BUSINESS & ACADEMIA CASE STUDY

Imperial College London

Assessing the potential for meshing LV networks through power electronics

Various Locations

Background

Given the unpredictability and high variability of solar photovoltaic and electric vehicles, low voltage (LV) networks will quickly become saturated. However, congestion will concentrate around particular substations or feeders, leading to increased energy losses, overheating of key assets and power cuts.

In line with this, this study aims to assess the advantages of incorporating power electronics to mesh LV networks and to compare the benefits against normal network reconfiguration.

The OpenLV project will provide invaluable data to assess the state of these networks and it will help evaluate what information is useful when deciding which networks to mesh and when.

What is the challenge?

LV networks are extensive and have a complex topology, which makes it hard to model them accurately and makes autonomous meshing challenging. The lack of information about the loading state of the individual components of the network makes it difficult to implement any type of autonomous meshing.

What is the proposed solution and how is OpenLV enabling it?

A combination of strategically-located monitoring devices, smart meters and algorithms could help increase the observability of LV networks and enable the control of smart solutions such as power electronics.

Data coming from the OpenLV project makes possible the analysis of these solutions in real networks by giving an accurate estimate of the loading state of secondary substations and LV feeders, as well as highlighting any potential balancing opportunity. It also serves as a benchmark by allowing the comparison to theoretical models.

Ultimately, the findings of this study will support the development of new solutions to manage LV networks more efficiently and allow the connection of higher amounts of both photovoltaic generators and electric vehicles.