ICE PROJECT OUTPUTS DESCRIPTION

CONNECTED OBJECT INFORMING ELECTRIC GRID STATUS

JULY 2020

ICE report OUTPUT 3:

Informative connected objects : Detailed Diplay

Background information

The island of Ushant consumes around 6 GWh of electricity annually, almost all produced by generator sets with internal combustion engines using fuel oil. The energy transition in Ouessant is underway and the SDEF has to date deployed three photovoltaic plants on the roofs of the gymnasium, technical workshops and the multipurpose room, for a total installed power of 94 kW. As part of the ICE project, the SABELLA company has installed a tidal turbine in the Fromveur passage which will develop a maximum power of 250 kW. These new means of electricity production significantly increase the island's renewable production, but are by definition intermittent. Knowledge of the state of the electrical network allows consumption to be adjusted to production.

As part of the ICE project and using the LoRa infrastructure deployed as part of the Finistère Smart Connect project of the SDEF, the current project aims to deploy informative connected objects to the inhabitants of the island of Ouessant.
These objects are intended to inform a large number of people of the state of the network (maximum power, renewable production rate on the island) through an easy to understand and educational signal in order to encourage them to shift their electricity consumption to more favorable times for grid management and for the integration of renewable energies.

SYSTEM/TECHNOLOCY SPECIFICATIONS

Detailed display: an object that presents more information for more informed consumers; it takes the inhabitant's consumption information via its Linky smart meter and displays it on a screen, and also displays a color according to a signal sent by the LoRa network. More precise information allows the user to quantify their impact.

The display will receive a signal to change color or not with different intervals, between every 10 minutes and every 60 minutes, transmitted by the LoRa network and transmitted by a control platform, and will retrieve the household consumption information in which it is installed, at a frequency sufficient for the consumer to understand the impacts of switching on / off appliances in their home.

For the recovery of household consumption data, a minimum frequency of 1 measurement per minute will be targeted. Consumption recovery should preferably be done through an element connected to the Linky meter via the TIC socket and transmitted by waves to the display (example with an ERL module - Linky Radio Transmitter). Individual consumption data will not necessarily be transmitted in LoRa. The consumption information will be displayed on the display screen.

To simplify, the indications will be representative of the following situations:
• Green: high renewable production and low consumption
• White: neutral situation
• Yellow: consumption to be limited because low renewable production
• Red: low renewable production and high consumption

Exemple of the look of detailed display

The object's power supply will be via a mains connection.

ANTICIPATED AND/OR RECORDED IMPACTS/ BENEFITS

The impacts of this objects are based on two aspects:

1) The main objective is to inform to population to the status of the grid. The expected benefits is to raise awareness among the population about the energy consumption-production of the island. The information from the household's consumption could also increase the perception of inhabitants regarding their own consumption.

2) The second objective is to be provide a level of adaptability for the microgrid, based on volunteer action. In the case of a wide access of this object to the population, this could represent at most a potential adaptability of 500 times the power consumption of washing machine, oven… (2kW each), which would result in a 1 to 2 MW adaptability capacity.

ANTICIPATED AND/OR RECORDED CHALLENGES

One main challenge of this solution is that it is based on volunteer action, which do not ensure a real response in consumption shift.
Moreover, when the object displays a red signal, the shift effectively produced would not be made by everyone:
First of all, because people need to cook or use their machines when they can, which is by definition when they are at home, when the consumption is high.