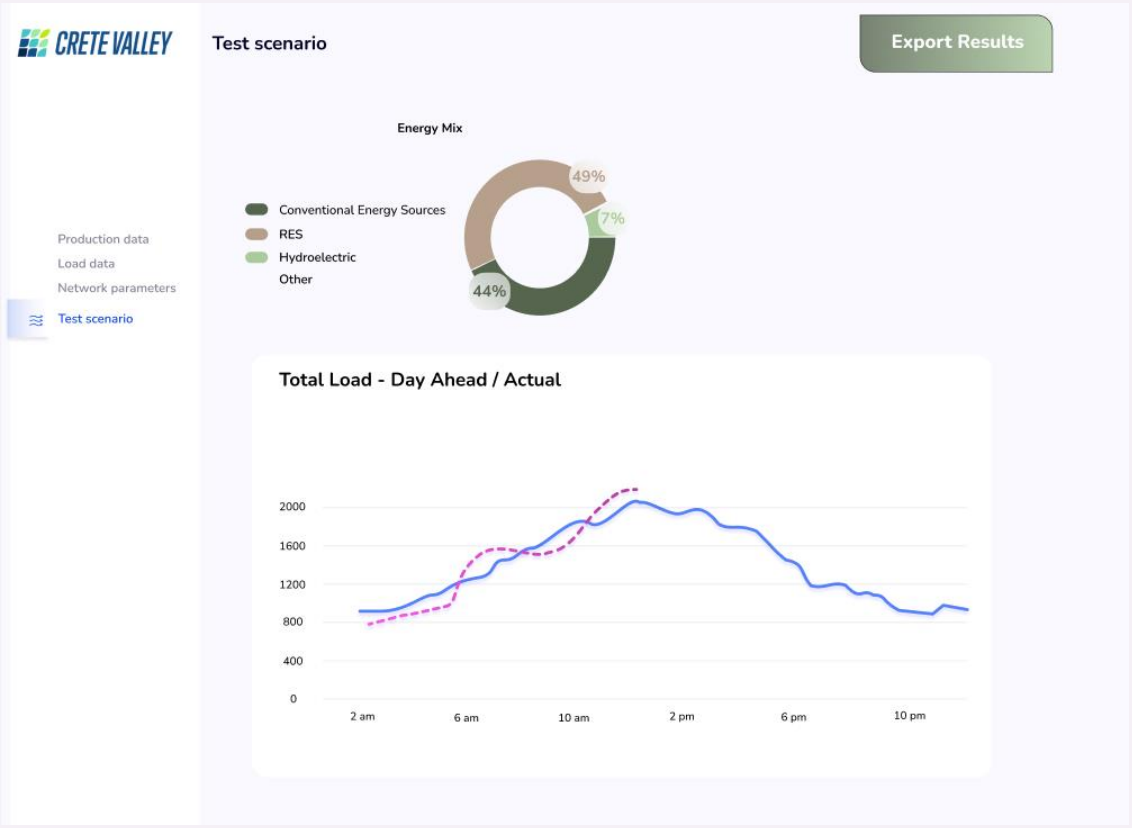
Ensuring grid feasibility

WP4 – Next day scenario

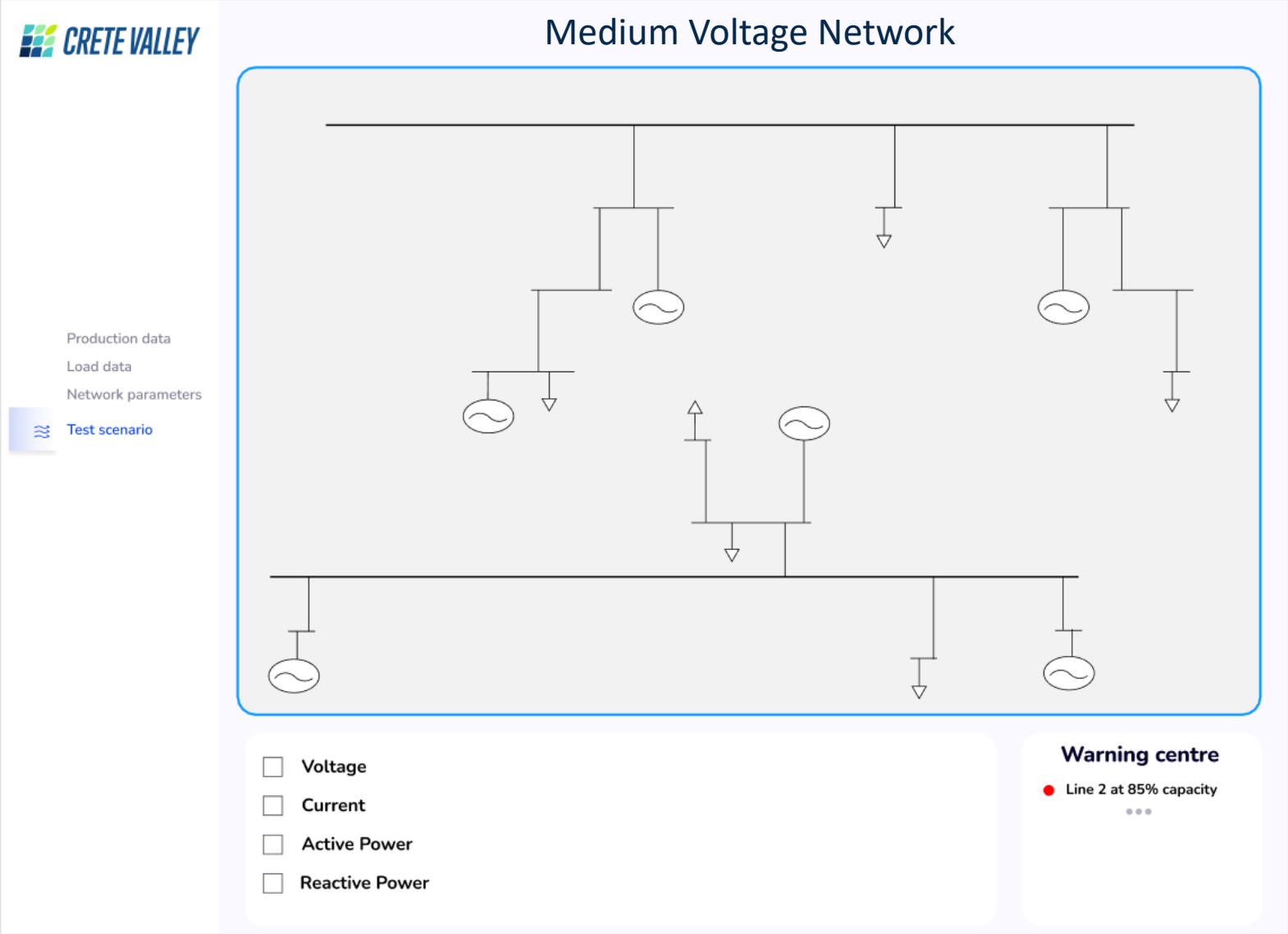


WP4 – TSO Mockup

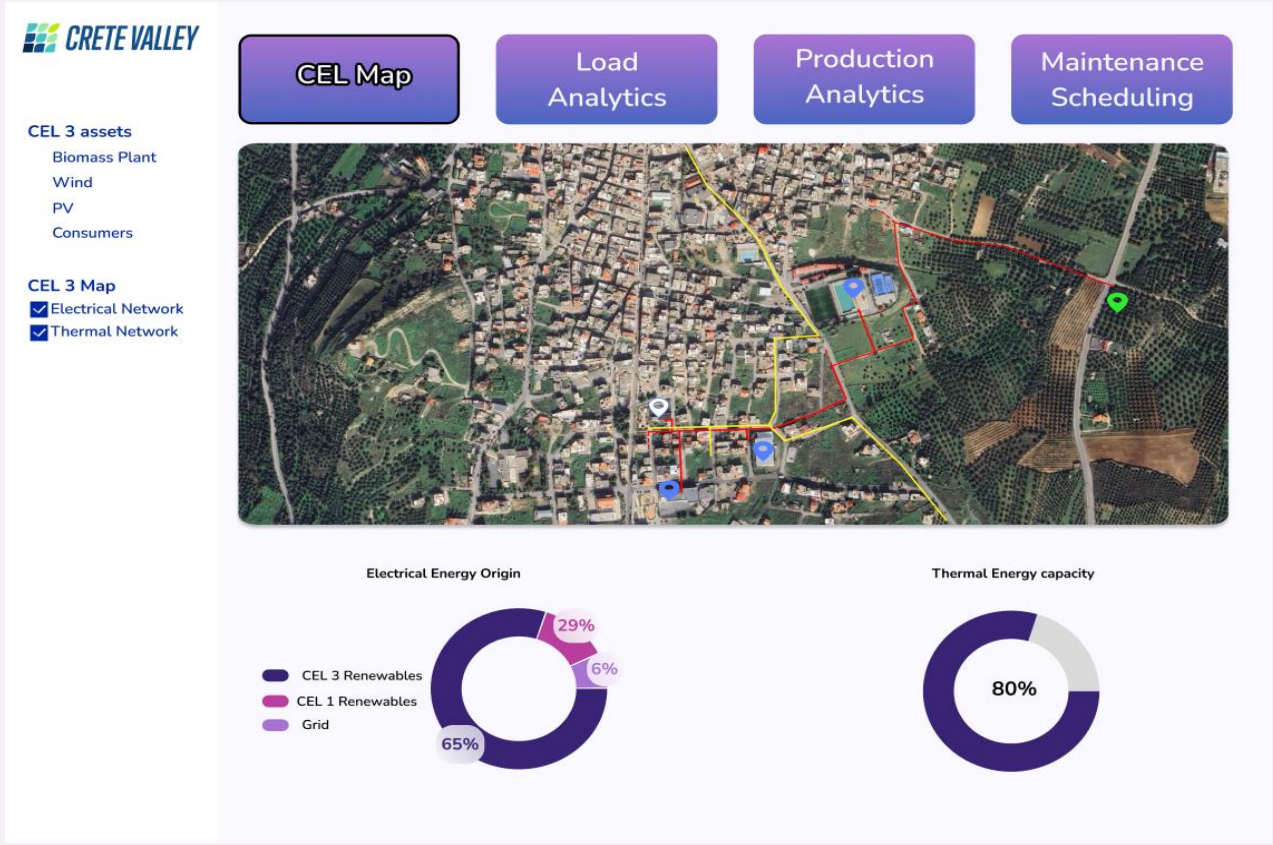


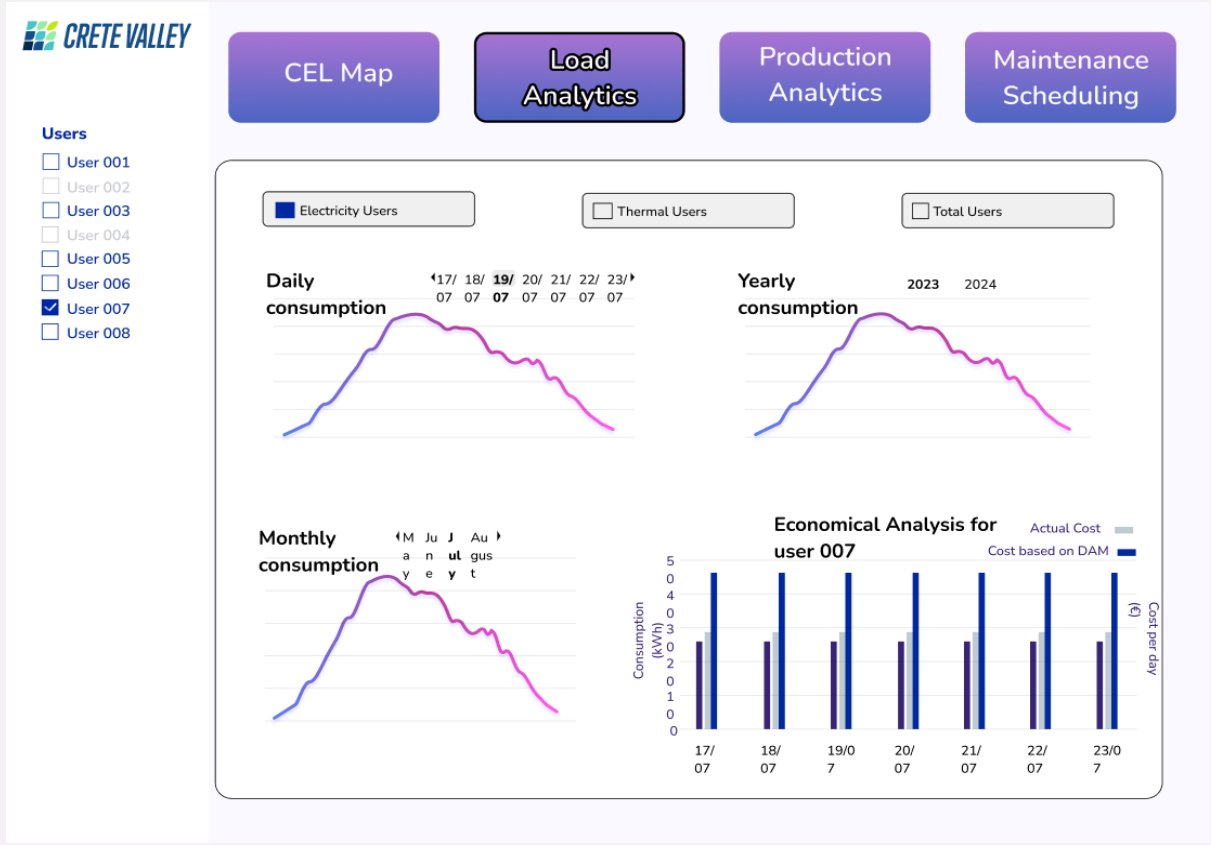


WP4 – DSO Mockup

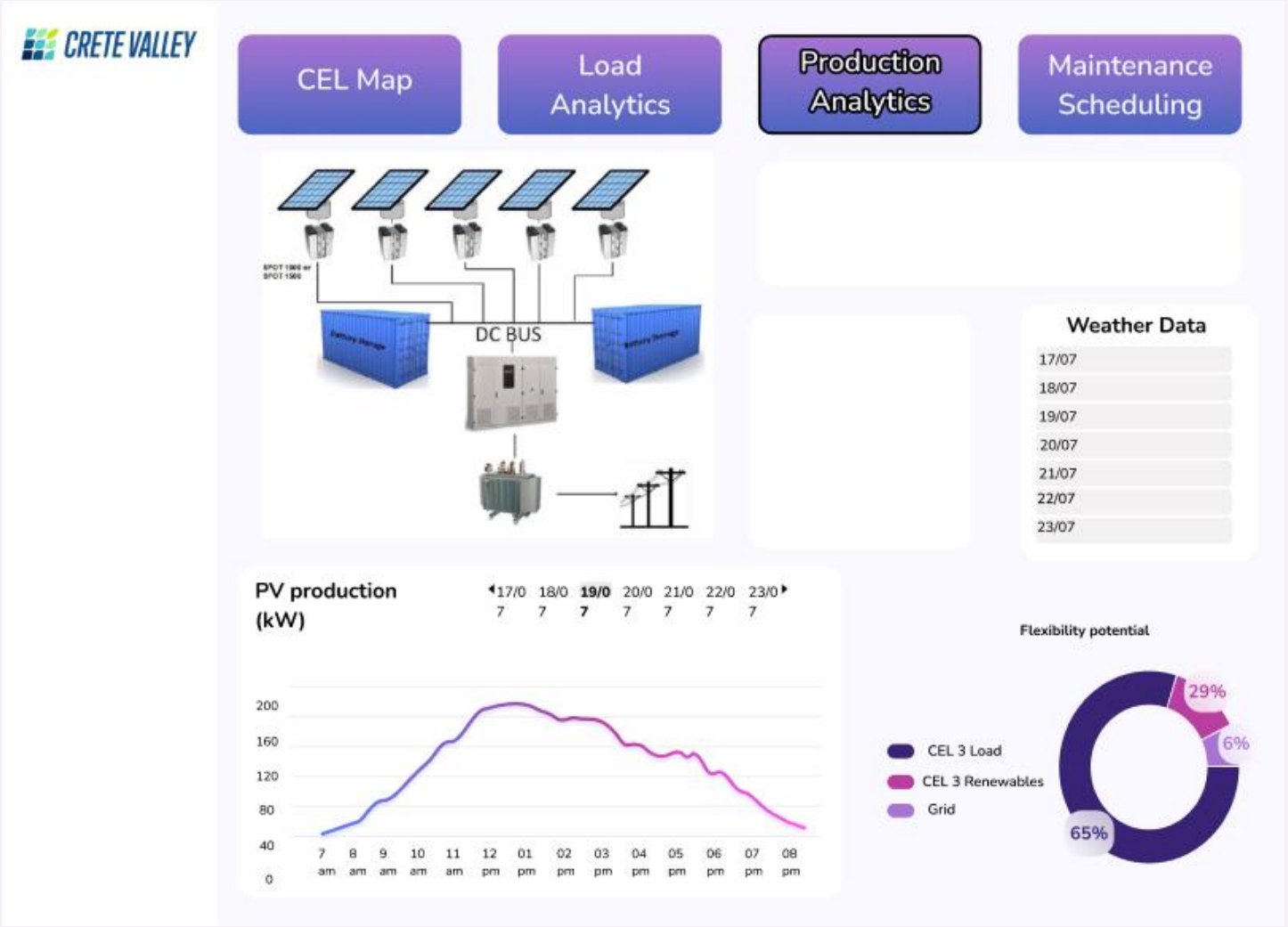


WP4 – CELs Mockup





WP4 – CELs Mockup



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Who we are

Our consortium brings together **41 partners from 13 European countries**

Thank you!

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