



NEWS from CIGRE Greece NC

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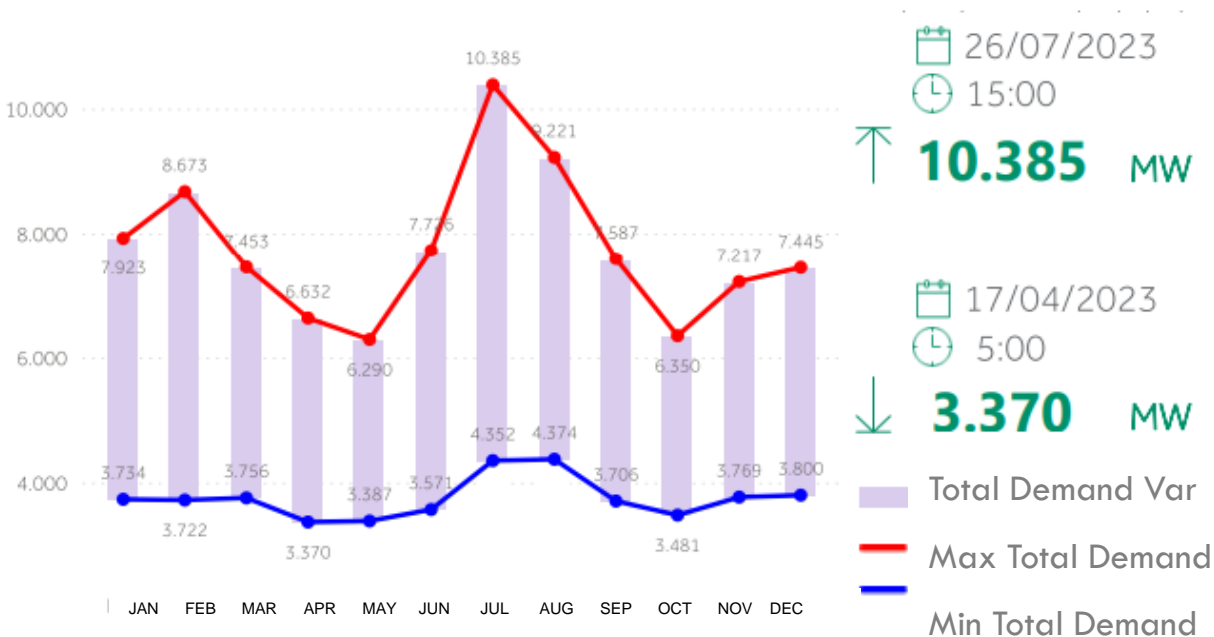
For power system expertise

2024 SEERC TAC Meeting - SEERC Workshop, Cavtat, Croatia, May 2024

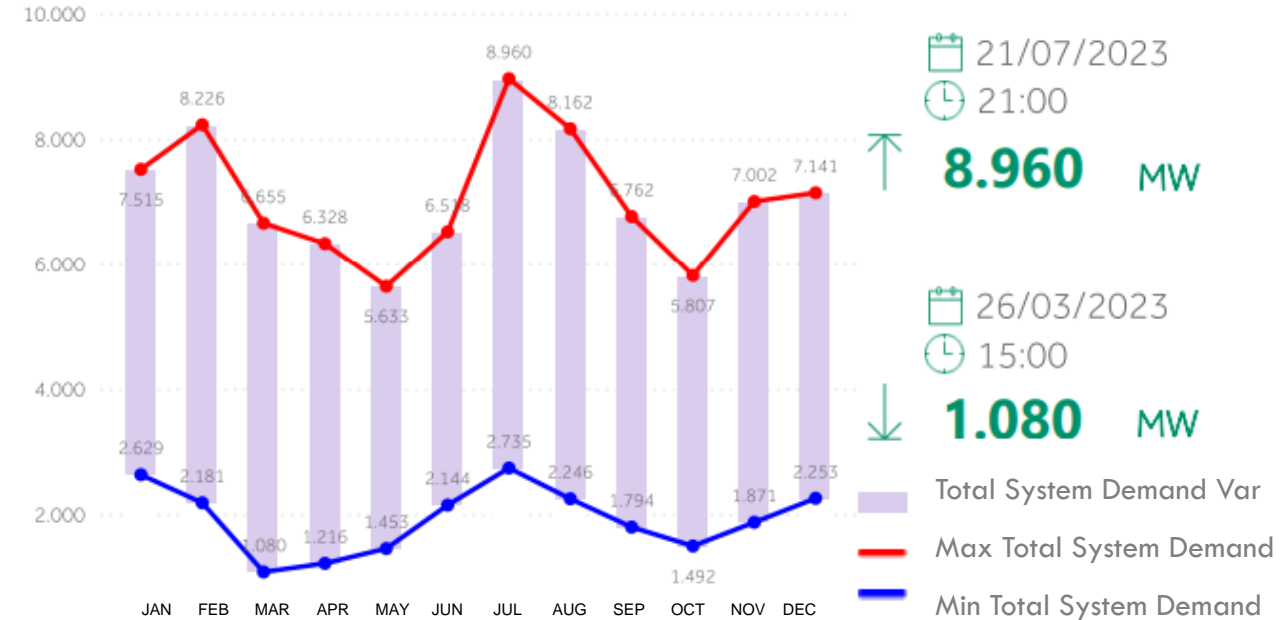
Maximum and Minimum Demand 2023

Total Demand and System Demand

Maximum & Minimum Total Hourly Demand (MW)



Maximum & Minimum Total Hourly System Demand (MW)

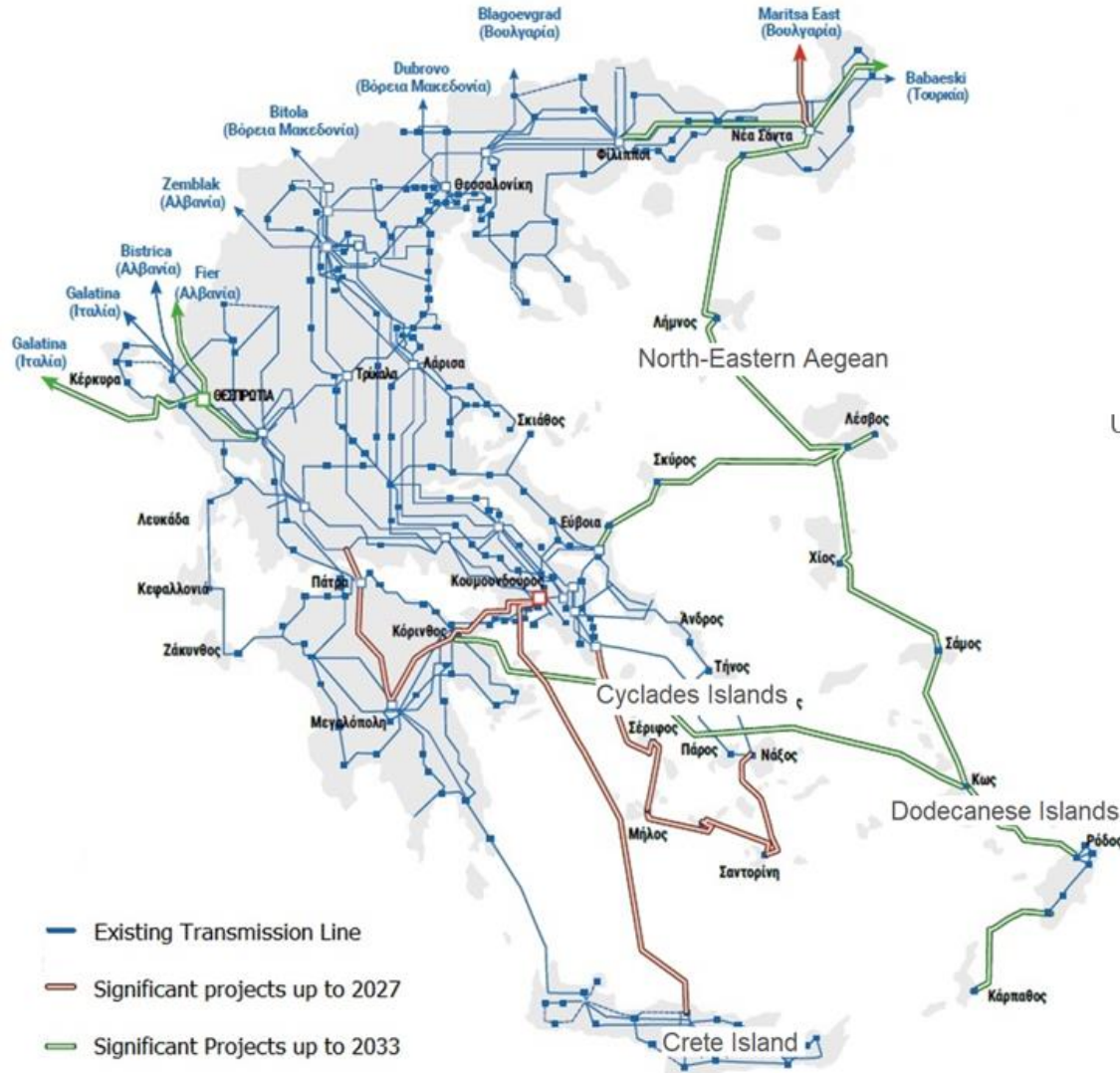


Drivers for the Power System Planning in Greece

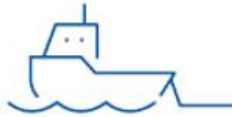
EU→GR

- **Clean Energy for all Europeans package:**
 - ✓ Energy performance in buildings,
 - ✓ Renewable energy,
 - ✓ Energy efficiency,
 - ✓ Governance regulation (NECPs),
 - ✓ Electricity market design,
 - ✓ Non-legislative initiatives (coal regions in transition, clean energy for EU islands, measures to define and better monitor energy poverty)
- European Green Deal → REPowerEU
 - ✓ Diversifying our energy supply
 - ✓ Securing affordable energy supplies
 - ✓ Saving energy
 - ✓ Investing in renewables
- **Fit for 55 package**
- **RES Integration**
- **System Security and Reliability**
- **Islands Interconnection**
- **New Int'l Interconnections**
- **Offshore Wind Integration**
- **Energy Storage Integration**
- **System Stability and Control**
- **Long-term System Development Strategy**

Transmission




11.948 km
Over Head Lines
(OHL)



1.172 km
Submarine Cable Lines
(SCL)



410 km
Underground Cable Lines
(SCL)



2,7 GW
μεταφορική ικανότητα
διασυνδέσεων



50,5 TWh
Transmitted Energy



12.2 GW
RES
Transmission & Distribution
Grid



22
Extra-High Voltage
Substations



386
High Voltage
Substations

Cross-Border Interconnections

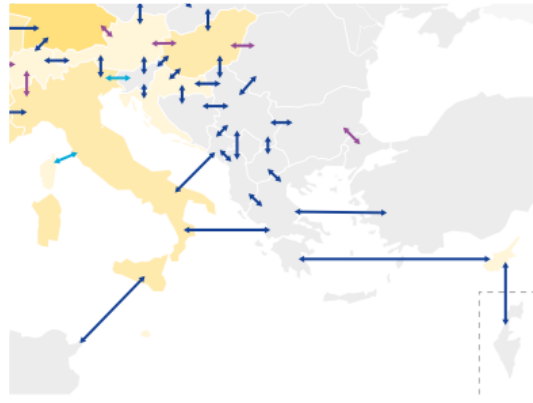
Opportunities for increases in cross-border transmission, storage and peaking units capacity in 2040

CROSS-BORDER CAPACITY INCREASES NEEDS IN MW (ADDITIONAL TO THE STARTING GRID 2025)

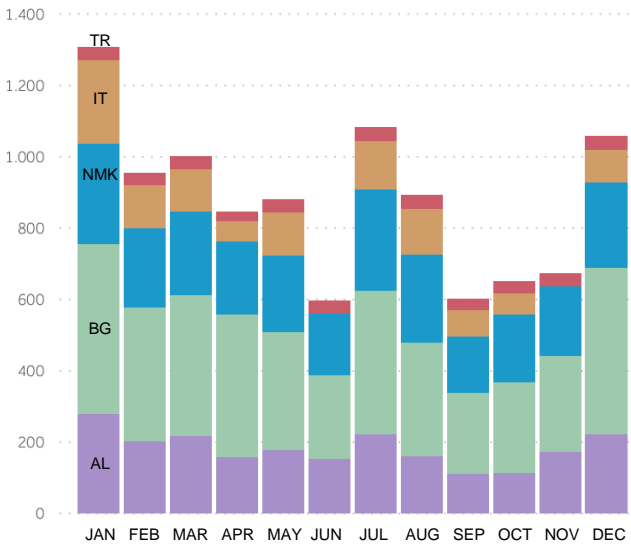
- < 500 MW
- 500 → 2,000 MW
- 2,000 → 4,000 MW
- > 4,000 MW

STORAGE NEEDS IN MW (ADDITIONAL TO BATTERY CAPACITIES IN NT2030 AND TO 2040 CAPACITIES FOR OTHER STORAGE TECHNOLOGIES)

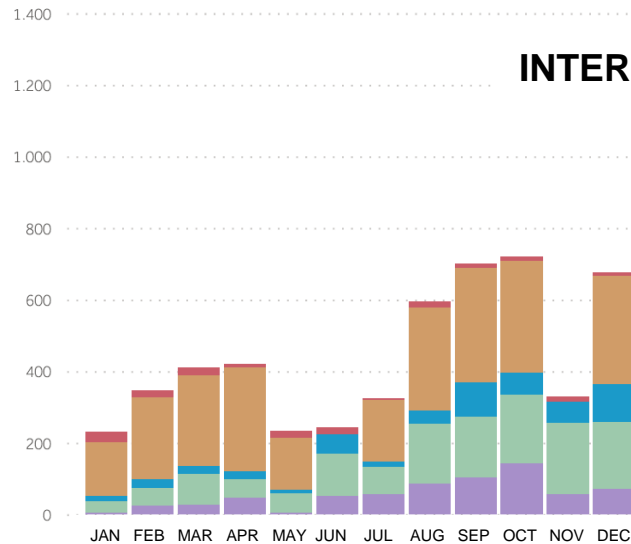
- < 1,000 MW
- 1,000 → 5,000 MW
- 5,000 → 10,000 MW
- > 10,000 MW



IMPORTS 2023

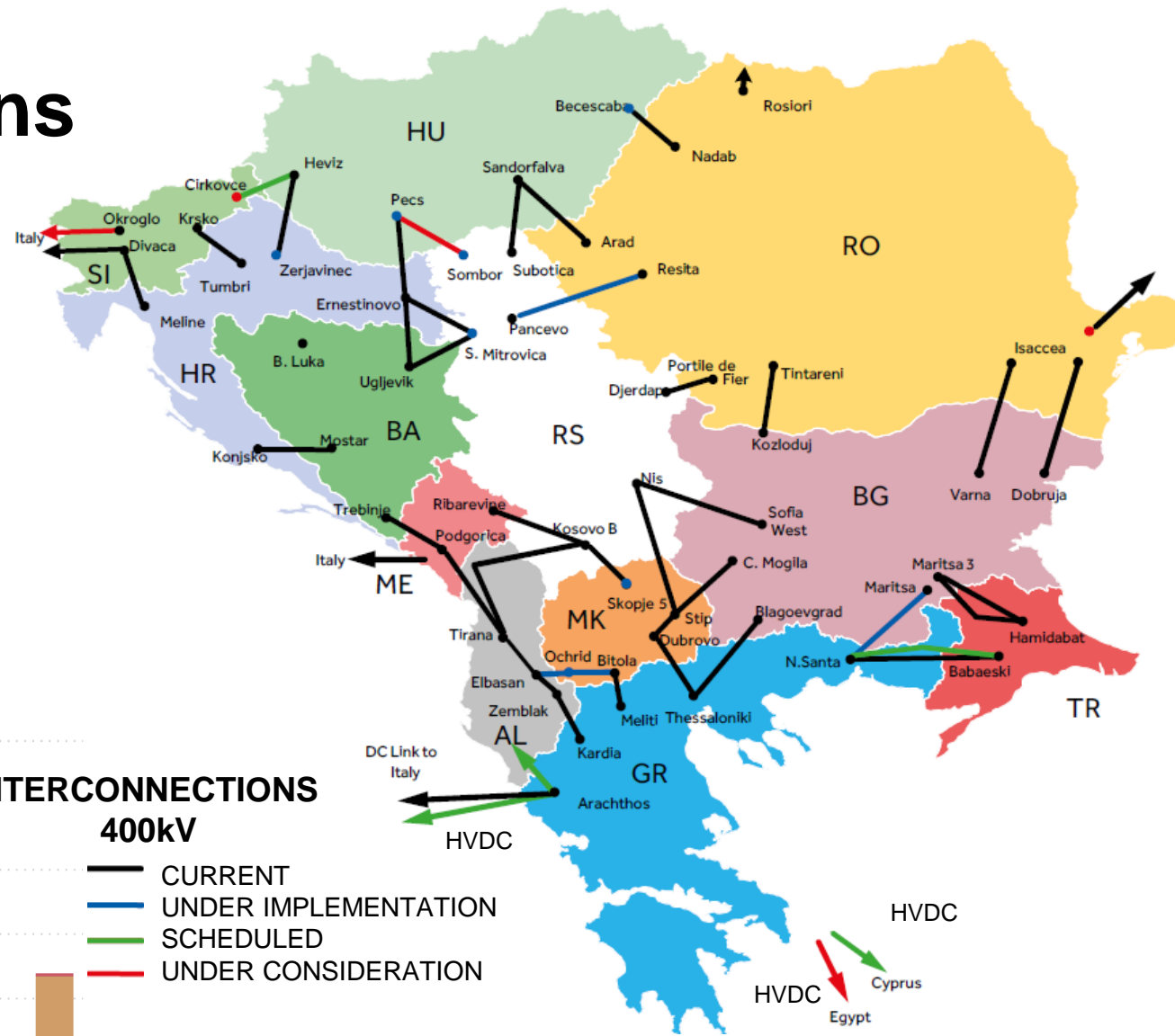


EXPORTS 2023



INTERCONNECTIONS 400kV

- CURRENT
- UNDER IMPLEMENTATION
- SCHEDULED
- UNDER CONSIDERATION



Greek islands interconnections

Interconnection Crete-Attica (expected 2025)

- The 2nd phase of the interconnection of Crete with the HETS (2x500MW HVDC \pm 500kV)
- Ariadne Interconnection SPSA
- Interoperability with CY-IL Interconnector
- The 1st of its kind in Mediterranean (500kV DC cables and VSC)
- Among the top 3 deepest interconnections worldwide (1,250m)
- Largest energy infrastructure ever in Greece
- Budget 1B€



Greek islands interconnections

Interconnection of Southwestern Cyclades

- Santorini, Folegandros, Melos, Serifos

Interconnection of Dodecanese islands

- Kos, Rhodes, Karpathos

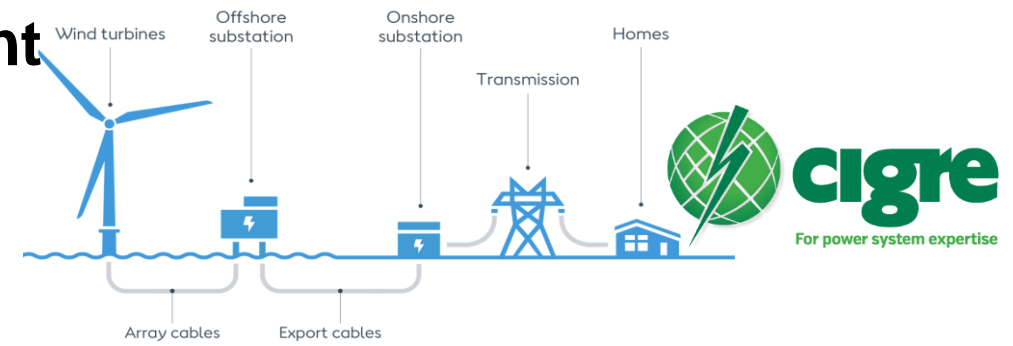
Interconnection of Northeastern Aegean islands

- Skyros, Lesvos, Limnos, Chios, Samos



Offshore transmission network development

- Responsible for all stages of offshore transmission network assets for OWFs connection



Distribution

HEDNO Overview

Hellenic Electricity Distribution Network Operator “HEDNO” is the owner¹ and operator of the electricity distribution network in Greece, with 100% market share

HEDNO is responsible for the operation, maintenance and development of the power distribution network on the mainland and all Greek islands

- **Network length of approximately 245,000km, serving 7.8m customers**
- **Operates under a perpetual license**

HEDNO is regulated by the Regulatory Authority for Energy (“RAE”) and has commenced a new four-year regulatory period in (2021–2024). A second four-year regulatory period will cover years 2025-2028

HEDNO is well positioned for **growth under a strong, performance-oriented management team**

HEDNO shareholders are Public Power Corporation (“PPC”), that possesses the 51% of the company and Macquarie Asset Management that possesses the rest 49% since February of 2022.

HEDNO Key Financials

	2018	2019	2020	2021	2022 ⁴	2023
Revenues	€814m	€833m	€822m	€861m	€833m	€1,117m
Normalised EBITDA³	€412m	€426m	€405m	€396m	€374m	€530m
CAPEX	€148m	€149m	€174m	€221m	€312m	€449m
RAB	~€3.1bn	~€3.0bn	~€2.9bn	~€2.9bn	~€2.9bn	~€3.1bn

Service Territory and Operations²



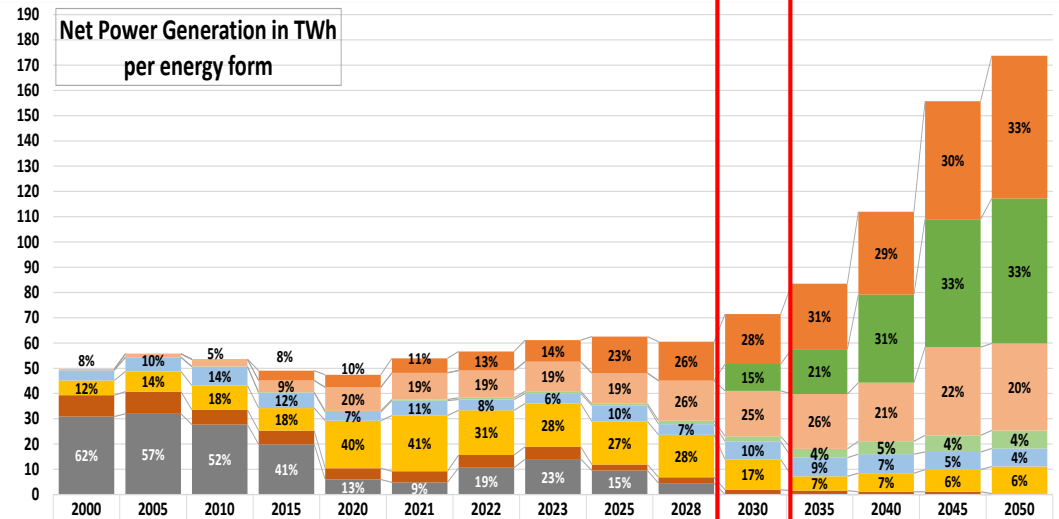
HEDNO Operational Stats (Q1 2023)

	Connections points	7.8m
	Market share	100%
	Electricity consumption	41,983 GWh
	Network length	244,795 km ⁴
	Sub-Stations	244 (HV/MV) & 164k (MV/LV)
	Employees	5,806

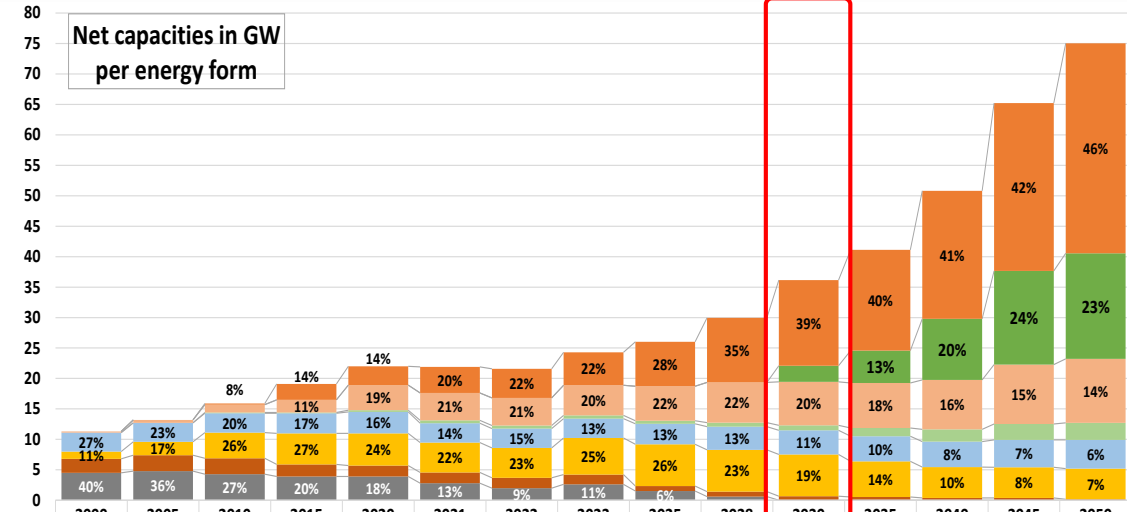


¹. Post the envisaged asset carve-out from PPC that took place on 30 Nov 2021. ². Of total connections. ³. Non-recurring items. ⁴. Due to the drop in consumption HEDNO had a very high under recovery which will be covered by a specific percentage in 2023 and 2024 according to RAEs decisions for 2023 & 2024 RR. ⁵. MV & LV Breakdown, consisting of 128 thousand kilometers of low voltage lines, 113 thousand kilometers of medium voltage lines in the Interconnected System and the Non-Interconnected Islands, as well as approximately one thousand kilometers of high voltage lines in Attica and in the Non-Interconnected Islands.

Installed Capacity and Net Power Generation per Energy form



	2000	2005	2010	2015	2020	2021	2022	2023	2025	2028	2030	2035	2040	2045	2050
Solar	0.0	0.0	0.2	3.9	4.9	5.8	7.5	8.6	14.4	15.5	19.8	25.9	32.8	46.7	56.5
Wind offshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.6	17.8	34.8	50.7	57.4
Wind onshore	0.5	1.3	2.7	4.6	9.3	10.5	10.8	11.7	12.1	15.8	18.0	21.7	23.2	34.9	34.4
Other RES	0.0	0.1	0.2	0.2	0.5	0.5	0.7	0.9	0.7	1.4	2.0	3.5	5.1	6.6	7.1
Hydro	4.1	5.6	7.4	6.1	3.4	5.9	4.3	3.9	6.3	4.2	7.1	7.4	7.5	7.0	7.1
Gas	5.8	8.0	9.6	8.9	18.8	22.0	17.6	17.2	17.1	16.9	12.0	5.6	7.4	8.8	10.7
Oil	8.4	8.7	5.8	5.4	4.5	4.4	5.1	4.9	2.3	2.3	1.9	1.6	1.1	1.1	0.4
Solids	30.9	32.0	27.7	19.9	5.9	4.8	10.6	14.0	9.6	4.5	0.0	0.0	0.0	0.0	0.0
Total net generation (TWh)	49.6	55.7	53.6	49.0	47.4	53.9	56.6	61.1	62.5	60.5	71.5	83.5	112.0	155.7	173.7



	2000	2005	2010	2015	2020	2021	2022	2023	2025	2028	2030	2035	2040	2045	2050
Solar	0.0	0.0	0.2	2.6	3.1	4.3	4.8	5.4	7.3	10.6	14.1	16.5	21.0	27.5	34.5
Wind offshore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	5.3	10.0	15.4	17.3
Wind onshore	0.2	0.5	1.3	2.1	4.1	4.5	4.6	4.9	5.6	6.6	7.1	7.4	8.1	9.8	10.5
Other RES	0.0	0.0	0.1	0.1	0.3	0.5	0.5	0.5	0.5	0.7	0.8	1.4	2.0	2.6	2.8
Hydro	3.1	3.1	3.2	3.3	3.5	3.2	3.2	3.2	3.4	3.8	4.0	4.1	4.2	4.5	4.7
Gas fired	1.2	2.2	4.2	5.1	5.3	4.9	4.9	6.0	6.9	6.9	6.9	5.8	5.1	5.1	5.1
Oil fired	2.3	2.6	2.6	2.0	1.8	1.8	1.7	1.6	0.8	0.8	0.7	0.6	0.4	0.4	0.2
Solids fired	4.5	4.8	4.3	3.9	3.9	2.8	2.0	2.6	1.5	0.6	0.0	0.0	0.0	0.0	0.0
Total Net-Capacity (GW)	11.3	13.2	15.9	19.1	22.0	21.9	21.6	24.3	26.0	30.0	36.1	41.1	50.8	65.2	75.0



PYLONS

e-magazine

- The magazine is published by CIGRE Greece NC biannually hosting articles both in Greek and English language
- Editorial Board: Emeritus Prof. Costas Vournas, *Editor in Chief*
Dr. A. Koronides and Dr. G. Georgantzis
f. Chairmen of CIGRE GREECE

Issues:

- ✓ **Issue 1, Jul. 2021: Regional Cooperation in Europe**
- ✓ **Issue 2, Apr. 2022: Uncertainty – Security – Resilience**
- ✓ **Issue 3, Mar. 2023: Green Energy Transition**
- ✓ **Issue 4, Sep. 2023: Electromobility**
- ✓ **Issue 5, May 2024: Islands Interconnection NEW!**
- **Recurring Themes**
 - ✓ **Flashback**
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Thank you!

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