AN INDUSTRIAL SOLUTION OF DATA-SHARING ENABLING LECS

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ABSTRACT

The EU Clean Energy Package introduces the notion of Local Energy Communities (LECs). It aims to accelerate the energy transition by allowing consumers to engage directly in the active management of consumption and local production. The French law already enables the sharing of generation among customers connected to the same LV feeder. Industrial solutions had thus to be developed.

INTRODUCTION

Local energy communities can be an effective way of managing energy at the community level.
However, two questions arise :
- How to organize the interactions of energy community manager with the Distribution System Operator (DSO) ?
- How to organize the purchase and sale of electricity not covered by the production of the community on all organized markets either directly or through aggregators or suppliers ?

This paper presents the industrial solutions developed by the French DSO Enedis to answer the above questions of managing the local distribution loop and sharing information with market players.

ENEDIS PROPOSAL

Enedis proposal is based on clarification of the roles of energy manager and distribution system operator. It takes advantage of smart grid technologies and the data management infrastructure associated with the deployment of smart meters.

Enedis' industrial solution enables every consumer to :
- know its share of local production as agreed in the governance of the community project,
- be supplied, even in the absence of local production,
- sale the production surplus not consumed,
- be guaranteed of the quality of the power supply (voltage and frequency),
- receive reliable, certified data,
- be able to choose or to change the complement supplier.

Consistently with the governance agreed by the community, market players receive necessary information (in particular reconciliation of energy flows) for an effective commercial activity on the wholesale market.

COLLECTIVE SELF-CONSUMPTION

An example of implementation of the solution is presented for a community of individual houses bound by a self-consumption agreement.

1 - IMAGINE AND DEVELOP THE PROJECT

The homeowners collectively finance a photovoltaic unit to later share the production while procuring individually missing generation. They take advantage of the power produced locally in a collective self-consumption lifestyle.

MV/LV transformer
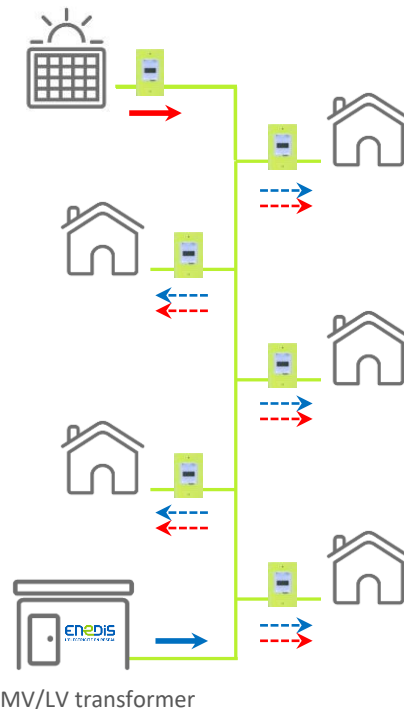
The project is developed through :
- the creation of a legal entity, contractually binding PV generator and consumers,
- the signature of a collective self-consumption contract between the legal entity and Enedis.

The collective self-consumption contract sets :
- the list of consumers involved in the operation.
- the practical details organizing the allocation (static or dynamic) of the generation between consumers.

Enedis proposes connection contract to the legal entity and adapts the grid to the expected consequences of the operation.

2 - NEAR REAL TIME MANAGEMENT OF LOCAL DISTRIBUTION LOOP

Enedis integrates in its management of the distribution system the anticipated consequences of the collective self-consumption operation and operates the grid in near real-time.
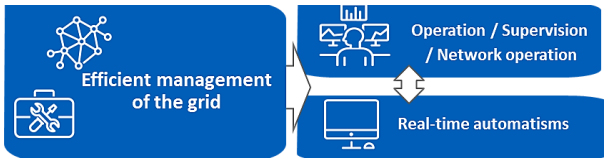
For medium voltage grid, different solutions will be industrialized by 2018 as advanced voltage regulation.
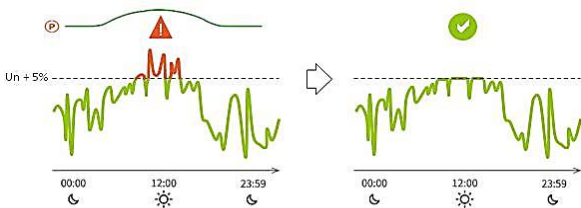
For the low-voltage grid, solutions are under development or in the testing phase.

3 - NEAR REAL-TIME METERING AND DATA MANAGEMENT

All B2B customers are recorded by smart-meters.

By the end of 2018, more than 40% of the B2C customers will be equipped with Linky smart-meters.


The information system associated to French smart-meters allows, at low marginal cost, creation of innovative services such as : synchronized reading, calculation of generation/consumption balances or provision of certified information.

For a collective self-consumption operation, Enedis' services are delivered through three steps that will be described successively.

STEP 1 : NEAR REAL TIME METERING AND DATA PROCESSING

Enedis counts and collects the electricity generation injected into the grid by the PV plant and the electricity consumption of each participant regardless generation sourcing.

These data organized into load curves are synchronous, today with an elementary step of 30 minutes.
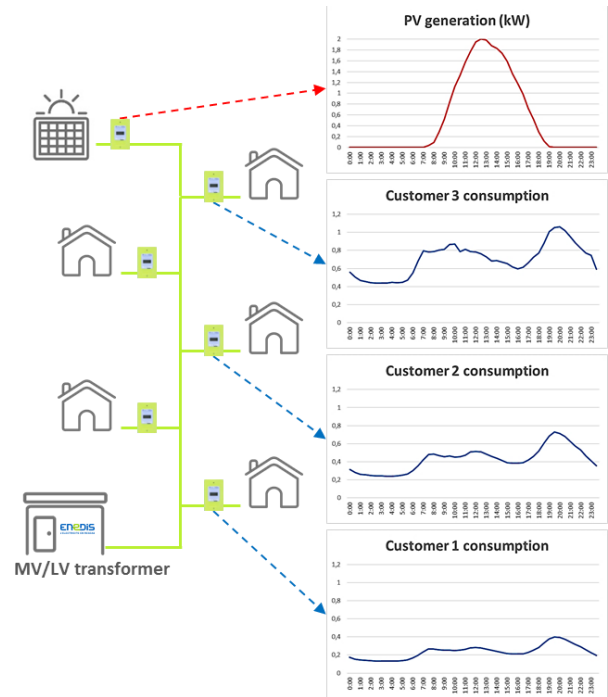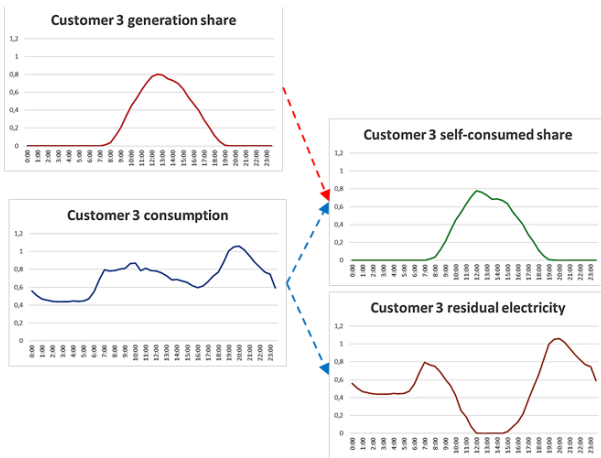

STEP 2 : PERIODIC CALCULATIONS

Enedis calculates the share of the production to be allocated to each participant according to the rules established by the self-consumption contract.
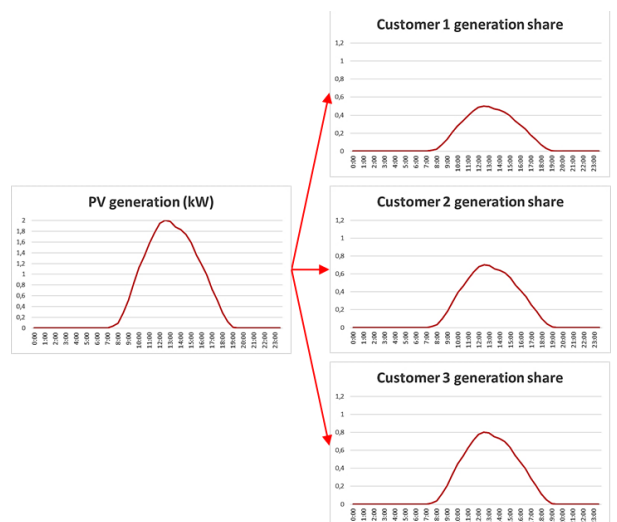
The share of electricity self-consumed by each participant corresponds to the share of the local production actually consumed at any moment.

The use of load curves allows simultaneous control of production and consumption.

Enedis calculates the collective surplus in accordance with the self-consumption contract.

In accordance with the French energy law, this surplus may either be sold by the legal person on the electricity market or transferred free of charge to the Distribution System Operator

STEP 3 : PERIODIC DATA PRODUCTION AND PUBLICATION

Enedis generates the necessary data for collective self-consumption :
 - the overall consumption of each occupant,
 - its share in the electricity self-consumed,
 - the supply of additional electricity.

Enedis provides these data to different stakeholders :
 - customers,
 - manager of the self-consumption operation,
 - residual electricity suppliers,
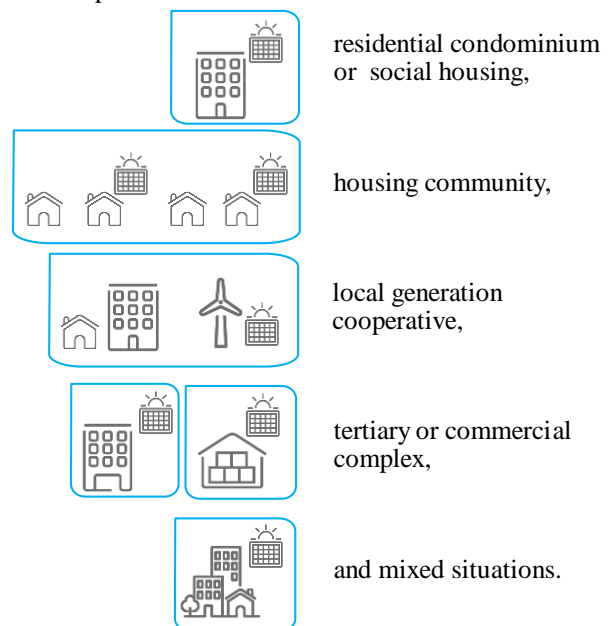 - balancing entities.
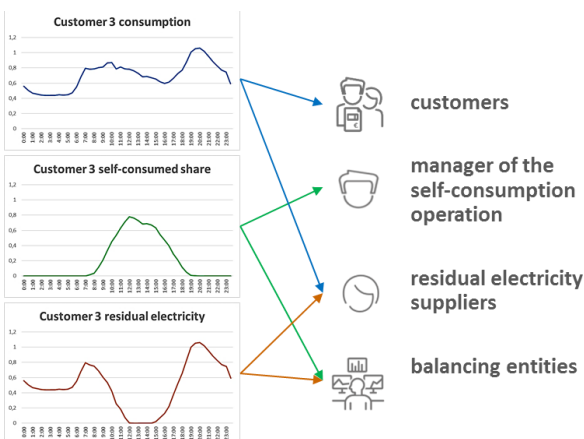
These data are used to :
 - bill the electricity transit through the network,
 - bill the residual electricity supplied,
 - apply taxes and contributions,
 - implement the balancing mechanism.

COLLECTIVE SELF-CONSUMPTION ENEDIS' INDUSTRIAL SOLUTION

Enedis' industrial solution enables active electricity grid management and the provision of certified data to project stakeholders.
It opens the way towards a broader range of services.

It can be adapted to different cases of collective self-consumption :

residential condominium or social housing,

housing community,

local generation cooperative,

tertiary or commercial complex,

and mixed situations.

FIRST COLLECTIVE SELF-CONSUMPTION OPERATION : GIRONDE HABITAT

The first collective self-consumption operation in France was commissioned at the end of 2017 in Bordeaux.

The residence "Les Souffleurs", of the social lodging Gironde Habitat, is a 60 housing building equipped with solar panels.

Since the beginning of 2018, all residents of this building are able to benefit from this local production and thus from a reduction of their rental charges.

Housing community collective self-consumption