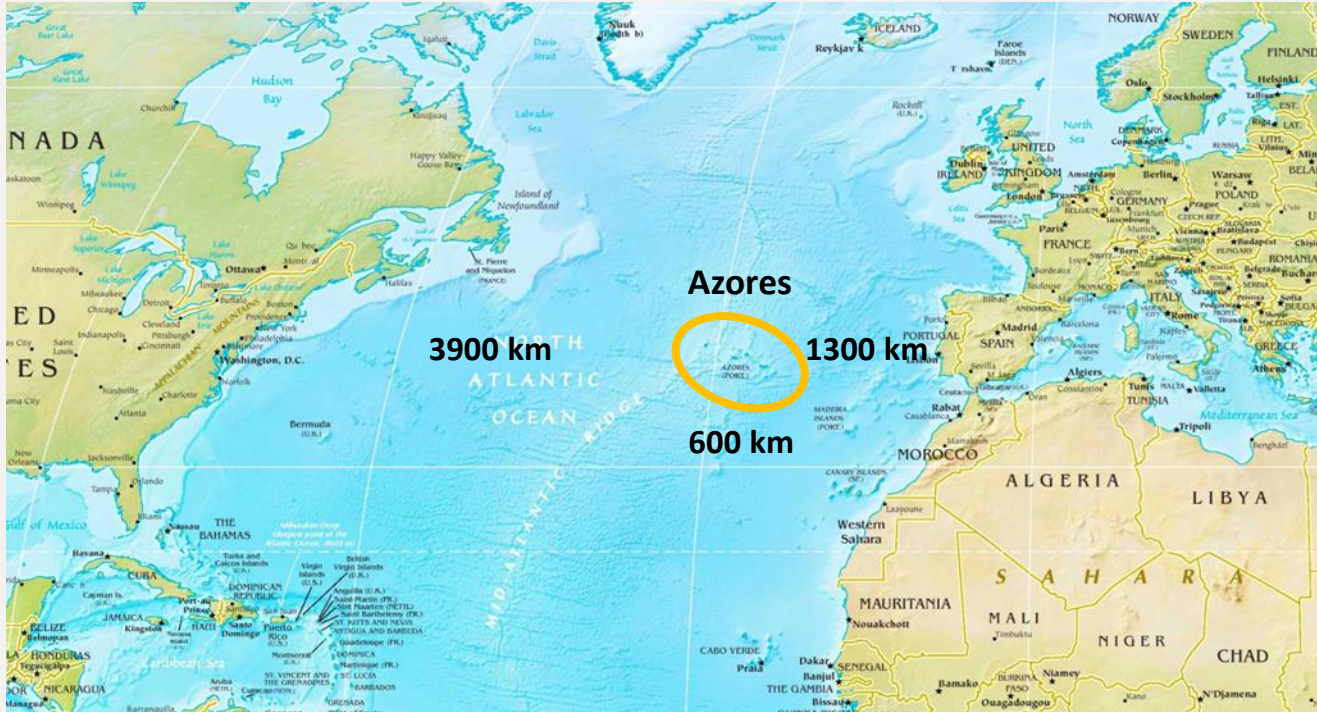


# BESS Projects in Azores

10 nov 2023



# Azores Archipelago



Corvo  
Flores

Graciosa  
S. Jorge  
Faial  
Pico  
Terceira  
S. Miguel  
Sta. Maria

Area : 2.322 km<sup>2</sup>  
Population : 236.440 inhab.  
Costumers: 129.157 clients  
Demand : 808,5 GWh

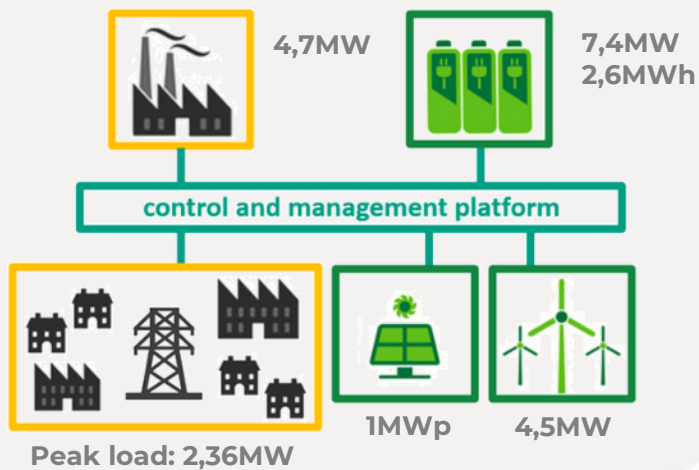
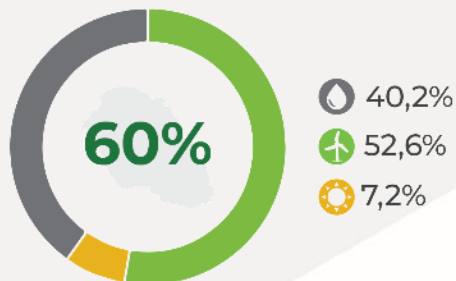
nine small independent electrical systems, without the capacity of exporting or importing renewable energy

electric interconnections between islands are expensive and not yet economically feasible

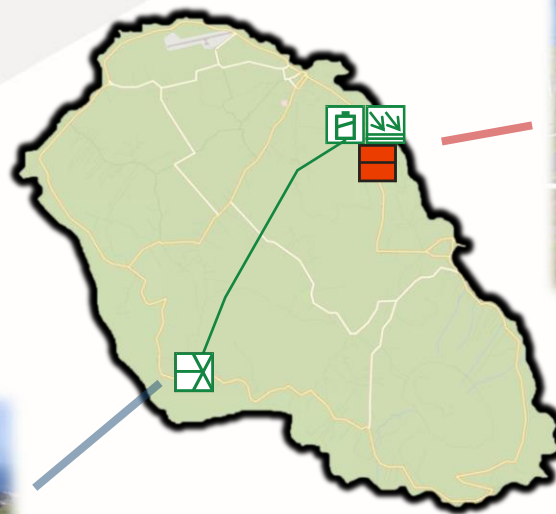
# BESS Project in Graciosa Hybrid Renewable Power Plant





- Inhabitants: 4 301
- Peak Load: **2,5 MW**
- Power Generation: **14 GWh**
- ✓ **60 % Renewable Energy**
  - Wind: 53%
  - Solar: 7%

## GRACIOSA



Battery Energy Storage System



-  Diesel Power Plant
-  Battery Energy Storage System
-  Wind Farm
-  PV Plant

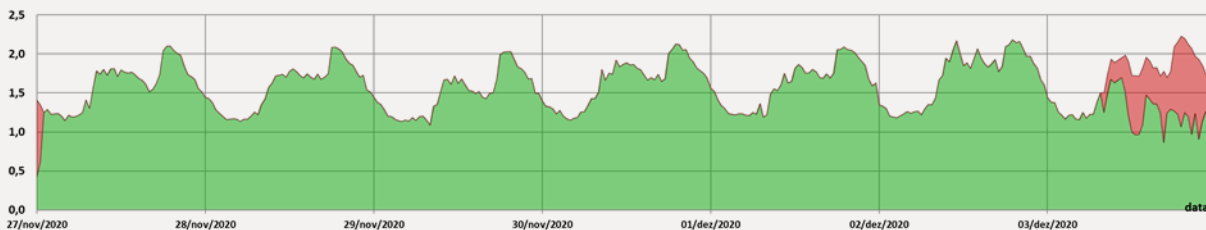
# BESS Project in Graciosa

## Power Generation

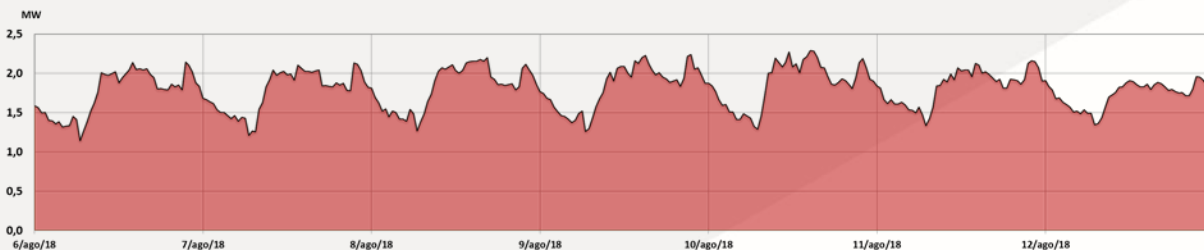
### Power Generation

■ Fossil ■ Renewable

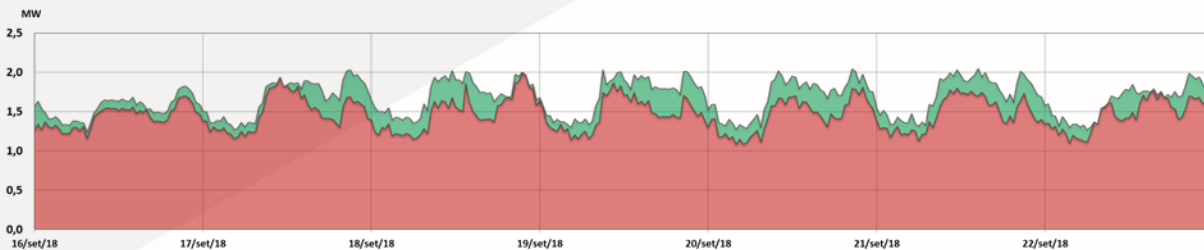
2020 (November/December week)



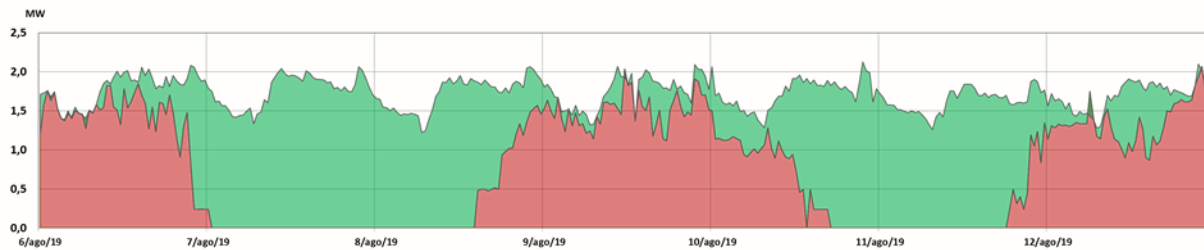
2018 (August week)



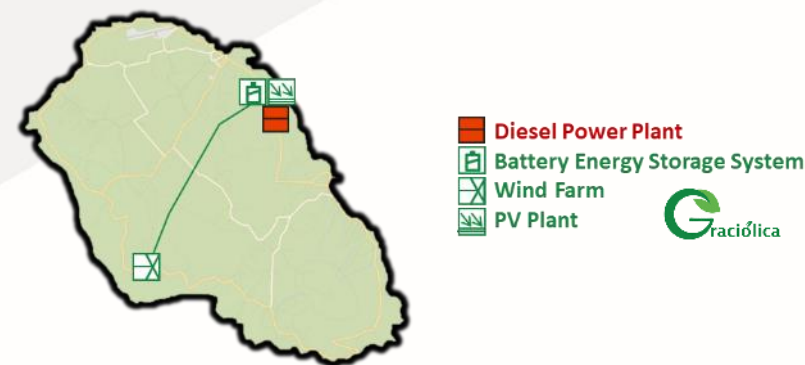
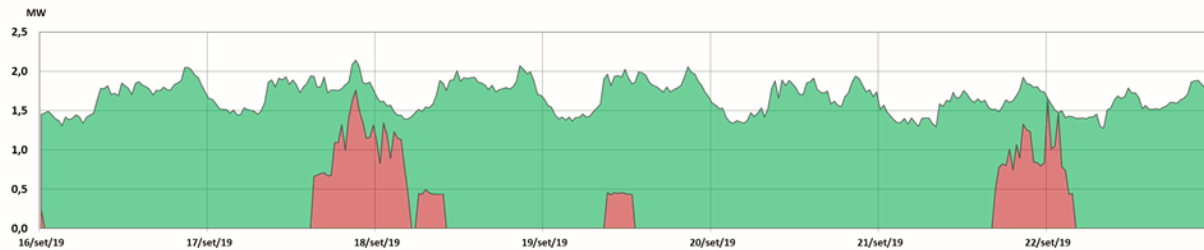
2018 (September week)



2019 (August week)



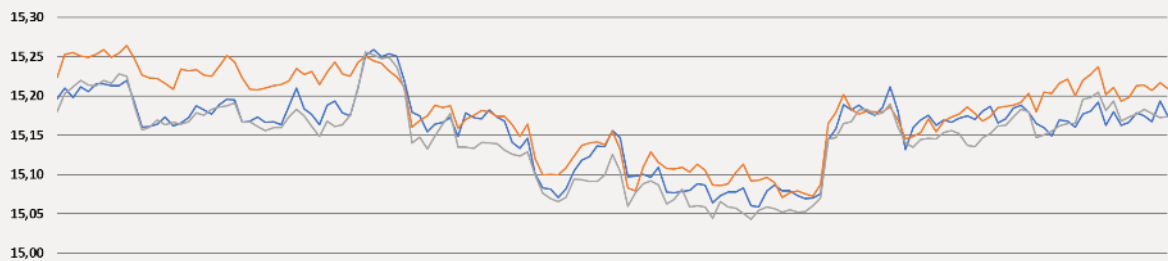
2019 (September week)



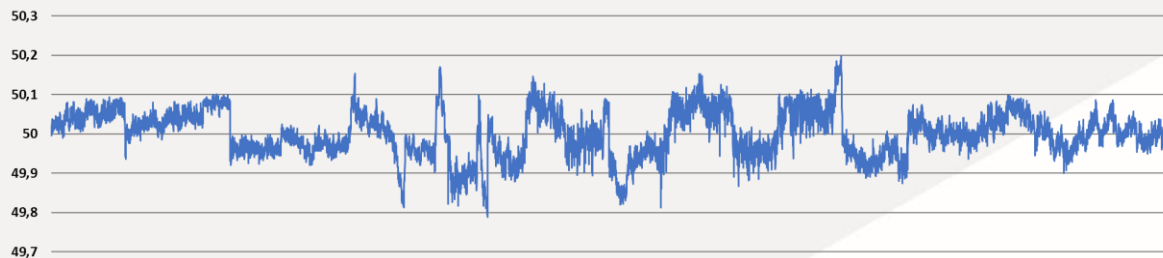


2018 (August 7)

Voltage [kV] (3 phases)

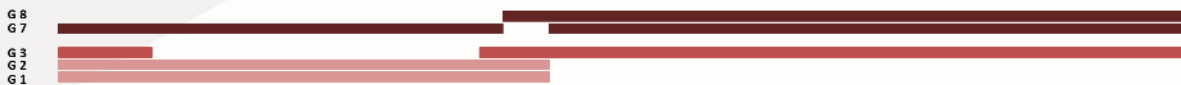
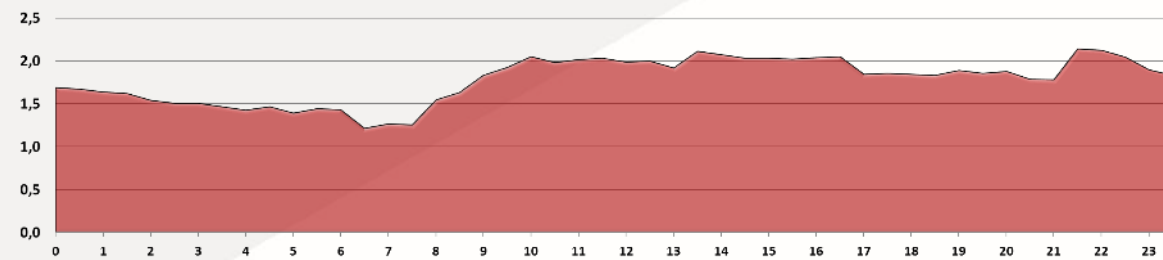


Frequency [Hz]



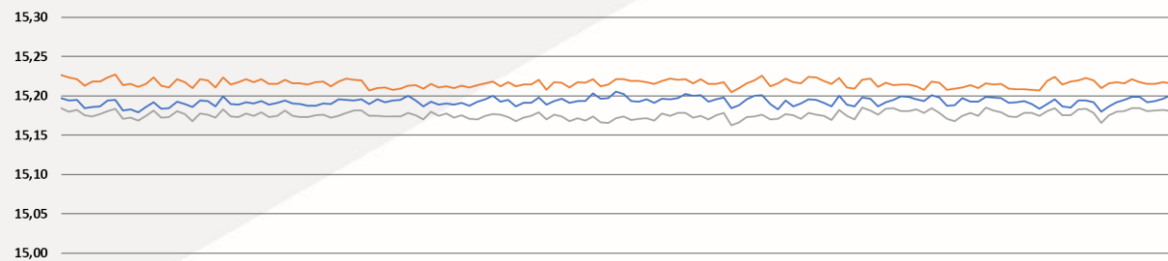
Production [MW]

Fossil Renewable

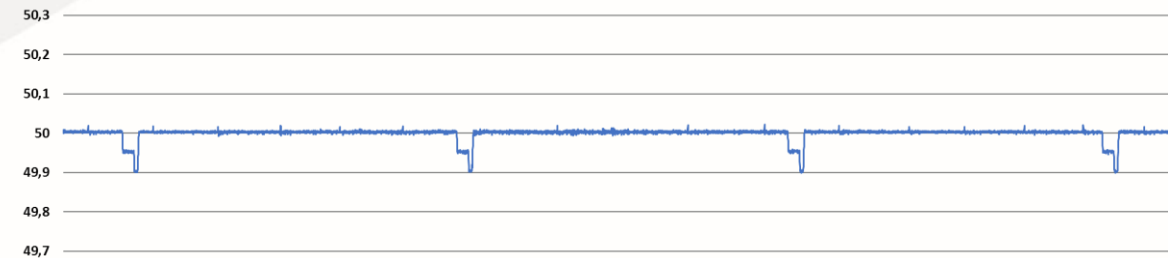


2019 (August 7)

Voltage [kV] (3 phases)

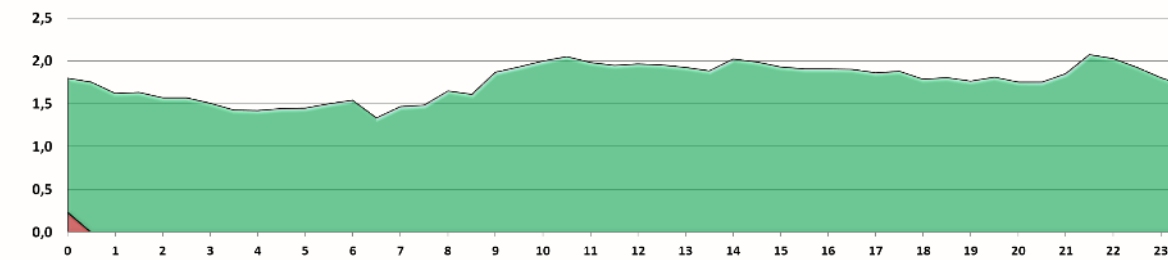


Frequency [Hz]



Production [MW]

Fossil Renewable



G1

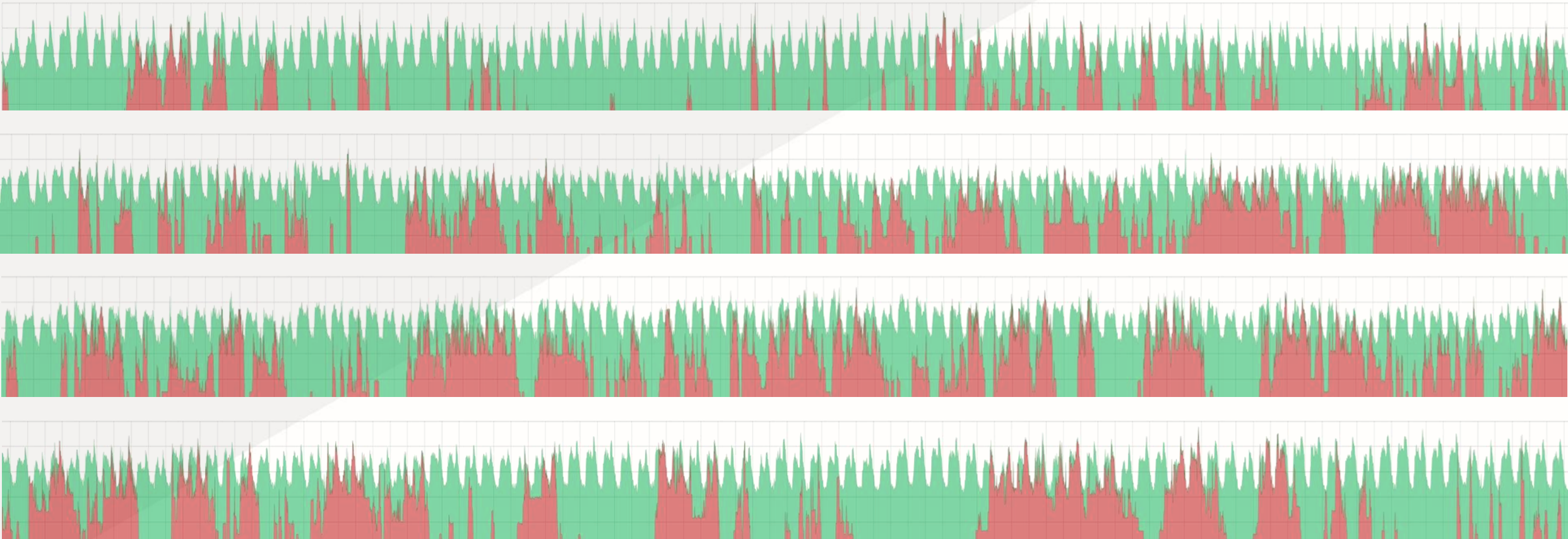
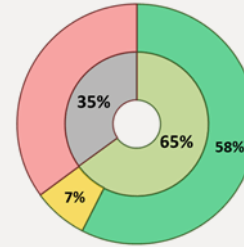
# BESS Project in Graciosa

## RES variability over a year

### 2021 load diagram

Electric Power Production [MW]

Graciosa  
Island



# BESS Projects for the remaining Azores Islands

## Main Goals



- **enhance renewable and endogenous resources**  
compensating for their intermittent nature;
- **allow the direct integration of a greater share of renewable production**  
by reducing the number of thermal units necessary to keep in service to guarantee security of supply;
- **improve the quality of service**  
higher level of reliability and power quality.



Terceira Island BESS (15MW/10,5MWh)



Factory tests in Vietnam



Laboratory tests in Labelec



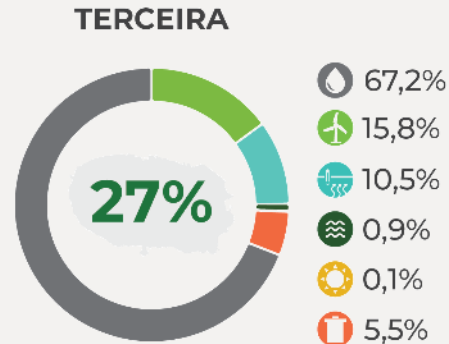
São Miguel Island BESS (20MW/20MWh)



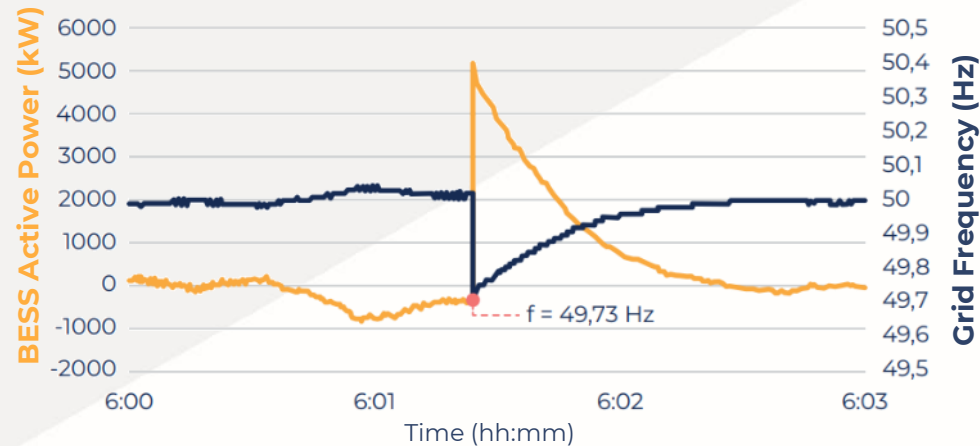
# BESS Project in Terceira

## BESS Terceira

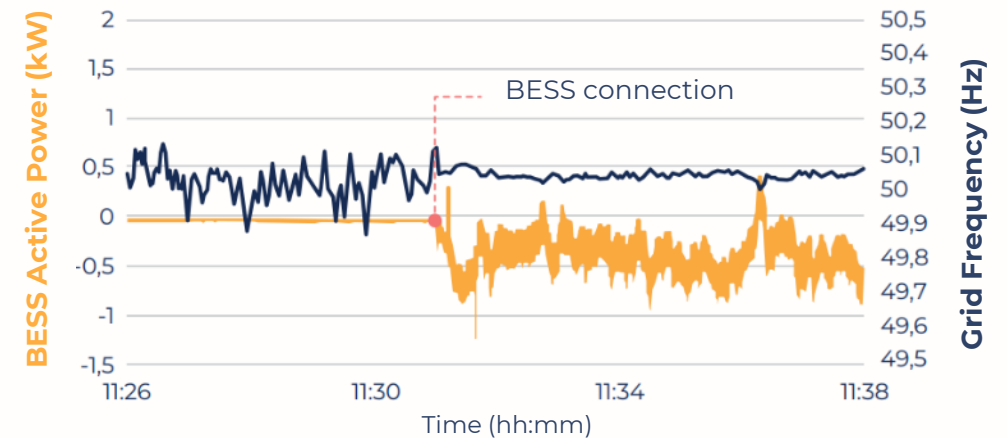
- Inhabitants: 53.234
- Peak Load: **33,5 MW**
- Power Generation: **196 GWh**
- ✓ **27 % Renewable Energy**
  - Geothermal: 10%
  - Wind: 16%
  - Hydro: 1%
- ✓ **6 % Waste to Energy**



**Loss of generation  $\approx$  5 MW**



**Frequency Regulation**





**Obrigado**  
**Thank you**

