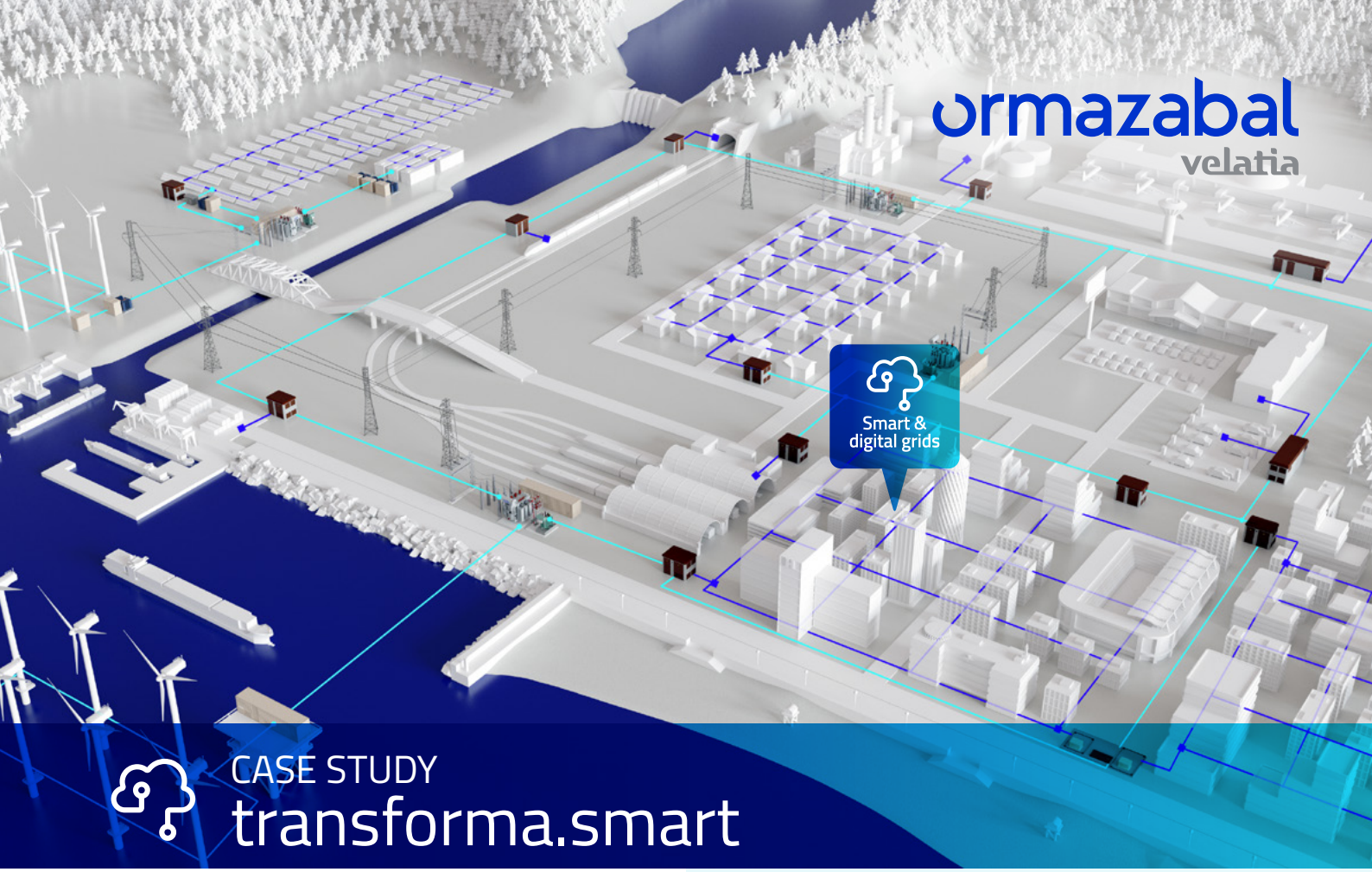


CASE STUDY

transforma.smart

Challenge

The irruption of the renewables energies sources, electric vehicle and the emergence of new private customers are affecting the low voltage grid, causing overvoltages and undervoltages. Furthermore, an additional complication of the low voltage grid is the inherent unbalance present across phases due to typical high percentage of single-phase consumers and uncoordinated loading.

It is necesary to keep the system stability, so **voltage regulation is seen as a key enabler for the integration of low carbon technologies in the LV distribution grid**.

Solution

transforma.smart is a transformer solution which integrates an on-load tap changer (OLTC) to allow voltage regulation. It can operate in remote control mode, via external remote communications, or in automatic mode regulating the LV voltage to a configured target voltage set-point and rapid/slow operation bands.

Features

- Remote control operation
- Scalable solution
- Real-time monitoring
- Automatic mode LV voltage regulating



Project
Ormazabal - GSGIH

The project was launched by Iberdrola Global Smart Grid Innovation Hub (GSGIH). The GSGIH is a global innovation and knowledge centre that aims to be a world reference in smart grids responding to the challenges of the energy transition.

This project included the installation of several **transforma.smart** solutions in different distribution transformers substations of the i-DE electrical network. In these cases, the installed equipment was certified to Iberdrola's i-Trafo specification.

One of these installations was a 630 kVA urban transformer substation located in Bilbao, Spain, where **transforma.smart** could adjust the low voltage so that the downstream feeder voltages can be maintained within statutory limits without the need of a conventional grid reinforcement.

Once the voltage set point was identified and the optimal OLTC configuration was determinated, data was collected to asses the **transforma.smart** performance and the grid status:

- Automatic voltage controller behaviour
- Overvoltage analysis
- Undervoltage analysis
- Dynamical voltage set point



producto desarrollado en GSG INNOVATION HUB | Iberdrola

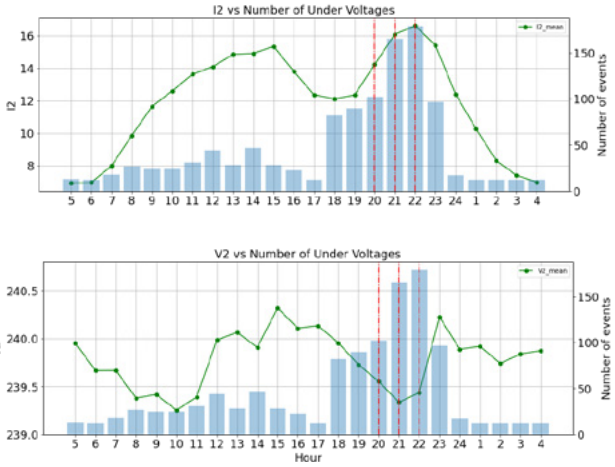
Conclusions

There were undervoltage events in the hours of greatest consumption which also coincided with those of lower voltage.

Futhermore, the overvoltage events were strongly linked to high voltages at the transformer substation and to weekend periods. So, there also seemed to be a direct relationship with voltage and load imbalances and current flowing through the neutral.

Therefore, the actions to be carried out would be:

- Reducing load unbalances whenever possible
- Using dynamic voltage setpoint
- Minimising voltage congestion



Benefits

transforma.smart is an essential element for the distribution grid:

- **Efficiency**
- **Flexibility**
- **Reliability**

It maximises the integration of renewable energies and electric mobility

More info

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