



**Interreg**



France ( Channel Manche ) England

**ICE PROJECT OUTPUTS DESCRIPTION**  
**CONNECTED OBJECT INFORMING ELECTRIC**  
**GRID STATUS : COLOR INDICATOR**

*JULY 2021*



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# ICE report OUTPUT x:

*Informative connected objects : Colored Indicator*

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## 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/TECHNOLOGY SPECIFICATIONS

The colored indicator: simple and educational object that changes color according to a signal sent by the LoRa network.

This object is able to display 4 different colors representing different states of the network. The color change is made when an indicator, calculated from information provided by EDF (local electric producer), which currently manages electricity production on the island, reaches certain thresholds.

To simplify, the indications will be 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





Figure 1 : Photos of the four states the color indicator

The display 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 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.

The online supervision regroups the historic of the color indicator (figure 2), as well as the possibility to update the message accompanying the color (figure 3).

## Historiques de l'indicateur ORB

### saison intermédiaire

08/09/2021 au 14/09/2021

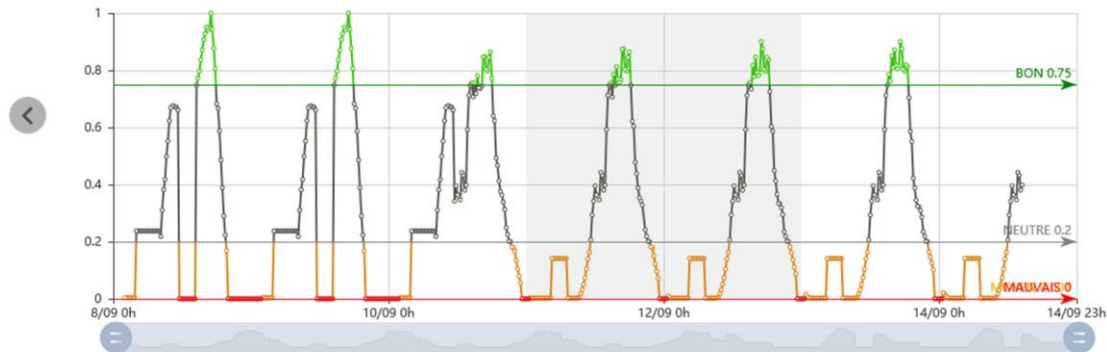


Figure 2 : History of the color indicator for 1 week

## Messages des états de la grille affichés sur les boitiers

Le texte saisi sera affiché sur les boitiers lorsqu'un état sera actif

<b>BON</b>	Production renouvelable forte	29 / 30
NEUTRE	Etat normal	11 / 30
<b>MOYEN</b>	Forte conso/Peu renouvelable	28 / 30
<b>MAUVAIS</b>	Forte conso + pas renouvelable	30 / 30
INACTIF	En attente de données	21 / 30

Figure 3 : Tunable messages sent alongside with the color using the LoRa network (30 characters max)

## 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.
- 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...)

- 3) The main advantage of this color indicator is that it only relies on the LoRa network to communicate with the population. In other words, this object could easily be deployed in areas with low or no high technology communication network (e.g. internet, phone network...)

#### 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.

