



GT EÓLICA MARINA

6ª Reunión

Dirección Técnica
08 Mayo 2020



Orden del día

1. Introducción. Presentación de asistentes.
2. Hoja de Ruta para el Desarrollo de la Eólica Marina en España.
 - a) Conceptos Generales.
 - b) Documento de Alegaciones.
3. Ruegos y preguntas.

A photograph of a wind farm with several tall, white wind turbines standing in a green field under a blue sky with light clouds. The turbines have red and green markings on their lower sections.

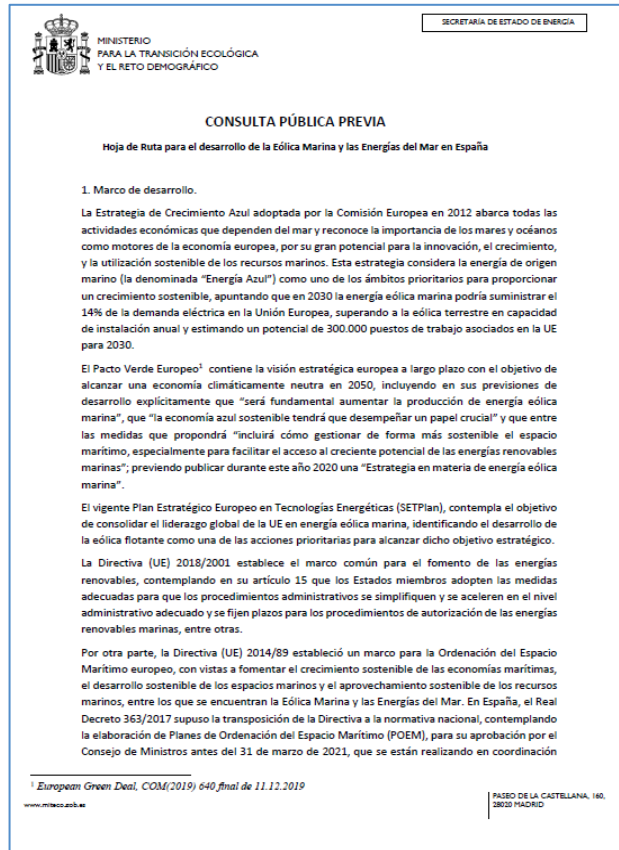
1. Introducción y presentación de asistentes

A photograph of a wind farm with several large white wind turbines standing in a green field under a blue sky with light clouds. The turbines have three blades each and a red stripe near the base of the tower. The text is overlaid in the center of the image.

2. Hoja de Ruta para el Desarrollo de la Eólica Marina

Hoja de Ruta Desarrollo Eólica Marina

Estudio Ambiental Estratégico del PNIEC



Proceso de Participación Pública:

- Fecha inicio: 29/04/2020
- Fecha Fin: 15 días a partir del fin del Estado de Alarma
- Link de la consulta previa:
<https://energia.gob.es/es-es/Participacion/Paginas/DetalleParticipacionPublica.aspx?k=316>

A photograph of a wind farm with several large white wind turbines standing in a green field under a blue sky with light clouds. The turbines have three blades each and a red stripe near the base of the tower.

a. Hoja de Ruta para el Desarrollo de la Eólica Marina

- **Conceptos Generales**

Background

Balance between Regulation and Project Risk

Policy & Regulation:

- Which policy and regulatory frameworks have been most effective in catalysing growth?
- How can policymakers effectively balance the risk profile for developers and consumers?



Project Risk Management:

- How can developers manage risk throughout the project lifecycle?
- Which developer models and strategies have been most successful?

Investors will value FOW projects by taking a view on the 4 major development risks:

- Offtake. PPA secured and/or incentive mechanism allocated?
- Grid connection secured?
- Permitting free from any claims?
- Technology/design certified and/or with track record?

Source: Green Giraffe

Incentive mechanisms

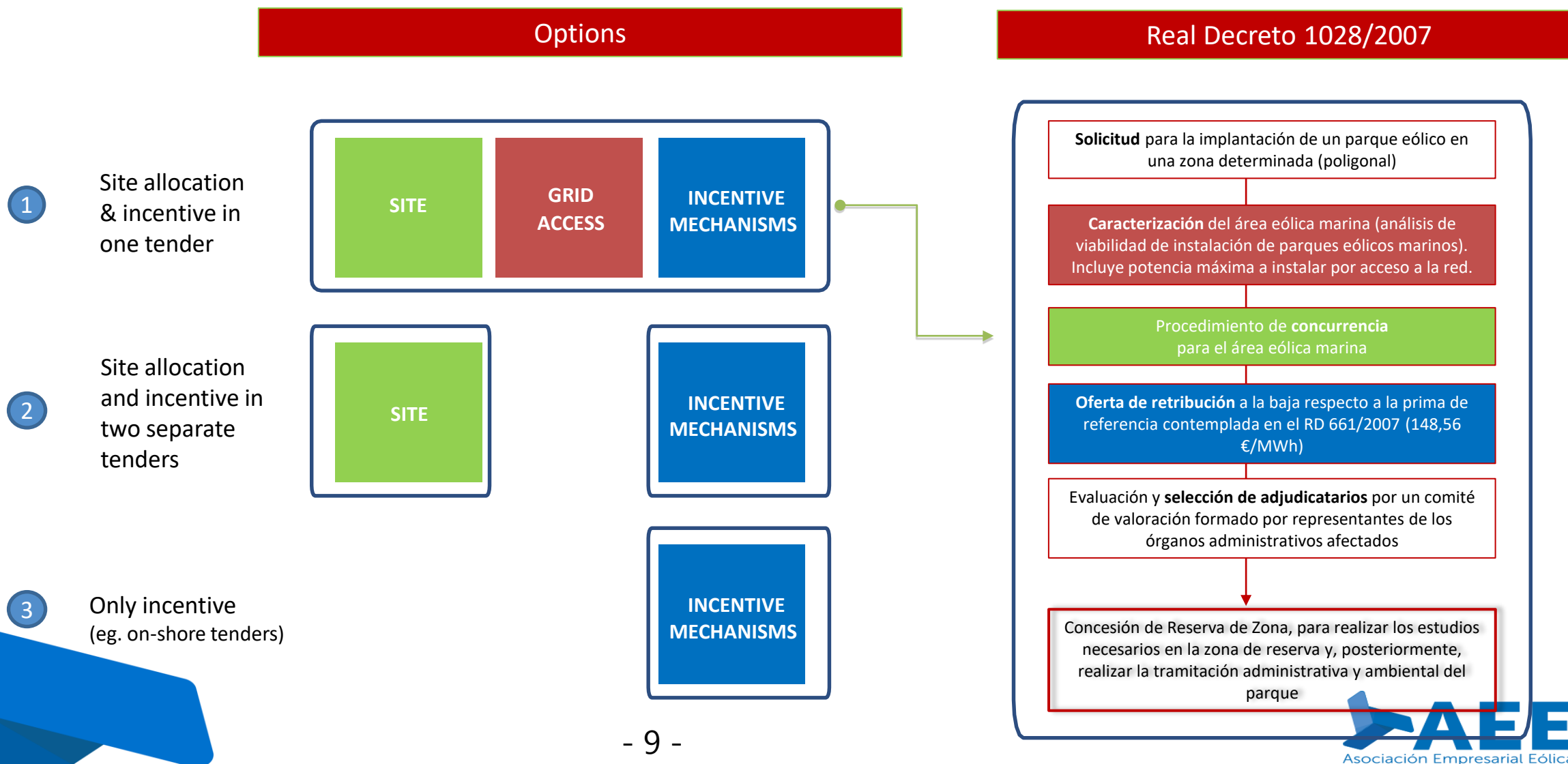
Evolve with technology and market maturity

Demonstration projects	Early commercial projects	Large-scale commercial projects
Maturity		
Capital grants	Fixed off-take contracts	Competitive auctions
- Supports early projects where costs are uncertain due to lack of experience - E.g. UK Offshore Wind Capital Grants Scheme	- Market-based mechanism - Provides commercial returns for developers, based on energy generation - E.g. Feed-in premium; UK ROCs	- Increased competition encourages cost reduction - Auction budgets can help to control government spend - E.g. UK Contracts for Difference

- Governments take on higher risk in immature stages, shifting risk to developers as the technology matures
- Growing **technology maturity** means that emerging markets are expected to go straight to fixed off-take or competitive auctions
- Limited **market maturity** may be a barrier to competitive auctions in more isolated markets

Competitive auctions

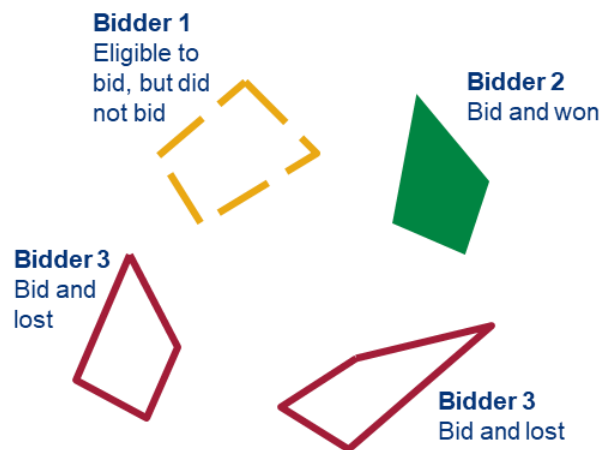
Content



Site development and competitive auctions

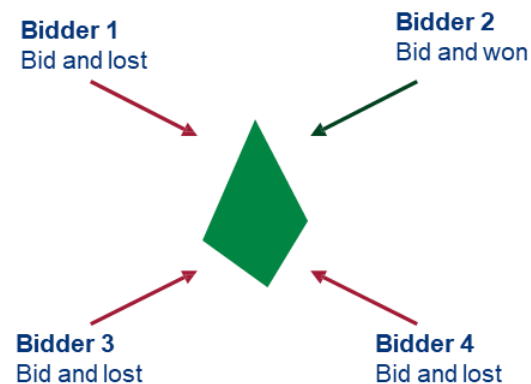
Decentralized vs centralized models

Decentralised tender



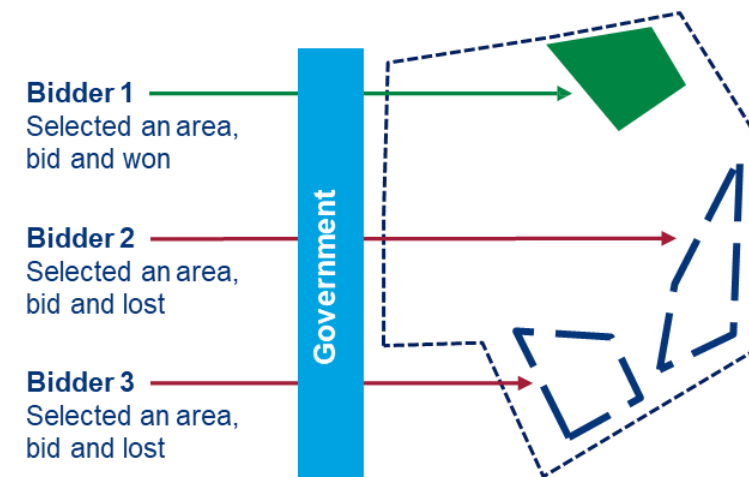
- Developers bid with projects that they have developed and compete with other projects that have been developed by other developers.
- Project would need to have passed pre- defined milestones to be eligible to bid. These milestones vary across tenders.

Centralised tender



- Government defines the outer boundaries of the projects and conduct preliminary studies at the site.
- Government initiates a tender based on a set of pre-defined criteria, allowing multiple developers to bid for the same project. The criteria, length and number of steps (e.g. prequalification), vary from project to project.

Hybrid tender



- Government has selected an area prior to the tender. The developer then selects a site within this area and subsequently bids in the tender
- Developer will be awarded the site at the same time it is awarded the tender.

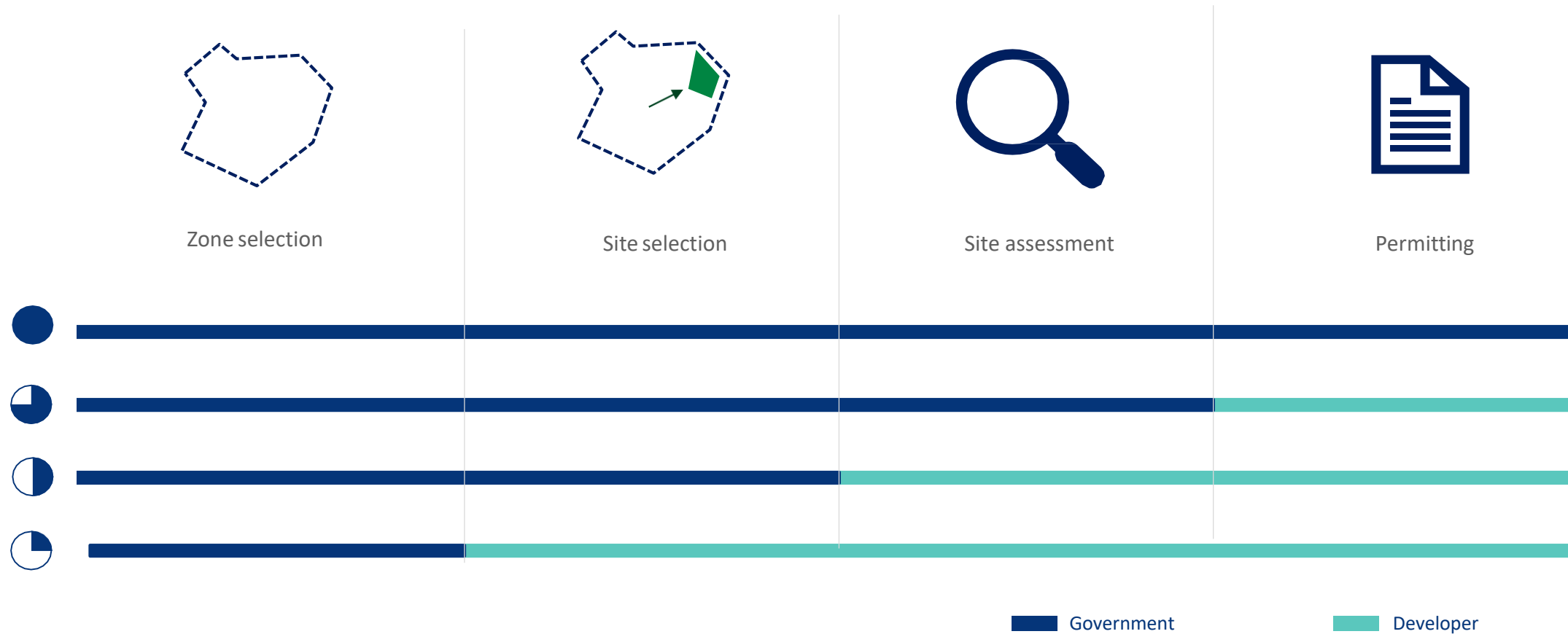
Site development & competitive auctions

Pros and cons of the different models

	Government Perspective	Developer Perspective
Decentralized	+ Lower cost and risk to government + Increased competition stimulates cost reduction - Less control over strategic coordination of grid access and connection - Efecto sobre el precio del mayor riesgo asumido por los developers	+ Greater control over the design and development of the offshore wind assets + Reduces the risk of delays in calling the auctions + Ability to demonstrate competitive advantage by detecting development opportunities and optimising the designs - Higher development costs and risks for developers
Centralized	+ Strategic coordination of offshore developments + Possibility of sharing assets between multiple wind farms - Centralised models require considerable internal capacity building - Cost to consumers may be higher if sites not well selected or optimised - Reduced room for competition can result in higher costs	+ Reduces allocation and development risks + Reduces development expenditures - Too long process for calling the auctions - Risk of design inefficiencies from Government - Site-specific tendering can introduce greater portfolio risk to developers able to create its own portfolio

Site development and competitive auctions

Development costs: categorisation and sharing models

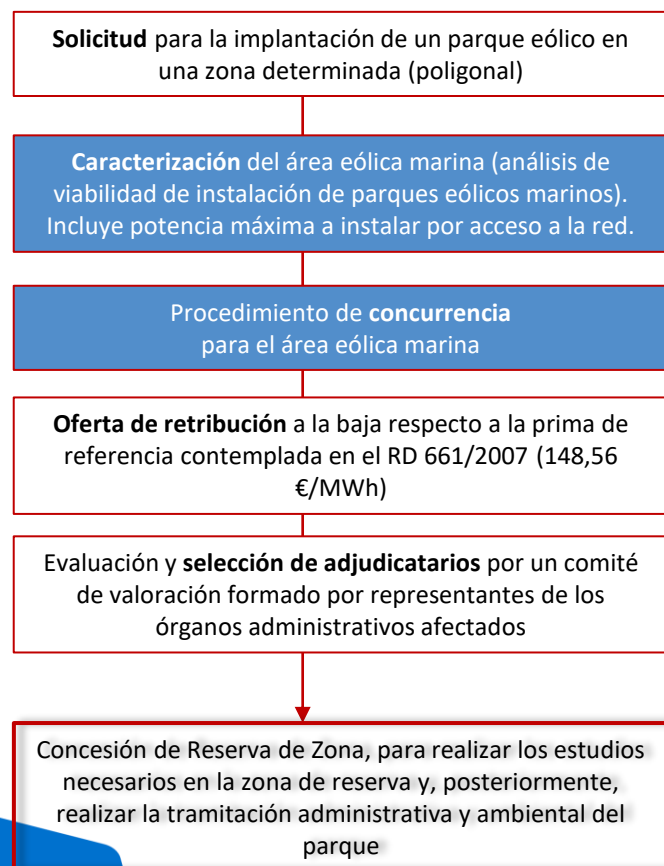


Source: Wood Mackenzie

Subastas en concurrencia

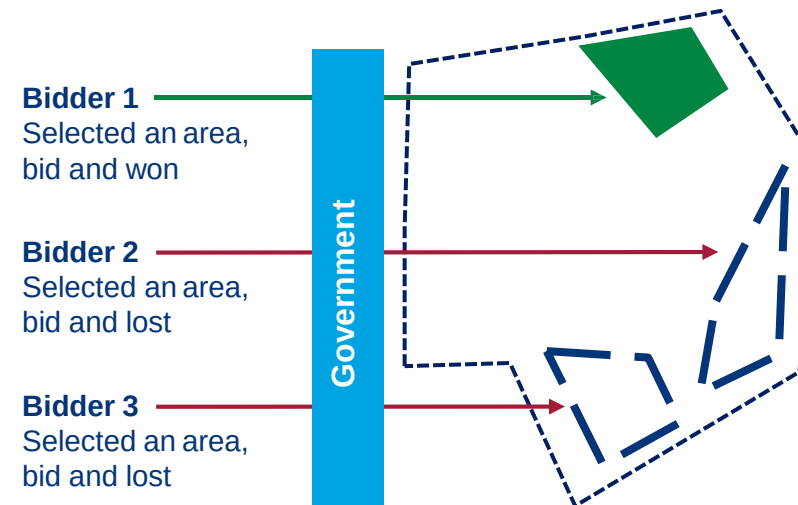
Modelo existente en el RD 1028/2007

Real Decreto 1028/2007



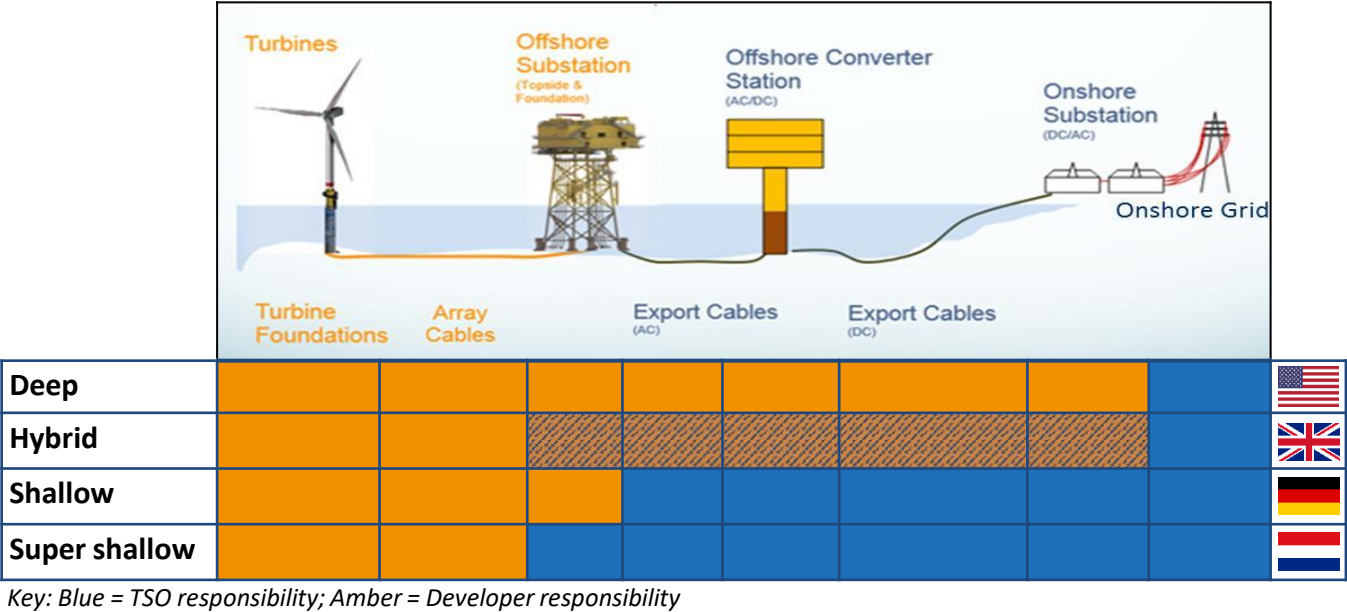
Modelo

Hybrid tender



Grid design & construction

Different models



Grid policy is heavily influenced by local context

- **Centralised TSO-build ('shallow charging')** approaches can help with **strategic coordination** of power transmission to **ease onshore grid constraints**. More amenable to offshore hubs and interconnection.
- **Decentralised developer-build ('deep charging')** models can result in **lower cost point-to-point transmission assets**

Grid design & construction

Pros and cons of the different models

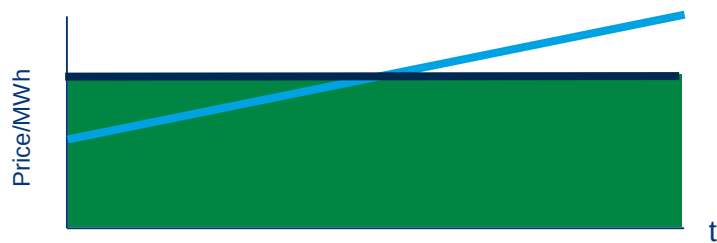
	Government Perspective	Developer Perspective
Developer Build & Operation <i>'Deep model'</i>	+ Lower cost and risk to government + Optimised point-to-point asset minimises costs to consumers + Increased competition stimulates cost reduction - Less control over strategic coordination of grid assets - Challenging to introduce converter platform hubs or interconnection	+ Greater control over the design and construction of the transmission assets + Reduces the risk of unforeseen or uncontrollable connection delays and lost revenue + Ability to demonstrate competitive advantage by optimising assets - Higher cost and construction risk for developer - Additional debt to finance construction
TSO Build & Operation <i>'Shallow/super-shallow model'</i>	+ Strategic coordination of onshore upgrades and offshore hubs + Share assets between multiple wind farms + Standardise substation designs for economies of scale savings - Cost to consumers may be higher if not optimised - Reduced competition can result in higher costs - High cost and risk sitting with TSO to build and manage all offshore assets – TSO needs to be suitably capitalised to take on risk - Public ownership exposes consumers to high risk if TSO is liable to pay compensation	+ Fewer assets to manage – lower risk provided compensation is in place to mitigate risk of downtime + Reduced developer investment, which can lead to lower cost of capital - Higher risk of delays or design inefficiencies from TSO – need adequate compensation in place to mitigate - Risk of low incentives for TSO to maintain to a high standard – downtime causes lost revenue - Less control over asset design

Source: IEA-RETD

Competitive auctions

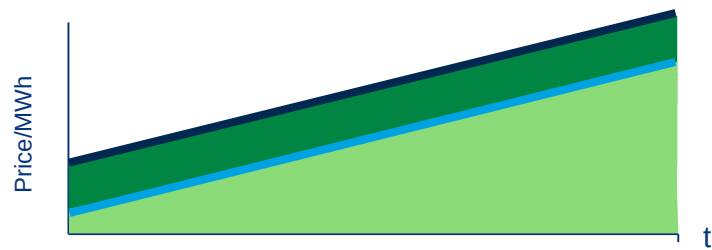
Incentive mechanisms

Fixed feed-in tariff (FiT)



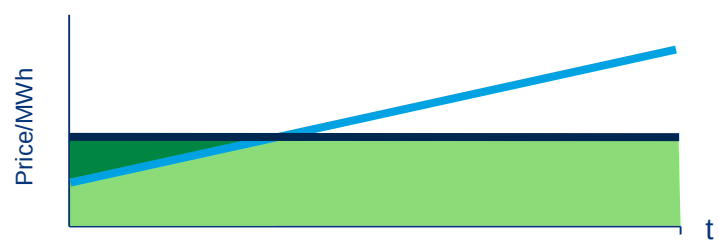
The generator obtains a fixed price for each MWh of electricity produced. The total remuneration is not exposed to power price changes. The remuneration is here paid as a bulk sum.

Floating feed-in premium (FiP)



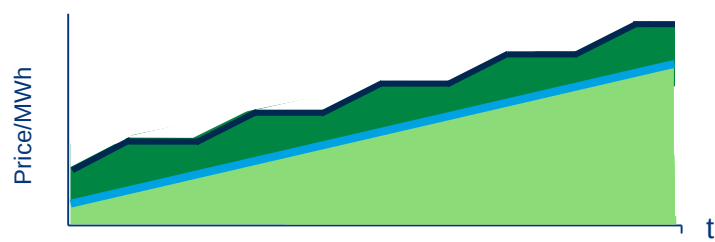
The generator obtains a fixed premium on top of the wholesale market price. The total remuneration is exposed to power price changes.

Contract for difference (CfD)



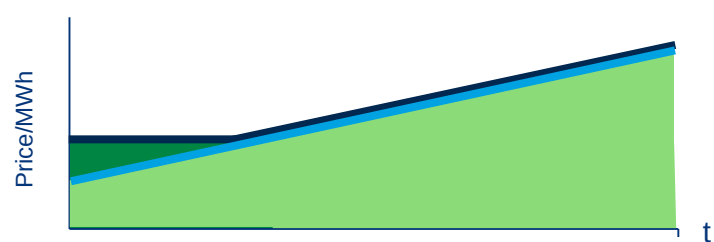
The generator obtains a fixed remuneration without market price upsides or downsides. The remuneration is not exposed to market price changes. Here you market the electricity directly on the wholesale market

Green certificate (GC)



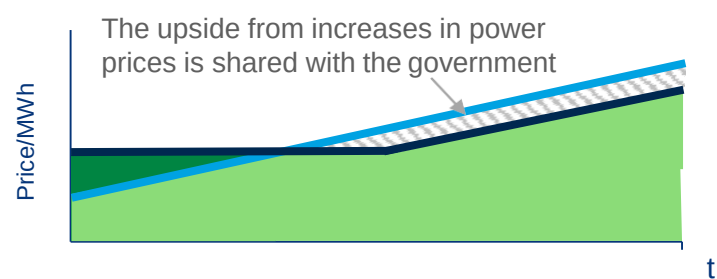
The generator obtains the GC price on top of the wholesale market price. The total remuneration is highly exposed to CG and power price changes.

Sliding feed-in premium (FiP)



The generator obtains a minimum tariff with a market price upside. The total remuneration is exposed to upward power price changes.

CfD with payout ceiling



Similar to a CfD. However, in this setup, the developer shares the power price upside with the government.

Source: Wood Mackenzie

— Remuneration

— Power price

■ Subsidy revenue

■ Wholesale power revenue

Principales premisas para asegurar el éxito de las próximas subastas de eólica marina en Canarias y en España

Objetivo
perseguido por
el MITECO:

Éxito de las
subastas

Implicaciones

¿Qué es
necesario para
conseguir ese
objetivo?

Construir la capacidad prevista...

- Atraer la participación (inversores) necesaria a la subasta(s) evitando que ésta quede desierta o no se cubra por completo la capacidad objetivo
- Asegurar que los proyectos ganadores son efectivamente construidos

...con el mínimo coste para el consumidor

- MITECO debe ser capaz de diseñar un sistema que consiga que los participantes en la subasta obtengan el mínimo incentivo posible que garantice la viabilidad de los proyectos: procedimiento de subasta que asegure la máxima competencia entre participantes, visibilidad en la remuneración

- A** Diseño adecuado del proceso de subasta que garantice la competencia, sea atractivo para inversores y garantice que los proyectos son efectivamente construidos
- B** Establecer un sistema de remuneración que proporcione la visibilidad de ingresos futuros de los nuevos proyectos

Hoja de Ruta para el Desarrollo de la Eólica Marina en España

Marco regulatorio previsto para energías renovables

1 **BORRADOR LEY CAMBIO CLIMÁTICO Y TRANSICIÓN ENERGÉTICA**

2 **Desarrollo Ley → Real Decreto**

- 3
- Orden Ministerial: Convocatoria subasta 1
 - Orden Ministerial: Convocatoria subasta 2
 - Orden Ministerial: Convocatoria subasta 3
 -

Definición modelo general subastas

Definición de las condiciones de detalle de cada subasta

MODELO DE SUBASTAS

- Subastas de energía?
- Pay as bid?
- Por Tecnologías?
- Ámbitos geográficos concretos?
-

previsión según borradores y contactos con MITERD

Subastas competitivas en España

Principios para el diseño

- **Site development:** Centralized / **Decentralized** / **Hybrid**
 - **Site allocation** (If centralized or hybrid): **Jointly with incentive** / Separate from incentive
 - **Grid design & construction:** **Developer** / TSO
 - **Incentive mechanism:** Feed-in Tariff / Feed-in Premium / **Contract for Differences** / etc.
 - **Price caps:** **Floor price** / **Ceiling price**
 - **Repayment intensity:** **Even spread** / Front-end loaded
 - **Support cap:** **Time-based (yrs)** vs Power production
 - **Rate of regression:** Shallow / Steep - **A definir, pero deberá existir un plazo para la puesta en marcha.**
 - **Site-neutrality:** Adjustment by water depth/distance from shore - **no aplicable en un ámbito geográfico tan pequeño**
 - **Price indexation:** **Inflation adjusted**
 - **Auction cap:** Fiscal vs **Capacity**
 - **Technology neutrality:** Technology Neutral vs Specific (**specific offshore, neutral floating vs fixed**)
 - **Auction format:** **Pay-as-bid** vs Pay-as-clear
 - **Pre-qualification:** **Yes** / No
- Bid bond: **High** / Low

Draft para análisis en el grupo de trabajo

A photograph of several wind turbines in a green field under a blue sky with light clouds. The turbines are white with red and green accents on their towers. The text is overlaid on the center of the image.

**b. Hoja de Ruta para el
Desarrollo de la Eólica Marina**

- **Documento de Alegaciones**

4. Ruegos y Preguntas

WEBINAR AEE

Próximo WEBINAR

Ciclo #WEBINAREÓLICOS

La nueva Ordenación que permitirá el desarrollo de la **Eólica Marina** en España

Martes 19 de Mayo 2020 | 16:00 - 18:00

España está inmersa en el proceso de elaboración de los planes de ordenación del espacio marítimo para las cinco demarcaciones marinas existentes.

La representante del **MITERD** expondrá el estado de los trabajos, el calendario estimado y los retos asociados; con una especial atención al sector de las energías renovables marinas, como una de las actividades humanas que tendrán lugar en el medio marino en los próximos años.

El representante del **IDAE** sintetizará cómo contempla el PNIEC 2021-2030 que los instrumentos sectoriales estén preparados para el despliegue de la eólica marina. Como primera acción, se encuentra en consulta pública previa la elaboración de la “**Hoja de Ruta para el desarrollo de la eólica marina y las energías del mar en España**”.

PONENTES

Sagrario Arrieta
Subdirección General
Protección del Mar
MITERD



Juan Ramón Ayuso
Jefe Departamento
Eólico
IDAE



**PRESENTA
& MODERA**
Tomás Romagosa
Director Técnico
AEE



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<https://register.gotowebinar.com/register/4974562645741518859>



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