

Customer

Enemalta is the leading energy service provider in the Maltese Islands, entrusted with the distribution of electricity, and the development of the national electricity distribution network. Electricity is sourced from a central Power Station (Delimara), a Malta-Italy Interconnector (Magħtab) and from several grid-connected renewable energy sources. The 50Hz electrical network consists of five voltage levels, 220kV, 132kV, 33kV, 11kV and 400/230V. A 100km, 220kV submarine cable links Malta to Italy and an additional 20km, 220kV underground cable is required in Malta. The underground cable lengths forming the network are as follows: 90km of 132kV; 340km of 33kV (13km of 33kV submarine cables), 1,245km of 11kV and nearly 2000km of 400V. The 11kV secondary substations, step down the voltage level to 400/230V to supply residences, businesses and other buildings.

Applications

The main aim was the correction of the LV feeders which were experiencing difficulties to keep the voltage levels according to EN50160, that is, the supply voltage must remain within the range of $\pm 10\%$ of the nominal voltage. Parts of the LV network was experiencing periods of overvoltage due to reverse power flow caused by excess PV generation. However, in certain cases it was also required to regulate undervoltages due to large voltage drops resulting from long distribution lines or heavy loads.

Technical Solution A. Eberle

The LVRSys is an active online voltage regulator which is connected in series with the desired section of the LV feeder. Some three phase LV feeders had unequal loading of the phases resulting in a voltage unbalance. The LVRSys regulator can step up or step down the voltage of each phase individually thus resolving the also unbalance issue apart from rises and drops in voltage.

The systems implemented were set for basic operation, where only two controller parameters were set by the user: (1) set point voltage, and (2) tolerance band. The controller will start to act as soon the input voltage deviates out of the tolerance band set and will remain in standby mode otherwise.

The LVRSys was set to decrease the voltage rise during periods of reverse power flow (excess PV generation) and to boost the voltage on feeders which were experiencing drops.

Customer Feedback

LVRSys systems have been installed in Malta since 2018 and vary in rating (30kVA to 250kVA). They are of the single and three phase type. Most types are ground mounted and a few systems are of the pole mounted type. The LVRSys have solved many problems of over and under voltage variations at different parts of the LV Maltese network.

Installations: **24 LVRSys installations**
Customer: **DSO**
Country: **Malta**
Date: **2022**



LVR Sys – Installations at Enemalta

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