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ICE PROJECT OUTPUTS REALIZED

CONNECTED OBJECT INFORMING ELECTRIC GRID STATUS – DETAILES DISPLAY

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BRETAGNE DÉVELOPPEMENT INNOVATION
SDEF
TECHNOPÔLE BREST-IROISE
Technopole Quimper-Cornouaille
PÔLE MER
UNIVERSITY OF EXETER
PLYMOUTH UNIVERSITY
UEA University of East Anglia
marine

ICE report OUTPUT Realized:

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.

The display (A, in figure below) receives a signal to change color every 15min (if needed), transmitted by the LoRa network and transmitted by a supervision platform. It also displays the household consumption information in which it is installed, with a refresh time below 10sec.

The recovery of household consumption data is done through an element (B, in figure below) connected to the Linky meter via the TIC socket (C, in figure below) which transmits data using the local wifi network. The consumption information are displayed on the display screen, with the instant power demand (in kW), and the daily energy consumed of the 3 last days.

To simplify, the indications are representative of the following situations:
• Green: high renewable production and low consumption
• White: neutral situation
• Yellow: low renewable production or high consumption
• Red: low renewable production and high consumption

The object's power supply is done using a power socket and USB type C – USB 3.0 cable.
Moreover, there is a small battery in the object, in order to allow the user to carry the object for few minutes and to test different electric devices in the house, in order to see the changes in power demand and therefore better understand their impact.

Figure 1 : Photos of the display (A), the data gathering module (B), and the module installed on the Linky Smart-meter (C)

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 provide a level of adaptability for the microgrid, based on volunteer action, in parallel with the Linky smart meter capabilities. In the case of a wide access of this object to the population (assuming 200-300 houses equipped over the 500) , this could represent a "controllable" power ranging from dozens of kW up to hundred of kW. Considering this is the result of a voluntary action which will decrease momentarily the comfort of inhabitants (no oven, no washing machine…)

ANTICIPATED AND/OR RECORDED CHALLENGES

One main challenge of this solution is that it is based on volunteer action. As a result, it is first difficult to involve people in the experimentation. So far 40 objects have been distributed (over 80 planned). Secondly, the volunteer action do not ensure a real response in consumption shift for people having the object, lowering the effectiveness of the signal action.
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.
Moreover, a second challenge will be to quantify the impact of the object on the general consciousness of the Ushant's population.

Another challenges is the requirement of local WIFI one hand, and a close proximity of the internet bax and the Linky Smart-meter, in order to allow the connect the display to the additional module. Unfortunately, in some houses, the Linky smart meters are too far, or the thickness of the wall, moreover in granit, which prevent the ability to transmit data from the Linky toward the display.