Danish Energy Agency

Offshore Wind Tendering in Denmark

Polish Delegation 09 April 2019

Erik KJAER, Global Cooperation, DEA

Outline

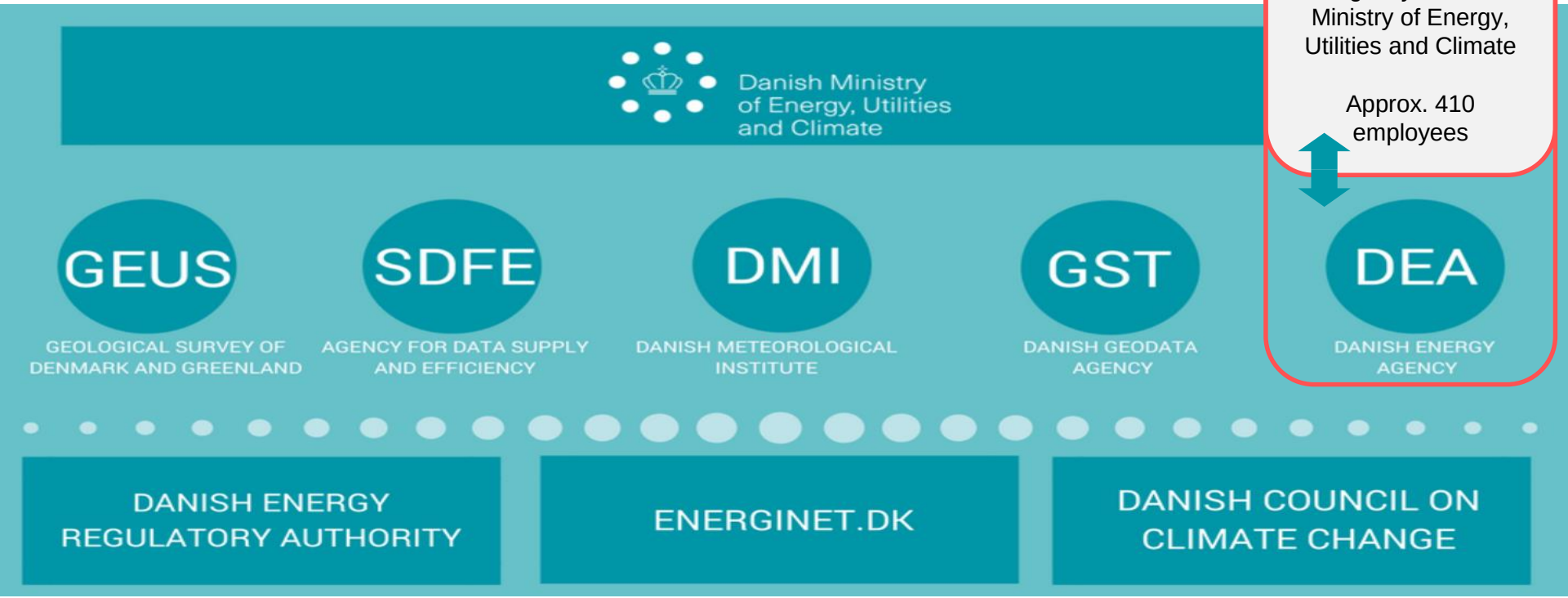
1. About DEA
2. Political Agreements driving offshore
3. The Danish model at a glance
4. Prices
5. Allocation of risks
6. Case: Auction process for 600 MW Kriegers Flak
7. Time for Q&A

Organisation

Established in 1976

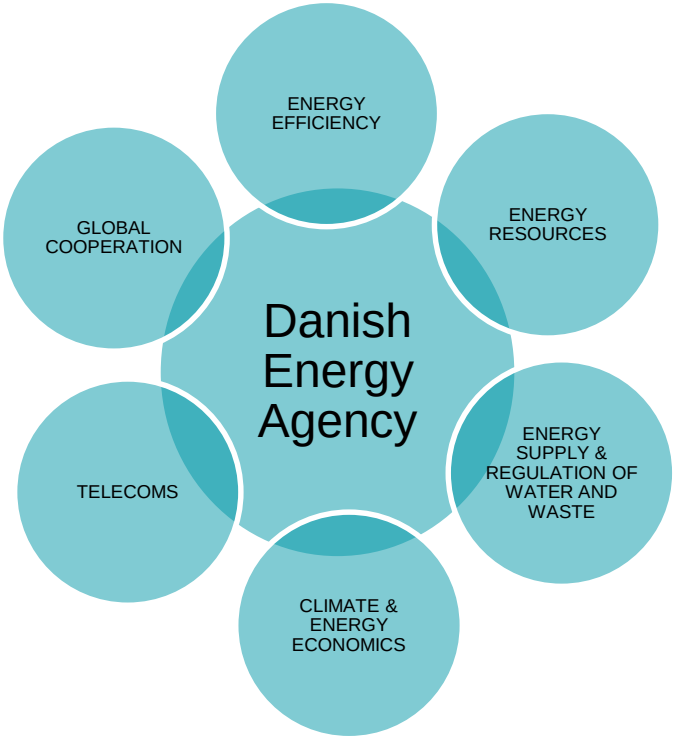
An agency under the Ministry of Energy, Utilities and Climate

Approx. 410 employees



The Danish Energy Agency (DEA)

- Agency under the Ministry of Energy, Utilities and Climate
- Established in 1976
- Responsibilities:
  - Energy production and supply & economic regulation of water and waste sector
  - Energy consumption
  - Energy economic and scenario analysis
  - Climate
  - Telecoms



Danish Energy Agency

Danish offshore wind power

Danish Energy Agency

Danish Energy Policy Agreement 2018

The Agreement applies for the period 2018-24
- based on a broad political agreement

The target is:
- 55% renewable energy in 2030
- Net zero CO2 emissions by 2050

Principles of the Agreement:
- The market shall, as far as possible, conduct the green transition
- The ambition is that the green transition can take place on commercial terms in a few years
- Electricity will be the dominant source of energy

Initiatives

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Tenders for 3 new offshore wind farms of at least 800 MW

Tenders of support for solar and wind power on land – 215 MW expected annually

Continued financial support for biomass plants and expansion of biogas and other green gases

Back to overview

Denmark Probing New Offshore Wind Sites

September 28, 2018

The Danish Energy Agency (DEA) has contracted COWI A/S to screen parts of the North and Baltic Seas to find new potential locations for offshore wind farms to be built.

COWI is in charge of investigating an area of more than 3,200km2 to identify possible different locations for offshore wind projects in the four sites the Danish Energy Agency marked as having relevant potential.

The screening will include discovering which areas are most attractive in terms of obtaining the lowest bid price, as well as whether they should be part of a single tender to increase competition between bidders and territories or whether only a single area will be offered, DEA said.

The Lyngby-based company is expected to complete the work by the end of the year

According to DEA, the screening is an important step towards the development of the plans to build an 800MW offshore wind farm by mid-2020s.

The Danish parliament recently unanimously voted for a new energy agreement which includes building three new offshore wind projects by 2030 with a total capacity of at least 2.4GW.

Four areas were selected as having the potential for accommodating offshore wind farms, including a site in the North Sea off the Jutland west coast, one in Jammerbugt, one at Kriegers Flak and one at Hesselø.

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OFFSHORE WIND | ONSHORE WIND | SOLAR | WAVE & TIDAL | OTHER NEWS

Danes select 800MW Thor to go under the hammer

Officials choose North Sea site for opening offshore wind rights auction

1 March 2019 | OFFSHORE WIND | [Image: Vattenfall]

RELATED STORIES

Siemens Gamesa wins Danish gold

28 NOVEMBER 2017

Danes to sell 21MW Sprogo

22 SEPTEMBER 2017

The Danish government has selected a site in the North Sea as the first 800MW zone for its upcoming offshore wind tenders.

The area, dubbed Thor, is located 20km off Nissum Fjord on the country's west coast and was chosen ahead of a portion of the Kriegers Flak site in the Baltic Sea.

Officials believe the project will unlock the lowest cost of energy.

The tender for the rights to develop the Thor site will be held this year with power due online between 2024 and 2027.

A further two 800MW tenders are also planned at later dates.

"We have kept the municipalities' wishes against our obligation to make the green transition as cheap as possible, and I think the location in the North Sea strikes a good balance, " said Energy Minister Lars Christian Lilleholt.

"The forthcoming offshore wind farm will be our largest and it will make a major contribution to local growth and the green transition.

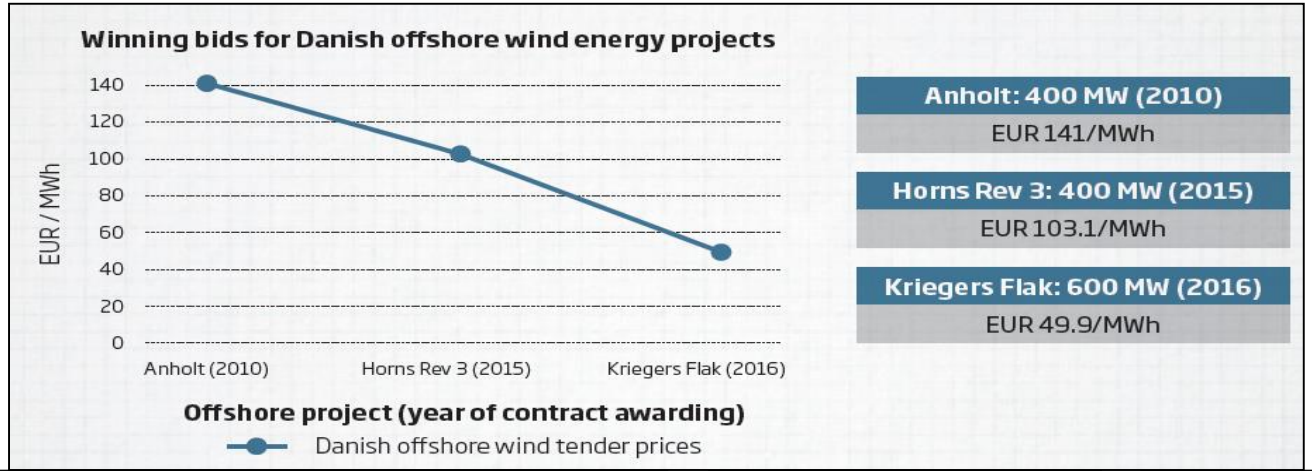
"Offshore wind is a Danish specialty, and the North Sea is well on its way to becoming a Silicon Valley for offshore wind."

The Danish Tender Model – The low risk approach

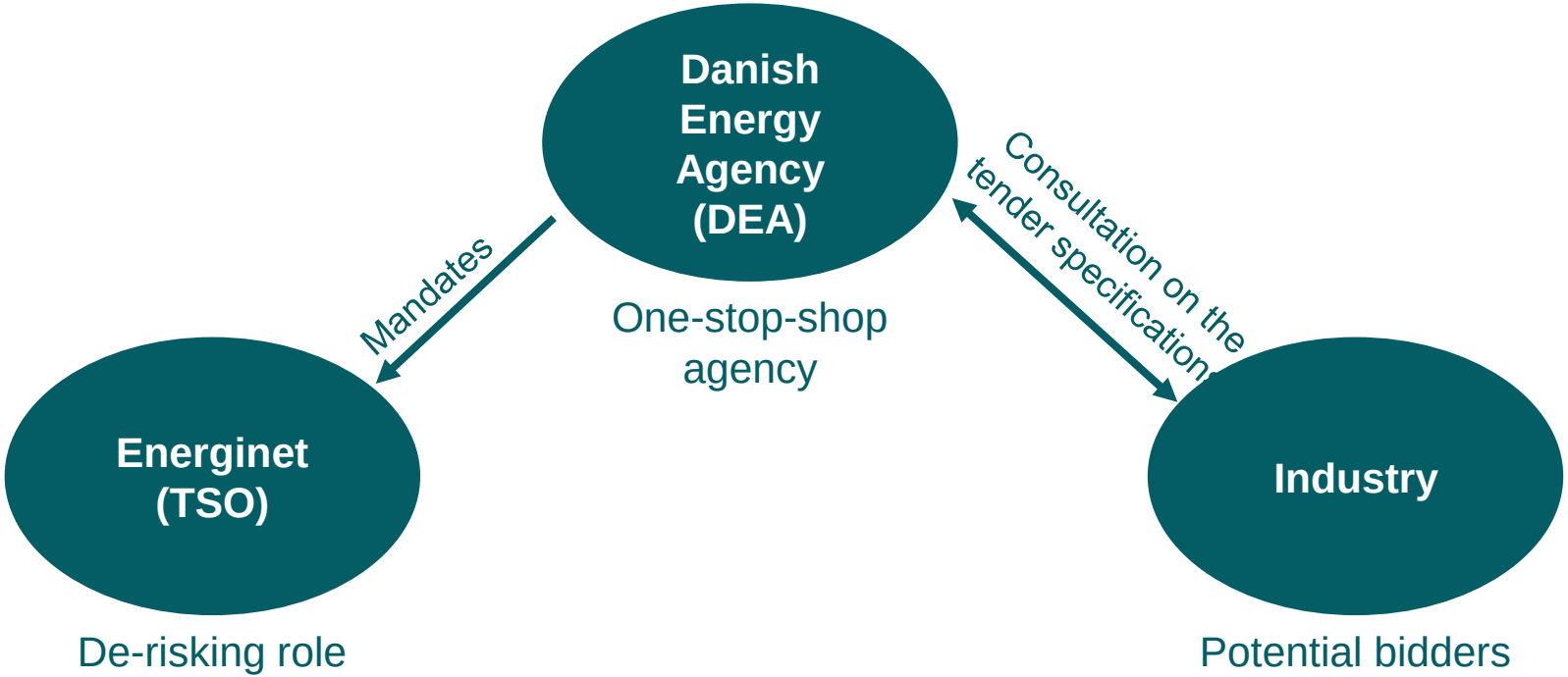
- TSO to develop the site including permitting
- Grid connection financed by the TSO*
- Fixed feed-in tariff for 50.000 full-load hours
- Priority access to the grid
- Increased cross-agency coordination (One Stop Shop)
- Efficient and transparent electricity market
- No local content requirements
- Price per kWh is the only award criteria
- Dialogue and negotiation with potential bidders

Prices for 50.000 FLH without grid

- Anholt – 1.05 DKK/kWH
- Kriegers Flak – 0.372 DKK/kWH



Through a transparent dialogue with the industry…



… a front-loaded de-risking approach

In a Danish offshore wind tender, Energinet - the Transmission System Operator (TSO) - is responsible for:

- Establishing the offshore grid connection infrastructures
- Performing the Environmental Impact Assessment (EIA)
- Acquiring metocean and soil conditions data

- ➢ The costs are refunded by the winner of the tender.
- ➢ Energinet is liable to pay compensation if delays occur.

➔ Lowest possible risk for the developer

Risk allocation

Who Should Bear The Risk?

The Party Least Able To Refuse Or The Party Best Able To Manage The Risk?

Policy Framework is a Tool

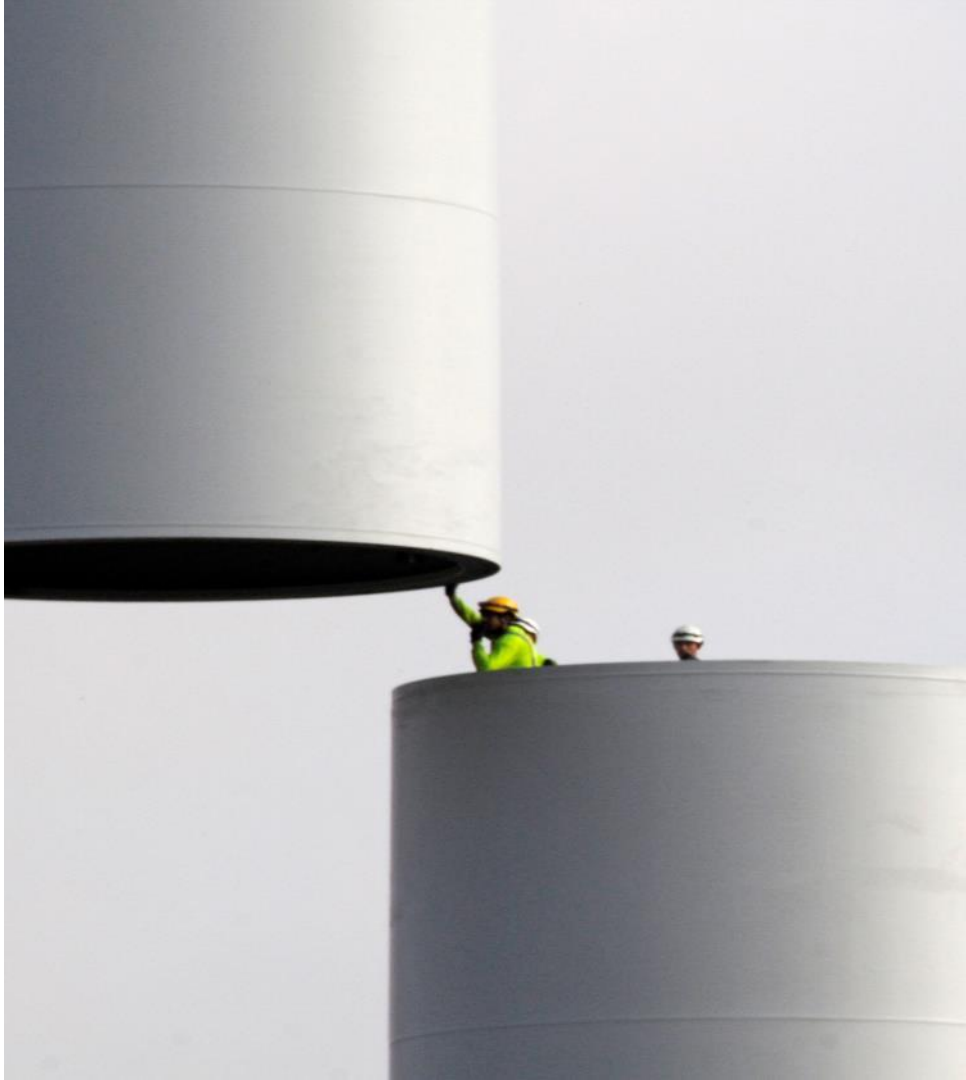
Defines:

- **Competition**
- **Potential**
- **Cost**

De-risking as central tenet

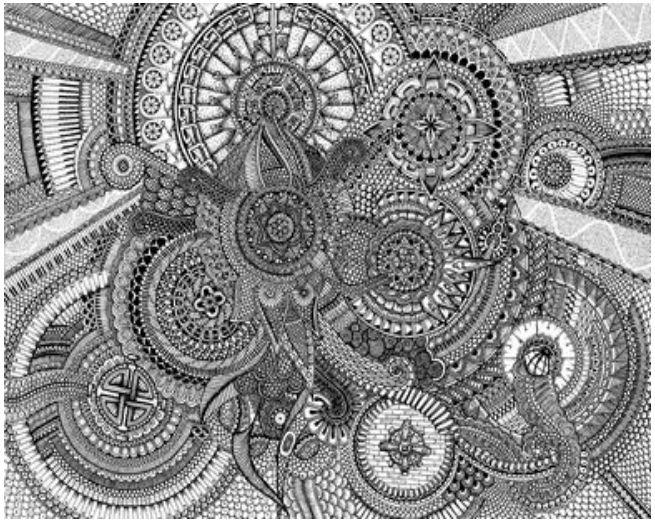
One-stop-shop

- Single point of entry: **Danish Energy Agency**
- Simplifies:
  - Licensing
  - Permitting
  - Authorisation
- De-risking for developer

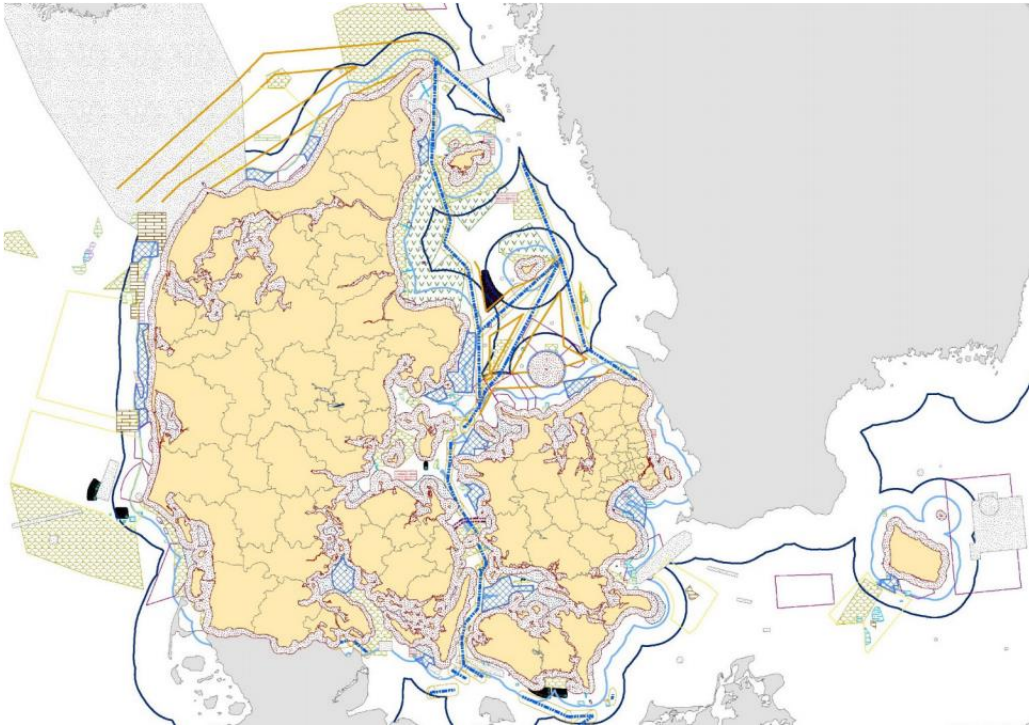


Offshore can be challenging

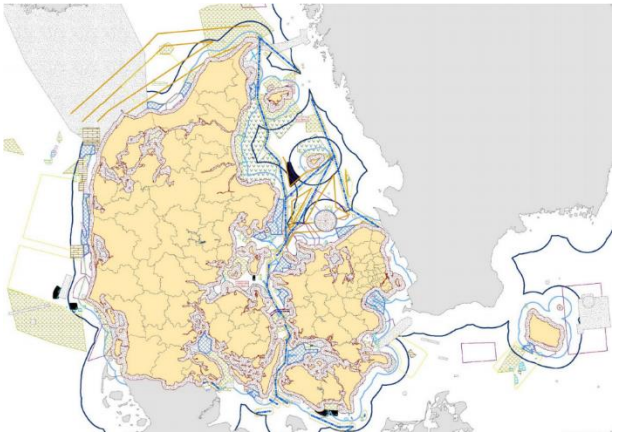
- Offshore projects affect several areas:
  - Defense
  - Environment
  - Energy
  - Transport
  - Citizens
  - Public acceptance



Spatial Planning



Spatial Planning



Economic Selection of Sites

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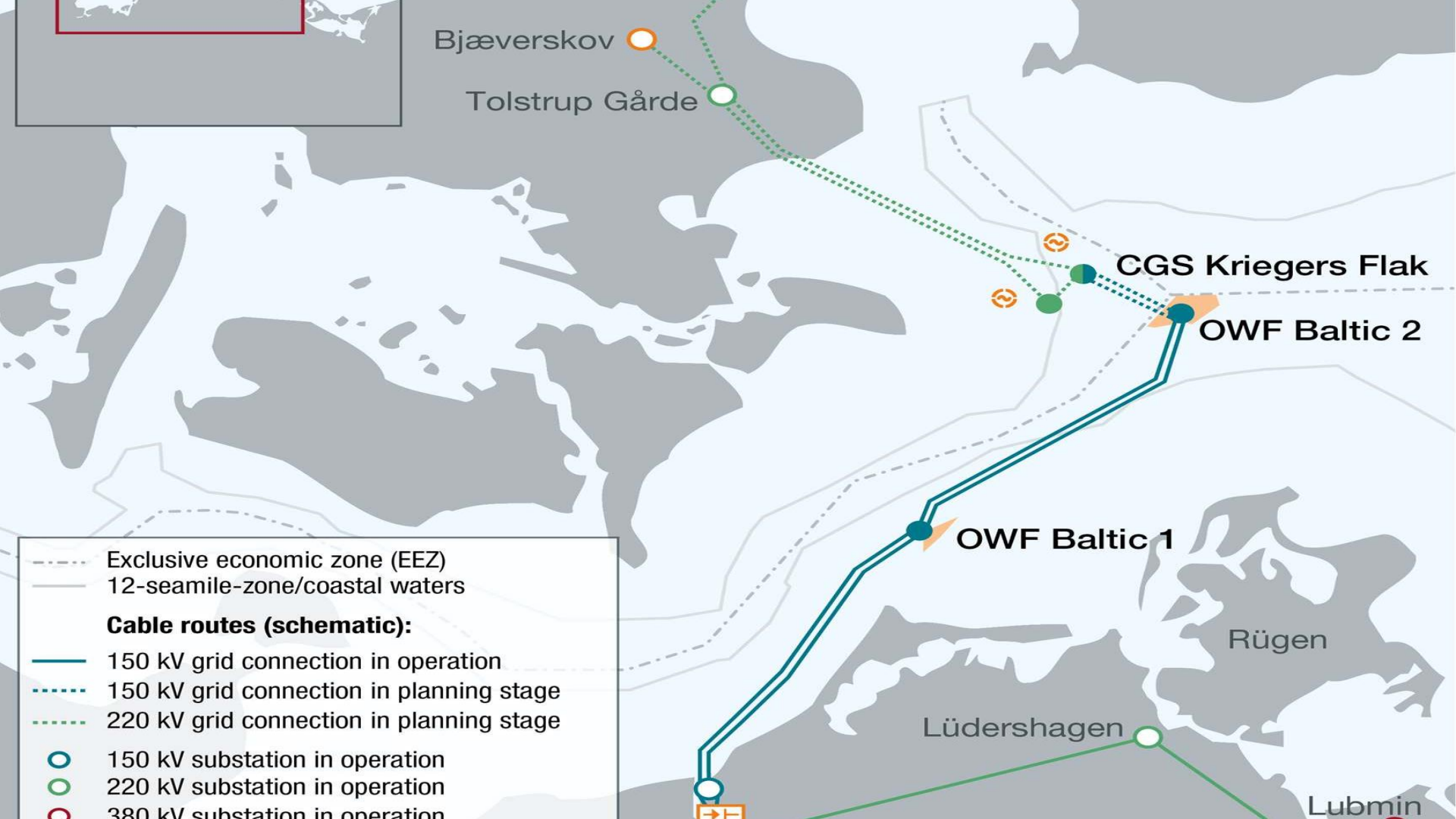
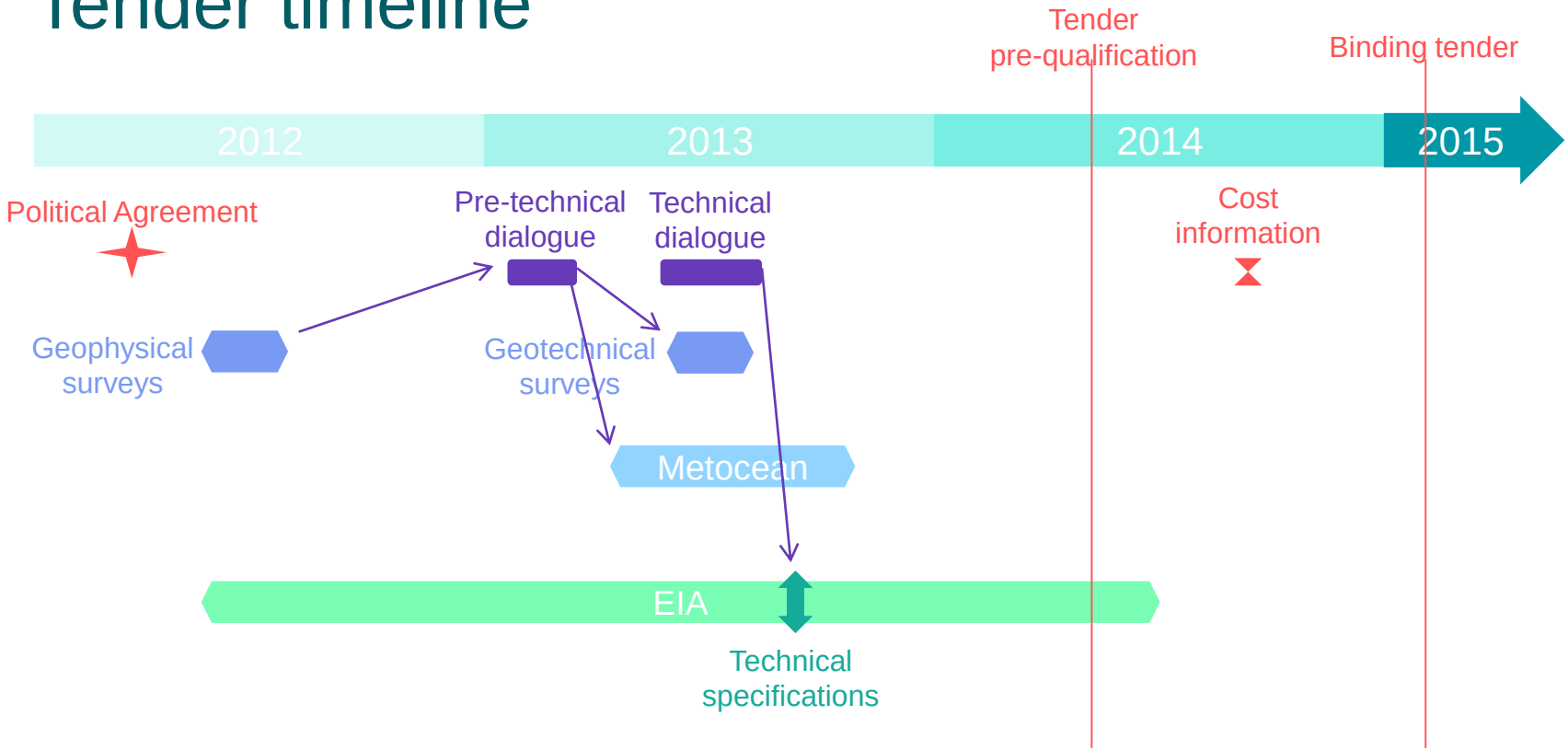
The case of Kriegers Flak – 600 MW

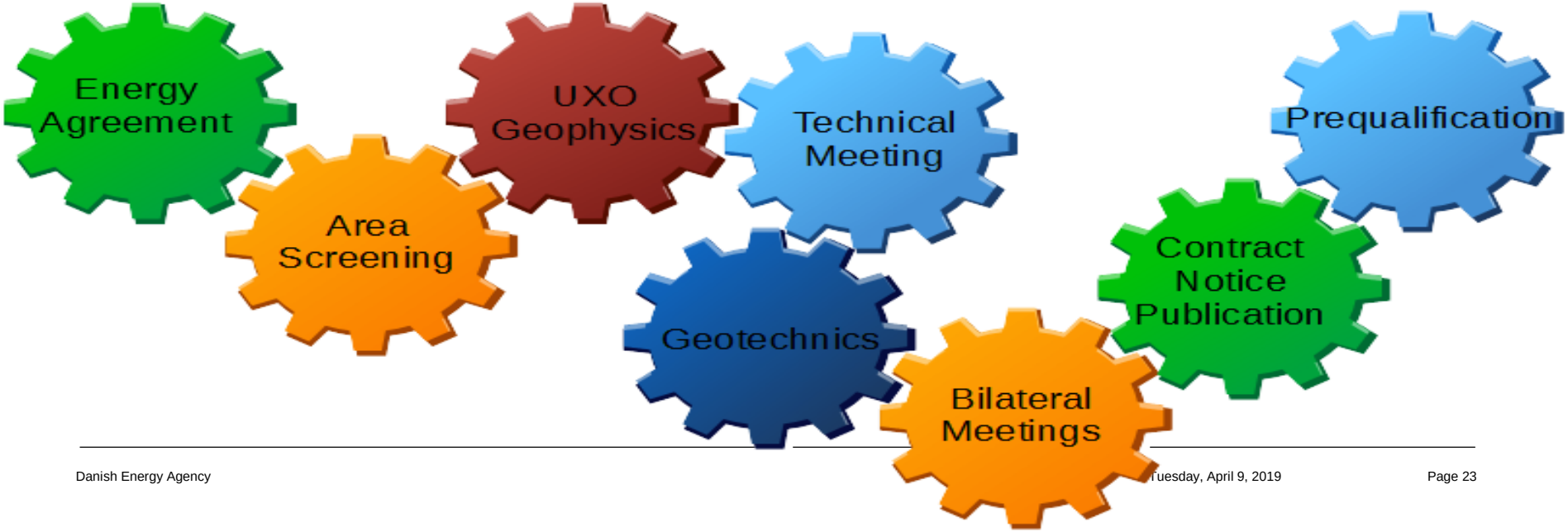

Bjæverskov
Tolstrup Gårde
CGS Kriegers Flak
OWF Baltic 2
OWF Baltic 1
Rügen
Lüdershagen
Lubmin
Exclusive economic zone (EEZ)
12-seamile-zone/coastal waters
Cable routes (schematic):
150 kV grid connection in operation
150 kV grid connection in planning stage
220 kV grid connection in planning stage
150 kV substation in operation
220 kV substation in operation
380 kV substation in operation

Tender timeline

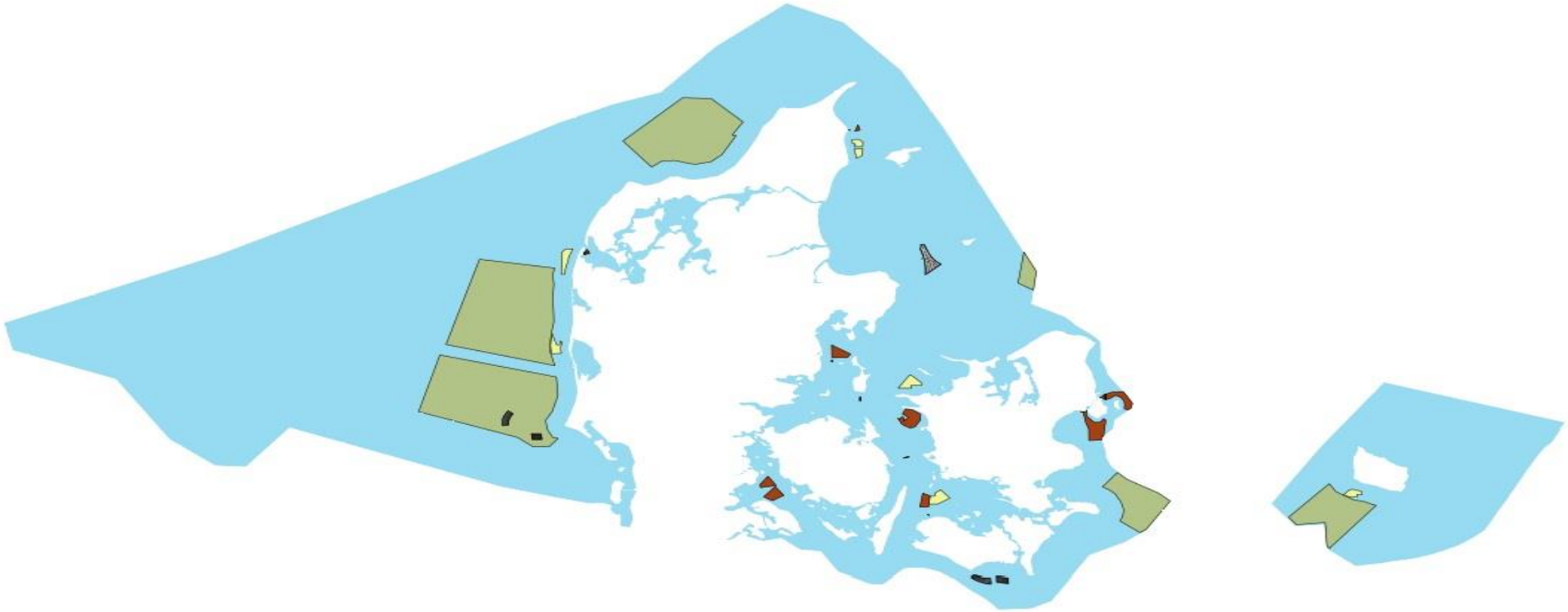


From the Energy Agreement to the prequalification

March 2012 ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ September 2015



Area Screening

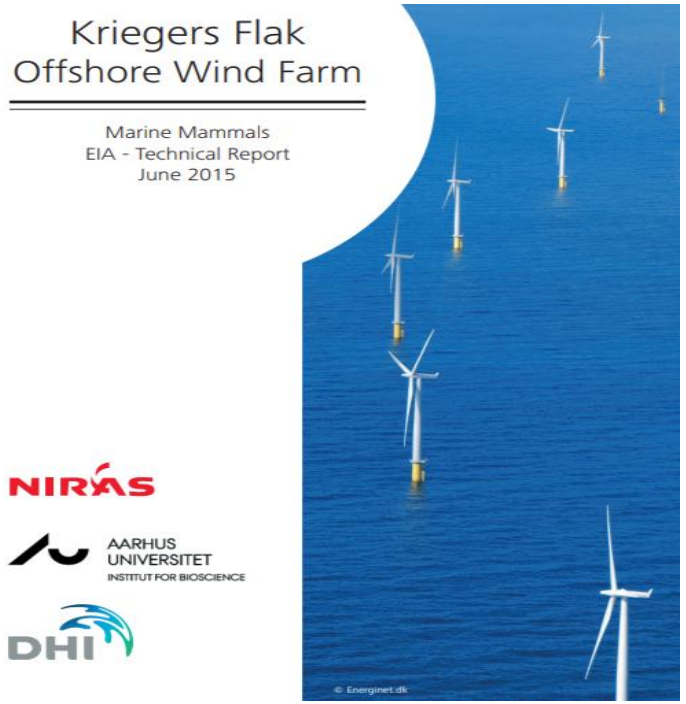


Preliminary Studies

TSO to develop the gross area

- Environmental impact assessment (EIA)
- UXO
- Geological investigations
- MetOcean: Wind, waves, tide, ice
- Content and scope are discussed in meetings

The costs are paid by the winner of the auction



Prequalification
Minimum requirements (for 600MW)

Financial Capacity

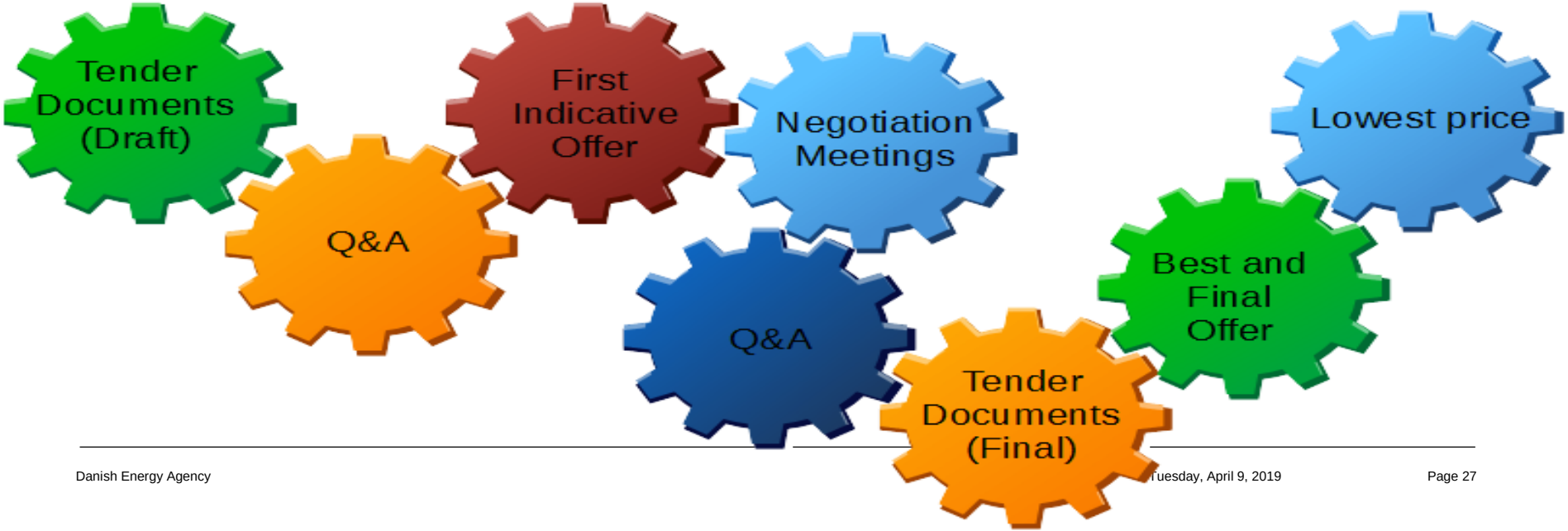
- Annual turnover of minimum 2.3 billion USD as an average for the last 3 years, and
- Equity-ratio of 20% **or** long debt rating BBB (Standard & Poors and Fitch) or Baa3 (Moody's)

Technical Capacity

- Documented experience in development and management of construction of at least one offshore wind farm of 150 MW (project completed)

From the draft of the tender conditions to the awarding

October 2015 ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ November 2016



Negotiated Procedure:

Discussions Enable Competitive Bids

- Constant interaction with developers
- Some topics discussed:
  - Award criteria
  - Penalties and deadlines
  - Timetable
  - Support scheme format
  - Designated areas

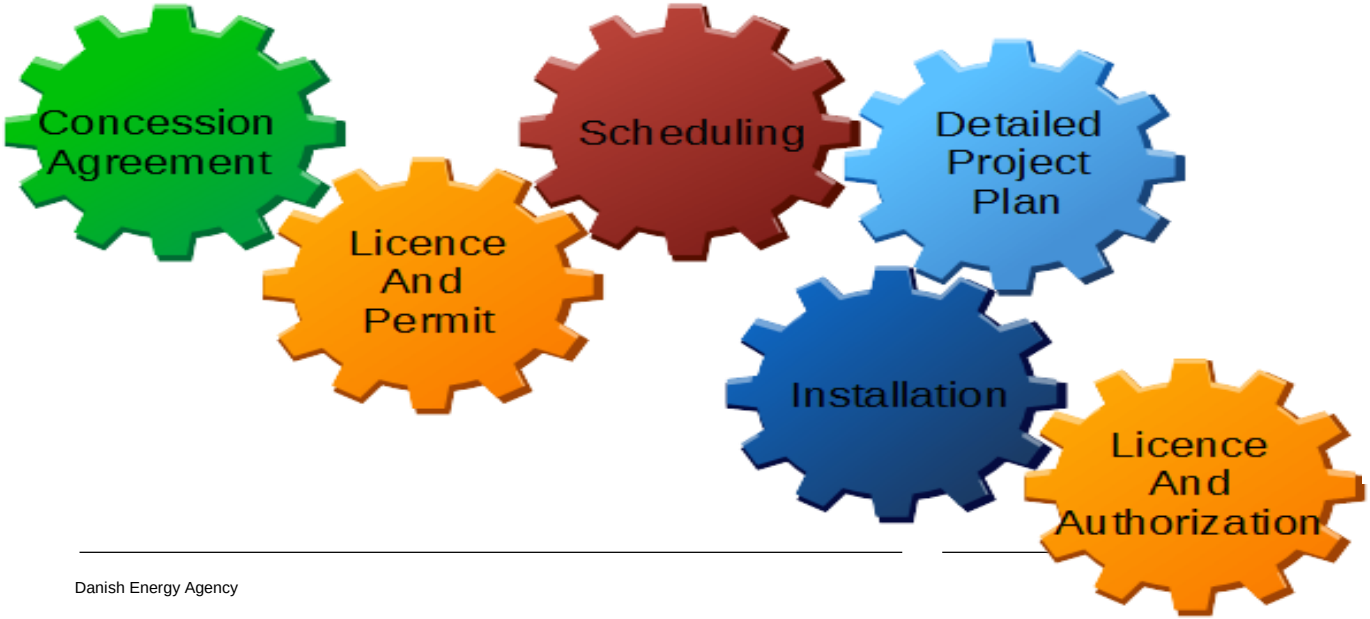
Tender conditions for

Kriegers Flak Offshore Wind Farm

Final tender conditions - June 2016
Latest revised 18 October 2016

From the Concession Agreement to the full operation of the wind farm

November 2016 ▶ ▶ ▶ ▶ ▶ ▶ ▶ ▶ December 2020



Licences and permits

Licence to conduct pre-investigations

Licence to exploit the Wind power from the Electric power Generating plant

Licence to construct An electric power Generating plant

Authorisation to Produce electricity

The Result


Vattenfall record low at Kriegers
€50/MWh secures rights to build 600MW Baltic project
09/11/2016

Danish Energy Agency

A second perspective

Auction Design

- Prequalification
- Invitation to Dialogue
- Environmental Impact Assesment
- Preliminary Studies
- Penalties & Award

Prequalification

- **Financial** and **technical** assessment (no local content)

- **Transparency** and **Risk**

- 7 companies prequalified (**2** from Denmark)

Invitation to Dialogue

- Understand the reality of industry
- Topics discussed:
  - Prequalification requirements
  - Award criteria
  - Penalties and deadlines
  - Timetable
  - Designated areas

Preliminary Studies

TSO to develop the gross area

- Environmental impact assessment (EIA)
- Geological investigations
- MetOcean: Wind, waves, tide, ice

The costs are paid by the **winner of the auction**

Environmental Impact Assesment

- Broad EIA by the TSO
- EIA is a hard stop for any project
- Effects on:
  - Birds, Fish, Mammals…
- Publicly available

Environmental Impact Assesment

- Can be followed by further EIAs by the project developer
- Construction, operation, cabling, transformers, turbines, etc.
- Considers many possible technologies and solutions

Ex. Order 68. https://www.retsinformation.dk/Forms/R0710.aspx?id=190128

Environmental Monitoring: Informed decision-making

Environmental Monitoring: Horns Rev and Nysted

Carried out by

- Danish Forest and Nature Agency
- Danish Energy Agency,
- Vattenfall + DONG Energy.

Supervised by:

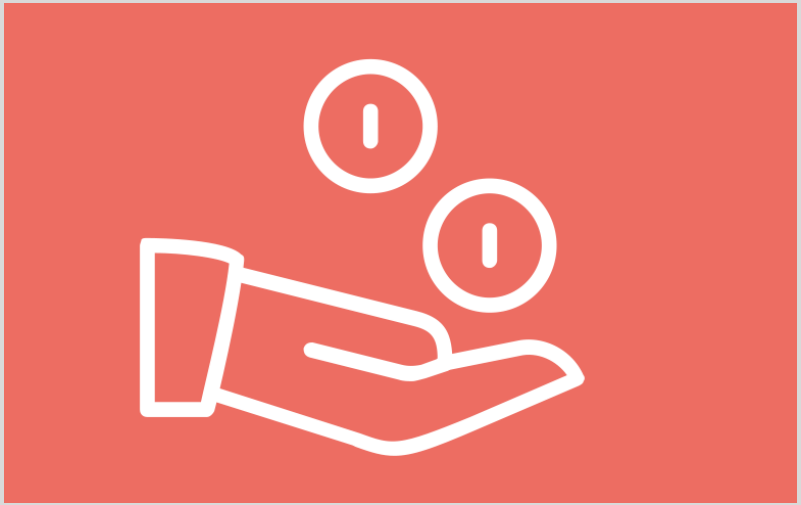
- Expert Panel on Experiments on Marine Ecology (IAPEME)

Considers:

- Before, during and after construction

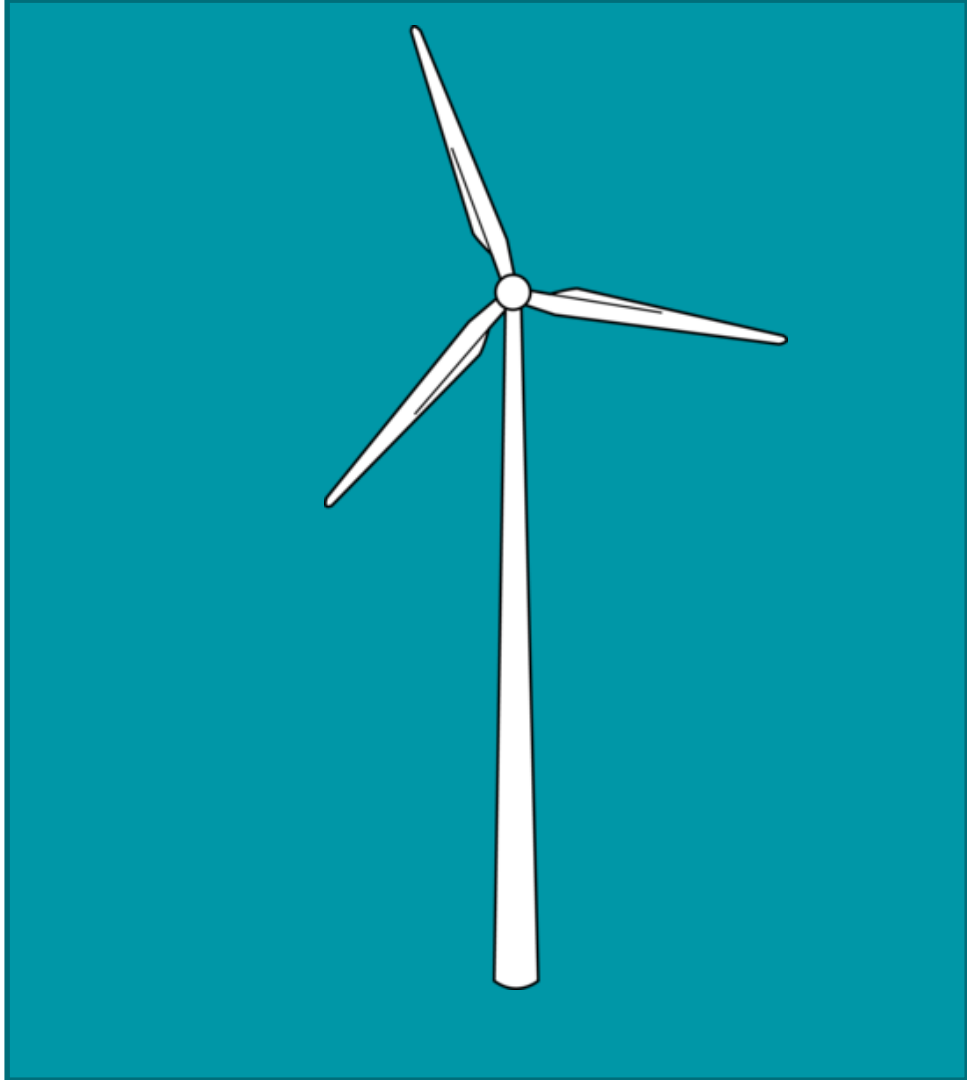
Penalties and fees

- Discussed **before** the tender
- Associated to fulfilling milestones of the project
- Financial **prequalification** important!

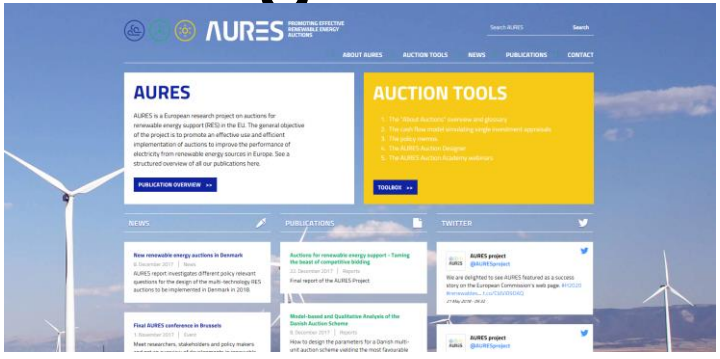


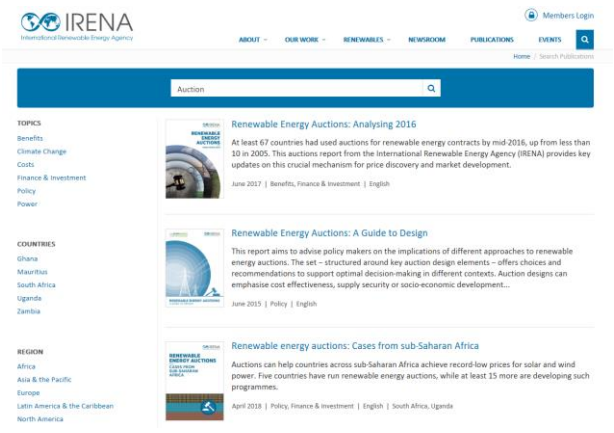
Auction

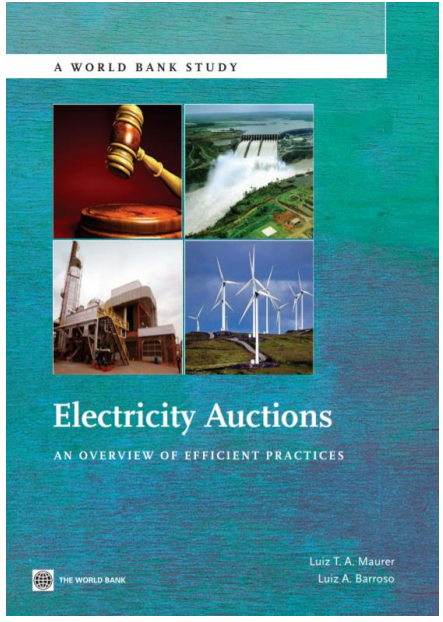
- **Price** per kWh (Feed-in-tariff) is the only criterium
- Bids received 8th November 2016
- Winner announced 9th November 2016

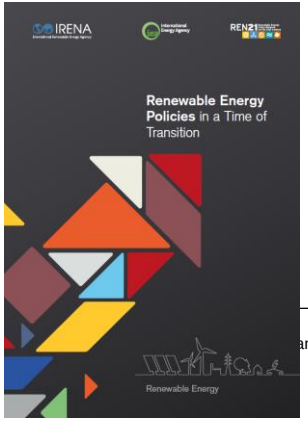


Other sources of inspiration for design of auction systems









Wind auctions destroying the industry, says industry body in SC petition opposing Gujarat auction

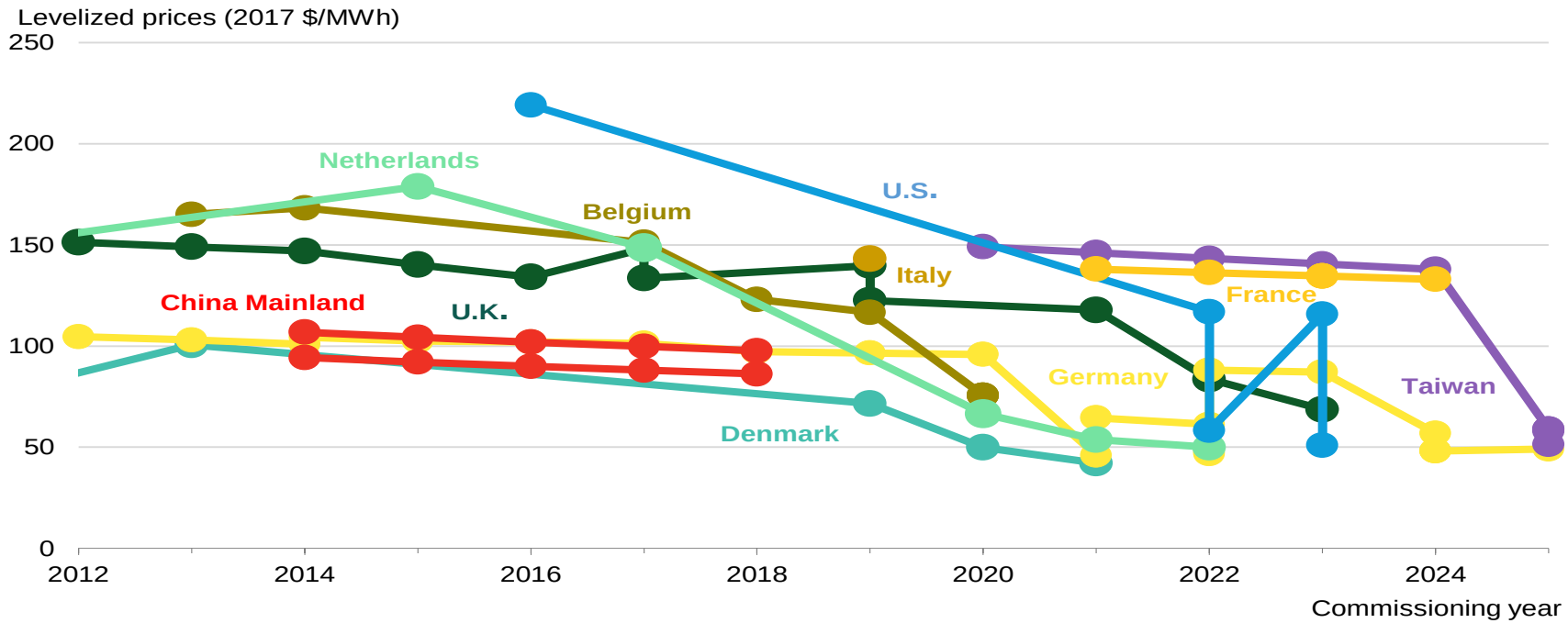
By Kavya Chandrasekaran, ET Bureau | Dec 04, 2017, 01.00 AM IST

Small scale manufacturers of components for wind turbines are being squeezed by the relentless fall of wind energy tariffs in successive auctions, according to the petition filed by the Indian Wind Energy Association (Inwea) in the Supreme Court, whose admissibility will be decided on Monday.

The petition, opposing the 500 MW wind energy auction Gujarat's power utility Gujarat Urja Vikas Nigam Ltd (GUVNL) wants to hold, harps mainly on technicalities, maintaining that the auction is contrary to law because the Centre has not yet issued guidelines on the conducting of such auctions, as required by Section 62 of the Electricity Act, 2003, and

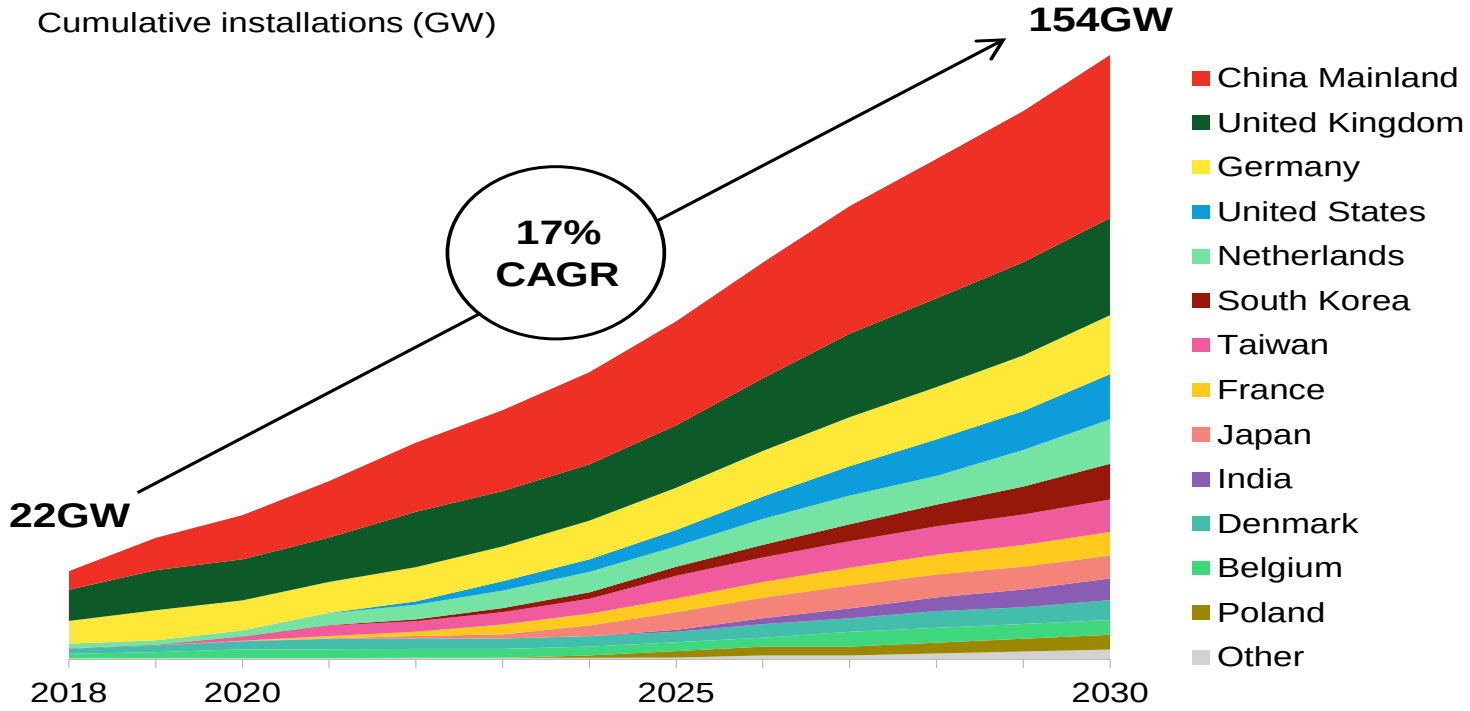
Another industry body, the Indian Wind Power Association (IWPA), has also made an intervention, supporting Inwea's petition with similar arguments.

Levelized offshore wind prices



Source: BloombergNEF. Notes: Figures refer to an estimated levelised price, taking into account tariff price and length, inflation, a merchant tail assumption and a 25-year project lifetime.

Global cumulative installation forecast



Source: BloombergNEF. Note: 'Other' -- Sweden, Ireland, Norway, Finland, Portugal, Spain, Italy.

The Danish Tender Model – The low risk approach

- TSO to develop the site including permitting
- Grid connection financed by the TSO*
- Fixed feed-in tariff for 50.000 full-load hours
- Priority access to the grid
- Increased cross-agency coordination (One Stop Shop)
- Efficient and transparent electricity market
- No local content requirements
- Price per kWh is the only award criteria
- Dialogue and negotiation with potential bidders


THANK YOU
FOR YOUR ATTENTION

Danish Energy Agency

Backup slides

Permitting – front loaded or back loaded?

Permitting element	Front loading benefits	Back loading benefits
Spatial planning, uncovering conflicts and ranking project economics		
EIA for offshore wind farm		
EIA for offshore platform/grid		
Implications for auction price		
Socio-economic national optimal solution		

Allocation of risks case

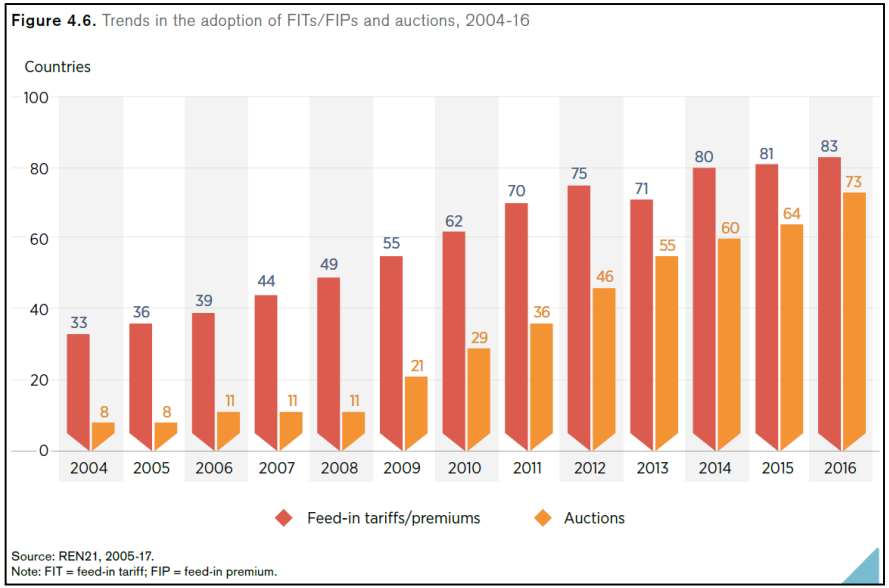
Risk	Authorities	Developer	Remarks
Design of efficient auction process			
Permitting of wind farm (EIA etc.)			
Permitting of offshore transformer and grid to shore (EIA etc.)			
Permitting of onshore substation (EIA etc.)			
Construction plans			
Execution of construction plans			
Weather risks during construction			
Weather risks during operation			
Detailed design of wind farm, choice of			

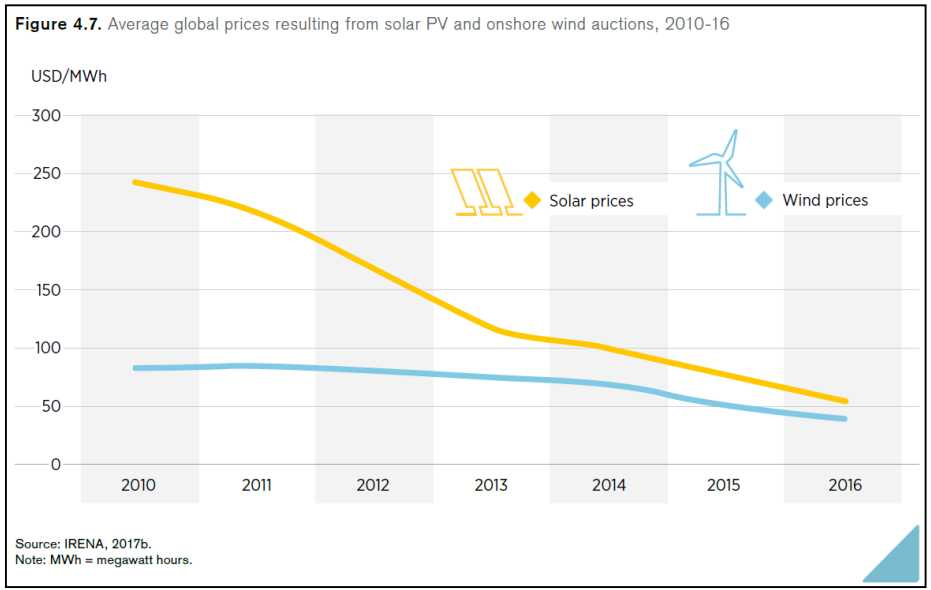
Auction principles, definitions

Forward auction: buyers compete to obtain goods or services by offering increasingly higher prices.

Reverse auction: the sellers compete to obtain business from the buyer and prices will typically decrease as the sellers underbid each other. (Often closed bids).

Renewable Energy Policies in a Time of Transition





Other sources of inspiration for design of auction systems