

A photograph of an offshore wind turbine at sunset. The turbine is silhouetted against a bright, orange and yellow sky. The sea is visible in the foreground, with gentle ripples. The overall mood is serene and focused on renewable energy.

Development of a Regulatory Framework for Offshore Wind Development in Greece

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1. Offshore wind technologies

“...among the renewable technologies with the greatest potential to scale up...”

E.U.: 12 GW installed → 60 GW in 2030 → 300GW in 2050

Potential:

LCOE Fixed-Bottom: 44-75 €/MWh today

LCOE Floating: 76 €/MWh in 2030, 46 €/MWh in 2050

Fixed-Bottom:

- Technological maturity
- Cost-effectiveness (Dunkirk offshore: 44€/Mwh in 2020)

Floating:

- Technological innovation (150MW in 2024)
- Large potential
- Social acceptance



2. NATIONAL PARAMETERS

Large depths at the Aegean Sea

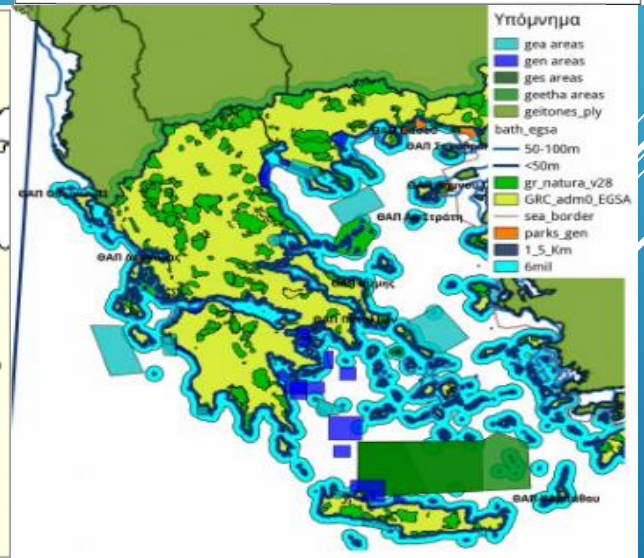
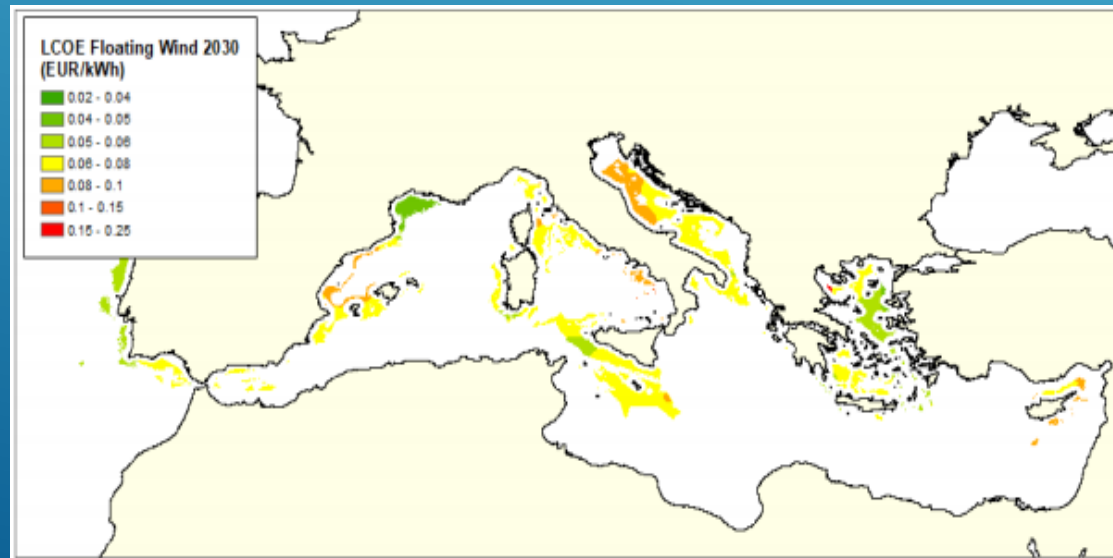
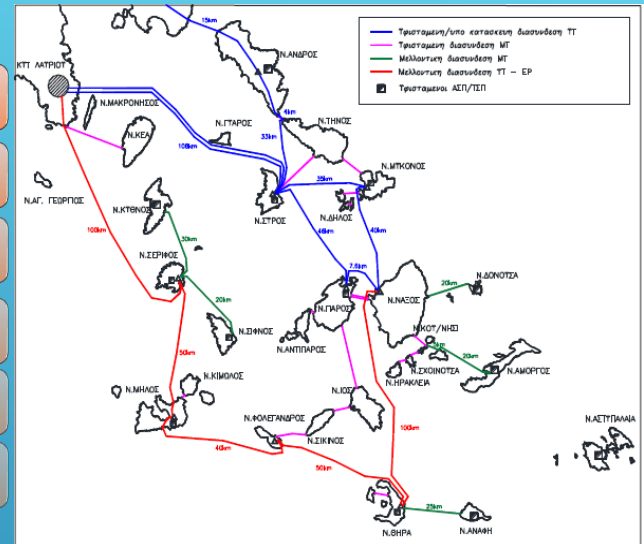
“Mild” developmental model for islands

Complex and ambitious interconnection plan for islands

Lack of port infrastructure

3.5 GW exploitable potential for fixed-bottom in territorial waters

263 GW exploitable potential for floating in EEZ



3. KEY DESIGN CHOICES

Zoning - Permitting

- Process for selection of eligible sites
- Process for rights for wind measurements
- Environmental / operational permitting process

Interconnection

- Planning, permitting and execution of subsea interconnection
- Role of the TSO
- Possible role of private companies
- Allocation of connection costs

Remuneration

- Cost-efficiency vs Bankability
- Best timing for auctions
- Auction design options

3.1 SITE SELECTION – PERMITTING

- ▶ **Spatial Planning:**
 - ▶ Lack of maritime spatial planning
 - ▶ Substitution with SEA
- ▶ **Selection of Sites:**
 - ▶ Selection by the State vs unsolicited proposals
 - ▶ Interaction with other competent authorities
- ▶ **Wind Measurements:**
 - ▶ Pre- or post-auctions?
- ▶ **Licensing/Permitting:**
 - ▶ Process similar to onshore RES?

The key issue to be decided is the role of the State in the process, i.e. how centralized or de-centralized the framework will be.

3.2 INTERCONNECTION

▶ Role of the TSO:

- ▶ TSO is very experienced
- ▶ TSO has some limitations (e.g. public procurement rules 4412/2016)
- ▶ Planning, Permitting, Building

▶ Options:

- ▶ Institutional competence of TSO
- ▶ Investor may choose Private Contractor
- ▶ Investor must/may choose TSO as Contractor

▶ Connection Costs:

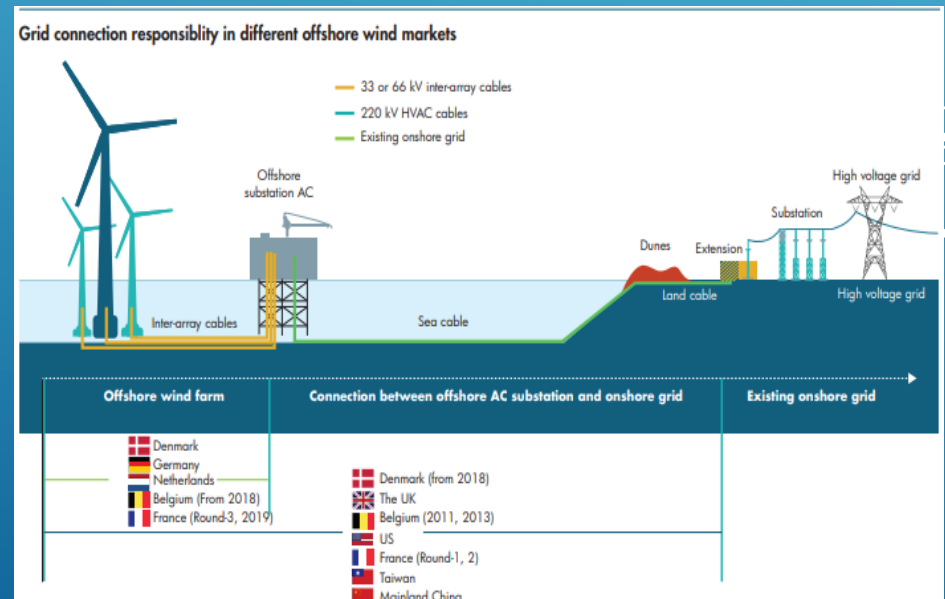
- ▶ Paid through Grid Charges
- ▶ Paid by agreement between Investor and Contractor
- ▶ Regulated costs paid by Investor to TSO

Belgium, France,
Germany

-> TSO

Denmark, U.K., U.S.A.,
Netherlands, Taiwan

-> Investor



3.3 REMUNERATION SCHEME

▶ Key alternatives:

- ▶ Incentive: CfD/FiT
- ▶ Mechanism: Auctions/Individual Notification

▶ Design options:

- ▶ Offshore-specific auction
- ▶ Joint auction with premium on onshore price

▶ Bankability:

- Investment de-risking: early price lock-in
- Competition and cost-effectiveness: late price lock-in

The support scheme must allow full cost recovery and a healthy profit while at the same time guaranteeing effectiveness for the System through competition.

Renewable Obligation Certifications
Feed-in-Tariff
Guaranteed price auctions with Premium Tariff
Demonstration Incentive Program
Contract for Difference (CfD)
Competitive Bidding
Auctions with Zero-subsidy
Centralised Auctions
Corporate PPAs with T-REC (Taiwan Renewable Energy Certification)
Premium Tariff through Tendering System
Auction with ceiling price regulated
Feed-in-Premium (SDE)

Support schemes in key offshore wind markets

Key Market	Former Schemes	Current Schemes	Upcoming Schemes
UK			n/a
Denmark			
Germany			
The Netherlands			n/a
Taiwan			
China			
Japan			n/a

4. TWO INDICATIVE DESIGN OPTIONS

Option 1: Open door

Through an Eol Investors are solicited for Project ideas for 500 – 1000 MW

Permitting

- ▶ Check of proposal
- ▶ Ad hoc grant for measurements
- ▶ EIA
- ▶ Auction for concession

Interconnection

- ▶ Cooperation with TSO
- ▶ Cost allocated to Investor

Remuneration

- ▶ Feed-in tariff/premium through auctions/individual notification

Option 2: Mechanism for the creation of project pipeline

A permanent framework for maturing and implementing projects

Permitting

- ▶ Preselection of eligible sea zones
- ▶ SEA
- ▶ Established process to grant rights for measurements

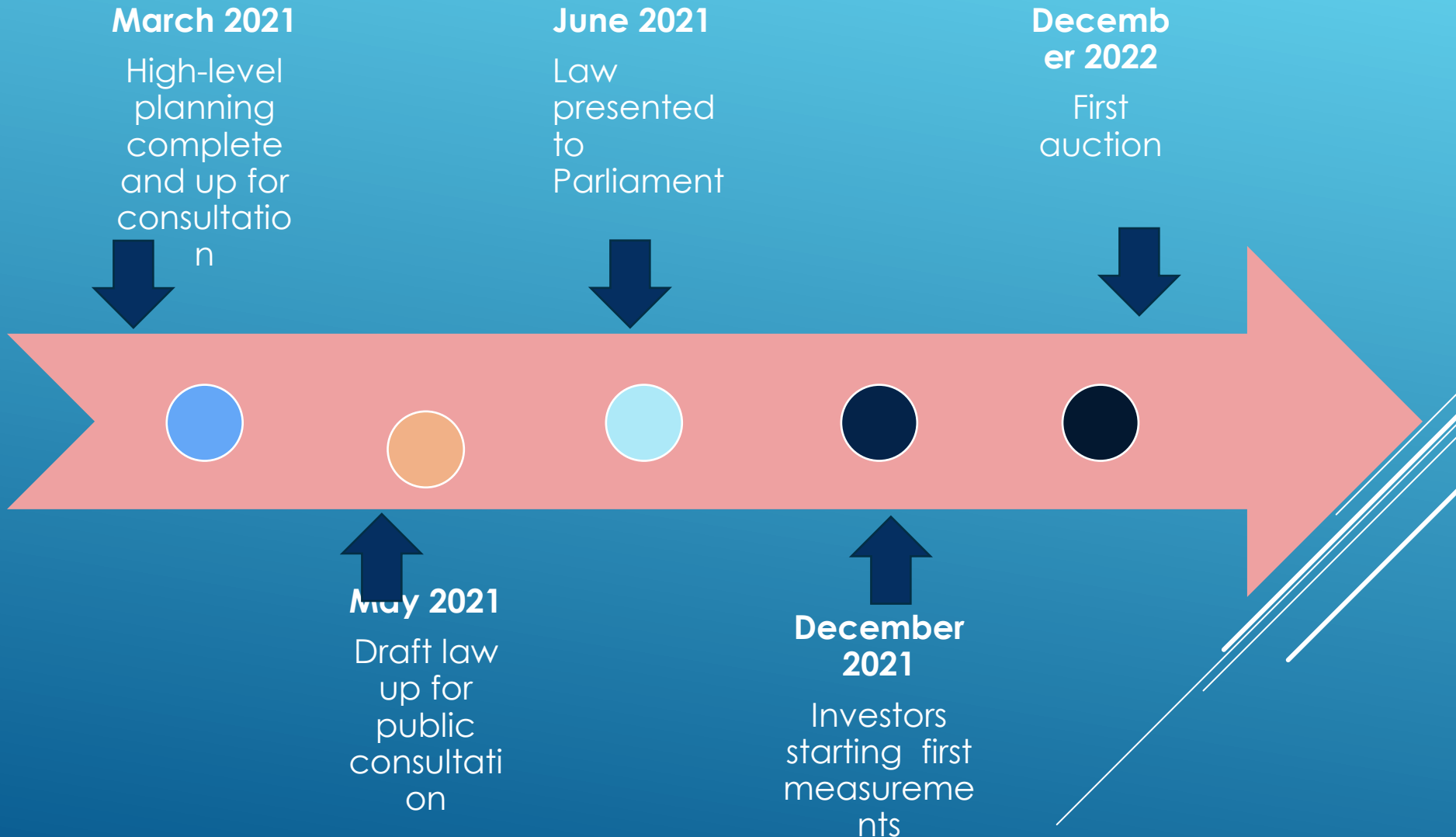
Interconnection

- ▶ Contractor selected by Investor
- ▶ Possibility to work with TSO on a project basis
- ▶ Costs allocated to Investor

Remuneration

- ▶ Feed-in premium through scheduled, recurring auctions

5. ROADMAP



**Thank you for your
attention!**

Antonis Marinos

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General Secretariat for Energy and Mineral Resources

Ministry for Environment and Energy

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