

This contribution presents an innovative for supplying (backup power) of secondary systems in remote substations, providing security, reliability and sustainability, bringing even less environmental impact. In order to replace diesel generators for backup power, the suggested system (Figure 1) combines energy storage technologies (BESS) and renewable energy sources (photovoltaic solar panels, PV).

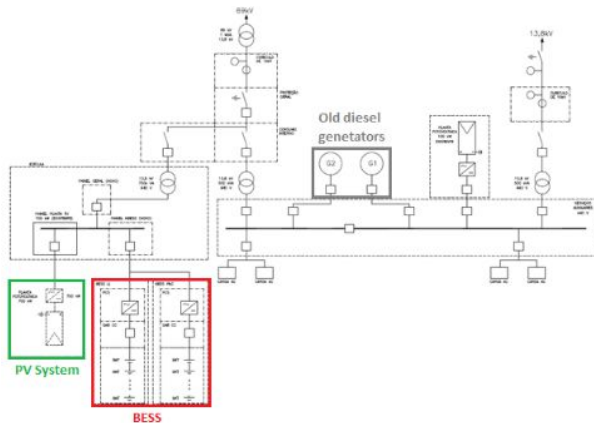


Figure 1

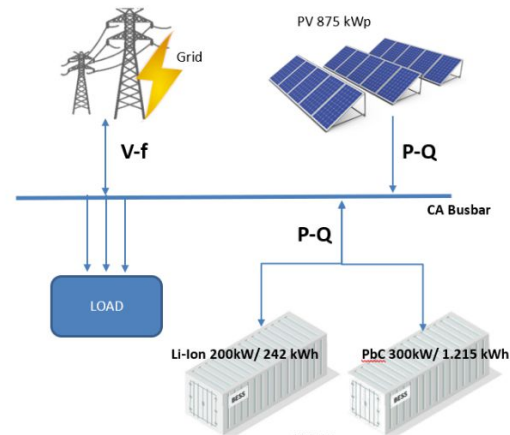


Figure 2

Table 1 summarizes the main characteristics of the proposed system.

Characteristics	Value
Solar PV (kWp)	875
BESS (kW/kWh)	200/242 Li-Ion + 300/1.215 PbC
Maximum Operating Time (BESS)	12h (2,4h + 9,6h)
Diesel Generators (replace)	2x 225 kVA

The proposed system is being installed at a Messias 500/230 kV substation through a Research and Development Program of the Brazilian Regulatory Agency (ANEEL). The Messias substation is located close to the Maceio, in the state of Alagoas (Northeast of Brazil) and was constructed more than 25 years ago. Power for secondary services is provided through lengthy and unreliable rural feeders (13.8 kV) and backup power is supplied through diesel generators. The substation is part of Chesf, the largest utility for power generation and transmission in northeastern Brazil. The substation has a total electrical capacity of 1800 MVA. Their primary duty is to supply the state of Alagoas, including certain industrial customers. The PV system has been working since June/22 and BESS system will come into operation by July/23. The complete system is shown in Figure 2.

Conclusions

A pilot project was presented as an alternative for back-up power operation where diesel generation sets are commonly used in substation secondary systems (especially for remote substations). With the system proposed, there is a chance to greatly lessen the environmental impact of a system with diesel generators, as well as to fulfill emission targets within a predetermined benchmark and to employ recycled materials and renewable energy sources as part of production processes.