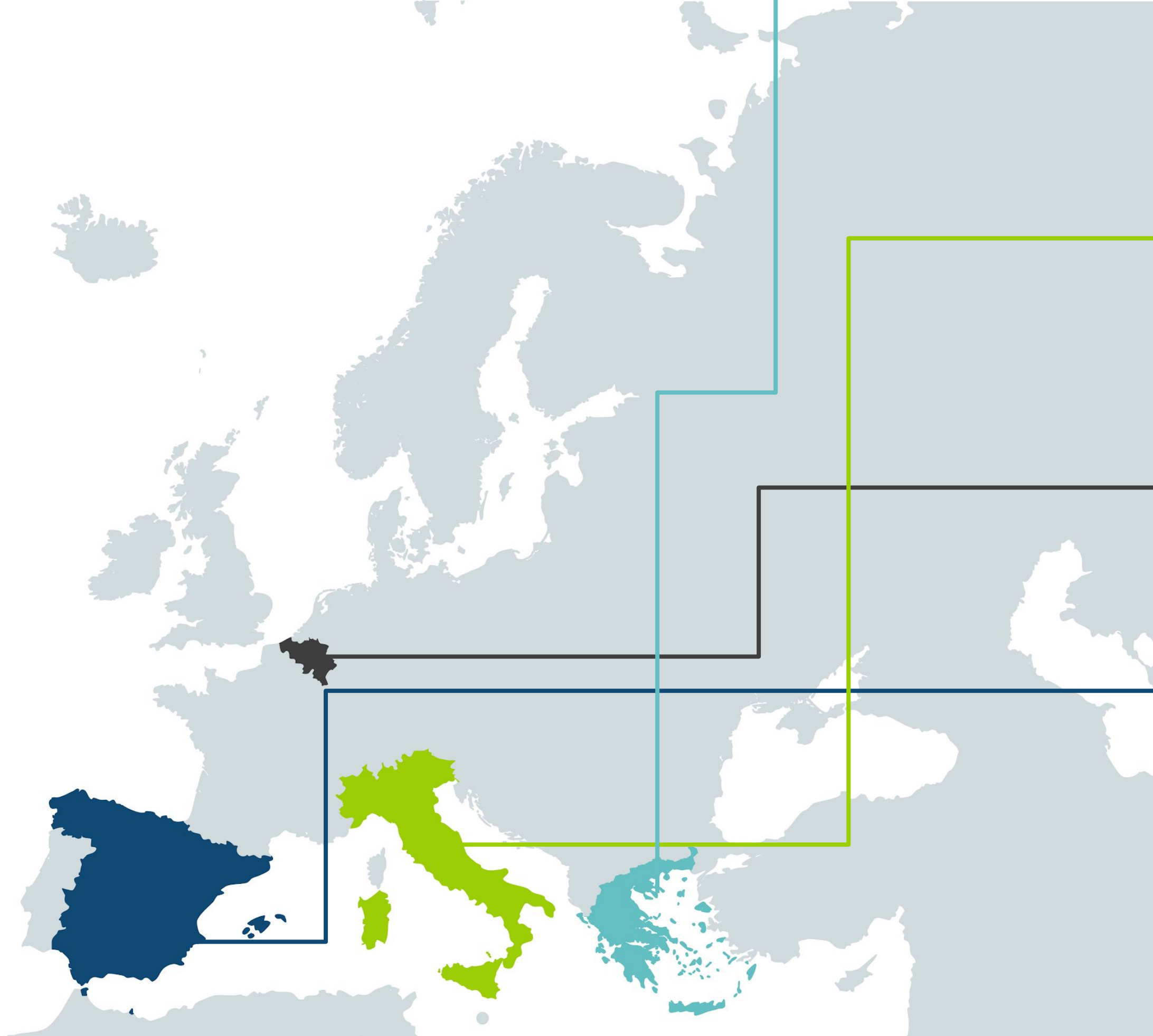


wisegrid

Wide Scale Demonstration of Integrated
Solutions and Business Models for
European SmartGrid





Crevillent, Spain

Terni, Italy

Ghent, Belgium

Kythnos and Mesogia, Greece

Pilot Sites



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement No 731205.

FOREWORD



WiseGRID is successfully arriving at its very end thanks to the knowledge, proactivity and effort of all project partners. The 3.5-year project has given birth to nine cutting-edge tools that will soon be brought to market pursuing the challenge of decarbonising our energy sector.

WiseGRID is an example of the way European projects have to look into the future when bringing novel energy solutions to the sector. The set of products developed within the project perfectly reflect the commitment of the consortium and the close work and relation between developers and end-users, resulting in nine useful and user-friendly applications.

From ETRA, it has been a pleasure having had the opportunity to coordinate the WiseGRID consortium and to lead the project to this end. We hope that for all partners, its result has been as satisfactory as for us.

Our thanks and appreciation to all partners and stakeholders that have pushed together to achieve the very satisfactory outcomes that we have today.

ETRA Team

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What is ?

WiseGRID integrates, demonstrates and validates advanced ICT services and systems in the energy distribution grid in order to provide secure, sustainable and flexible smart grids and give more power to the European energy consumer.

WiseGRID's main objective is to provide a set of solutions and technologies to increase the smartness, stability and security of an open, consumer-centric European energy grid. The project combines an enhanced use of storage technologies, a highly increased share of Renewable Energy Sources (RES) and the integration of charging infrastructure to favour the large-scale deployment of electric vehicles. It places citizens at the center of the transformation of the grid.

WiseGRID goes beyond empowering prosumers. On top of having a consumer-centric approach, the project makes a difference in the market by delivering tools that facilitate the creation of a healthy, open market where not only 'traditional' utilities but also players such as electric cooperatives and SMEs can play an active role, contributing to the transition to energy democracy.

WiseGRID integrated solution demonstrates and evaluates in 4 pilot sites under real life conditions - in Belgium, Italy, Spain and Greece - under different technical, climatological, regulatory, legislative and social conditions.



WiseGRID tools



WG IOP - WiseGRID InterOperable Platform

Secure and open ICT platform for real time monitoring and decentralized control to support effective operation of the energy network.



WiseCORP - Corporate application

Corporate tool for businesses, industries, ESCOs and public facilities consumers and prosumers to become active, smarter energy players.



WG Cockpit - A micro control room

Used by DSOs or microgrids operators in order to control, manage and monitor their own grid, improving flexibility.



WiseCOOP - Platform for cooperatives and communities

Tool for energy retailers, aggregators and local communities to achieve better energy deals.



WiseEVP - WiseGRID Electric Vehicle Platform:

Used by vehicle-sharing companies and charging point operators in order to optimize charging and discharging of the electrical vehicles and reduce energy billing.



WG STaaS/VPP -

WiseGRID energy STORAGE as a Service/Virtual Power Plants

Through this tool consumers/prosumers can easily offer their unused storage capacity to the market.



WiseHOME - Platform for household owners

Tool for individual domestic consumers and prosumers to become active energy players.



WG FastV2G -

A fast charging station for electric vehicles

This tool makes it possible to use electric vehicles as dynamic storage devices, feeding electricity stored in their batteries back into the system when needed.



WG RESCO -

WiseGRID Renewable Energy Service Company

This tool enables the provision of energy to the consumers from renewable energy sources.

Crevillent, Spain



Energy Production

Zero Emissions

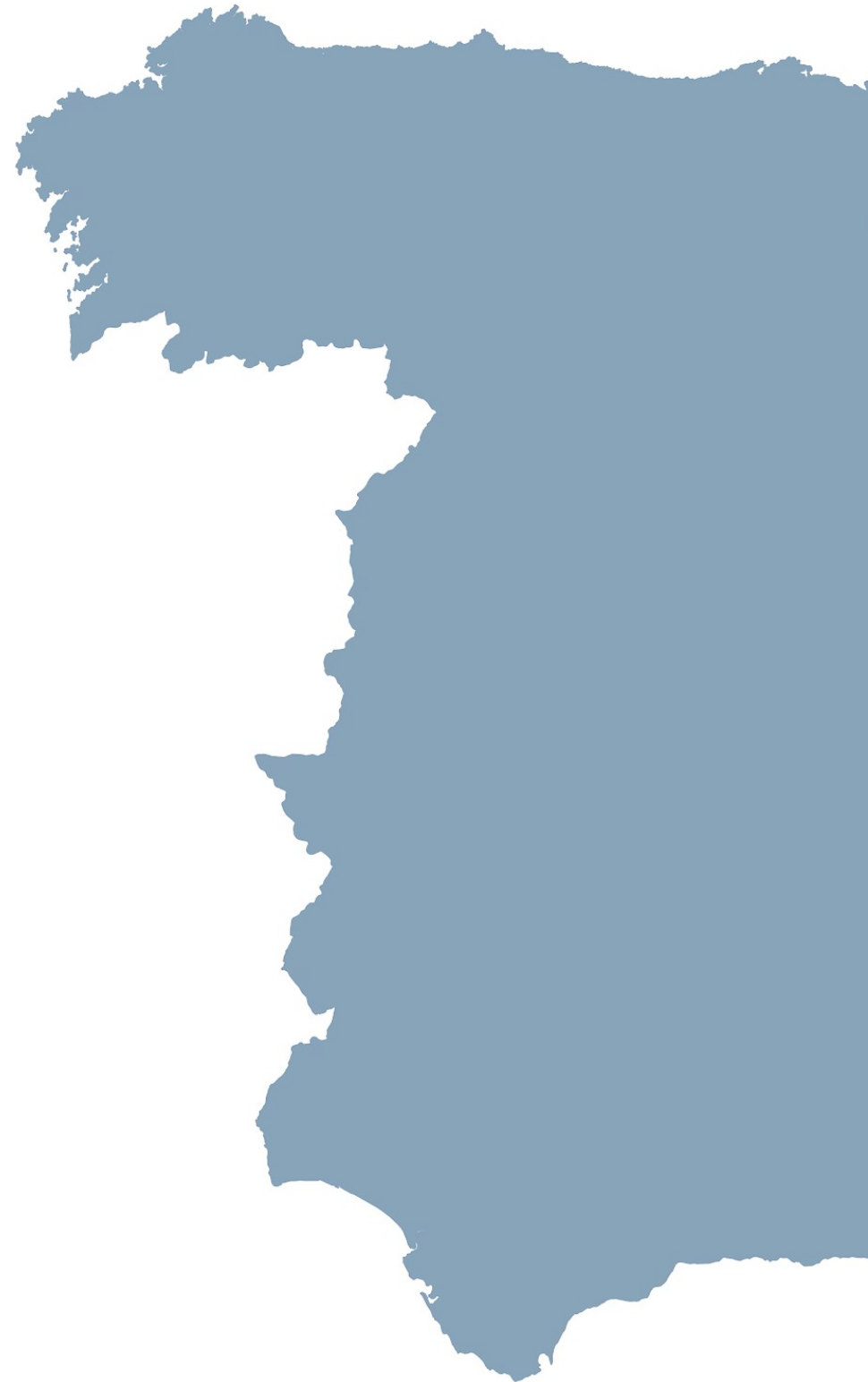
Working hard to reach 100% clean generated and distributed energy

About

One of the demonstration sites is in Crevillent, a city on the Mediterranean coast of Spain. The grid is managed by Cooperative Crevillent, a part of Enercoop which manages 14,315 consumers (13,047 households and 1268 companies) in low voltage network; and 30 consumers in medium voltage network (mainly industrial and service sector companies).

The entire energy production of the entity has zero emissions and is working hard to get all the generated and distributed energy 100% clean. The experience and background has led the company to be one of the most important cooperatives in Spain having a great international prestige.

Enercoop have installed and integrated into their grid more than 75,000 PV panels in solar plants, 2,000 modules of PV panels in solar roofs.



Charging Points

Installing an EV charging station in Crevillent, which operates under the WG FASTV2G tool.

This piece of equipment not only makes EV ownership easier for the citizens, but also allows EVs to act as dynamic storage, providing grid flexibility.



Number of installed PV panels

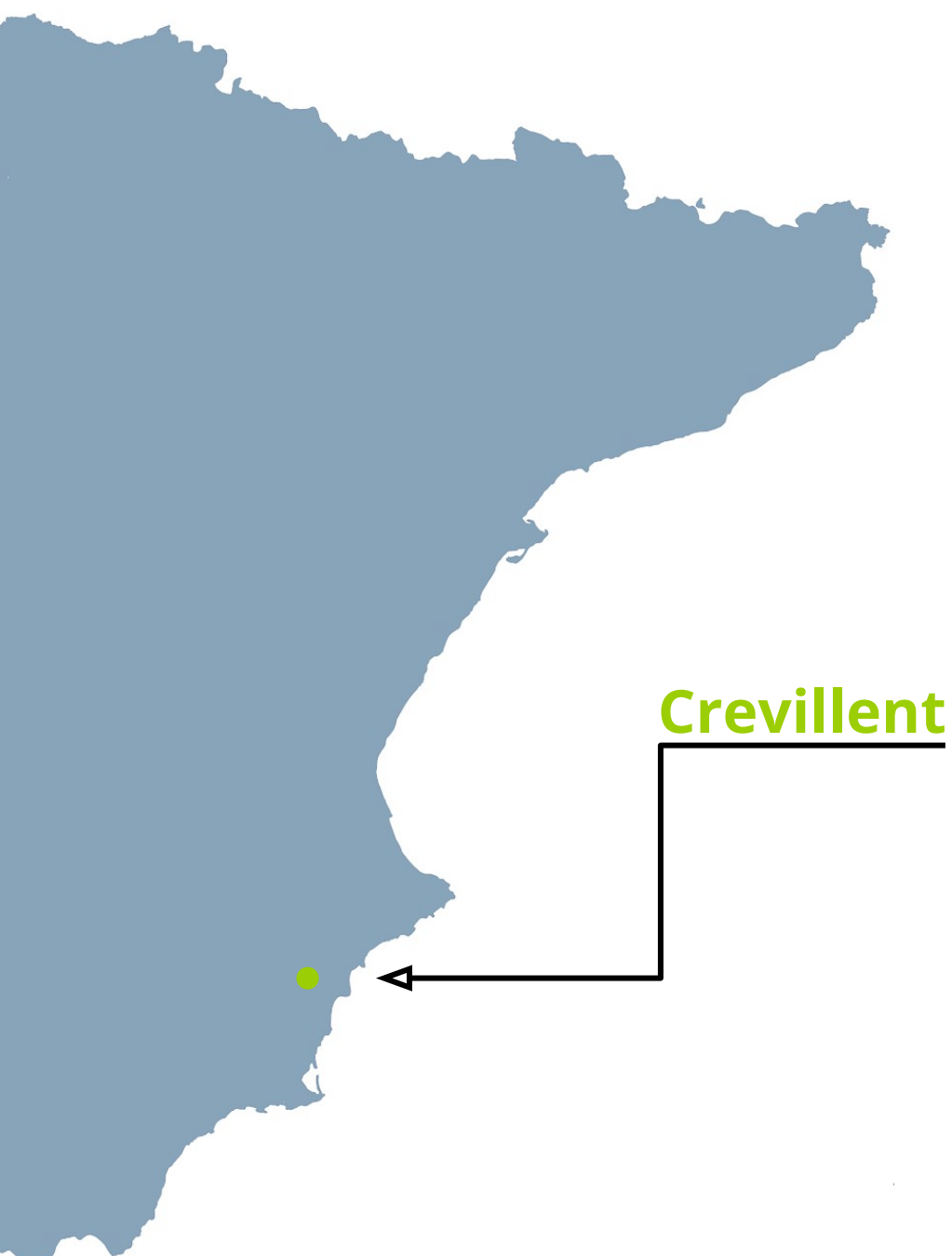
Solar Plants 75,000

Solar Rooftops 2000

Number of customers

Households 13,047

Companies 1268



Crevillent



Citizen Engagement

WiseGRID hosted two workshops in Crevillent, the first in 2018 and the second in 2020, involving partners REScoop.eu, ETRA, Enercoop, and ITE.

These pilot site workshops were planned and designed to contribute to the overall project objectives to include citizens in the different decision-making processes. The community engagement workshops informed the citizens about the deployment of the WiseGRID tools in their neighborhood and provided a platform to ask questions and to give feedback and suggestions.

Following the 2018 workshop the vast majority of attendees were satisfied with the process and 100% said there was enough time to discuss issues with the speakers and experts.

// The platform that you have exposed helped me to understand how the tools will work in practice //

Workshop attendee



Terni, Italy



Our local partner is
Municipally Owned
Focusing on energy efficiency, renewable
energy uptake and e-mobility

About

This demonstration site is in Terni, a small sized city at the heart of Italy with 105,000 inhabitants. The local multi-utility operator (ASM) is fully owned by the municipality. ASM Terni directly owns and operates the power distribution grid and distributes electricity to the end consumers (65,000 Smart Meters).

ASM

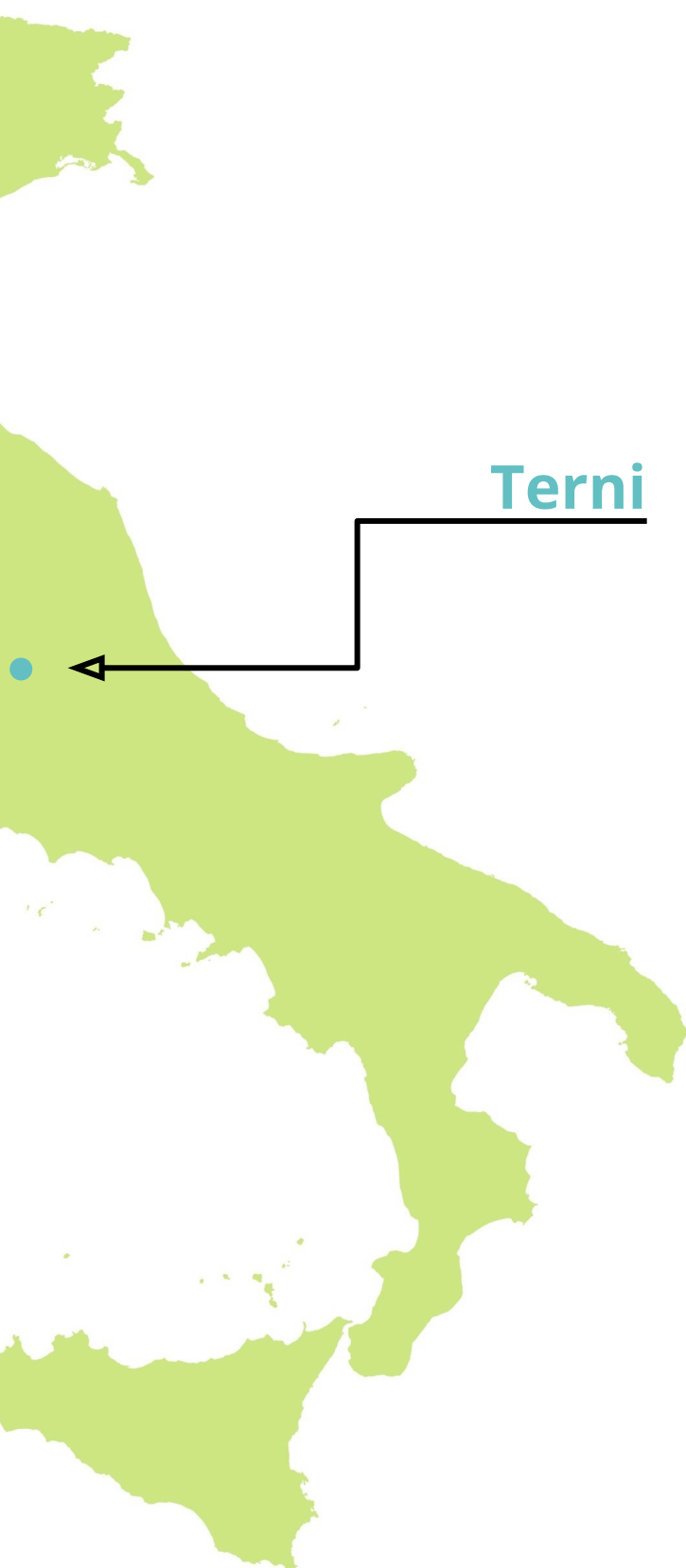
ASM Terni deployed and operated charging electrical vehicles as well as battery energy storage along the Low Voltage branch of its owned smart grid, which mitigates and smooths the fluctuating power output generated by the nearby PV farm while forecasting as much as possible and avoiding outage situations. The resulting configuration for the ASM Terni's pilot consists of a 240 kW PV farm, connected to the LV branch of the network, which is complemented by a 96 kWh battery energy storage.



Electric Vehicles

As part of the WISEEVP tool, electric vehicles were demonstrated at the pilot site. This tool allows citizens to share the vehicles through the use of an app.

Number of...	
End Users	65,000
Smart Meters	65,000



Citizen Engagement

WiseGRID hosted two workshops in Terni, the first in 2018 and the second in 2019. The initial workshop was a collaboration with fellow Horizon 2020 project Nobel Grid where citizens could discuss with experts and speakers about how the community can play an active role in the energy transition.

The second workshop was during the TerniOn city festival where ASM Terni set up a stand, showing off the WiseGRID tools, an EV, and ideas of energy management. This led to 200 positive conversations and 80 people signing the participation list.

Following the 2018 workshop the vast majority of attendees felt they had enough time to discuss issues and were satisfied with the workshop.

//

I appreciated the fact that the company took the effort to come to expose their projects

//

Workshop attendee



Ghent, Belgium



Electric Vehicles

Powered by solar energy

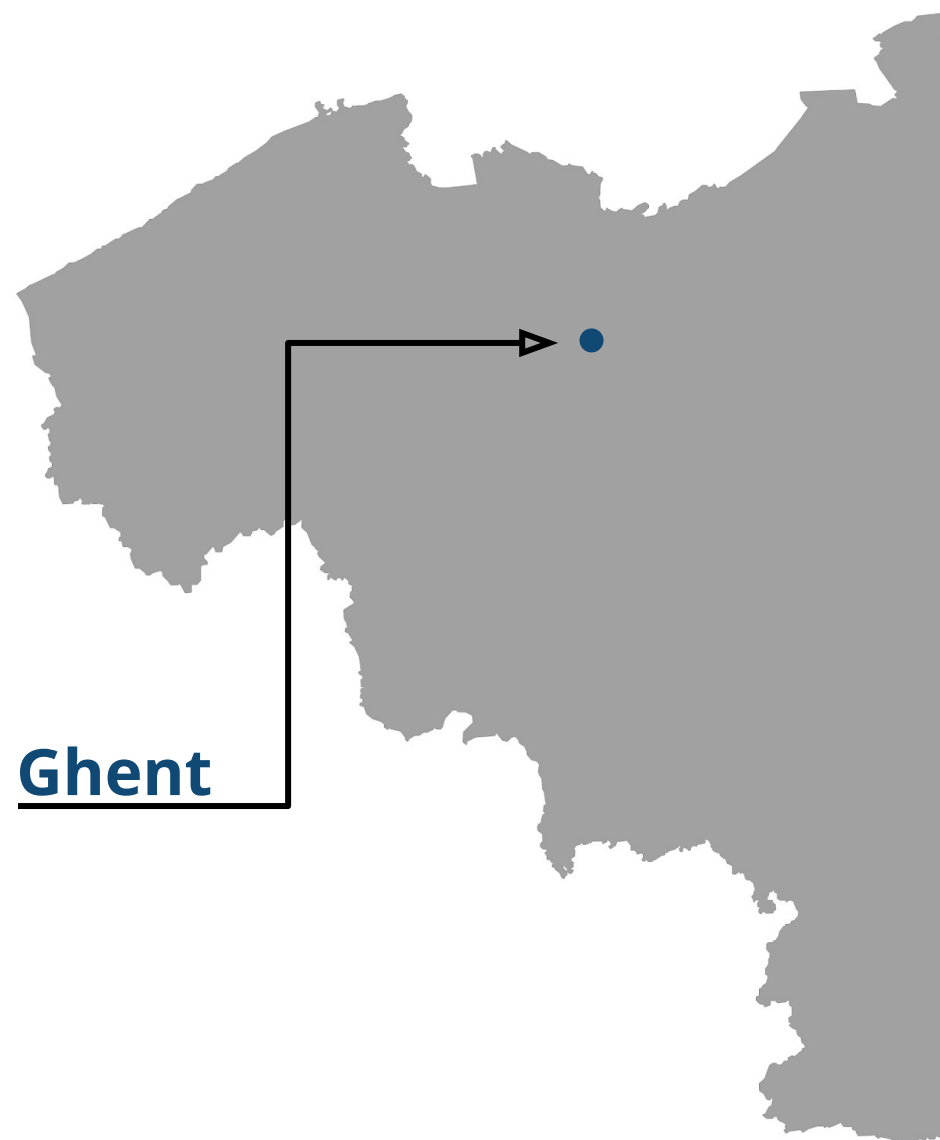
About

The demonstration site is in the Sint-Amandsberg district. The project area counts 2,451 households. Ecopower drives the project, together with EnerGent, the local energy cooperative and partners Energie-ID and Partago.

Tools

The apps offer participants of the neighbourhood overview of consumption and renewable energy consumption on an individual and collective basis. Residents and SMEs are encouraged to shift their consumption to moments when local renewable energy production is high to create a self-sufficient neighbourhood.

The generated solar power that is not consumed immediately by the local households is used to recharge electric cars from the Ghent cooperative Partago or to be stored in batteries. The WiseGRID project aims to develop a smarter and more consumer-oriented European electricity grid..

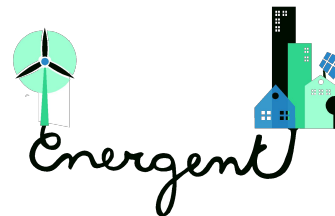


Ghent



Information about Ghent

Inhabitants	3171
Families	1371
Households	1128



energieID



↑ PARTAGO

Citizen Engagement

WiseGRID co-organised a workshop on smart metres in 2019 and a final event in 2020 together with the project partners of Buurzame Stroom.

Buurzame Stroom, a project started by local residents aimed at transforming the area into an energy neighbourhood of the future, discussed how WiseGRID would help fulfil its aims at the workshop.

Attendees claimed there was enough time to speak with experts about the project with a majority believing they were well informed.

The final event involved the partners presenting the findings and further recommendations, followed by comments from the Flemish Minister for Energy Zuhal Demir.

Electric Vehicles

Local cooperative Partago participated in the project with an EV sharing platform that gives residents access to e-mobility



Kythnos and Mesogia, Greece



Kythnos



Mesogia

Aiming to inter-

Connect islands

To become more self-sufficient

About

One of the demonstration sites is in **Kythnos**, an island and municipality in the Western Cyclades, with a population of 1632 people.

The other half of the demonstration site is in **Mesogia**, an area of Greek islands, including the municipalities of Koropi, Lavrio, N. Makri and the interconnected islands of Kea, Andros and Tino.

HEDNO is the main DSO in Greece, responsible for the distribution network in the whole country, including the Non-Interconnected Systems in Greece (islands that are not interconnected with the main grid.)

Infrastructure

The electricity mix of **Kythnos** Island is dominated by diesel and fuel oil. The local power station, constructed by Public Power Corporation S.A. in 1964 has a thermal installed capacity of 4.966 MW, with a peak power consumption of 2.7 MW. The desalination plant in Kythnos is automated to shift its operation to periods of low energy demand and integrate more renewables to the grid.

In **Mesogia**, HEDNO provides energy for residential, industrial, commercial & public buildings, agriculture and streetlight.



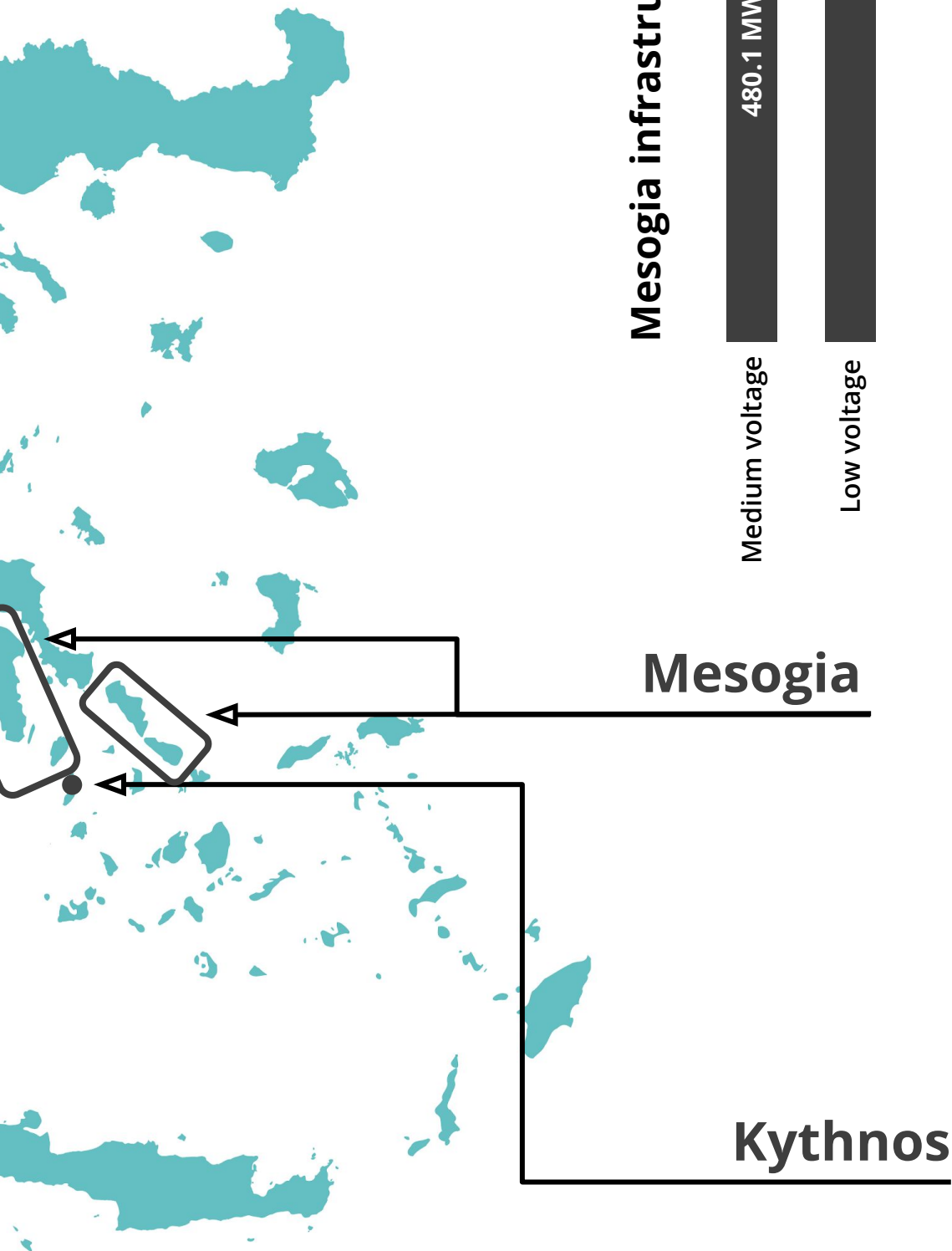
Local Planning

An attendee at the workshop in Kythnos helping with project planning on the island. The connection that is built between expert and local citizen gives the community the freedom to make their own decisions.



// I like the fact that new technologies will be tested in Kythnos. The island will be known on a European level, which will be significantly beneficial //

Workshop attendee



Panels and Batteries

Five lithium-ion battery storage systems were installed in municipal buildings in Kythnos to increase the use of renewable energy generated in the island.



aegean energy & environment agency
THE SUPPORTING ORGANISATION FOR GREEK ISLANDS



Citizen Engagement

WiseGRID hosted an event in April 2018 in Kythnos to engage to community in the project and later the following September another workshop was conducted in Mesogia.

During the workshops, local attendees had the opportunity to learn about which tools would be deployed in their area and were able to have individual discussions with the project managers.

Feedback following the events showed that in both workshops the vast majority of people were completely satisfied with their understanding of how the tools worked and 100% of attendees believed they had enough time to speak with experts.

Batteries

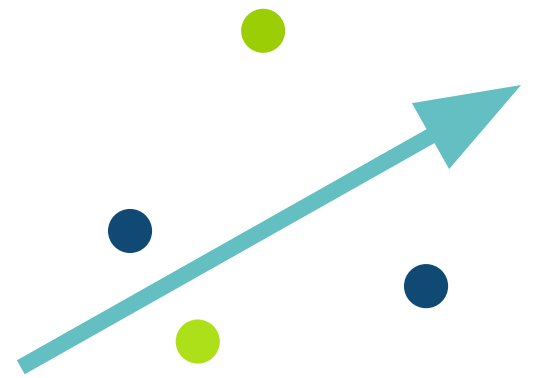


Desalination Plant

New knowledge

Successes

From the start, WiseGRID set out with very ambitious aims to present how advanced ICT services could be included in the energy distribution grid to give more power to the European energy consumer while making the grid more secure, sustainable, and flexible. In order to boost the credibility of its findings the project used 4 different pilot sites under different technical, climatological, regulatory, legislative and social conditions.



Demand response

A range of different technologies can play a part with demand such as smart metering, smart home appliances, batteries and EVs.

All 9 tools play a part but WISECORP and WISEHOME have shown that new players and citizens can participate in demand response with easy access to real time data on consumption, production and energy pricing.

Smartening the grid

Advanced monitoring allows more data to be readily available providing new opportunities for grid management.

WG IOP is the central tool that reduces ICT costs for prosumers and smaller players, being able to process massive data streams. WG Cockpit allows DSOs to use new data to improve flexibility and detect faults.

Energy storage

Storage is becoming one of the most important aspects of the grid of the future and therefore it is important that all players can have access. WGSTAAS/VPP gives consumers/prosumers the capability to aggregate together their unused storage and offer it to the market.

E-mobility

Sharing EVs among citizens can lead to a higher usage of e-mobility. WISEEVP helps optimise charging and discharging of an EV fleet taking into consideration the renewable energy profile, tariffs and driver requirements.

WGFASTV2G opens up EVs as extra storage space.

Accessibility

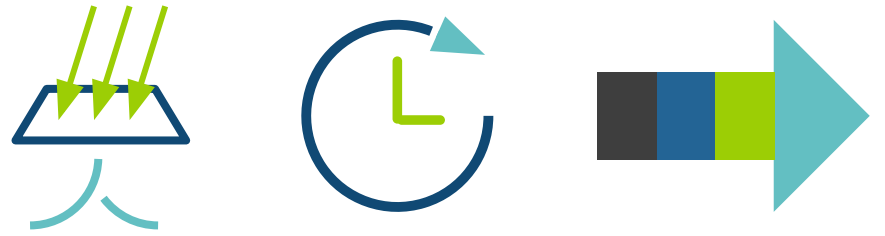


As the number of prosumers increases then the topic of accessibility is going to become more relevant. WISECOOP gives smaller players a fighting chance by bringing them together to achieve better energy deals while WG RESCO gives renewable energy producers access to customers.

Looking to the future

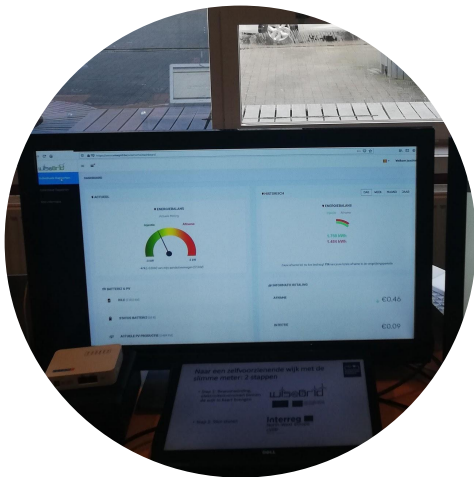
Ideals of the Smart Grid

Commonly, the ideals that surround smart grids involve decentralisation, local consumption, bi-directional flows of energy and data, numerous small producers, and active participation. These ideals were kept in mind during the WiseGRID project and need to be continued.



The citizens

In order to have an effective decentralised system, local knowledge will have to be harnessed from the residents in the area, whether through citizen engagement from utilities, workshops with local government or the formation of cooperatives.



Data access

The tools developed during WiseGRID showed that the collection and access to data allowed for new innovations to improve the stability, flexibility and security of the grid while opening up the possibility for further renewable energy integration. Future projects should bear in mind the results of WiseGRID would not have been possible if data was limited to a select minority.

Complexity

A stable grid is one that is resilient to change, whether that be a sudden peak in demand, an electrical fault, or fluctuating consumer/prosumer behaviour. Complexity can be a method of building resilience by not relying on one single mode of energy production and distribution. Future projects should take note of how WiseGRID brought in needed complexity through the integration of different renewables, virtual power plants, EVs as storage, and real-time data monitoring, without making it complex for the citizen to understand.



etra I+D



Partners