Roundtable: grid integration of RES

- Several grid operators sent slides presenting relevant grid issues for RES integration (congestion, curtailment, grid safety...) on their networks. These include:

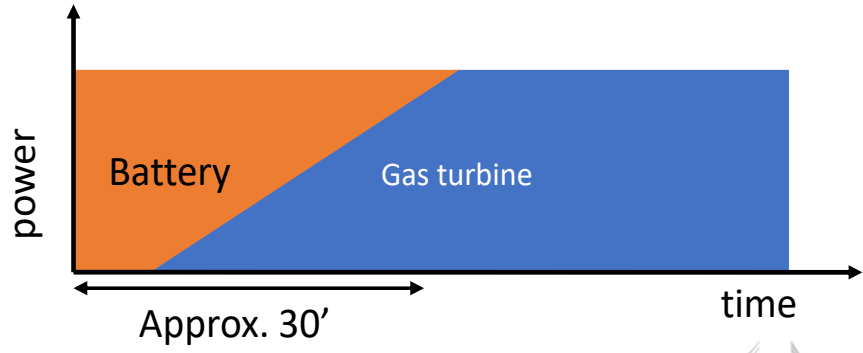
  ENEL Endesa, Canary and Balearic Islands actor

  EDF SEI, French island DSO

  HEDNO, Greek DSO

Endesa: Canary and Balearic Islands, Spain

- Key drivers:
  - Potential high curtailment as RES penetration increases.
  - Generation mix: aged thermal generation mostly based on oil, not adapted to current flexibility needs.
  - Lack of storage capacity.
- Challenges:
  - Significant security of supply risk in the short term (reserve margin is 10%).
  - The need for significant spinning reserve, with several groups required to connect at low load. This reduces room for RES integration, leading to curtailments.
  - Regulated regime: current generation facilities cannot be upgraded or modernised (i.e. flexibility upgrades) unless authorized by the Ministry following a tender procedure, yet to be launched.
- Potential solution (among others):
  - To modernize and decarbonize thermal generation by hybridization with batteries to provide reserve. The thermal generator does not need to be running since the battery would immediately inject energy in case of need, covering the time to startup the generator.
  - Delivers fuel savings and emission reduction.
  - Markets parties to invest in stand alone storage capacity rather that SOs.



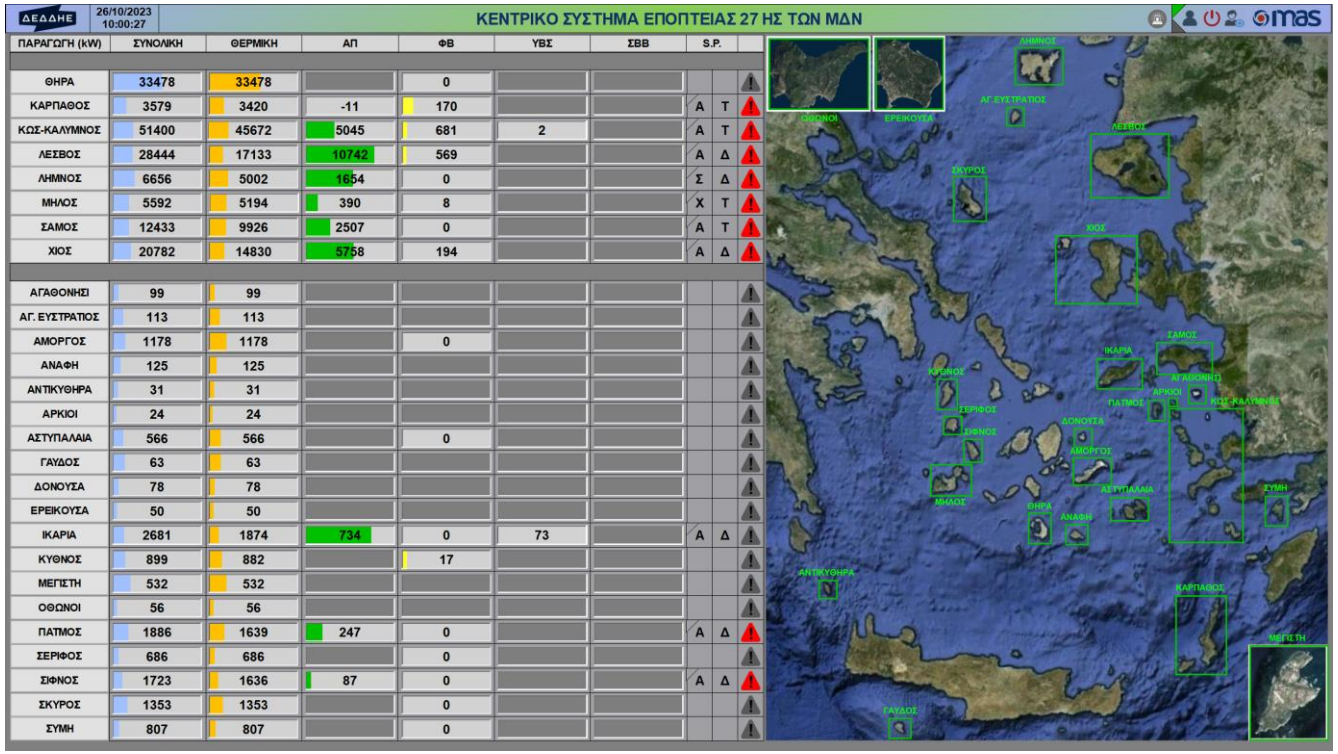
EDF SEI – Martinique, Guadeloupe, Réunion, Guyane, Corse

- Delay of power restoration following a voltage sag for DERs with zero power mode (required for all DERs > 10 kVA in SEI operated islands) ?

- EDF SEI requires the DERs to restore their power in 100 ms after a voltage sag. What delay is required by other DSOs ?

Challenges of RES integration on Greek NIIs

- Curtailments for technical reasons
- Production level depends on Weather conditions (peak of load different from peak of RES production)
- Load changes significantly during the year / during the day
- Currently impossible to avoid thermal units
- Telecommunication Issues



ΠΑΡΑΓΩΓΗ (kW)	ΣΥΝΟΛΙΚΗ	ΘΕΡΜΙΚΗ	ΑΠ	ΦΒ	ΥΒΣ	ΣΒΒ	S.P.	
ΘΗΡΑ	33478	33478		0				
ΚΑΡΠΑΘΟΣ	3579	3420	-11	170			Α	Τ
ΚΩΣ-ΚΑΛΥΜΝΟΣ	51400	45672	5045	681	2		Α	Τ
ΛΕΣΒΟΣ	28444	17133	10742	569			Α	Δ
ΛΗΜΝΟΣ	6656	5002	1654	0			Σ	Δ
ΜΗΛΟΣ	5592	5194	390	8			Χ	Τ
ΣΑΜΟΣ	12433	9926	2507	0			Α	Τ
ΧΙΟΣ	20782	14830	5758	194			Α	Δ
ΑΓΑΘΟΝΗΣΙ	99	99						
ΑΓ. ΕΥΣΤΡΑΤΙΟΣ	113	113						
ΑΜΟΡΓΟΣ	1178	1178		0				
ΑΝΑΦΗ	125	125						
ΑΝΤΙΚΥΘΗΡΑ	31	31						
ΑΡΚΙΟΙ	24	24						
ΑΣΤΥΠΑΛΑΙΑ	566	566		0				
ΓΑΥΔΟΣ	63	63						
ΔΟΝΟΥΣΑ	78	78						
ΕΡΕΙΚΟΥΣΑ	50	50						
ΙΚΑΡΙΑ	2681	1874	734	0	73		Α	Δ
ΚΥΘΝΟΣ	899	882		17				
ΜΕΓΙΣΤΗ	532	532						
ΟΘΩΝΟΙ	56	56						
ΠΑΤΜΟΣ	1886	1639	247	0			Α	Δ
ΣΕΡΙΦΟΣ	686	686		0				
ΣΙΦΝΟΣ	1723	1636	87	0			Α	Δ
ΣΚΥΡΟΣ	1353	1353		0				
ΣΥΜΗ	807	807		0				

EDF SEI – Martinique, Guadeloupe, Réunion, Guyane, Corse

- Large transients that instantaneously trigger several load shedding levels result in severe overvoltages (up to 1.3 p.u.)

- SynCon have the ability to both spread the load shedding levels over time thanks to their inertia but also to better maintain the voltage within an acceptable range. Do other TSOs face the same phenomenon ?

Lesvos

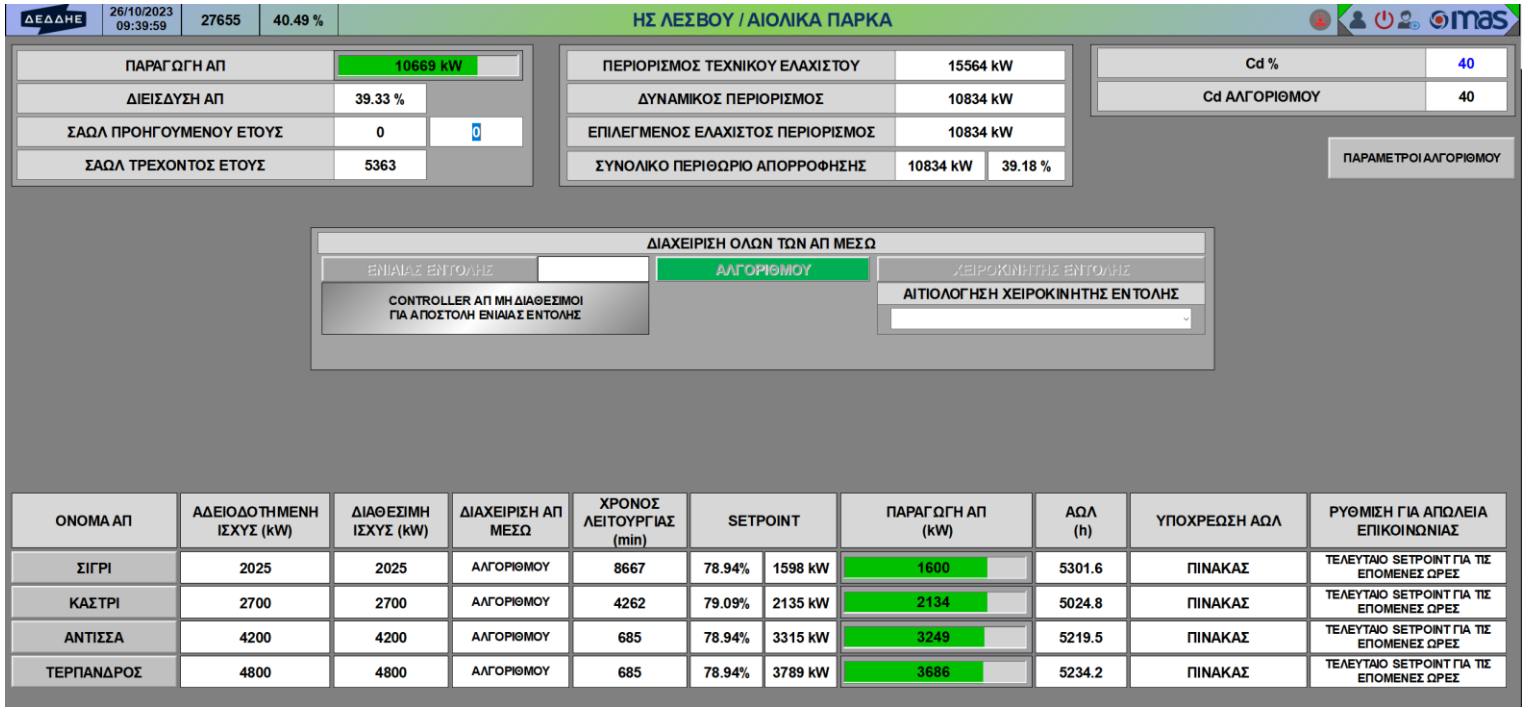
- Peak load of 2022: 50,29MW
- Peak load of 2023: 62,5MW
- Minimum Day Peak of 2022: 22,0MW
- Minimum Day Peak of 2023: 22,5MW

- Peak of the day 25/10/2023: 32,87MW
- Minimum of the day 25/10/2023: 16,75MW

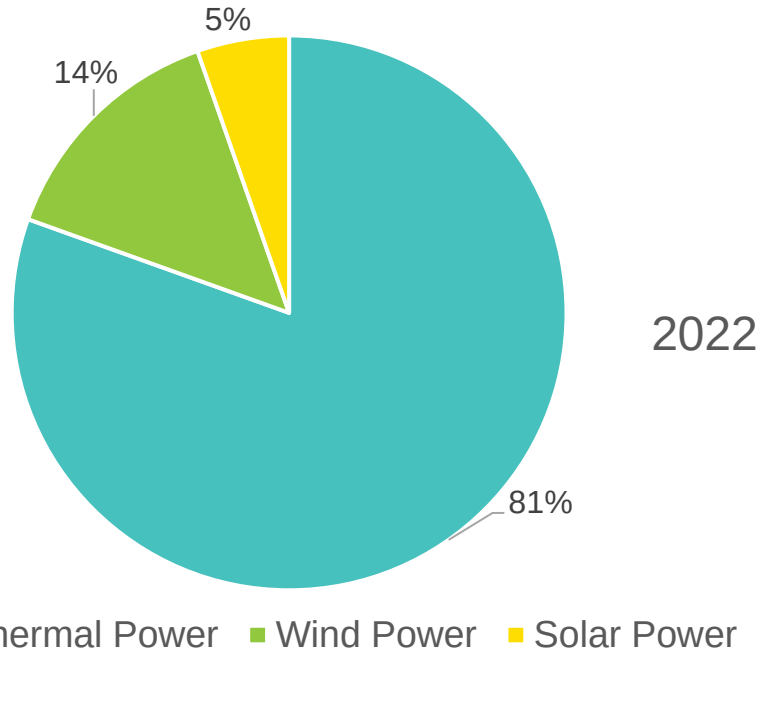
- 4 Wind Parks: 13,725MW total installed capacity
- Solar: 9,026MW total installed capacity

- Largest Thermal Unit: 10MW

Lesvos



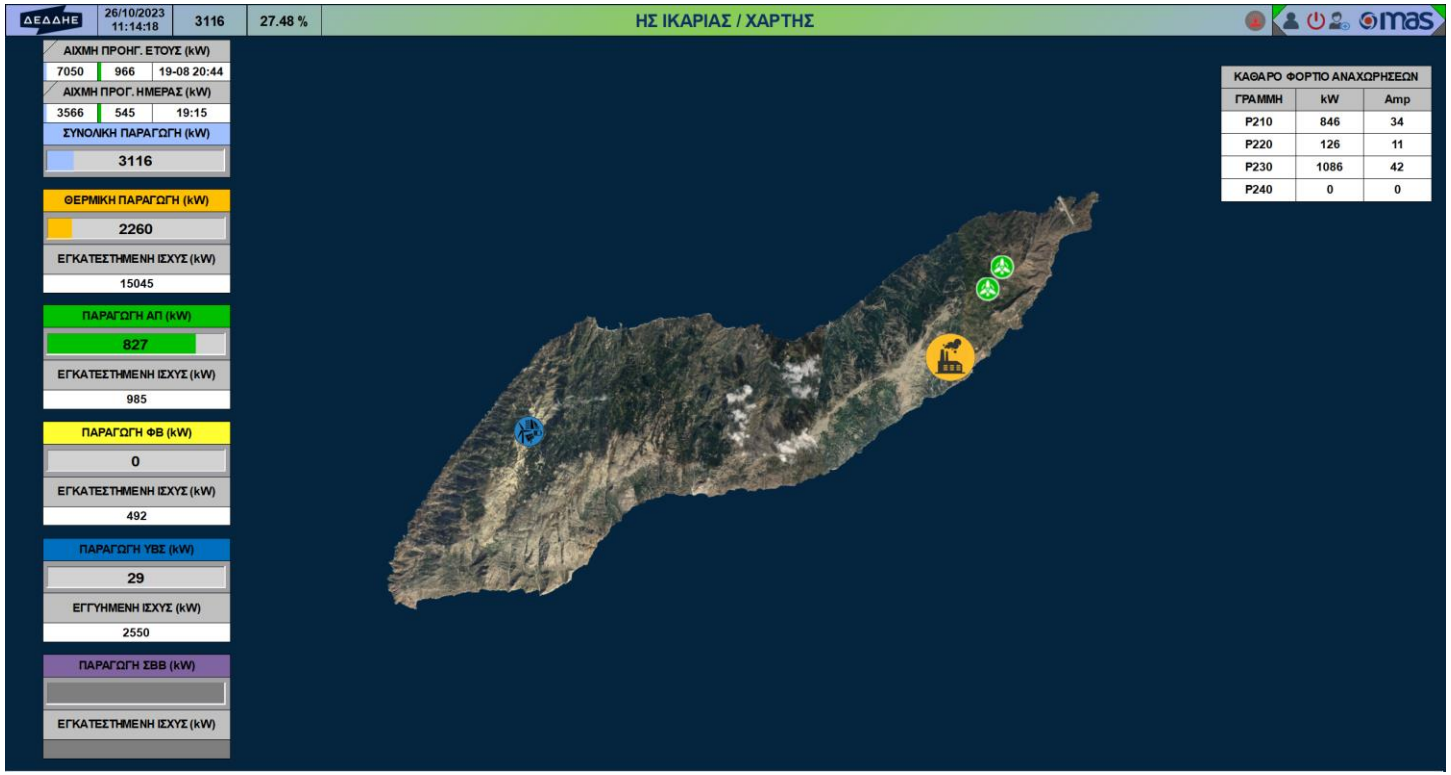
ΟΝΟΜΑ ΑΠ	ΑΔΕΙΟΔΟΤΗΜΕΝΗ ΙΣΧΥΣ (kW)	ΔΙΑΘΕΣΙΜΗ ΙΣΧΥΣ (kW)	ΔΙΑΧΕΙΡΙΣΗ ΑΠ ΜΕΣΩ	ΧΡΟΝΟΣ ΛΕΙΤΟΥΡΓΙΑΣ (min)	SETPOINT		ΠΑΡΑΓΩΓΗ ΑΠ (kW)	ΑΩΛ (h)	ΥΠΟΧΡΕΩΣΗ ΑΩΛ	ΡΥΘΜΙΣΗ ΓΙΑ ΑΠΩΛΕΙΑ ΕΠΙΚΟΙΝΩΝΙΑΣ
ΣΙΓΡΙ	2025	2025	ΑΛΓΟΡΙΘΜΟΥ	8667	78.94%	1598 kW	1600	5301.6	ΠΙΝΑΚΑΣ	ΤΕΛΕΥΤΑΙΟ SETPOINT ΓΙΑ ΤΙΣ ΕΠΟΜΕΝΕΣ ΩΡΕΣ
ΚΑΣΤΡΙ	2700	2700	ΑΛΓΟΡΙΘΜΟΥ	4262	79.09%	2135 kW	2134	5024.8	ΠΙΝΑΚΑΣ	ΤΕΛΕΥΤΑΙΟ SETPOINT ΓΙΑ ΤΙΣ ΕΠΟΜΕΝΕΣ ΩΡΕΣ
ΑΝΤΙΣΣΑ	4200	4200	ΑΛΓΟΡΙΘΜΟΥ	685	78.94%	3315 kW	3249	5219.5	ΠΙΝΑΚΑΣ	ΤΕΛΕΥΤΑΙΟ SETPOINT ΓΙΑ ΤΙΣ ΕΠΟΜΕΝΕΣ ΩΡΕΣ
ΤΕΡΠΑΝΔΡΟΣ	4800	4800	ΑΛΓΟΡΙΘΜΟΥ	685	78.94%	3789 kW	3686	5234.2	ΠΙΝΑΚΑΣ	ΤΕΛΕΥΤΑΙΟ SETPOINT ΓΙΑ ΤΙΣ ΕΠΟΜΕΝΕΣ ΩΡΕΣ



2022

Ikaria

- 2 Wind Parks: 0,985MW total installed capacity
- Solar: 0,492MW total installed capacity
- Hybrid Power Station:2,7MW total installed capacity

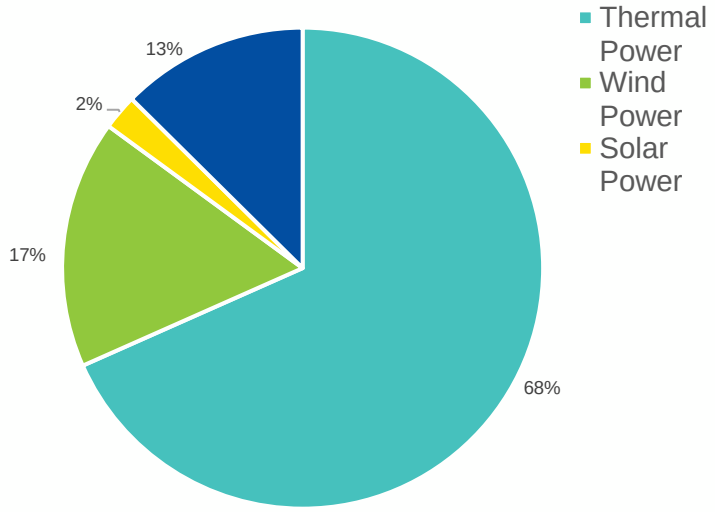


Ikaria

- Peak load of 2022: 7,05MW
- Peak load of 2023: 7,12MW
- Minimum Day Peak of 2022: 1,60MW
- Minimum Day Peak of 2023: 1,20MW

- Peak of the day 25/10/2023: 3,57MW
- Minimum of the day 25/10/2023: 1,84MW

- Largest thermal unit:2,4MW



2022