WHY OFFSHORE WIND IN GREECE

Panagiotis Ladakakos
HWEA, President
### National Energy & Climate Plan (NECP)

<table>
<thead>
<tr>
<th>Energy parameter/index</th>
<th>Target 2030</th>
<th>Estimation 2030*</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHGs decrease compared to 2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>non-ETS sectors</td>
<td>16%</td>
<td>31%</td>
</tr>
<tr>
<td>ETS sectors</td>
<td>43%</td>
<td>63%</td>
</tr>
<tr>
<td>RES share</td>
<td></td>
<td></td>
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<tr>
<td>in Gross Final Energy Consumption</td>
<td>31%</td>
<td>31%</td>
</tr>
<tr>
<td>in Gross Final Electricity Consumption</td>
<td>55%</td>
<td>56%</td>
</tr>
<tr>
<td>in Heat &amp; Cooling</td>
<td>30%</td>
<td>32%</td>
</tr>
<tr>
<td>in Transportation</td>
<td>14%</td>
<td>20%</td>
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</tbody>
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*with the application of additional policy measures provided in NECP

**Source:** National Plan for Energy and Climate (January 2019)
NECP: A challenging decade for wind energy in Greece...

Installing 7.8 GW of new RES until 2030 is a challenge. Could offshore wind ensure the 2030 targets?

Source: National Plan for Energy and Climate (January 2019)
Current status & prospects of onshore wind

- Wind Energy Auctions have been undersubscribed
- Lack of mature onshore wind projects
- High wind onshore sites are gradually exhausted
- Eventually there will be a saturation in onshore wind...

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<tbody>
<tr>
<td>July 2018</td>
<td>Wind (3MW&lt;P≤50MW)</td>
<td>300</td>
<td>170.9</td>
<td>129.1</td>
</tr>
<tr>
<td>December 2018</td>
<td>Wind (3MW&lt;P≤50MW)</td>
<td>229</td>
<td>159.7</td>
<td>69.4</td>
</tr>
<tr>
<td>April 2019</td>
<td>Common (Wind&gt;50MW &amp; PV&gt;20MW)</td>
<td>600</td>
<td>?</td>
<td></td>
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<tr>
<td>(upcoming)</td>
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</table>

Source: RAE

Only one wind project participates!
NECP: Few but critical provisions for wind offshore

NECP, pg. 135

“The specific requirements for the development of a specific regulatory (licensing and support scheme) and spatial planning framework for offshore wind farms are also highlighted”

NECP, pg. 147

<table>
<thead>
<tr>
<th>Αρίθμηση</th>
<th>Όνομα μέτρου πολιτικής</th>
<th>Στόχος</th>
<th>Επηρεαζόμενος τομέας</th>
<th>Εκτιμώμενες επιπτώσεις (1: Πολύ χαμηλές έως 5: Πολύ υψηλές)</th>
<th>Κατηγορία μέτρου</th>
<th>Κατάσταση εφαρμογής</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2.3</td>
<td>Αδειοδοτικό και χωρωταξικό πλαίσιο για θαλάσσια αιολικά πάρκα</td>
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Licensing & Spatial planning for wind offshore

NECP, pg. 279

“It should be noted that in order to achieve the above-mentioned new wind and photovoltaic capacity... it is necessary to gradually examine... new categories of projects (e.g. offshore wind farms)... In this context, the respective regulatory framework for the operation of these projects should also be developed”

Source: National Plan for Energy and Climate (January 2019)
The opportunity of the Greek seas

Source: Marine Renewable Energy in the Mediterranean Sea: Status and Perspectives, Soukissian et. al., energies, 2017
The winds of the Aegean sea: Still an unexploitable source

Main challenges for Offshore wind in Greece

- Depth of waters
- Transmission Capacity
- Infrastructure (ports, shipyards)
- Licensing constraints
- Political - Geostrategic constraints
- Costs

Source: https://globalwindatlas.info
Offshore wind in Greece – Floating is a game changer

- **Rapid developments** in technology, costs, projects
- Exploitation of **domestic experience** & local industrial base (shipyards, cables etc.)
- Significant **domestic value** (WTGs less than 40% of CAPEX)
- **Opportunity** & need for Greece
Global challenge for floating wind - Huge potential in deep waters

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Share of offshore wind resource in +60m depth</th>
<th>Potential for floating wind capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>80%</td>
<td>4.000 GW</td>
</tr>
<tr>
<td>USA</td>
<td>60%</td>
<td>2.450 GW</td>
</tr>
<tr>
<td>Japan</td>
<td>80%</td>
<td>500 GW</td>
</tr>
</tbody>
</table>

Source: CarbonTrust

Source: EMODnet
Overview of floating wind today

Source: Wind Europe
Overview of floating wind today

Source: Wind Europe
Overview of floating wind today

Source: Wind Europe
Overview of floating wind today

Source: Wind Europe
Overview of floating wind today

Source: Wind Europe
The cost reduction journey of bottom fixed offshore wind provides confidence for similar floating wind LCOE decrease.

Source: Bloomberg NEF
Floating wind LCOE

LCOE decrease depending on capacity

Floating wind reaching parity with bottom fixed

Source: Wind Europe and BVG Associates
Maybe Greece should wait some years to open the market?

The answer to the question above is negative!

✓ Project development & licensing lead-times
✓ Adaptation of domestic infrastructure (grid, ports, yards etc.)
✓ Whiteboard future planning
✓ Advantage of today early stages
✓ Premature markets contain great chances

The future is today...Greece must grab the opportunity!
Macroeconomic benefits of floating wind projects

**QUESTION:**
- How much would offshore wind impact the Greek economy? real economic growth, jobs, social welfare

**Case study in the UK**

- 2031-2050: **1GW annual deployment** of floating wind in the UK and **2GW exports** in the growing global market
- **1 euro** of public support (by 2029) in supply chain, pre-commercial and early commercial stage will have **15 euros cumulative GVA** and **17,000 new jobs** by 2050

Alternatively

- **0 euro** of public support will have **7,9 euros** cumulative GVA and **3,600 new jobs** by 2050

**Source:** Macroeconomic benefits of floating offshore wind in the UK, Crown Estate Scotland, September 2018
Macroeconomic benefits of floating wind projects

500 MW of offshore wind generates 2.1 million person-days of employment

- **24%** Operation and maintenance
- **59%** Manufacturing and procurement
- **11%** Installation and grid connection
- **5%** Decommissioning
- **1%** Project planning
- **0.1%** Transport

*Source: International Renewable Energy Agency (IRENA)*
Are banks willing to finance floating wind?

Existing offshore wind projects in the EU co-financed up to 40% by European Investment Bank. Floating is the new candidate.

“Floating is a good example. If we could create a demonstration effect that led to more projects of this nature that created a supply chain around floating wind, we could get the costs down to something that is more economic, and we could then start and have a snowball effect... You open up huge potential. You also open up new export markets for Europe... That’s the dream.”

Andrew McDowell, Vice President European Investment Bank
Yes, but in a different way

- Current framework should be modified
- Government’s role should be the determination of a **marine spatial planning**, not the licensing of projects
- Simple and fast licensing approvals (floating is very environmental friendly)
- Remuneration scheme
What remuneration scheme for offshore wind?

Various alternative tools could become available

• Special auctions for **offshore wind**
  (pilot auctions for non mature projects could initiate the process since currently there are no mature projects)

• Auctions for offshore in **grid hubs** where the System Operator provides connection capacity

• **Common auctions** with onshore wind with special premium for offshore

• **Individual notification** process
  (2014/C 200/01 State aid guidelines provisions)

• **Unsolicited proposals** is also a useful tool
The key role of the transmission network

Saturation of grids in certain areas
- Many grids already characterized as saturated
- Several areas close to electrical saturation

...and
- Islands with limited capacity

Potential introduction of offshore wind should be coordinated very closely with the expansion of the National Transmission Network!

Source: 2019-2028 Ten-year Transmission System Development Plan, Hellenic TSO, November 2018
Proposals for immediate actions to boost offshore wind in Greece

✓ Allow licensing of projects from today
✓ The revision of the Spatial plan for RES should incorporate the Greek seas
✓ Screening for exclusion zones (marine traffic, firing ranges, sensitive areas etc.)
✓ HTSO/ADMIE should consider the idea of building Transmission hubs in the sea for offshore exploitation
✓ Pilot Projects & a Pilot Auction will be a catalyst
Last but not least: The geostrategic parameter

- Offshore wind gives the opportunity to exploit the unexploited territorial waters
- Electrical interconnection in the Aegean
- Development of Exclusive Economic Zones (EEZ) in all Greek Seas
- Greece producer & exporter of Green Energy
- Contribution to the European Strategy for Energy Independence
- Attraction of large foreign investors/investments
- Geopolitical empowerment and sustainable development

Source: Angelos Syrigos, Assis. Professor, Panteion Univ., Kathimerini, Special Edition 2018
Thank you!