



E.DSO



SHAPING SMARTER GRIDS FOR YOUR FUTURE

E.DSO - European Distribution System Operators

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CUSTOMERS' POWER

Use cases from E.DSO's members for a participative electric distributed generation and integrations into their grids



Foreword

by **Christian Buchel**, Chair of E.DSO

This year has without question been one of the most challenging in our lifetime: Russia's war on Ukraine and the energy crisis. But while Europe was overflowing in chaos and uncertainty, the Distribution System Operators (DSOs) did what it always does, safely and reliably deliver electricity to customers. And while this came with a multitude of challenges, from electricity supply to rethinking how to efficiently engage customers, DSOs also continued to hold steadfast to their mission of eliminating carbon from their operations. This is not a small achievement, considering that EU ambitions are set to be achieved over the next 30 years.

The current energy crisis made us realise that there are two fundamental drivers to decarbonisation.

First, we need to act quick. This exemplifies why, in this difficult year, DSOs did put their efforts on the back burner. Energy efforts today results in more climate value for the future.

The second driver is to make customers key players of the energy system as their actions and behaviors can have an impact on the system. Some of DSOs' activities are dependent of customers

actions: matching an electrical vehicle charging time with the grid constraints, adapting their energy consumption thanks to smart metering data, or integrating domestic generation of solar PV to the network. These actions require adapting internal processes and providing new and easier services to match consumers' needs while addressing the challenges of the decarbonisation.

In this brochure we demonstrate how E.DSO members are leading the way on empowering customers.

More than 30 DSOs across Europe, which we represent, are constantly improving and reinforcing their customers' relationship. They are working hand-in-hand to lower their energy use and lower their bills while also reducing demand on the grid. E.DSO members are actively working to provide customers with the information and tools necessary to flex their energy use to off-peak hours. This is even more accurate concerning the current situation with high tension on the electricity supply for this winter, as it allows citizens to proactively contribute to the general efforts.

However, all the above will not happen without providing a pathway for customers. To the end, E.DSO is working to make it easier for customers to participate in energy efficiency programs, access EV charging, and respond to a set of price signals or incentives that capture and create value from distributed resources. To drive these behavior changes, they are educating and ensuring all customers can participate.

This brochure would not have been possible without the guidance of the Customer Empowerment working group and we are grateful to everyone for their helpful examples.

I wish you a very good reading of DSOs examples of the efforts they have underway.

by **Christian Buchel**,
Chair of E.DSO

Introduction

Historically, DSOs are not typically known for their customer-centricity. For long, the energy system used to be a one-way flow from DSOs to customers. Today, DSOs are moving towards a customer-led future by deploying foundational technology, new platforms, agile practices, new governance models, strong risk management and security, to name a few. Similarly, customers are more involved in DSOs activities than before since the large amount of data and increased advanced technology allows the companies to understand their customers better and serve them in more direct and convenient ways.

One of the greatest opportunities for customers is through self-service options, via which customers have the power to control their electricity needs and use. We come to realise that DSOs that are most successful in their climate transitions start decarbonisation with the customer in mind and work backward across offerings, operations, and the supply.

It is essential to understand that not all customers are moving at the same pace, so targeting the right ones based on their carbon ambition,

progress, and internal carbon price used is the best way to achieve the right green transition.

To make this happen, E.DSO members continue to work and transform the customer experience by simplifying processes to enroll new customers and request services, providing advice on lowering energy bills, and giving customers the ability to view and track real-time information on power outages, expected repair times, etc.

The leading DSOs, represented by E.DSO are well positioned to explore the benefits of predictive analytics, connected home services, personalisation, smart meters, and grids, and partnerships with public authorities and other relevant market players.

Customer-centrism has become key to maintaining sustainable distribution grids. It requires a combination of data and behavioral analysis. Data is needed to connect with customers on a personal level. For instance, customers with an EV or solar need to see how that equipment impacts their bill. Vulnerable customers need help finding the right energy affordability

programs. These are complex tasks but once the customer's unique situation is known it is easier to better serve them. This is where behavioral analysis comes in. Constantly testing new principles to influence actions, among all DSOs customers, is proven to generate high participation rates.

E.DSO vision is that technologies have shifted the role of the customer and increased the impact of customers in shaping the electricity system. Fortunately, the same technologies that give the customer a more central role also create opportunities to better manage their energy.

In addition to the benefit for DSOs to drive grid-side efficiencies, empowering the customer also helps to:

- Provide customers with the tools to better control their own costs
- Increase their value through better customer service or the development of new services; and
- Open a bidirectional dialogue through which DSOs can communicate the benefits of technology changes and customers can communicate their service preferences.

We are confident that customer empowerment can yield great benefits to electric DSOs if done well, or result in an erosion, if done poorly. Either way, it remains a significant driver of DSOs evolution.

Let us examine what that looks like in practice though the cases brought by our members.



CUSTOMER TYPES



HOUSEHOLDS

01

Case n°1: DSO boost - Fluvius Databoost

Case n°2: Digital balcony - E-REDES

fluvius.

E-REDES



Householders



Case n°1:

DSO Boost - *fluvius.*



Fluvius puts digitalisation and customer centricity in the centre of DSO's actions towards a greener future. By exposing data and boosting insights and new services, customers (Base Boost) are empowered. After its launch in 2019, over 1.000.000 households have been provided with a digital meter.

How is Databoost addressing householder's needs?

DSOs will shape the future of data exposure, digitalisation as well as support and accelerate development of new services based on accurate and real detailed

customers meter data. DSO Boost is addressing the need of customers for an intuitive and easily accessible way when it comes to exposing and boosting data. This does continuously add value while further empowering customers as well as giving them full control over the exposure of their individual data.

What does it do?

Collect & Transform Digital DSO data: Collecting daily, hourly and quarterly digital meter values and preparing them to be exposed.

Create a Digital Experience:

Base Boost: a Fluvius

customer portal with intuitive graphs and functionalities to boost customer insights

How does it do it?

KISS

Keep It Simple stop talking. Start doing.

Start minimum viable product (MVP) but solid for the future

Starting MVP is key. Followed by iterations continuously adding value and improving.

Case n°1:

DSO Boost - *fluvius*.



Continuously collect customer feedback

This type of feedback is a reliable source of tangible information. It is used if for creating the roadmap and taking business decisions.



Case n°2:

Digital balcony - **E-REDES**



E-REDES has a Broad and extensive Program regarding Customer Empowerment, Digitalization and Security in line with EU policies, sectoral and national laws.

E-REDES has several initiatives towards Customer empowerment, such as “Balcão Digital” that, promotes and enables digital experience in a transparent, responsible and inclusive manner.

This customer centred “one free stop shop”, with a win-win advantage for both DSOs and Customers, allows each client to connect with E-REDES digitally, in order to submit and obtain several requests and/

or Information at their convenience.

What's on?

“Balcão Digital” it's the new integrated “digital ecosystem”, from which the Customers can interact with the E-REDES promoting transparency, responsibility and a closer relation between DSOs and Clients.

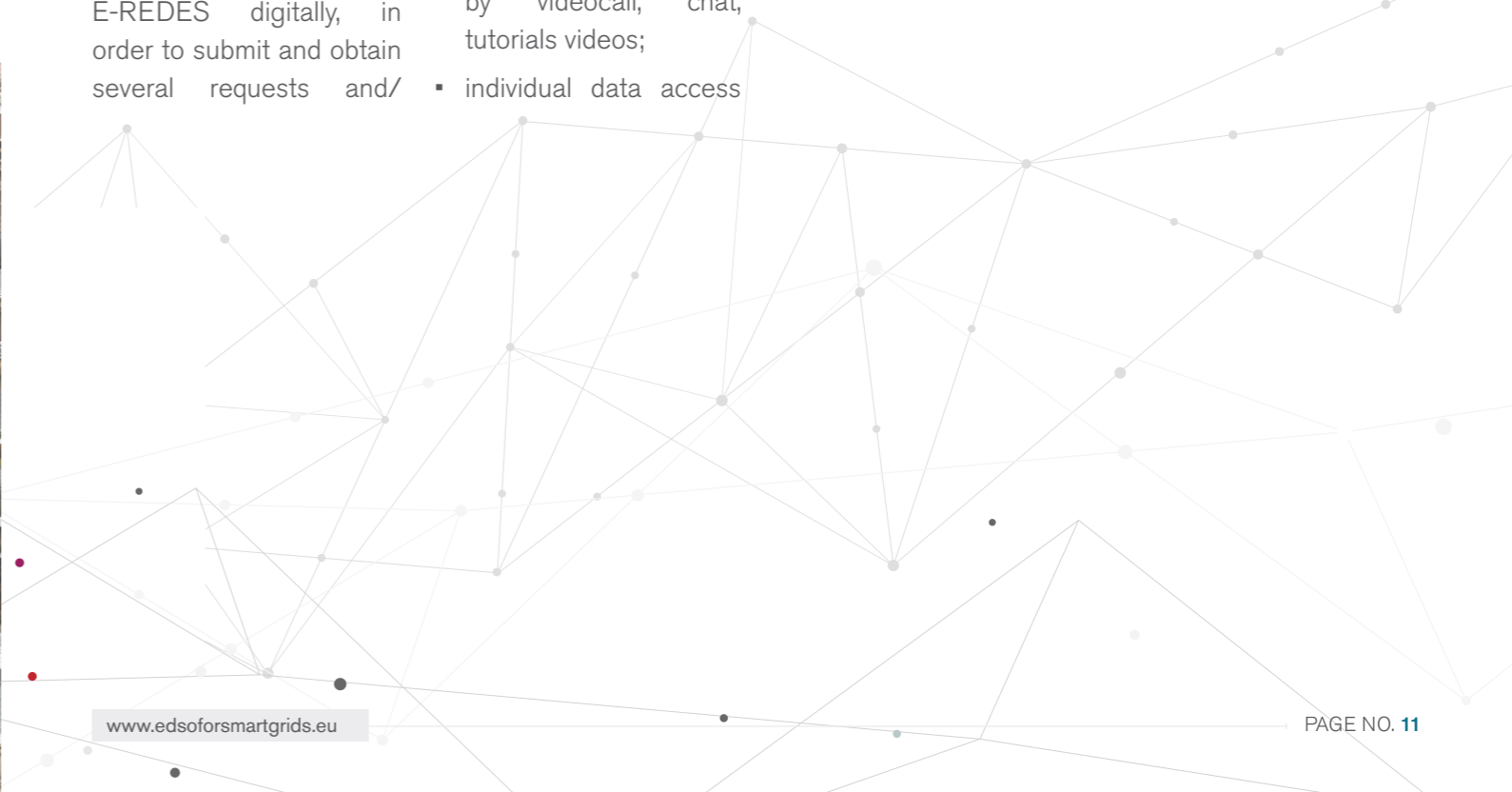
It's simple; intuitive, totally digital and offers:

- a new end-to-end digital experience with several types of interactions: request and follow the services, remote schedule appointments by videocall, chat, tutorials videos;
- individual data access

if requested (in a safe digital environment)

Principle available services:

- Submission of electricity meter readings
- Report on streetlights malfunctions
- Report on power cuts
- Scheduled videocall assistance appointment
- New grid connection requests and budget simulation
- Consumption and production data



Case n°2:

Digital balcony - E-REDES



What's hot?

E-REDES customers Top 3 most wanted services are:

Grid Connection Request:

With the Grid Connection Request service, a new request is just a click away. Besides making it easier, the “Balcão Digital” also allows customers to simulate all the costs involved, follow current status of their requests and access to all interactions with the DSOs. In case of any doubts Customers can also schedule an on-line appointment



Case n°2:

Digital balcony - E-REDES



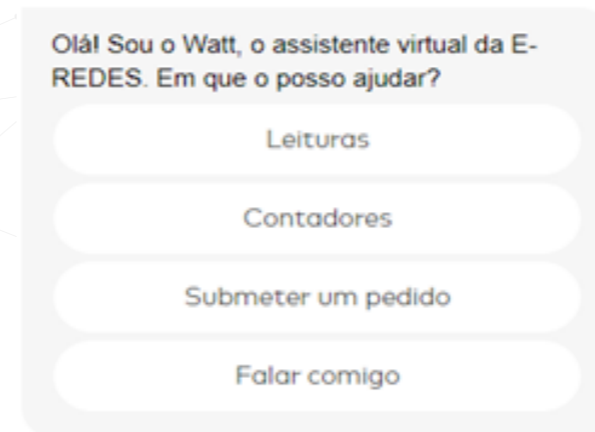
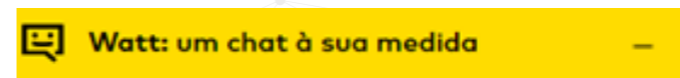
Videocall assistance:

With more than 2100 requests made since the beginning of Balcão Digital



Watt – The Chatbot:

E-REDES virtual helper is one of most used services as it helps customers with a wide range of frequently asked questions on many topics, like meter readings, smart meters, grid connection request, power cuts, etc.



What's next?:

Being the Customer the centre of our activity, this digital tool will be complemented with more developments with the aim of incorporating new useful features, keeping it adjusted to the customers' needs:

- WhatsApp for reporting malfunctions
- Anonymous data sharing (open data) to all Citizens and Community
- Requests for Prosumers/producers for grid connections

LOCAL AUTHORITIES

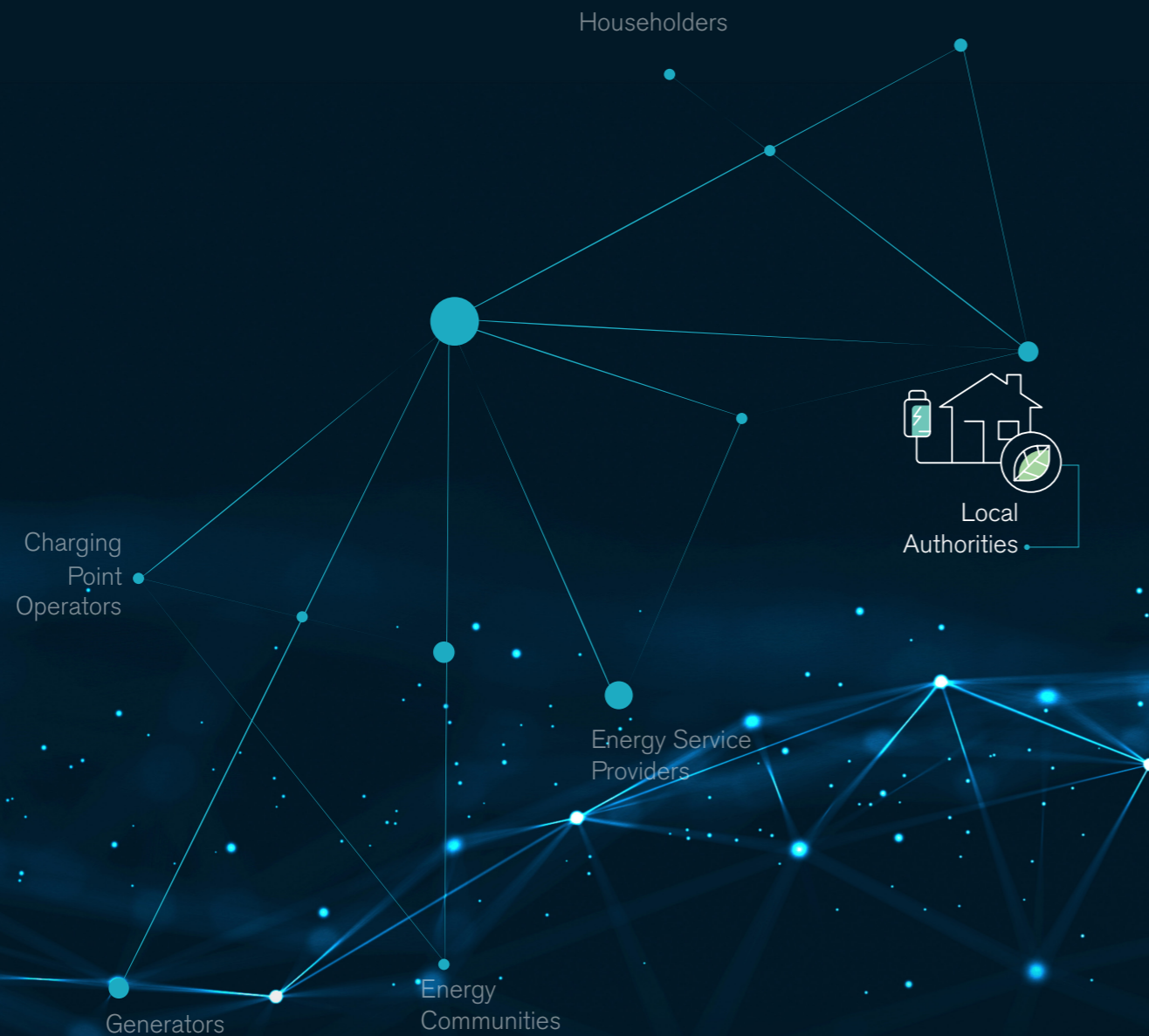
02

Case n°1: Prioréno - Enedis

Case n°2: Energy Portal - E.ON

ENEDIS
L'ELECTRICITE EN RESEAU

e-on



Case n°1

Prioréno -

ENEDIS
L'ELECTRICITE EN RESEAU



Prioréno is a large-scale and general interest data initiative aiming at a very practical objective: removing the obstacles that elected officials and local governments may encounter while renovating their public buildings.

Indeed, many local elected officials only have a partial understanding of their building stock's characteristics and sometimes lack the essential information they need to launch the renovation works.

The Prioréno initiative was launched by the Banque des Territoires (Caisse des Dépôts Group) — the general interest banking institution which provides financial support to the

projects of local authorities and social housing actors — in partnership with Enedis, the main distribution system operator in France which delivers electricity to 95% of the French territory. Relying on 2000 GB of data, it aims to provide a complete and detailed overview of the 500.000 public buildings in France (location, surface area, number of floors, construction date, etc.) including their intended use (schools, town halls, sports facilities, etc.) and their energy consumption (smart meters data). Coupled with artificial intelligence, the Prioréno tool provides the local authority with an indicative prioritisation of the buildings in which

engineering studies should firstly be carried out. It thus allows local decision-makers to have a comprehensive picture of the energy consumption levels of their building stock. It also streamlines local public debates, allowing substantial timesavings in local decision-making by emphasising on the buildings that are potentially the most energy intensive. The Prioréno tool is a powerful lever for action preceding the necessary engineering studies.

Beyond that, an experiment is underway to try to predict the energy label of each building using machine learning (classification models

Case n°1

Prioréno - **ENEDIS**
L'ELECTRICITE EN RESEAU



such as XGBoost, Soft-Max) tested on 30.000 buildings. Thanks to their aerial image allowing to identify the shape of the roof and to cross the information with a set of dimensions for which data already exist (materials and construction date, etc). In 2021, in one of the experimental cities, the first 7 school buildings which have been automatically and charge-free prioritised by Prioréno are the same buildings that were targeted after a study conducted by a consultancy, which lasted for over a period of 10 months and required a budget of €120.000.

The tool is currently deployed in its

industrialised version, which is opened free of charge to all of the local authorities in France since first quarter of 2022, with a cooperation agreement that should be extended to GRDF, the main gas DSO in France. The impactful and innovative project fully embodies DSOs' core values: accompanying the energy transition across territories. After only one month, more than 2,000 local authorities asked for Prioréno. Interest for this tool is obvious and its potential for public policies is important; thanks to all data collected through the 35 million "Linky smart meters" that have been successfully roll-out in France.

Smart meters are at the service of the digitalisation and the energy transition:

- Allowing customers, communities, individuals and businesses to track their electricity consumption through the meter
- Making available all the consumption data collected and anonymised to enable the right choices in terms of investments and energy renovation programs
- Accompanying the development of electric mobility and self-consumption



Case n°2

EnergyPortal - **e.on**

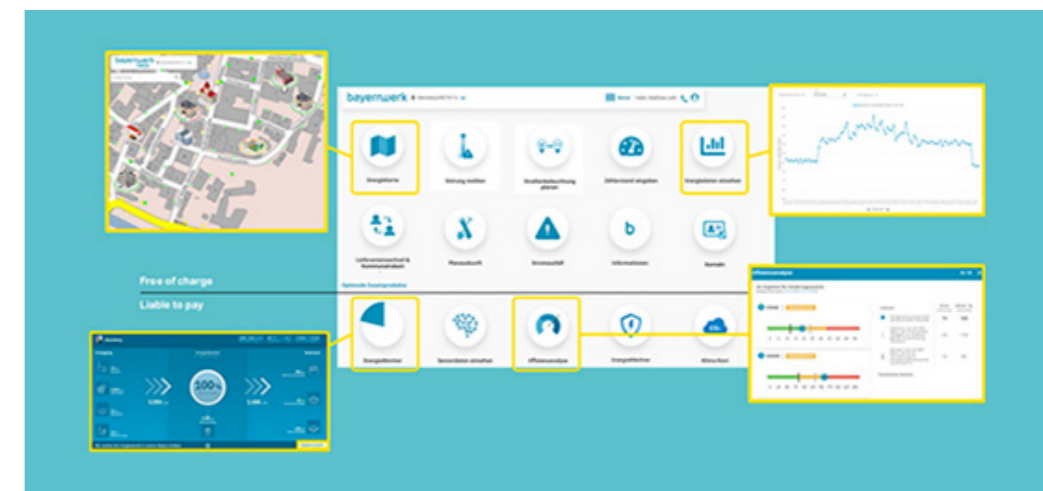
Alike an app-store, the EnergyPortal platform combines several energy solutions proposed to municipalities. Based on the collection and processing of data from various data points, the EnergyPortal covers a wide range of solutions: data visualization and energy monitoring, energy efficiency analysis, street lighting planner and problem reporting, power outages mapping and reporting, interactive energy map with data for all consumption points.

Some of the applications are free-of-charge. Additional ones can be purchased and are available via the tailor-made portal of the customer.

What does it do?

The EnergyPortal counts now more than 2.000 municipalities and 2.300 users in Germany. This helps customers to gain easy access to their energy-related information and dedicated services, to manage more efficiently some municipal services and eventually, reap the benefits of the energy transition.

While expanding the customers basis to business, the platform will be soon open to external solutions providers and turn to a marketplace enabling external energy solutions providers to meet customers. E.ON will also roll out the EnergyPortal across all its 18 DSOs in 9 European countries of presence. The EnergyPortal is constantly evolving in strong cooperation with the customers to ensure that the functionalities and the energy solutions proposed meet their needs and to support customers engagement so that they can actively contribute to the energy transition.



GENERATORS

03

Case n°1: Case Cable Pooling - Enexis

Case n°2: Smart connection agreements - Enedis



Householders

Local Authorities

Charging Point Operators

Energy Service Providers

Energy Communities

Generators

Case n°1

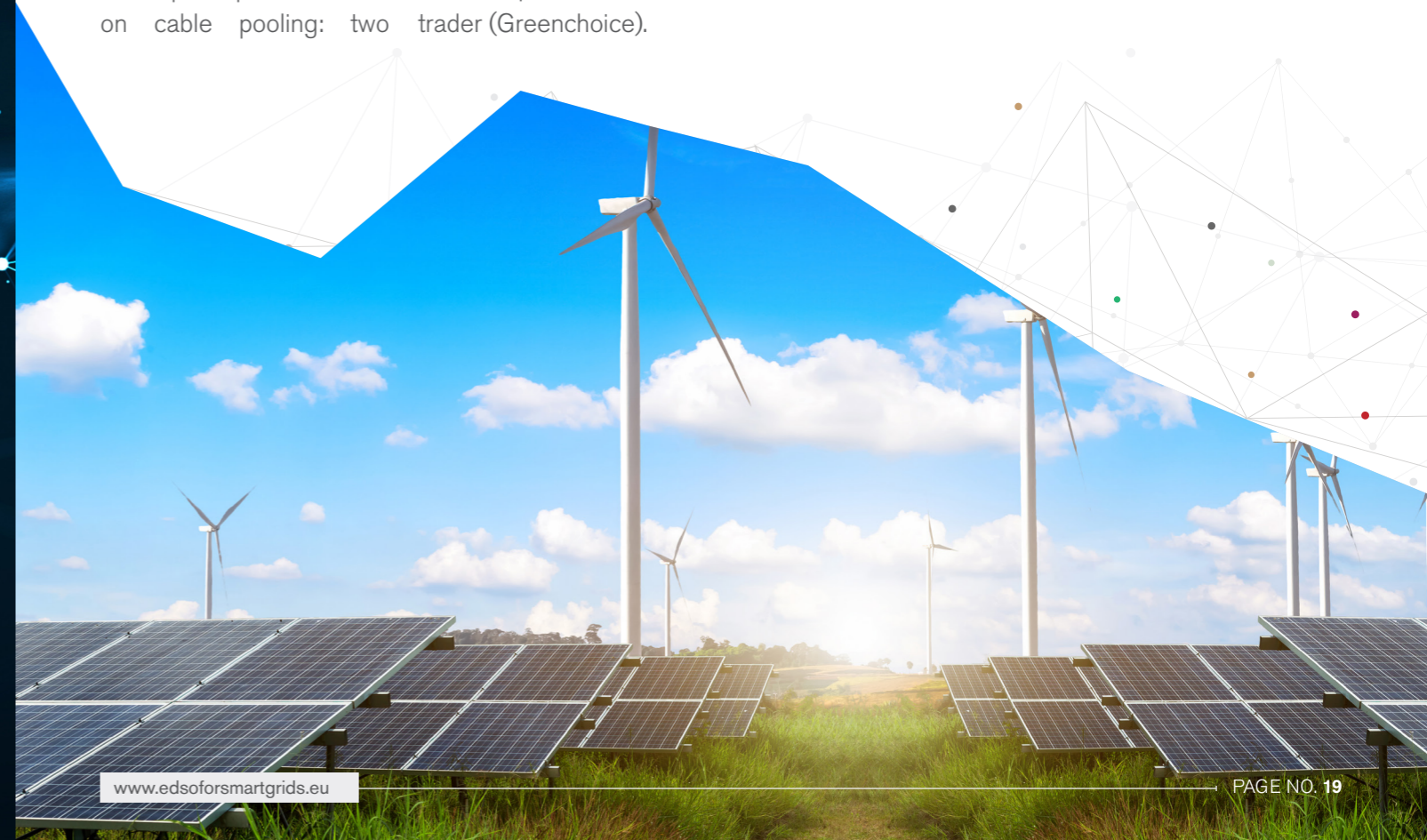
Cable Pooling - ENEXIS GROEP



Not all days are very windy and not all days are very sunny. So the network connection capacity for wind and solar parks is only partly used. And in The Netherlands, days that are windy and sunny at the same time are very rare. So why not combining wind and sun on one single network connection? Then the network can be used more efficiently, which prevents congestion and unnecessary network investments. This is why Dutch DSOs have developed a product based on cable pooling: two

renewable power systems on one shared connection point. An example of a shared connection has been realised by DSO Enexis in Waalwijk, a municipality in the province of Noord-Brabant in The Netherlands. There, a 10 MW windpark owned by energy trader (Eneco) is combined with a 7 MW solar park owned by a local customer energy cooperation (LangstraatZon), who sells the power to another trader (Greenchoice).

In that way the customers Eneco and LangstraatZon will save money. Not only by sharing the connection costs, but also by "splitting the bill" for the distribution tariffs, because they also share one connection agreement with the DSO Enexis.



Case n°2

Smart Connection Agreements - ENEDIS

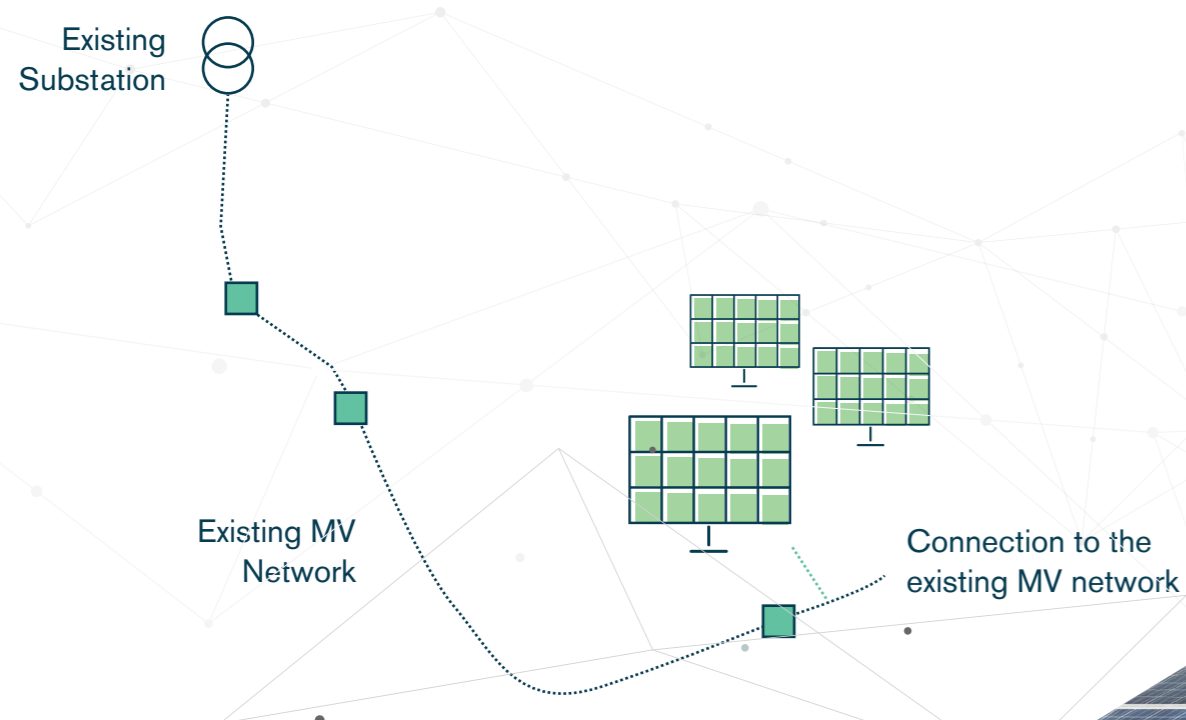
L'ELECTRICITE EN RESEAU



Each year, more than 30.000 new producers are connected to Enedis' distribution network. This trend will increasingly grow thanks to RES policies developed at both national and EU level to achieve the energy transition objectives.

Enedis has a "regular" connection offer which is proposed for all plants and is tailored to allow

the producer to inject the generated electricity any time, at the maximum active power required when subscribing to this connection agreement. However, it can concretely lead to significant works to adapt, reinforce the grid and imply higher connection costs, a longer delay or temporary restrictions for active power injection to conduct connection works.



Case n°2

Smart Connection Agreements - ENEDIS

L'ELECTRICITE EN RESEAU



In order to better accompany the RES generators, Enedis has developed two smart connection agreements to allow them to have their power plants connected to the distribution network faster and at a lower cost. These solutions are implemented since 2019 and aim at optimising the sizing of the connection assets or reducing the activation delay. It allows to connect more RES generation without carrying out new costly investments in the existing network.

These two alternative offers are based on two

demonstrations developed within the "Smart Grid Vendée" project since 2017, with one wind farm and one photovoltaic power plant.

Smart connection agreements allow RES producers to be connected to the closest distribution network, thus reducing both connection costs and connection timeframe in return for punctual redispatched generation. It requires a precise knowledge of grid constraints and to qualify and quantify them based on electrical flows forecasts.

Two possibilities:

- The power plant can constantly inject electricity to the network at a minimum capacity.
- When the grid allows for it, the injection can be done at a higher capacity Or the connection agreement settles an annual maximum volume of dispatched generation. With this offer, it is possible for the producer to anticipate the financial value of the electricity that is not injected.



ENERGY COMMUNITIES 04

Case n°1: ENTRNCE - Alliander

Case n°2: CLUE - Energie Netze Steiermark



Householders

Local Authorities

Charging Point Operators

Energy Service Providers

Generators



Energy Communities



Case n°1

ENTRANCE - **alliander**



Over the past years, different forms of Energy Communities have been growing steadily across Europe. Also in The Netherlands they play an increasingly important role in the energy transition. With the current high energy prices, some of them receive greater revenues from their electricity production than ever before. At the same time, their members struggle to pay their energy bills as their suppliers face high costs for purchasing

electricity. To help out, Energy Communities are implementing a concept called Local4Local. This initiative provides support and products for Energy Communities to supply their members with locally produced renewable electricity on a cost-plus basis. The impact on the local energy infrastructure is also part of this project.

The more locally produced electricity can cover the demand of Energy Community members,

the greater the impact Local4Local. This will also lead to a more efficient usage of the public electricity grid as supply and demand is optimised on a local rather than a national basis.



Case n°1

ENTRANCE - **alliander**



What is needed to make this work?

In the current Dutch legal framework, an Energy Community needs to contract a supplier and a Balance Responsible Party (BRP). They can also choose to become one themselves, but this is not an easy task, or contract a third party. Currently, there are several suppliers active who focus on servicing Energy Communities, generally originating from the Energy Community movement itself.

For **Local4Local** to work, Energy Communities and their members need to be able to procure

the renewable electricity volumes directly from producing assets, either their own or others.

As this shall be implemented as soon as possible, it needs to fit within the current market

processes and regulatory frameworks. Above that, an Energy Community strives to keep the cost-basis as low as possible in order to maximise the benefits that can be provided to the members.

How is Alliander contributing to this?

Since 2017, Alliander has been developing and

operating ENTRANCE, a local electricity exchange which enables users to directly exchange electricity with each other. Energy Communities can use ENTRANCE to purchase the electricity volumes from local renewable sources.

Case n°1

ENTRANCE - 



The product and its vision are characterised as follows:

- Increase freedom of choice for users by facilitating every possible electricity transaction possible at the lowest granularity available in the market
- Function within the current market design and processes by cooperating with the market parties involved

(suppliers and balance responsible parties)

- Financial settlement of traded electricity volumes and imbalance costs on an individual basis
- Provide full transparency with regards to insights into the realised electricity flows as well as the financial costs and benefits that come with trading directly with others.

The initiative of Local4Local is currently being implemented together with Energy Communities and their national associations. Alliander is exploring ways in which they can help them as much as possible and also looks at the experiences from system operators in other countries to learn more about the ways in which this could be done.

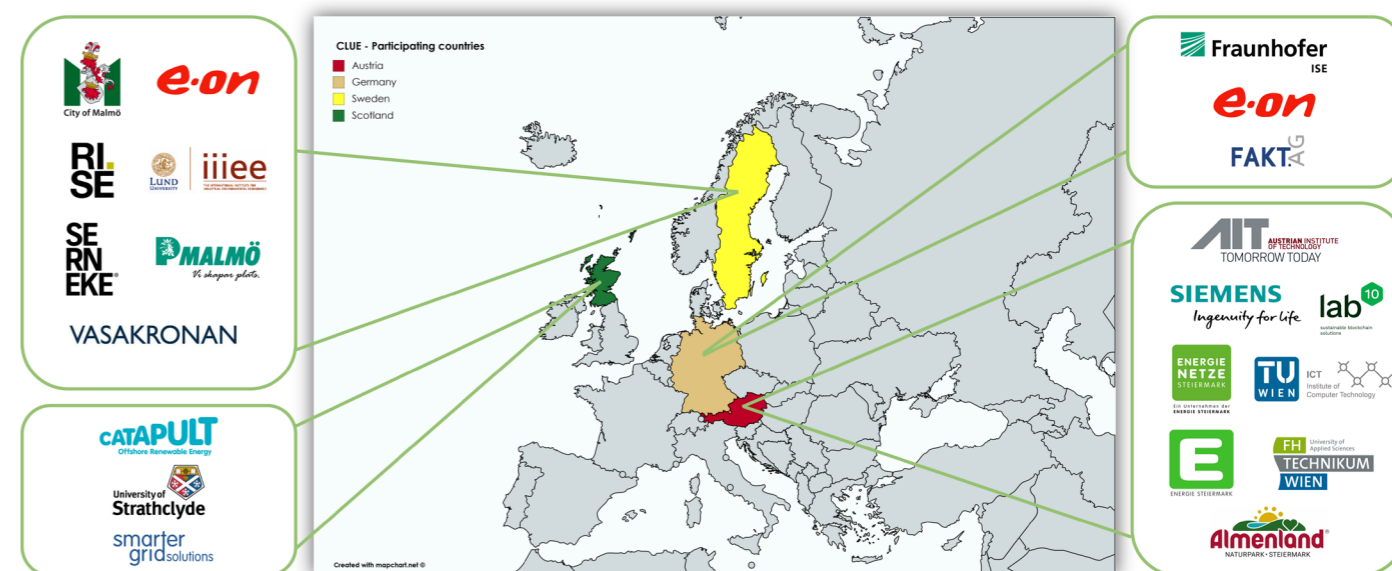


Case n°2

CLUE -



The Goal of the CLUE* project is active grid supporting of Energy Communities. The use-case includes P2C-Trading, Community Battery Storage (Daily Storage), Community Hydrogen Storage (Seasonal Storage) and Demand-Side Management (E-charging Stations). The focus lies on a grid and market oriented of the system. Storage Systems are connected locally to increase the grid impact. CLUE is a joint initiative from different stakeholders interested in fostering the development of Energy Communities across Europe.



*Funded by the Era-Net Project 5FFG) with a budget of EUR 7 Mio. the project started in September 2019. While it was set out for three years, it has just been extended until March 2023.

Case n°2

CLUE -



How is CLUE helping Energy Communities?

CLUE is fostering the self-consumption optimization of Energy Communities. By deploying different hardware components such as community storage and smart meters, households are optimizing their consumption levels. Grid support is thereby always the first priority. With the help of CDMA-Communication the energy flow is dynamically allocated. That way Energy Communities benefit

from costs savings due to reduced fees, levies and taxes on a local level.

What is the role of DSOs in this context?

Within one of the project's demonstration sites, Energie Netze Steiermark is testing several business cases supporting local energy community.

These business cases are:

- Peer-to-peer energy trading
- Community battery storage

- Community hydrogen storage
- Demand - side management of EV charging stations

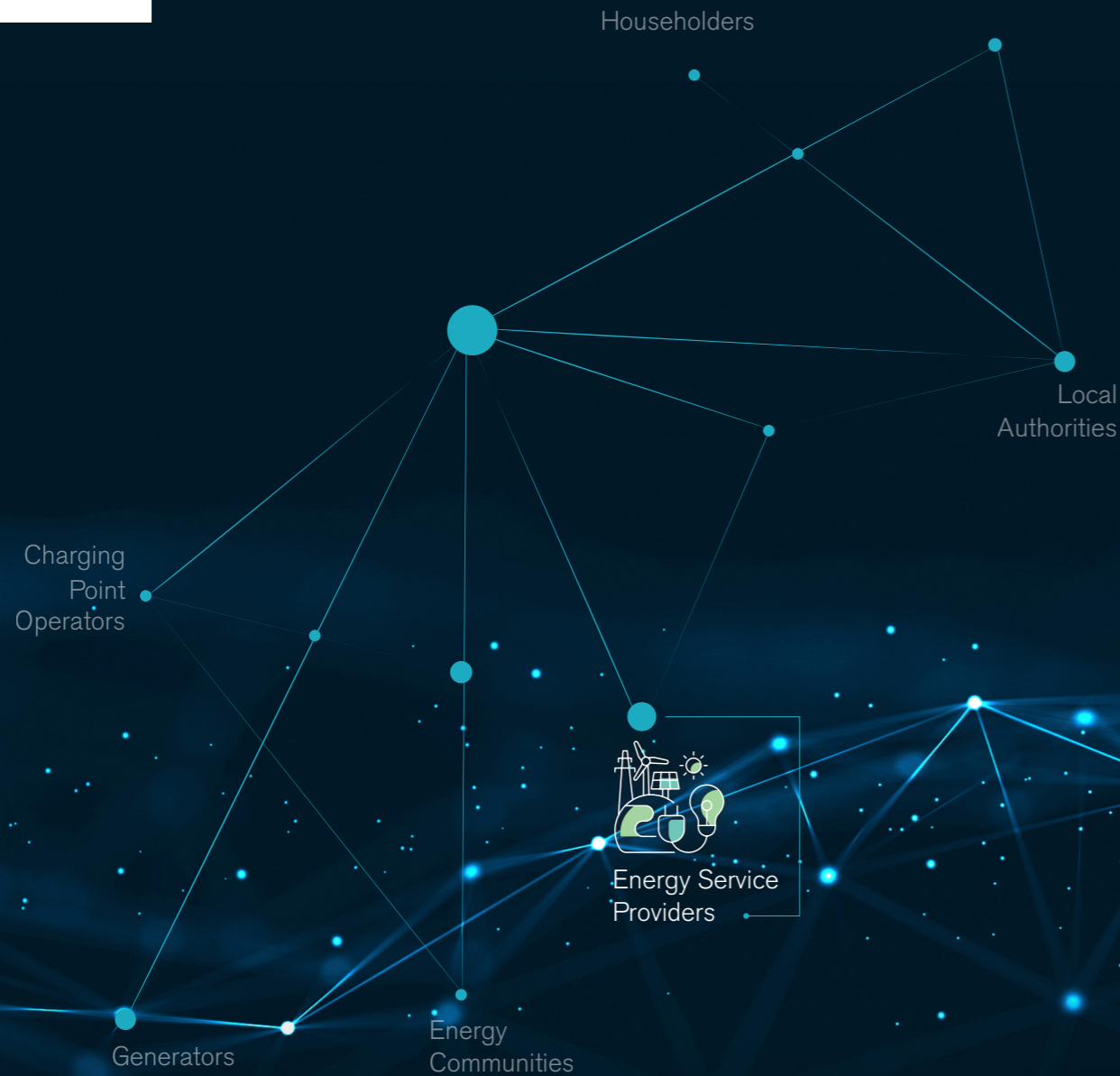
The community storage can be used by local prosumers to store their excess electricity production and use it later when the production cannot cover their demand. On top of that, the storage assets can be also used by the network operator for network management purposes.



ENERGY SERVICE PROVIDERS

05

Case n°1: Big Boost - Fluvius



Case n°1

Big Boost - *fluvius.*



In recent years there has been an increased interest in the provision of energy services to achieve energy and environmental goals. In particular, Energy Service Companies (ESCOs) provide energy services to final energy users, including the supply and installations of energy efficient equipment, and/or the building refurbishment. To execute their tasks in an effective way an easily accessible and GDPR proof process to get meter

data is key and 3rd party customers (Big Boost) are empowered.

To enable this Fluvius designed and implemented the so-called big boost.

This product was created together with the market players. Inspiration was given and collected, and the best choices were made. Fluvius started with a minimal valuable product followed by iterations and continuously adding value and improvements.

What does it do?

Build digital Bridges:

Big Boost: our API's connect with 3rd parties and governments. Combined with their data and services create a bigger boost.

Privacy by design GDPR-proof:

Only individual data is shared & exposed after a customer consent. Revoking is possible with 1 click!



Case n°1

Big Boost - *fluvius*.



How does it do it?

KISSS

Keep It Simple top talking. Start doing.

Start minimum viable product (MVP) but solid for the future

Starting MVP is key. Followed by iterations continuously adding value and improving.

Co-creating & Partnership are key for acceleration

Fluvius products are created together with the market players. Inspiration was given and the best choices were made.

Continuously collect feedback from market players

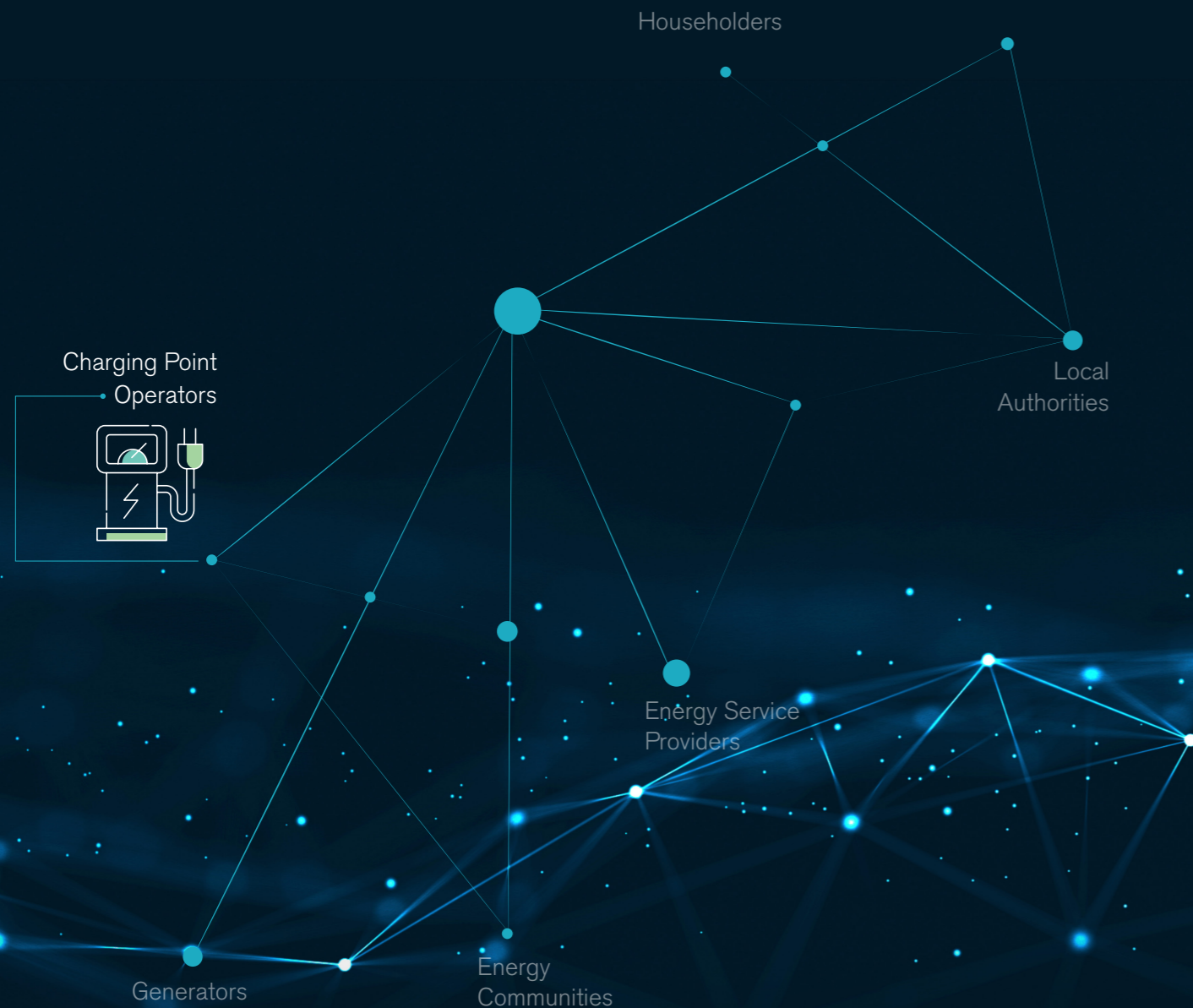
This type of feedback is a reliable source of tangible information. It is used for creating the roadmap and taking business decisions.



CHARGING POINT OPERATORS

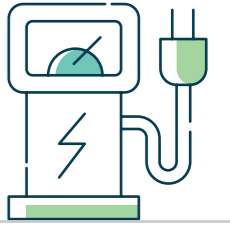
06

Case n°1: Recharging Solutions - Enedis



Case n°1

Recharging Solutions - ENEDIS



Recharging solutions at home (households and collective buildings)

90% of charging is done at the workplace or at home. 44% of French households live in collective buildings. Making it possible to charge at home is therefore a key driver of the transition: Enedis is involved in all different schemes to equip buildings with charging equipment. In this context for example, a guide on the installation process for recharging points has been jointly released by Enedis and AVERE.

In addition, a national decree which was published in September 2022, established the possibility for collective

infrastructure to be pre-funded by DSOs. Upon request of the owner or the condominium syndicate, DSOs can endorse the works for the collective infrastructure and advances monetary means to cover the initial costs.

Recharging stations in public domain:

Public communities are incentivised to plan and organise the deployment of E-Mobility. Enedis has developed a unique expertise to support them, by implementing:

- A state of the art
- A Prospective vision of the E-mobility market
- An estimation of the needs for the municipality level

- A Map and evaluation of impacts on the public distribution network

Recharging station in highways:

Today, one out four service area are equipped with 'High Power Charging' (HPC), i.e 2 chargers > 150 kW DC.

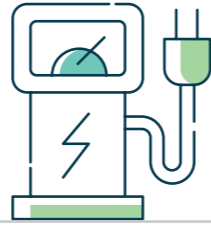
Major highway network companies have to equip all the service areas with HPC by the 1 January 2023.



Case n°1

Recharging Solutions - ENEDIS

L'ÉLECTRICITÉ EN RESEAU



To anticipate the fast charging along French highways, Enedis has conducted a study in cooperation with the TSO, to identify power requirements on service areas by 2028 as well as 2035. By 2035, the electrical power required per area would be around 5 MW in average and could reach 16 MW for the most visited areas.

Based on these outcomes, Enedis anticipates all connections from customers to the grid. The maximum demand of electric power will be during the summertime, i.e. August, while for this same period of time, electricity consumption in France usually is very low.

In addition, less than 20 % of work of reinforcement of the medium voltage transformer is required. Finally, we could assess smart connection if necessary.

AOB

To conclude, Enedis is also developing a valuable knowledge on processing, storing and protecting energy data. E-mobility data can foster new services for the whole system. As a matter of fact, thanks to data provided by Enedis, local authorities can implement their local blueprint and monitor them. Energy suppliers and aggregators use this data to provide flexibility services. Car manufacturers can also

use this data to propose new 'vehicles and services' offers.

Enedis is preparing the future by studying and experimenting innovative solutions to optimized insertion of E-Mobility in Distribution Network. As E-Mobility is a key part of smart grid shift for distribution network, ongoing experimentations are lead on V2G, metering adapted to E-Mobility, charge management, synchronisation between EVs and Renewable Energy Sources.

