Wind Energy Status in Greece

Challenges and prospects

Efi Karra

Hellenic Wind Energy Association

HWEA
Hellenic Wind Energy Association

HWEA – Hellenic Wind Energy Association

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Hellenic Wind Energy Association

- Founded in 1990
- National representative of European wind energy association WindEurope
- Members: Companies and Scientists of wind power sector
- Nonprofit Organization (NPO)

Scope

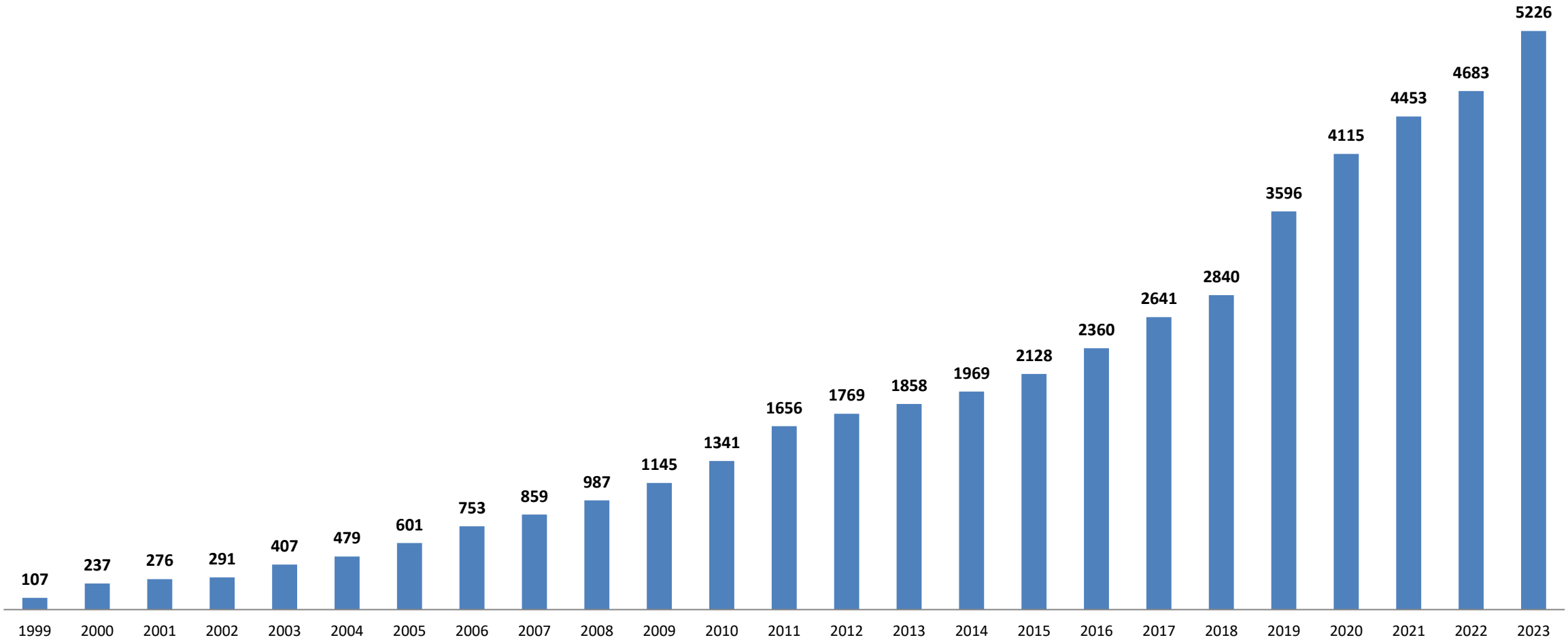
✓ Express the well-meant interests of the industry and the market by acting as a think-tank and dialogue forum with scientific documentation and competence

✓ Promote the scientific research, technology and applications of wind energy

✓ Communication campaigns dedicated to the general public

HWEA Wind Energy Statistics –2023

Total capacity to the grid (MW) per year



The HWEA Wind Energy Statistics take into account the wind capacity which is in commercial or test operation in Greece and are based on sources from the market actors. HWEA has made effort to crosscheck and confirm the data. However, HWEA does not guarantee the accuracy of them and do not undertake any relevant liability.

HWEA Wind Energy Statistics –2023

- 5,2 GW installed wind capacity
- 543 new MW connected to the grid
- 23,5% of the domestic electricity production

A wind energy vision for Greece

- ✓ Full exploitation of its 100% known energy resource which is wind potential and especially….
- ✓ …..the huge wind potential of Aegean Sea, onshore and offshore
- ✓ Development of a strong local supply chain, especially for wind offshore (incl. floating) incorporating our naval-industry tradition, shipyards, cable industry, OMS infrastructure
- ✓ Large international interconnections
- ✓ Foreign and local investments
- ✓ Producer and exporter of green electricity
- ✓ Strong contributor to the Europe’s energy independence
- ✓ Geopolitical reinforcement and sustainable economic growth

Greece's National Energy and Climate Plan (NECP) - draft under revision

NECP (April 2023)	2021 (estimation)	NECP 2019 for 2030	BASIC SCENARIO					
			2025	2030	2035	2040	2045	2050
Αέρια του θερμοκηπίου χωρίς LULUCF (μεταβολή από το 1990)	-26%	-40%	-41%	-54%	-68%	-82%	-89%	-93%
Αέρια του θερμοκηπίου με LULUCF (μεταβολή από το 1990)			-44%	-57%	-72%	-87%	-95%	-99%
RES index as % of gross final energy consumption	**22%**	**35%**	**31%**	**44%**	**65%**	**83%**	**97%**	**105%**
Ενεργειακή αποδοτικότητα		0%	-4%	-5%	-14%	-18%	-22%	-27%
Τελική κατανάλωση ενέργειας (εκατ. τιμ)	15.65	16.5	16.6	15.4	13.8	12.8	12.0	11.5
RES-Power generation	**36%**	**61%**	**58%**	**79%**	**94%**	**96%**	**96%**	**97%**
RES-Heating/Cooling	**31%**	**43%**	**36%**	**46%**	**63%**	**80%**	**99%**	**100%**
RES-Transportation	**4%**	**19%**	**13%**	**29%**	**98%**	**209%**	**381%**	**584%**
RFNBO (% καύσιμα μεταφορών)	0%	0%	0%	1.0%	11%	23%	31%	50%
Προηγμένα βιοκαύσιμα (% καύσιμα μεταφορών)	0%	1.5%	0%	2.4%	10%	17%	26%	32%
Συμβατικά βιοκαύσιμα (% καύσιμα μεταφορών) - άνω όριο	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
ESR (% μεταβολή ΑτΘ στους τομείς εκτός ETS)	-32%	-40%	-36%	-46%	-61%	-76%	-84%	-87%

Targets of the National Energy and Climate Plan for the Electricity Sector - draft under revision

NECP (April 2023)	2021 (estimation)	NECP 2019 for 2030	Basic Scenario					
			2025	2030	2035	2040	2045	2050
Electricity Sector								
RES power other than hydroelectric (GW)	**9.3**	**15.5**	**14.8**	**23.5**	**34.7**	**46.2**	**64.4**	**71.7**
Wind	**4.7**	**7.1**	**6.0**	**9.5**	**14.7**	**19.0**	**27.2**	**29.2**
- of which Offshore				*1.9*	*6.2*	*9.8*	*15.4*	*17.3*
Solar	**4.3**	**7.7**	**8.2**	**13.4**	**18.7**	**25.4**	**35.2**	**40.3**
Other RES	**0.4**	**0.7**	**0.5**	**0.6**	**1.3**	**1.8**	**2.0**	**2.1**
Υδροηλεκτρικά (Y/H) σε GW	3.1	3.7	3.1	3.8	3.8	3.8	3.8	3.9
Ισχύς αποθήκευσης ηλεκτρικής ενέργειας (GW)	0.7	2.7	3.3	5.3	5.7	11.0	21.3	24.8
- μπαταρίες (GW)	0.0	1.25	1.9	3.1	3.6	8.8	19.1	22.6
- αντλησιοταμίευση	0.7	1.40	1.4	2.2	2.2	2.2	2.2	2.2
Ισχύς μονάδων με αέριο καύσιμο (GW)	5.3	6.9	6.9	7.7	5.7	5.2	2.8	4.2
Ισχύς μονάδων με στερεό καύσιμο (GW)	2.3	0.3	1.5	0	0	0	0	0
Ισχύς μονάδων με υγρό καύσιμο (GW)	1.7	0.3	1.3	0.7	0.6	0.4	0.4	0.1
Σύνολο παραγωγής ηλεκτρικής ενέργειας (TWh)	54.7	57.9	58.0	66.0	87.5	114.6	157.7	175.3
- από αέρια καύσιμα (TWh)	22.5	19.0	16.3	12.1	2.6	1.2	1.6	2.9
- από στερεά καύσιμα (TWh)	5.3	0.0	4.8	0.0	0.0	0.0	0.0	0.0
- από υγρά καύσιμα (TWh)	4.7	0.8	2.4	0.2	0.5	0.0	0.1	0.0
- από ΑΠΕ (TWh)	22.2	38.1	34.5	53.7	84.4	113.4	156.0	172.3
Ανθρακικό αποτύπωμα ηλεκτροπαραγωγής (tCO2/MWh)	0.376	0.115	0.212	0.063	0.013	0.001	0.001	0.000
Εξάρτηση ηλεκτρικής ενέργειας από εισαγωγές	6.7%	7.9%	3%	4%	3%	3%	3%	2%

Offshore Wind in Greece

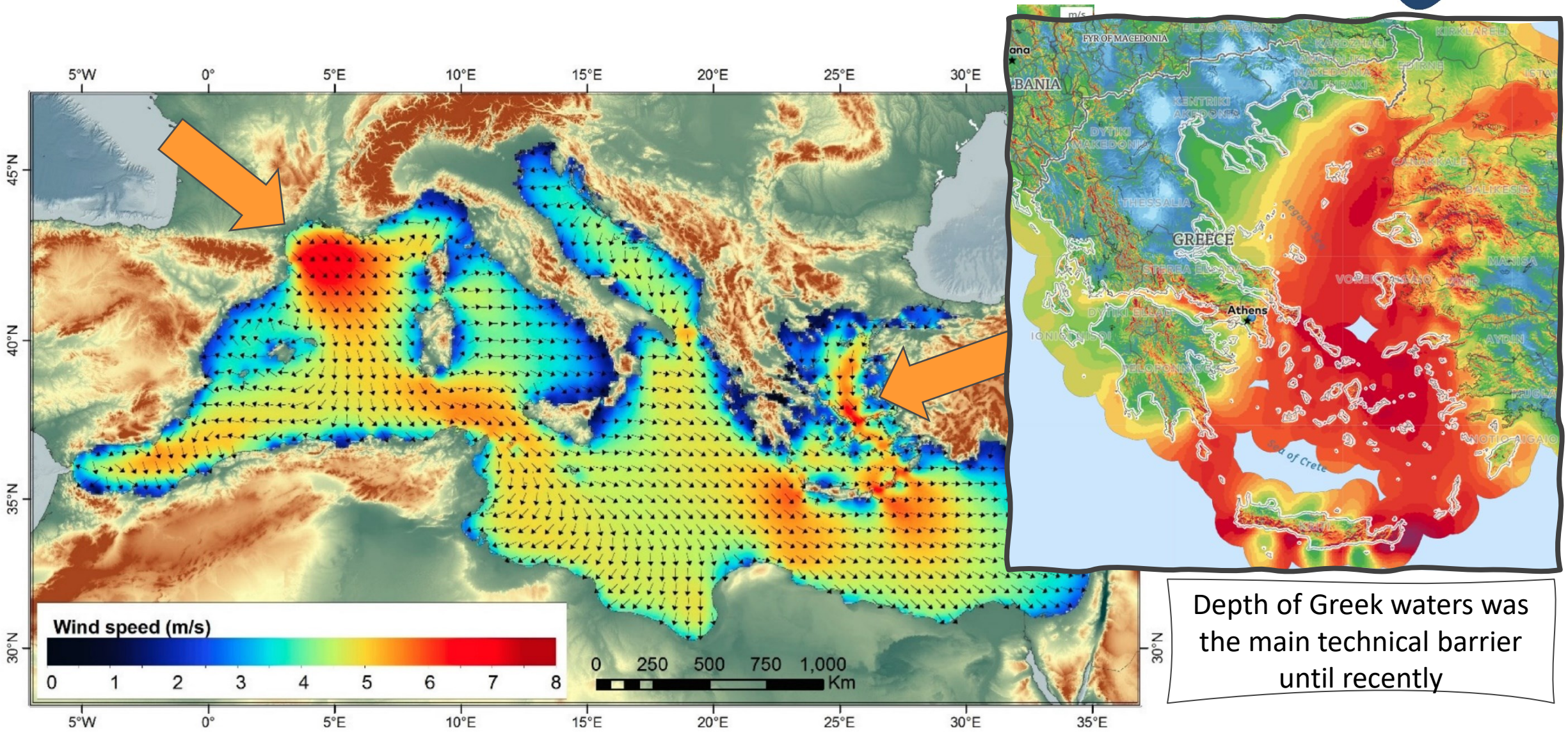
- Offshore wind development will be a game changer for Greece.
- 1,9GW target for 2030
- Legislative framework for offshore wind development, since summer of 2022.
- HEREMA, the public entity in charge of the law implementation

Offshore Wind in Greece

Offshore wind has significant competitive advantages:

- It provides massive wind MWs without conflicts with other human activities.
- It supports the establishment of a significant local supply chain, providing local added value to the local Greek economy, such as shipyards, ports, cables, logistics, cement industry etc.*
- It will lead to strengthening of the country from a geostrategic point of view.
- It will make Greece producer & exporter of Green Energy

Offshore Wind: The opportunity for the Greek waters

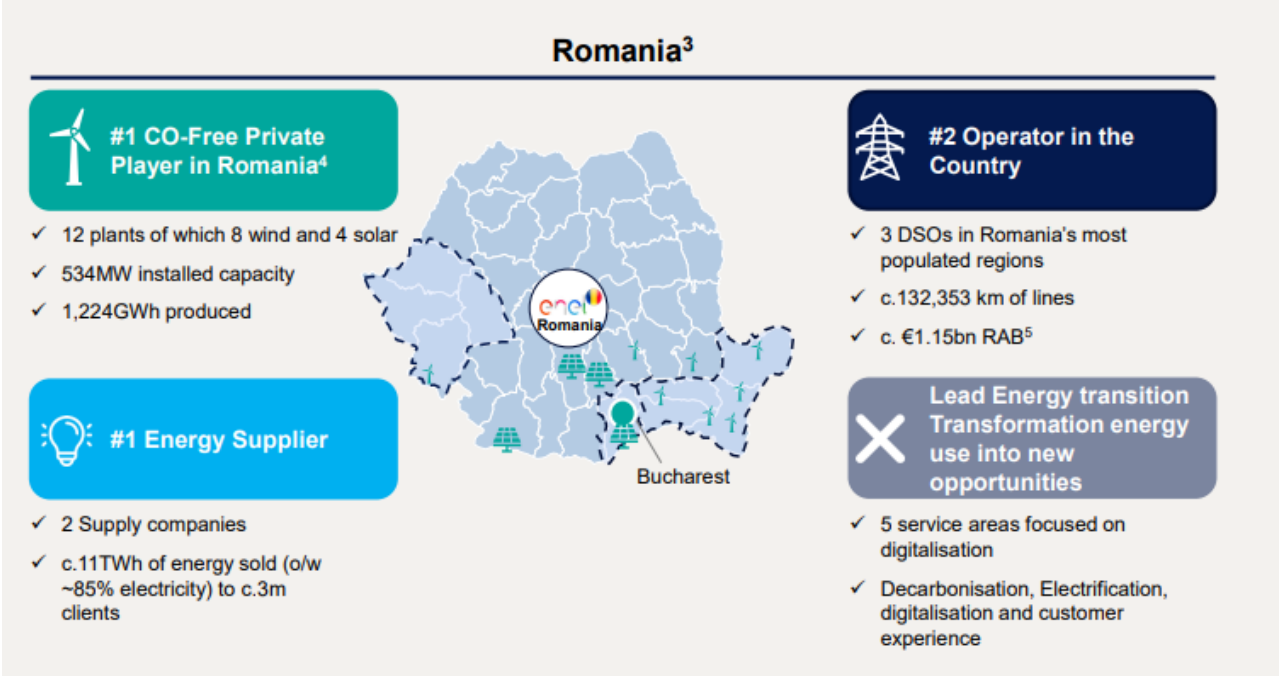


Depth of Greek waters was the main technical barrier until recently

***Source**: Marine Renewable Energy in the Mediterranean Sea: Status and Perspectives, Soukissian et. al., energies, 2017*

Greece-Romania synergies

- Public Power Corporation (PPC) acquisition of Enel Romania and its subsidies



3 Enel Romania data as of 2021. 4 Wind and solar generation among CO_2-free, private generators (dispatchable units only). 5 Including recoverable network losses.
https://www.dei.gr/media/2dqccemj/ppc-signs-agreement-to-acquire-enel-s-romanian-operations_vff.pdf

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www.eletaen.gr

www.ask4wind.gr