LES ORRES 9 JANUARY 2023

Smart Mountain for tomorrow

19th OCOVA FORUM

DATA SHARING AND VALORISATION

Some lessons learned on the large-scale deployment of smart charging of electric vehicles in the aVEnir project

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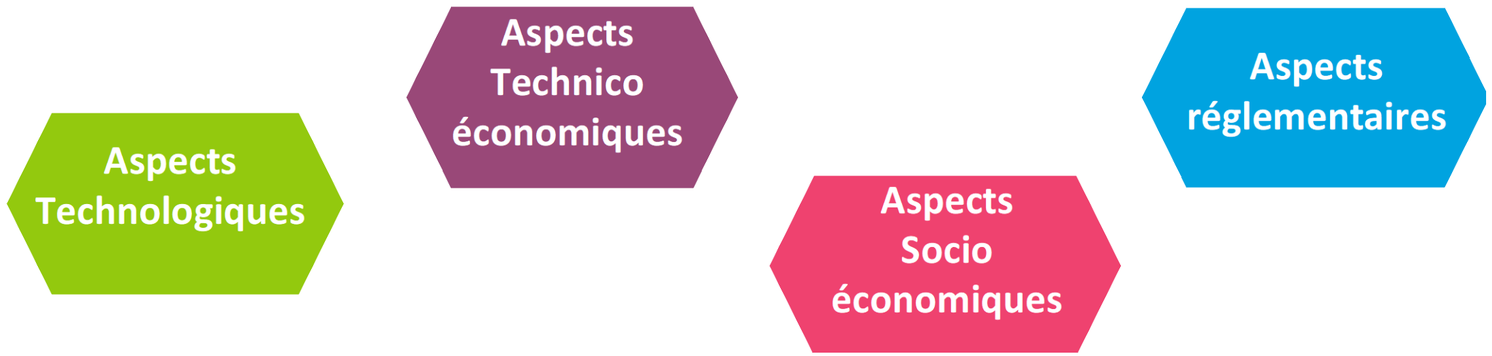
PROJECT ISSUES

- To support the large-scale development of electric mobility by experimenting, under real conditions, with the interactions between the public electricity distribution network, charging stations and electric vehicles.
- Test smart charging solutions to facilitate the integration of electric vehicles into the grid, evaluate the opportunities brought by electric vehicles for the management of local flexibilities on the electricity grid and integrate the acceptability of the solutions to users.
- Prepare the industrialisation of the tested solutions with a test of the economic and contractual models



CONSORTIUM OF 13 PARTNERS

ENEDIS L'ELECTRICITE EN RESEAU

Trialog

Aix*Marseille université Initiative d'excellence

UNIVERSITÉ Grenoble Alpes

Renault Group

STELLANTIS

Schneider Electric

TotalEnergies

Gireve

izivia GROUPE EDF

dreev GROUPE EDF

56

UN FINANCEMENT DU PIA, OPÉRÉ PAR L'ADEME

RÉPUBLIQUE FRANÇAISE
Liberté Égalité Fraternité

ADEME AGENCE DE LA TRANSITION ÉCOLOGIQUE

INVESTIR L'AVENIR

SOUTENU PAR LES PÔLES DE COMPÉTITIVITÉ TENERRDIS ET CAP ENERGIES

tenerrdis ENERGY CLUSTER

Capenergies

aVEnir

EXPERIMENTS IN REAL-LIFE CONDITIONS

Différentes solutions de pilotage de la recharge à la maille locale testées

- Moduler la puissance selon un signal réseau
- Faire appel au V2G pour répondre aux besoins locaux du réseau
- Faire appel à des agrégateurs de flexibilité
- Synchronisation entre production PV et recharge des VE

Des travaux d'analyse et data science

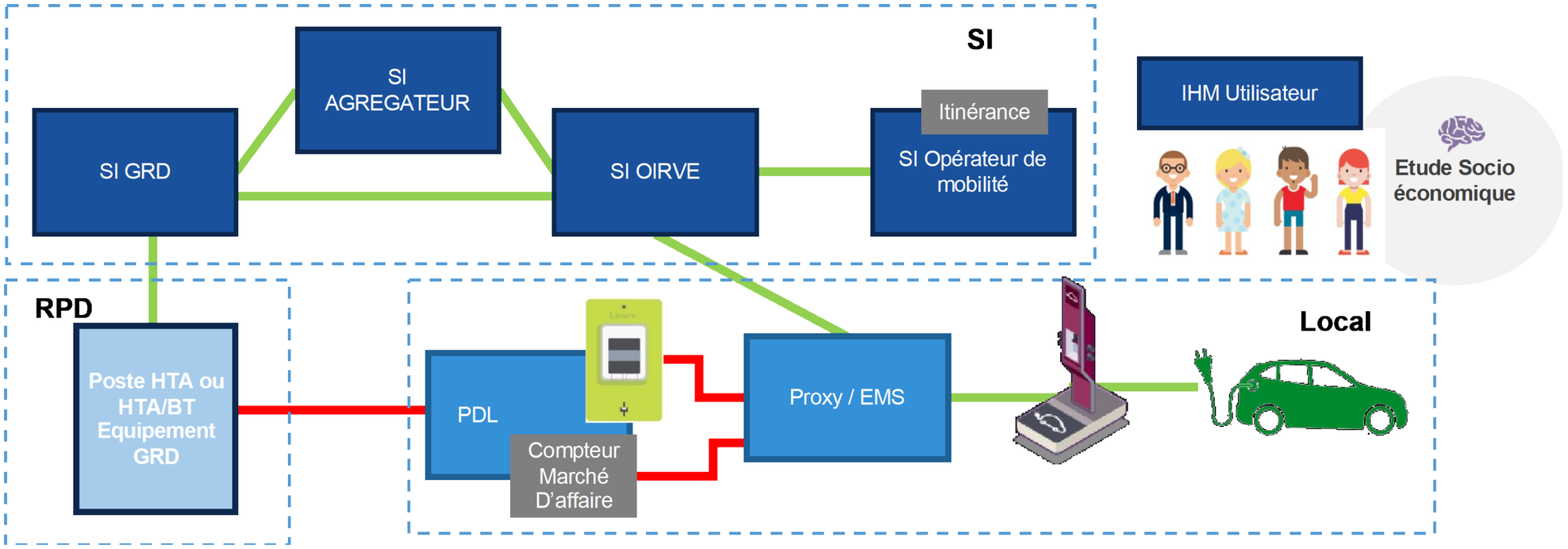
- Maîtriser la puissance de raccordement en aval du point de livraison
- Disposer d'une vision d'ensemble des recharges des VE, en prévisionnel et en temps réel

Des premières expérimentations en France métropolitaine avec test en conditions réelles des interactions entre GRD et opérateurs IRVE

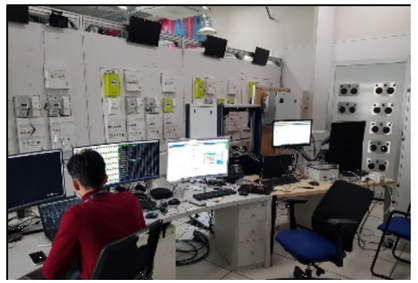
Des premières applications technologiques pour l'industrialisation de la filière

Des enquêtes et des retours des utilisateurs pour prendre en compte et valoriser l'UX

ARCHITECTURE TESTS



Test des solutions au Enedis Lab



SOME FIGURES

~10M€
Budget du projet
(sept 2019 – mai 2023)

~1,6M€
Financement ADEME dans la cadre du PIA

13 partenaires

3 chaînes de communication
- SI à SI
- Chaîne de comptage Linky
- Chaîne de comptage marché d'affaire

42 enquêtes
analysées, sur attitudes et comportement d'usage des utilisateurs

3 types de site étudiés
- Voirie publique
- Tertiaire
- Résidentiel collectif

~275 sites
~1650 points de charge
recrutés en France pour alimenter une plate-forme de données aVEnir

12 sites
qui font l'objet de tests en conditions réelles

aVEnir

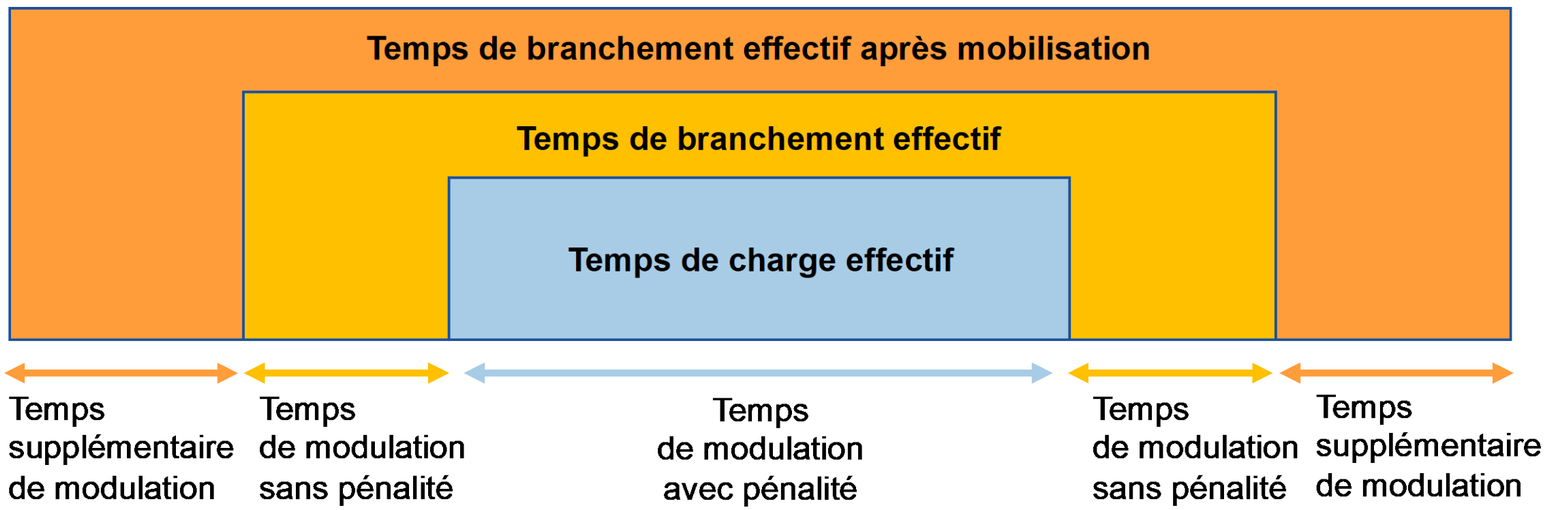
SMART CHARGING AND DATA (1/5)

Flexibility through modulation of charging power at different scales in withdrawal and/or injection.

- Requires a vehicle to be connected and communication established in order to achieve modulation
- Limits the energy drawn for a given duration or increases the charging time for a given energy

The flexibility potential available to meet the needs of the network depends on the :

- **Exploitable flexibility potential**: Number of connected vehicles
- **Mobilisable flexibility potential**: Number of vehicles that can be connected

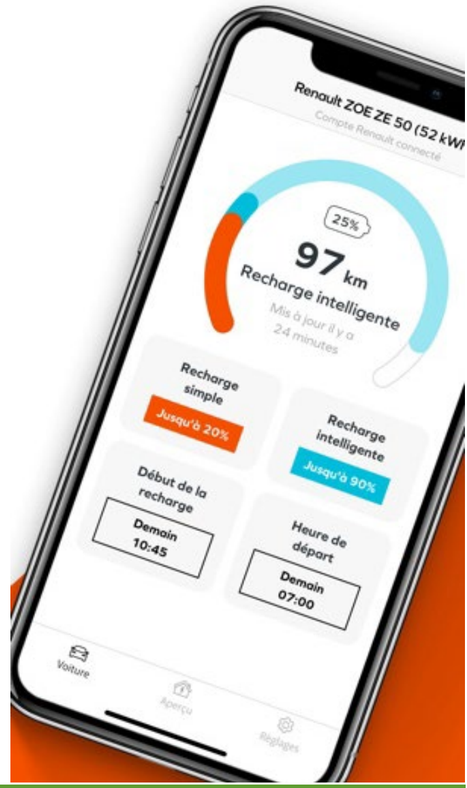


SMART CHARGING AND DATA (2/5)

Work on the "exploitable flexibility potential" and optimise the technical devices for coordinating recharging for a given number of connected EVs and network mesh

- Penalising" technical device that limits the SOC at the end of the charge
  - Use recharge data (power and duration) aggregated at different grid sizes
  - Determine the terms and level of any compensation in relation to the penalties

- Transparent" technical device that preserves the SOC at the end of the charge
  - Use off-load connection times from load data
  - Use the programming data for the start or end of charging (via an application for the vehicle or for the terminal)
  - Use the mobility needs declared by the user via a specific application to obtain the desired autonomy and the EV pick-up schedule

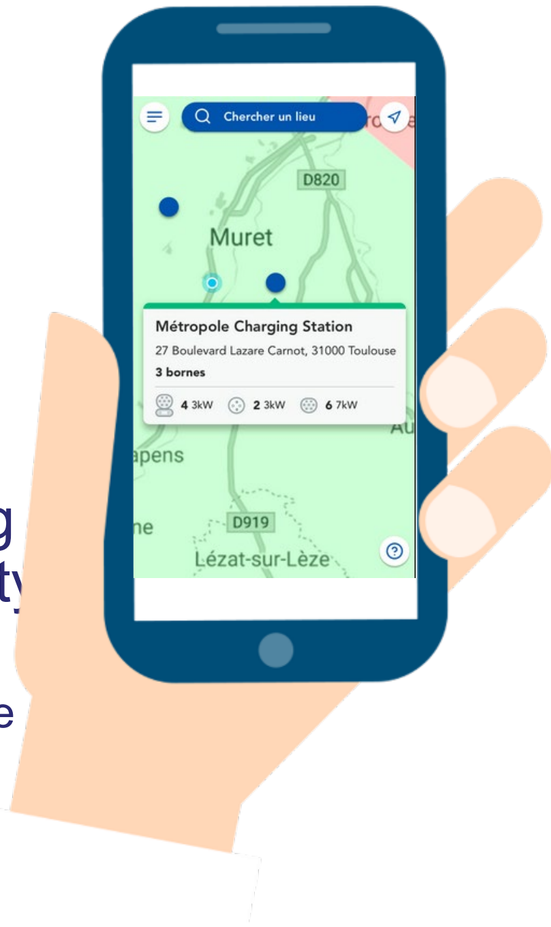


SMART CHARGING AND DATA (3/5)

Working on the potential for flexibility to be mobilised by behavioural devices to increase the potential for exploitable flexibility

- Negotiated behavioural device that requires a change in charging behaviour to optimise the number of EVs available at the most favourable times and places
  - Informing users in advance of flexibilities so that the EV can be made available
  - Incentivise users to make their EVs available through pricing and non-pricing schemes

- Adaptive behavioural device that increases the frequency of charging to optimise the SOC required at the end of the charge to meet mobility needs
  - Use driving data to estimate the SOC needed to ensure the mobility programme before the next load



SMART CHARGING AND DATA (4/5)

Using data to optimise flexibility devices

- The youth and segmentation of the ecosystem leads to data availability that limits the exploitation of the flexibility potential
- The distinction between "connection time" and "charging time" is difficult to make. Can be exploited from mobility operators.
- The geolocation issue does not allow for a linkage of EV data with data from the terminals/sockets
- Residential data is incomplete as few terminal control solutions are installed and the use of vehicle data is limited
- The coverage of data from charging stations limits the representativeness of observations and predictions (pricing, functionality of the sites, frequentation...)
- The autonomy needs (SOC) of users are poorly qualified and poorly known, which forces us to work on a limited flexibility potential.

SMART CHARGING AND DATA (5/5)

Using data to optimise flexibility devices

- Transformations in technology and the ecosystem are needed
  - The implementation of extended communication protocols between EVs and terminals could increase the available data and its quality (ISO 15-118 standard)
  - Systematizing the monitoring of recharging via the EV interfaces would allow for better knowledge and coverage of recharging, particularly at home.
  - The development of flexibility services would improve the knowledge of autonomy and flexibility needs (V2G, V2H...).

- The development of integration, coordination or interoperability of the different links in the value chain is an essential element in the establishment of an efficient data framework. The value of data depends in part on the business models deployed.

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THANK YOU FOR YOUR ATTENTION

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OCOVA ALPMEDNET

RÉGION SUD PROVENCE ALPES CÔTE D'AZUR

Hautes-Alpes le département

COMMUNAUTÉ DE COMMUNES SERRE-PONÇON

LES ORRES

CRÉDIT AGRICOLE