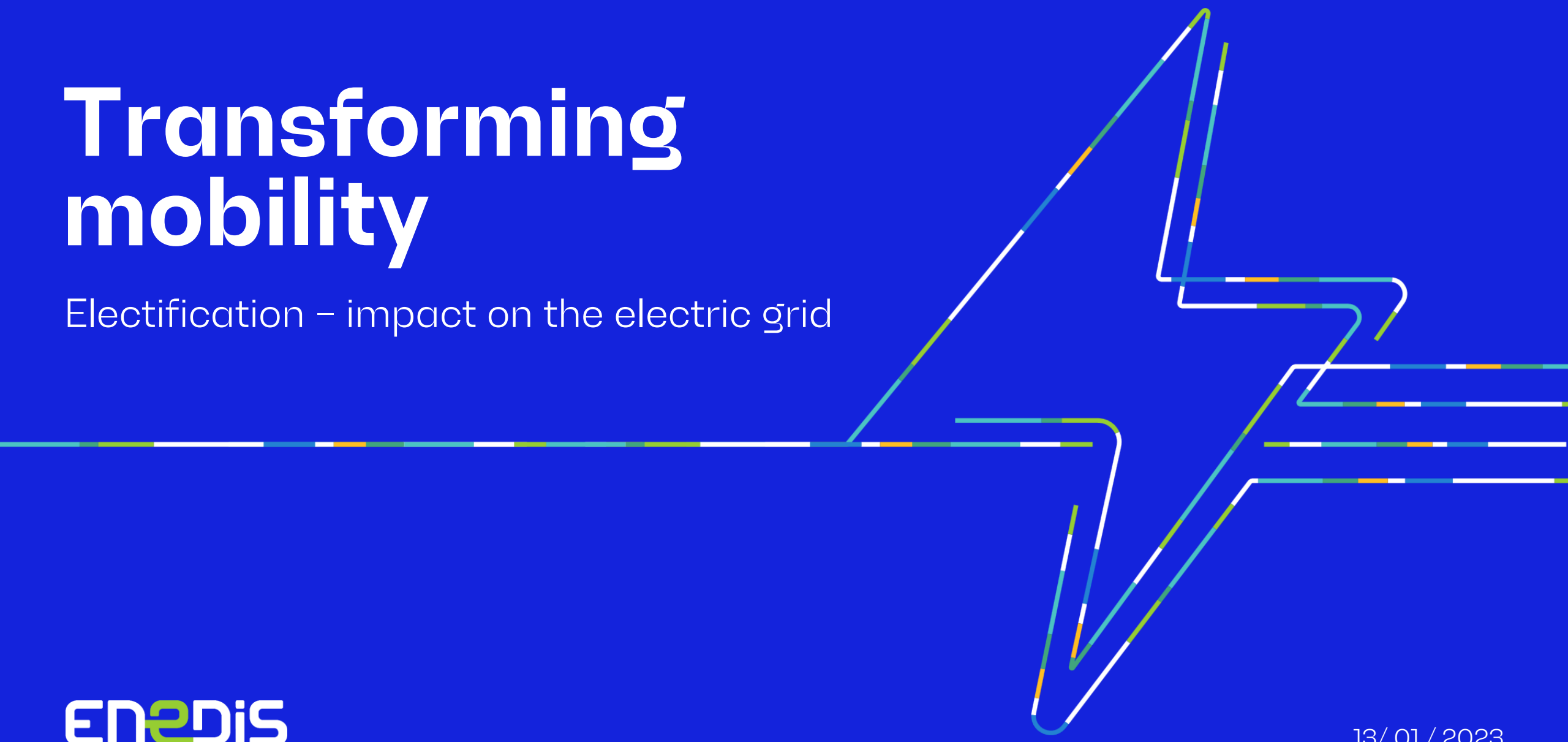


Transforming mobility

Electrification – impact on the electric grid





Introduction

- 1.1 The French electric system
- 1.2 The EV market took off in 2020
- 1.3 Auvergne figures




The role of Enedis for the large-scale deployment of electric mobility

- Introduction slide
- 2.1 Removing brakes
 - in collective residential
 - Speed charging on major roads and highways
 - Public domain and small towns
- 2.2 Public projects of territories



Electrification of companies fleets

- 3.1 Enedis fleet electrification



The impact of the transformation on the electric system

Introduction

—
Enedis in the French electric system
The EV market took off in 2020

Enedis in the French electric system

PRODUCTION
Activity in competition

TRANSPORTATION
A monopoly
Power lines of 400,000 V,
225,000, 90,000 and
63,000 V

LOCAL DISTRIBUTION
Monopoly - Power lines of
20,000 volts (medium
voltage) and 400 volts (low
voltage lines)
Enedis operates, maintains
and develops the local grid

Electricity SUPPLYING
Activity in competition



1.1 The DSO, a key public service player in the ecological transition

90% of renewable energy plants are connected to the local grid operated by Enedis

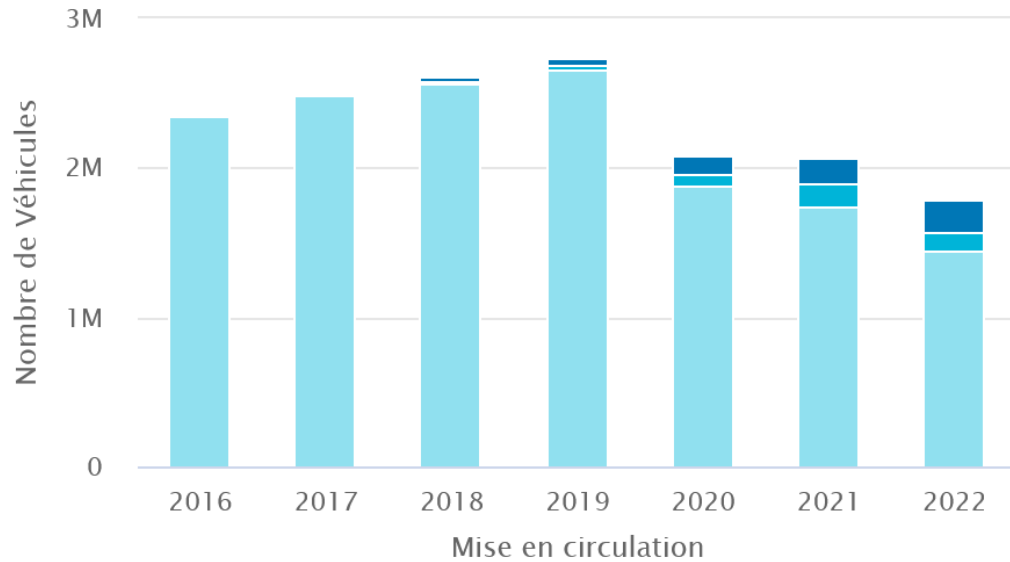
95% of electric vehicles (cars, bus ...) charging stations are connected to the local grid



1.2 The EV market took off in 2020

The year 2020 marked a turning point

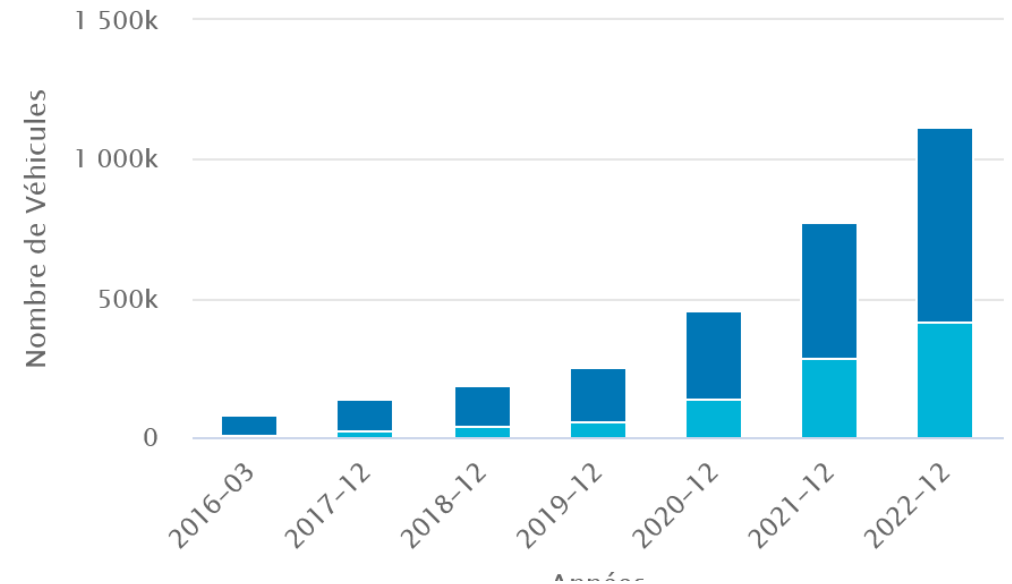
Parc VE, VHR, VT au 2022-12 réparti par année de première immatriculation



● VE Electric vehicle
● VHR Plug-in hybrid vehicle
● VT Combustion-powered vehicle

immatriculations	EV	PHV
2021	171 161	143 009
2022	218 868	127 778

Historique du parc de VE, VHR



1.2 The EV market perspectives

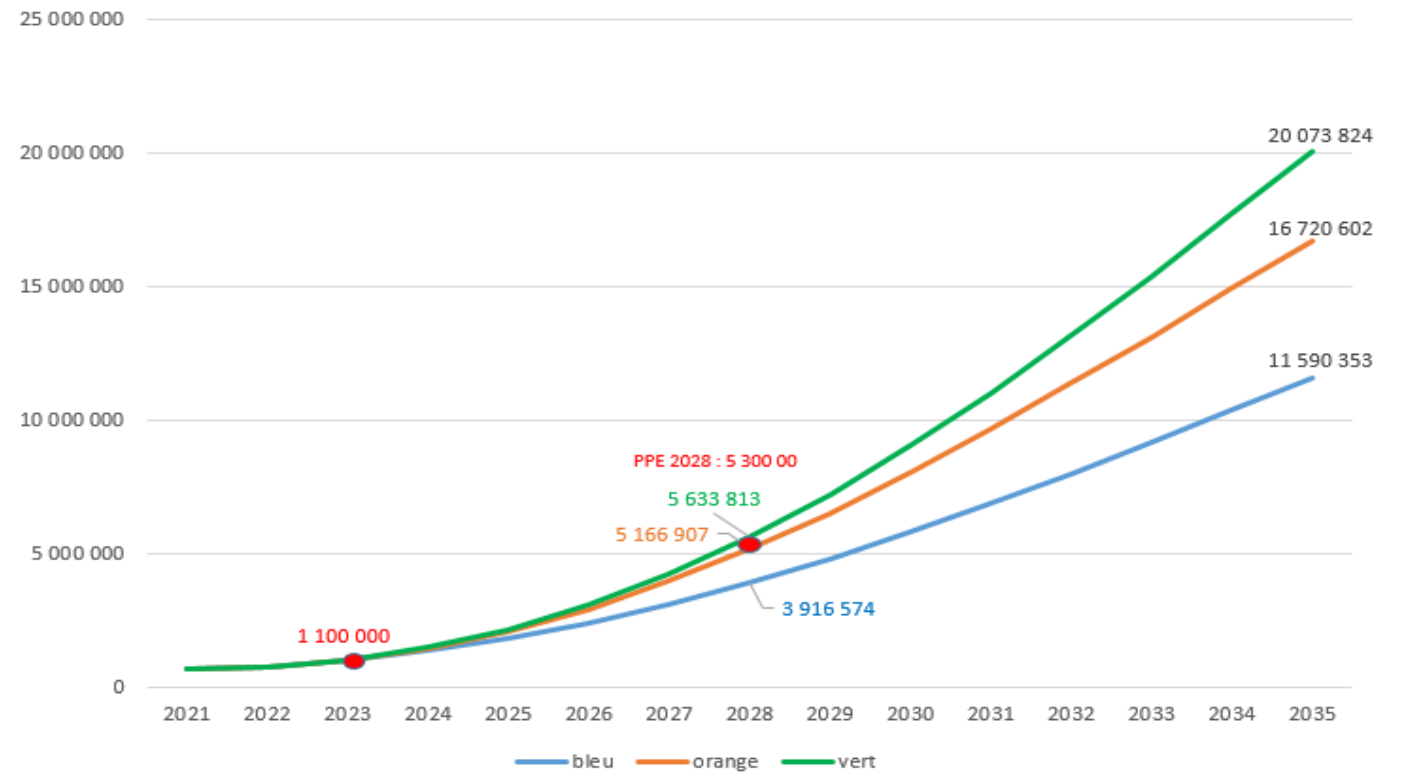
According to Enedis, considering the sales evolution,

17 million in 2035

electric and plug-in hybrid vehicles
in France
out of around 38 million light cars

2.2 million in AURA region

334 000 in AUVERGNE



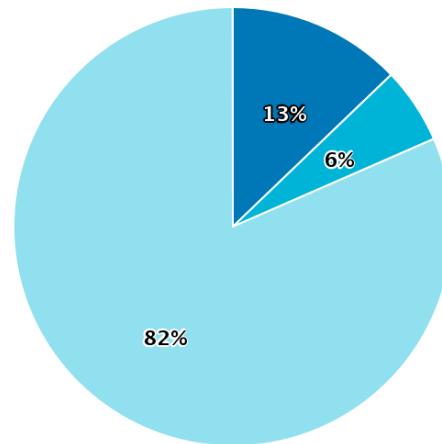
1.3 In Auvergne, the EV market took off also in 2020



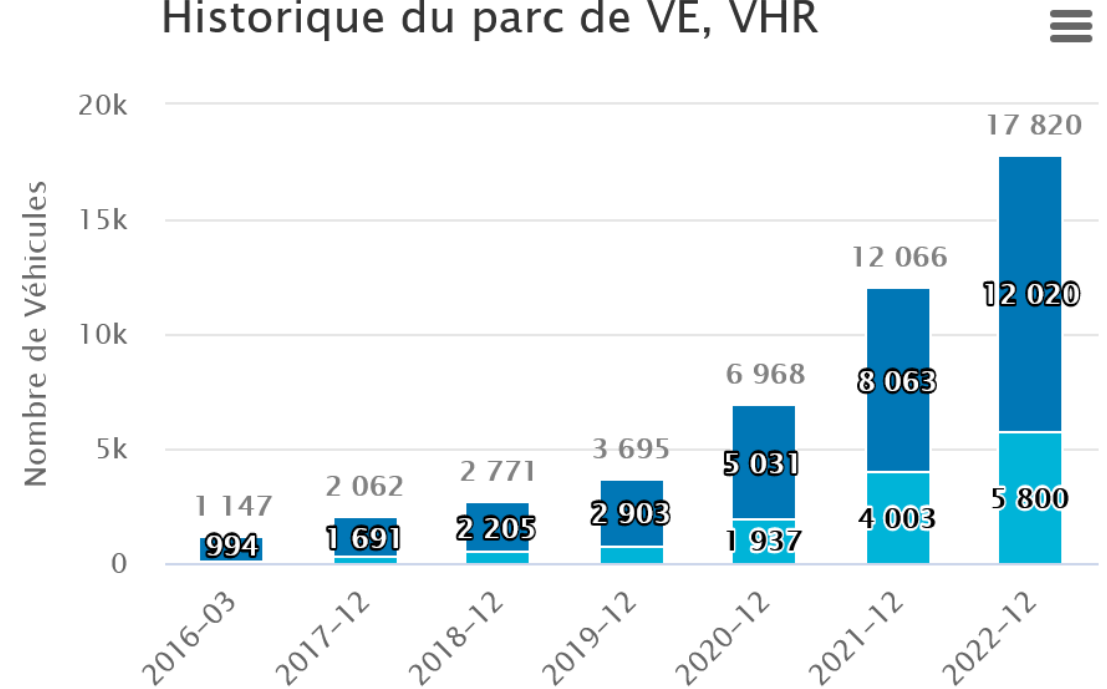
17 820

EV-PHV end of 22

19%

 of the Auvergne cars sales

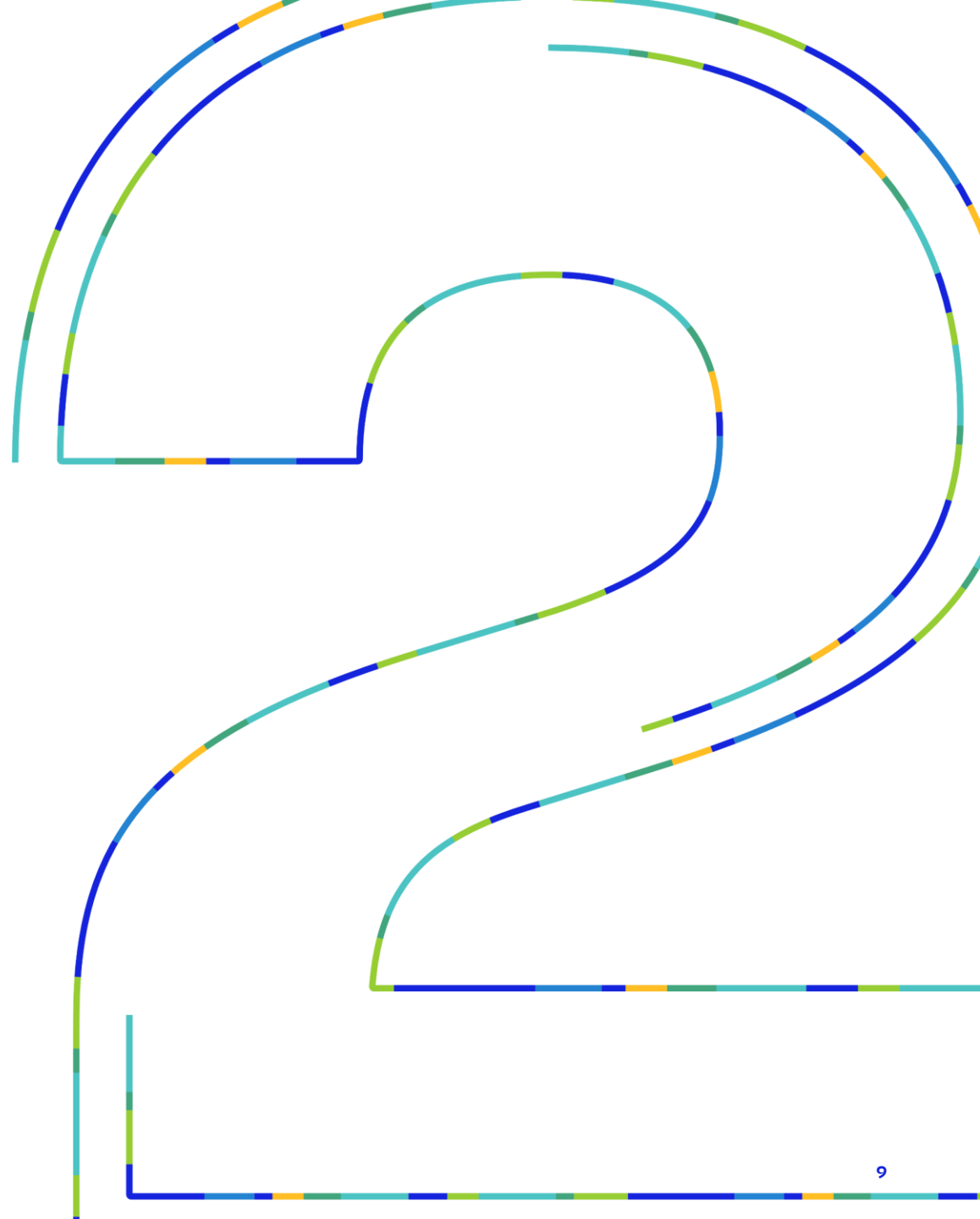
Historique du parc de VE, VHR



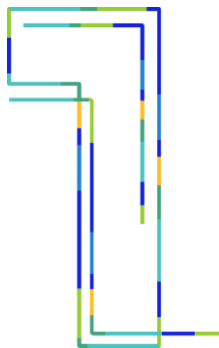
Pushing the electrification

The role of Enedis for a large-scale deployment of electric mobility in France

- Charging points
- Projects of territories



Enedis actions for the large-scale deployment of electric mobility in France



Removing brakes

Enedis supports, promotes and accelerates the large-scale deployment mobility in the region:

3 priorities :

Collective residential

Major roads and highways

Public domain in roads and small towns



Partner in all electric mobility projects in the territories

Enedis supports and works with the local authorities on their projects as :

Electrification of bus fleets : Vichy Co , CAM



Enedis prepares for the future

Enedis leads studies : Market perspectives, customer behavior and needs, networking sizing, ...

Enedis leads experiments, demonstrators for recharge control, V2G, coupling recharge and local renewable...



(no slide)

2.1 Removing brakes : collective residential



Enedis supports all stakeholders in order to equip buildings with charging points

Being able to recharge one's electric vehicle at home is a key factor for buying it
89% of EV buyers say they charge at home

Résidence Jaude-Foch

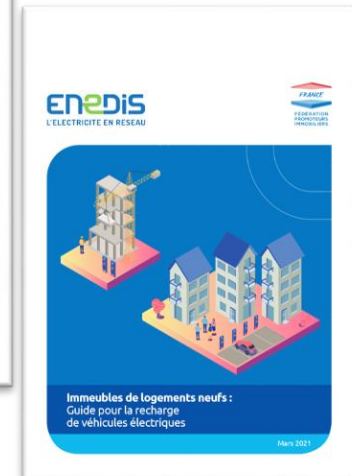
Down town Clermont-Ferrand, equipped since last year with individual metering for each charging point.

information, presentation of the technical solutions in owners assembly, instructions to their electrician for implanting the solution, orientation to the financial subsidies...

Information for real estate professionals

by Enedis and the AVERE

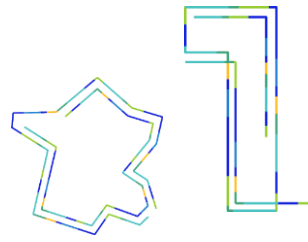
Webinars
Trainings
Documentation



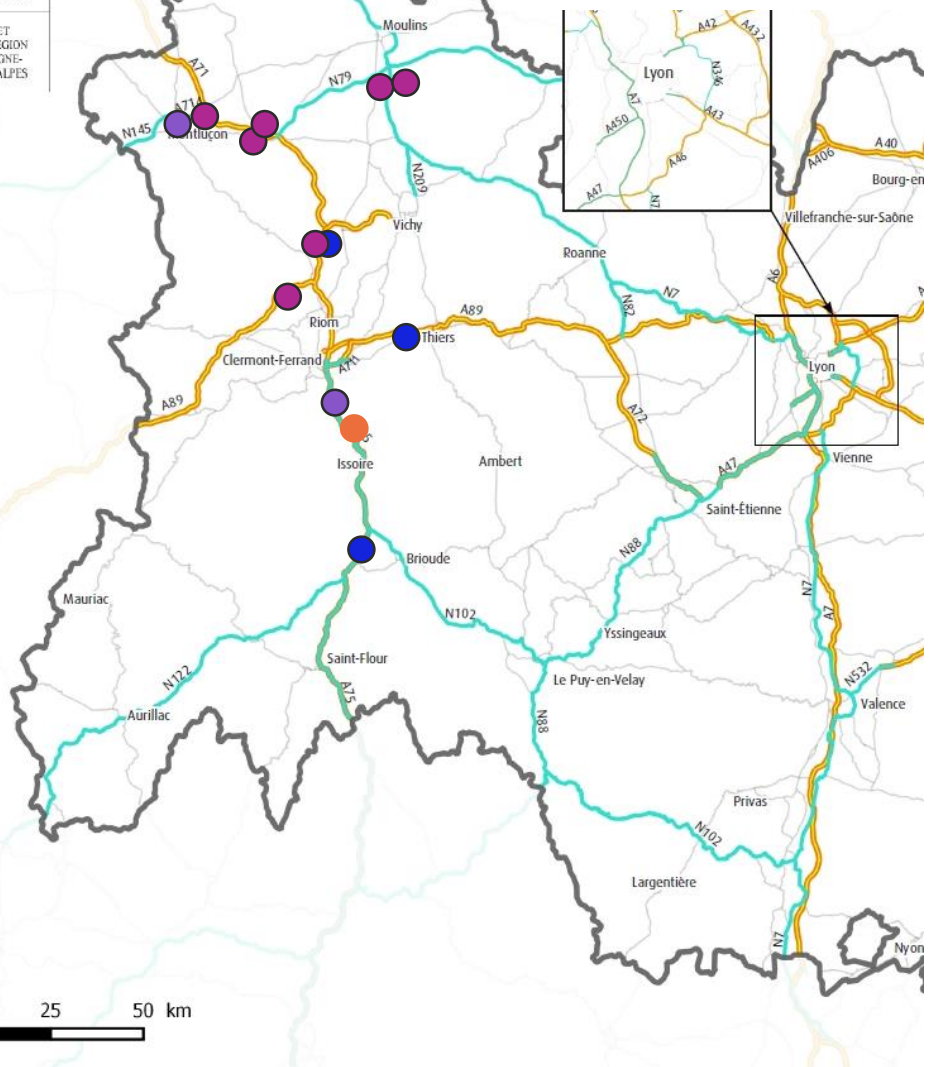
And incitation by law !

The law « Climat et résilience » provides for the pre-financing by the DSO of the « horizontal column », the internal grid ; so the flat owners have just to pay a quota, instead of the all cost

2.1 Removing brakes : for long-distance travels







10 highway service areas in Auvergne - around 400 in France



The deployment of high-powered infrastructures on highways is another key success factor

Enedis has made concrete proposals for adapting connection procedures in order to optimize lead times.

High-powered clients	Charging points created in 2022
   	APRR: 59 Engie: 24 Ionity: 16 Tesla France: 40 Total Energies: 48 Vinci Autoroute: 13

And we work with the supermarkets, hypermarkets operators ...



2.1 Private actors develop the offer in public car parks

E LECLERC in MOULINS example

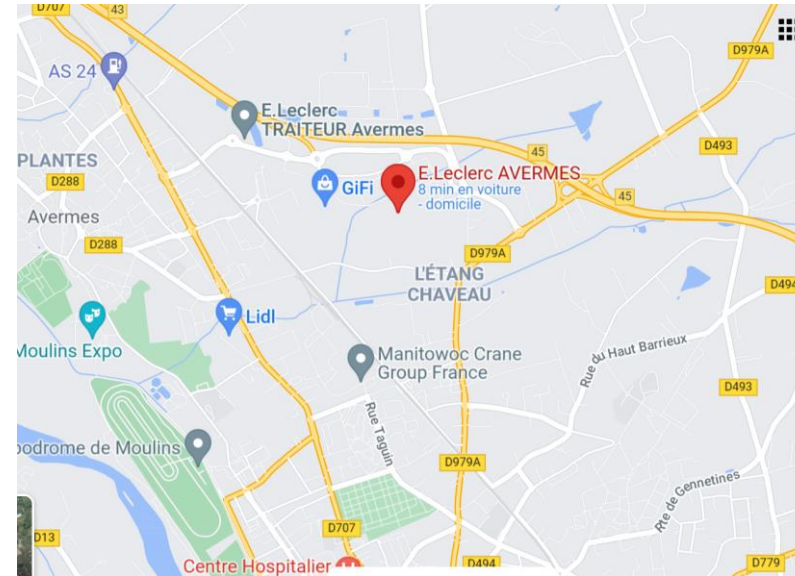
A parking of around 1.500 cars near a big roads crossing



4.2 MW photovoltaic installation

22.000 m² integrated into sundowners

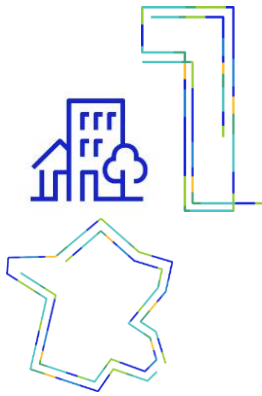
+ 69 public charging points



Publié le 04/10/2021 à 18h50



Des ombrières recouvrent désormais le parking du centre commercial Leclerc Les portes de Fallier à Avermes. © Philippe BIGARD



2.1 Removing brakes : public charging points in rurality with public actors



the French law LOM encourages local authorities to establish a master plan « schema directeur d'IRVE » to reach 100,000 charging stations open to the public

Enedis produces figures and perspectives to establish the local diagnostic with the local authority in charge of the public charging stations

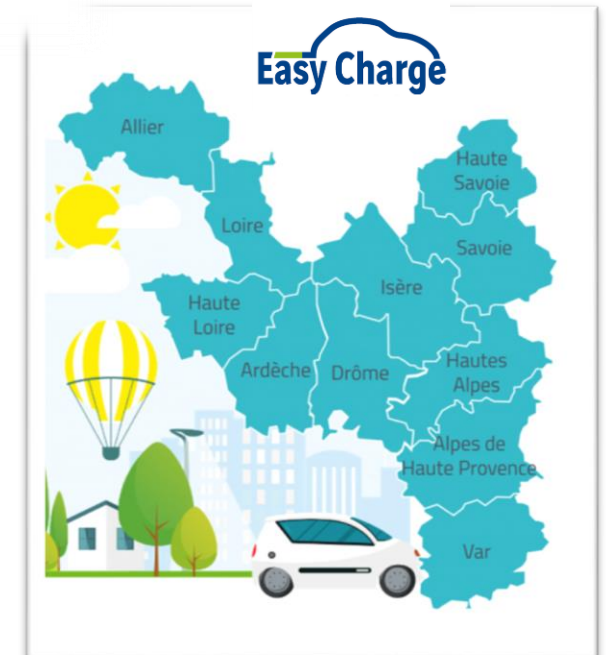
When the new charging stations need is estimated by the local authority, Enedis optimizes the impacts on the local public grid

Enedis connects the charging stations to the grid



To think bigger than Auvergne, local electric grid owners work together to establish a common local and global diagnostic, to cover local distance travels

Enedis work with them , in project mode



2.2 The DSO is a partner in all electric mobility projects in the territories

Case of Clermont metropole



2 lines of high level service bus « BHNS »

40 electric buses 27 kilometers

64 charging stations

in 2026

A peripheric line (no BHNS) should be later equipped with a hydrogen bus for an experimentation

Before the choice and the decision, collaboration with the local authorities : informations sharing...

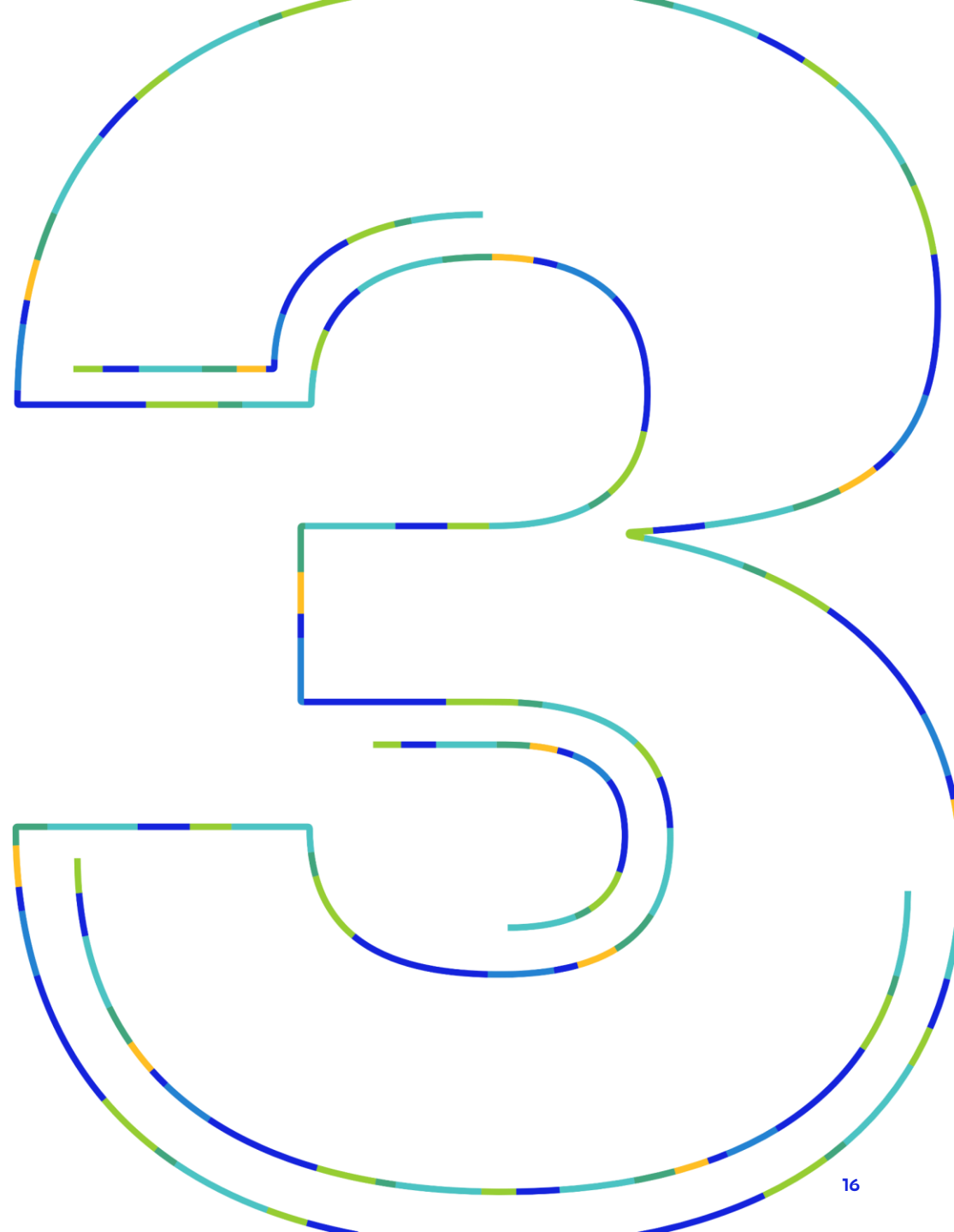
After the decision, studies of the impacts on the grid ; preparation works

And now,

40 M€ relocalisations and replacements of the local grid

Electrification of corporate fleets

—
Enedis fleet case



3.1 Electrification of Enedis fleet



Our ambition by 2030 : **100% of our light vehicles** are electric

70% of our light-duty vehicles

**In Auvergne, by 2024 : +100 elec.veh.
to reach 38% of our regional fleet**

Accompanying measures are numerous :

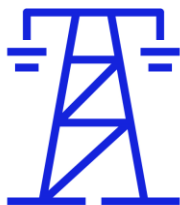
- Equipping our sites with charging stations
- Explaining to the staff the recharge
- Explaining the electric car driving particularities
- Testing the electric cars – testimonials of employees happy to drive an electric car
- We have introduced fleet greening in the profit-sharing criterias



The impact of electromobility on the electric system

—

We'll have enough electricity



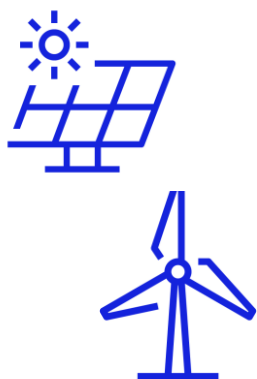
RTE is responsible for the supply-demand balance. RTE's vision is that **from 2030, France will produce more electricity that we need**, and so will export electricity to our neighbors as we oftenly do.

The electromobility has an impact on electric grids, but the impact is marginal compared to that of the development of renewable energies.

Clearly, the brake is on the side of charging station operators and the key issue of their profitability.

What about the winters ?

RTE said 2 years ago that in winters 22-23 and 23-24, we may have a demand-offer imbalance. Because of the necessary maintenance of nuclear plants programm, because of delays of wind plants, because of the high price of natural gas, those risks are real but just for those 2 winters.



In 2035, the electric production from nuclear, wind and solar plants should exceed our needs and France will export electricity as we've done past years. But we all have to accept the projects of new plants. If the projects remain projects, we'll lack electricity because of industry, transport, home heating decarbonation.

What is important too, is not how many electrons we use, but when we use it. EV Charging can be controlled as we do since decades for the domestic hot water production.

Smart charging ?



Enedis experiments concern :

- EV charging control , V to G,
- The use of datas and traffic patterns (light and heavy-duty vehicles)
- Energy metering...



But we already have something very simple and very useful !

➔ A simple hourly placement, as the devices on hot water heaters today, is enough to spread the charging so that this does not worsen the peaks of electricity consumption.

Charging our electric vehicles in off-peak hours while avoiding the 8:00-1:00 and 6:00-8:00 slots is therefore desirable in view of the constraints of the electrical system, but also for the user: automation at the charging station can take full advantage of specific supply offers.



**Thanks for your
attention**

ENEDIS

