# Paris Session 2022



# Grid-forming inverters in Agios Efstratios island grid



Question 16: What local, and whole-system considerations shall be applied to optimise the design and mitigate any potential side-effects when using synchronous condensers, grid-forming inverters, or a combination to address emerging system stability issues?

#### Apostolos Papakonstantinou, Greece

Group Discussion Meeting

© CIGRE 2022

1

© CIGRE 2022

### Grid-forming sources Storage units of high power capacity close to each other $BESS \rightarrow Grid$ -forming, RES $\rightarrow Grid$ -supporting

> Applied in Ag. Efstratios island grid

High BESS rated power is preferable in systems aiming for high-RES penetration for effectively managing RES surplus, as well as providing sufficient fault current level & in-rush currents for energizing transformers

Agios Efstratios: 2x500 kW BESS, providing comparable fault current level to 1-2 diesel units usually synchronized in the grid today

Having grid-forming power sources close to each other reduces power oscillations between them

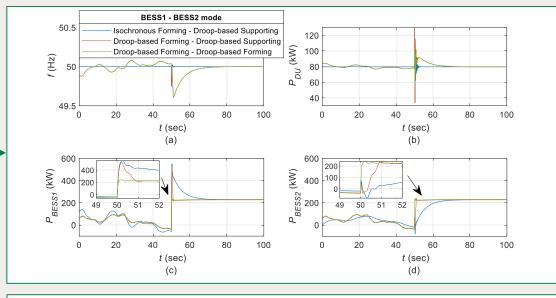
> Ag. Efstratios: Both battery systems installed at the same location

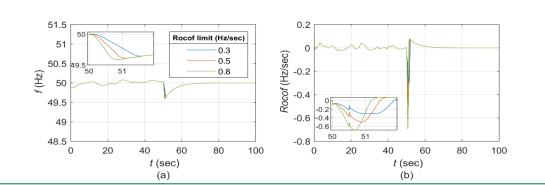
**Group Discussion Meeting** 

### **Grid-forming sources** Power sharing & ROCOF limitation

- Droop-based grid-forming mode can achieve the desired power sharing between several grid-forming units
  - Results shown for 3 combinations of control modes, both BESS in droopbased grid-forming in green
- A maximum admissible ROCOF can be set in the grid-forming controller, to address stability issues of low-inertia systems
  - ✤Results shown for limits 0.3-0.8 Hz/s —

Group Discussion Meeting





© CIGRE 2022