

# IRELAND'S RENEWABLE SUPPORT REGIME

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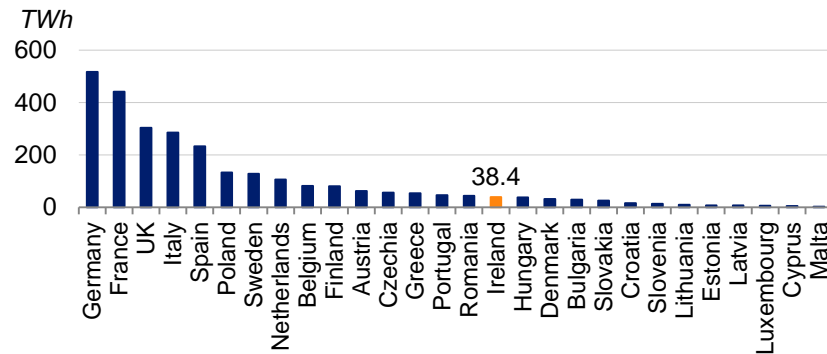
# Why look at Ireland?

# IRISH MARKET HAS SOME SIMILARITIES WITH GREEK MARKET

The Irish Single Electricity Market is: (1) relatively small (2) limited interconnection (3) dominated by fossil fuel generation (4) is a test case for renewables integration

## EU-28 electricity demand (2016)

(TWh)



Source: EuroStat, EirGrid, SONI, SEAI

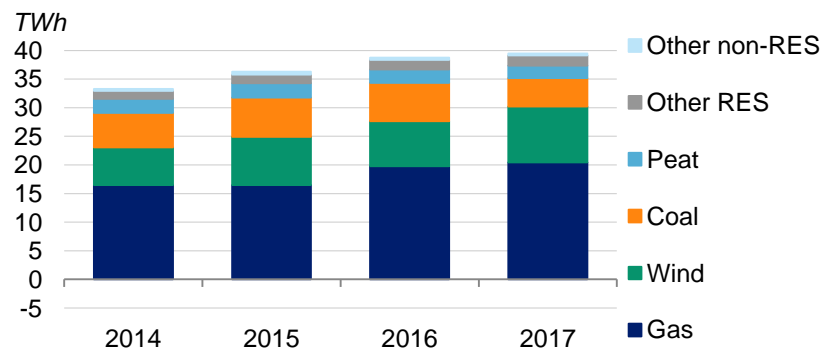
## Isolated

- Currently two interconnectors with GB:
  - Moyle: NIR-GB (500MW)
  - EWIC: ROI-GB (530MW)
- Moyle flow to GB limited until 2022
- Peak demand is 6-7GW



## Irish generation fuel mix (2017)

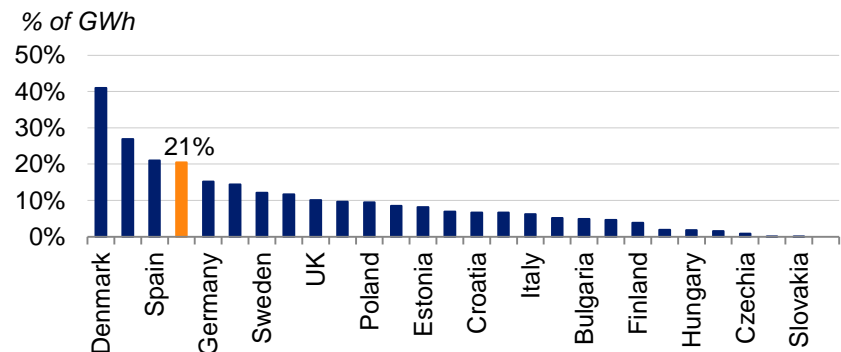
(TWh)



Source: EirGrid, SONI, SEAI

## EU-28 wind share of generation (2016)

(% of TWh)



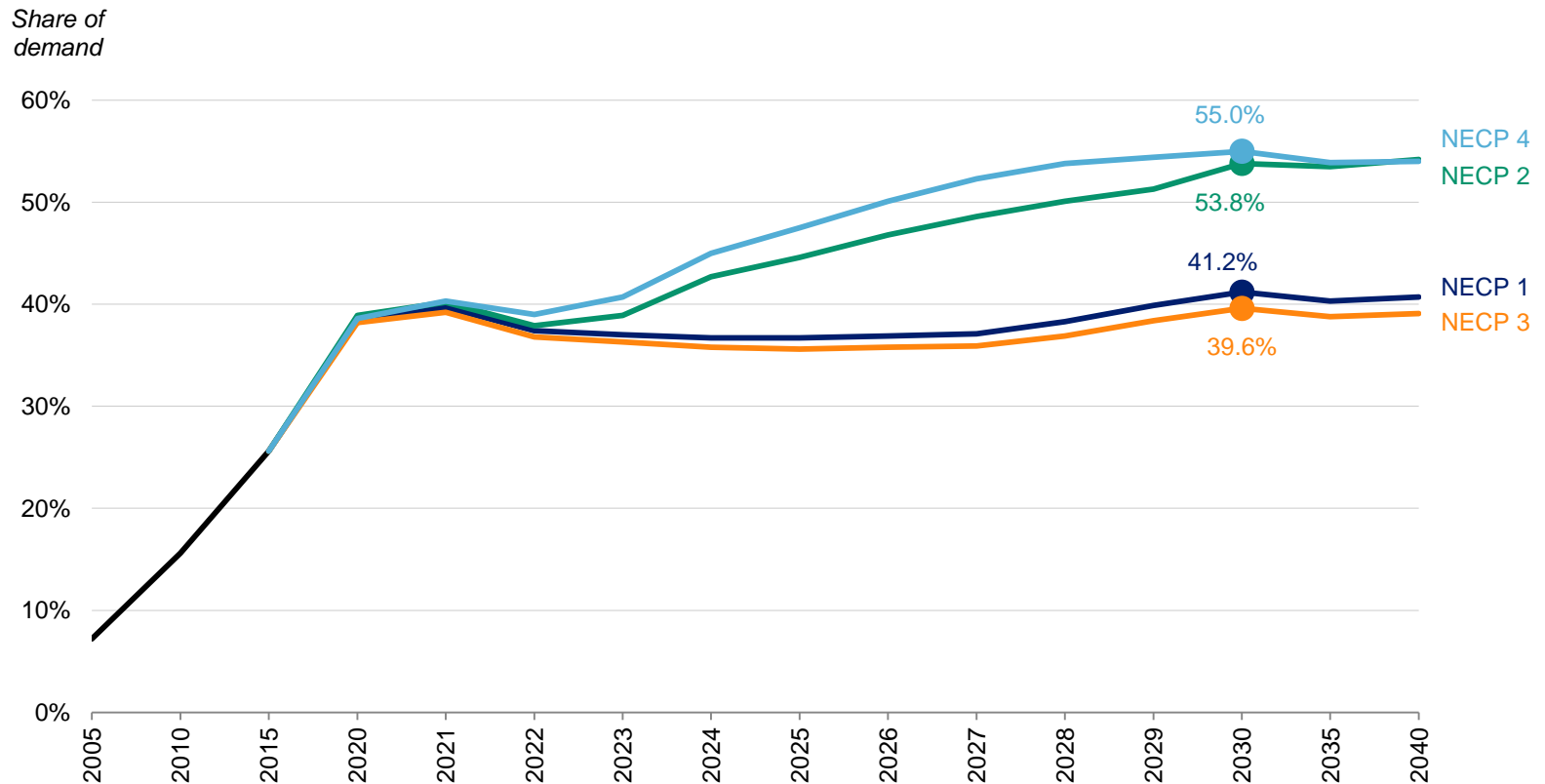
Source: EuroStat, EirGrid, SONI, SEAI

# IRELAND HAS AMBITIOUS RENEWABLES PLANS, WITH SIGNIFICANT PENETRATION ALREADY

Ireland's draft National Energy and Climate Plan (December 2018) calls for renewables penetration of 55% by 2030

Renewables penetration scenarios in the draft NECP

(% of demand)

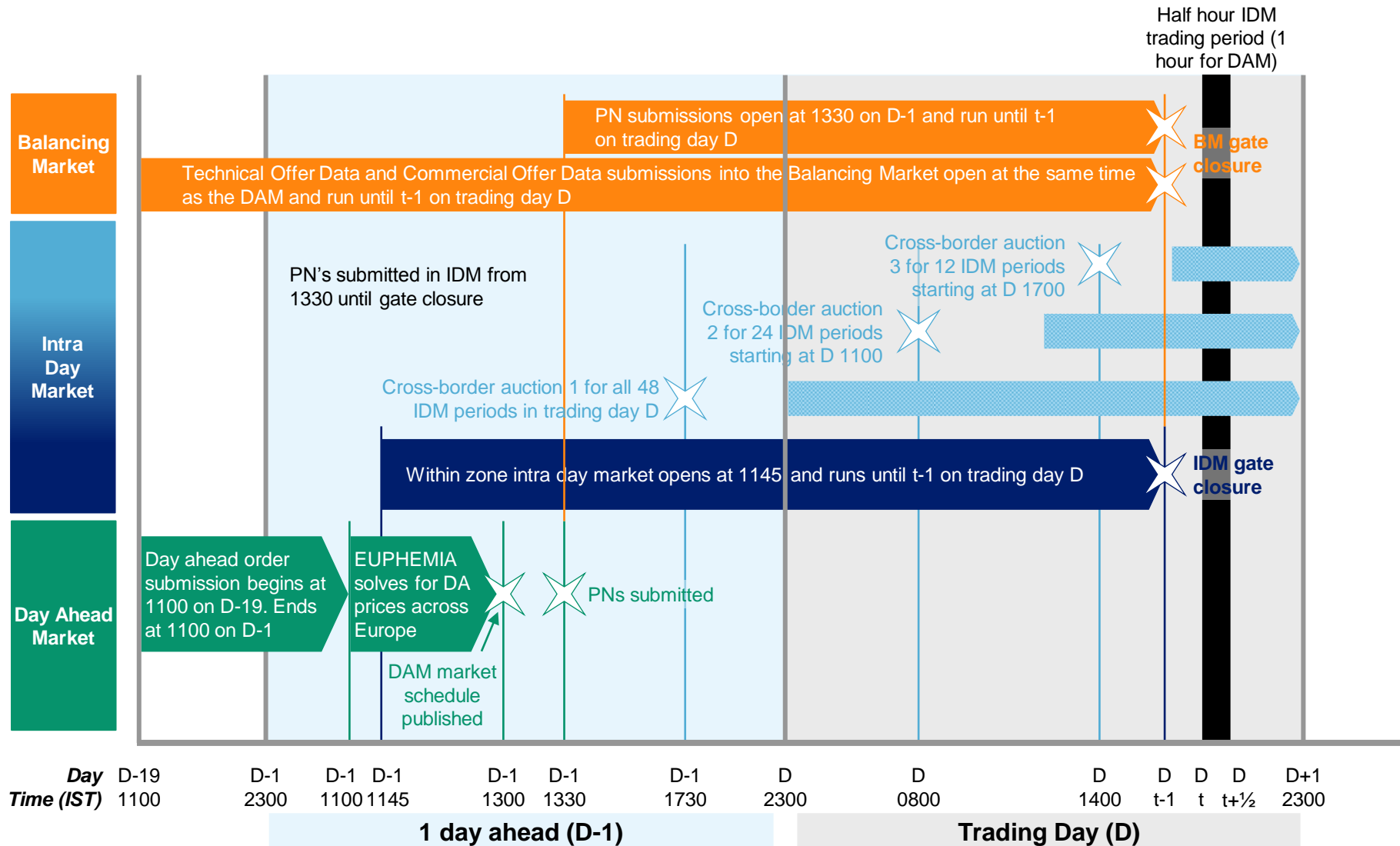


# IRISH MARKET RULES ALSO RECENTLY AMENDED TO ACCOMMODATE TARGET MODEL

## I-SEM implemented in October 2018

	SEM	I-SEM
<b>Market structure</b>	One pool and timeframe (day ahead)	Different markets with different timeframes: forward markets (FM, FTR); physical markets (DAM, IDM, BM); capacity market (CRM)
<b>Trading opportunities</b>	Single opportunity for generators to submit their bids for each day	Generators and suppliers have multiple opportunities to trade in DAM and IDM.
<b>Setting the market price</b>	All generator bids stacked into a merit curve with the last generator required to meet demand setting the price. Suppliers are price takers	Suppliers are price makers, setting limits on what they are willing to pay. Where this crosses with generators' offers sets the market price
<b>Balancing supply and demand</b>	Supply and demand are matched using an algorithm	Generators and suppliers have to match their actual with their traded generation and usage. Where there are errors, suppliers and generators are liable for the resulting costs in the balancing market
<b>Capacity payments to generators</b>	CPM gives capacity payments to cover generators' fixed costs and are paid as long as a generator declares it is available to run.	Generators are paid if successful at auction. Incentivised to be available t times of high prices.
<b>Trading across interconnectors with GB</b>	Capacity on interconnectors can be reserved to flow power in line with their trading approach. This may not deliver a cost-efficient flow.	Interconnection capacity allocated based on prices with electricity always flowing from the cheapest to most expensive market

# TRADING ARRANGEMENTS FOLLOW TARGET MODEL TIMELINES





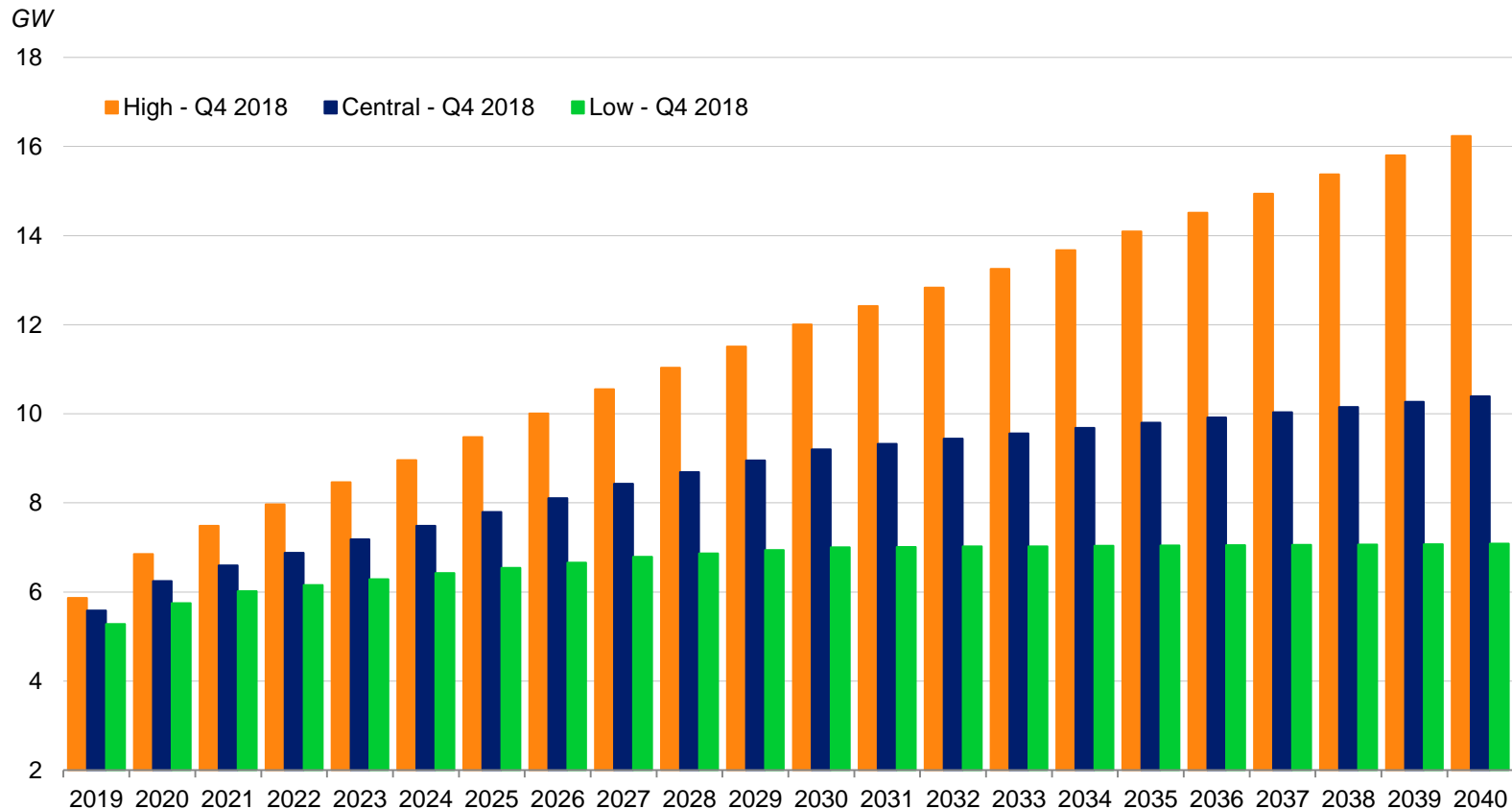
# 2 Renewables support

# REACHING 55% RENEWABLES REQUIRES A FURTHER RAMP UP IN WIND CAPACITY – SUPPORT REGIME IS A KEY ENABLER

In the Central scenario we expect 10GW+ of wind and solar capacity to be built by 2040 if the 55% renewables penetration target in the Republic of Ireland is to be met

Wind and solar installed capacity projections in the SEM

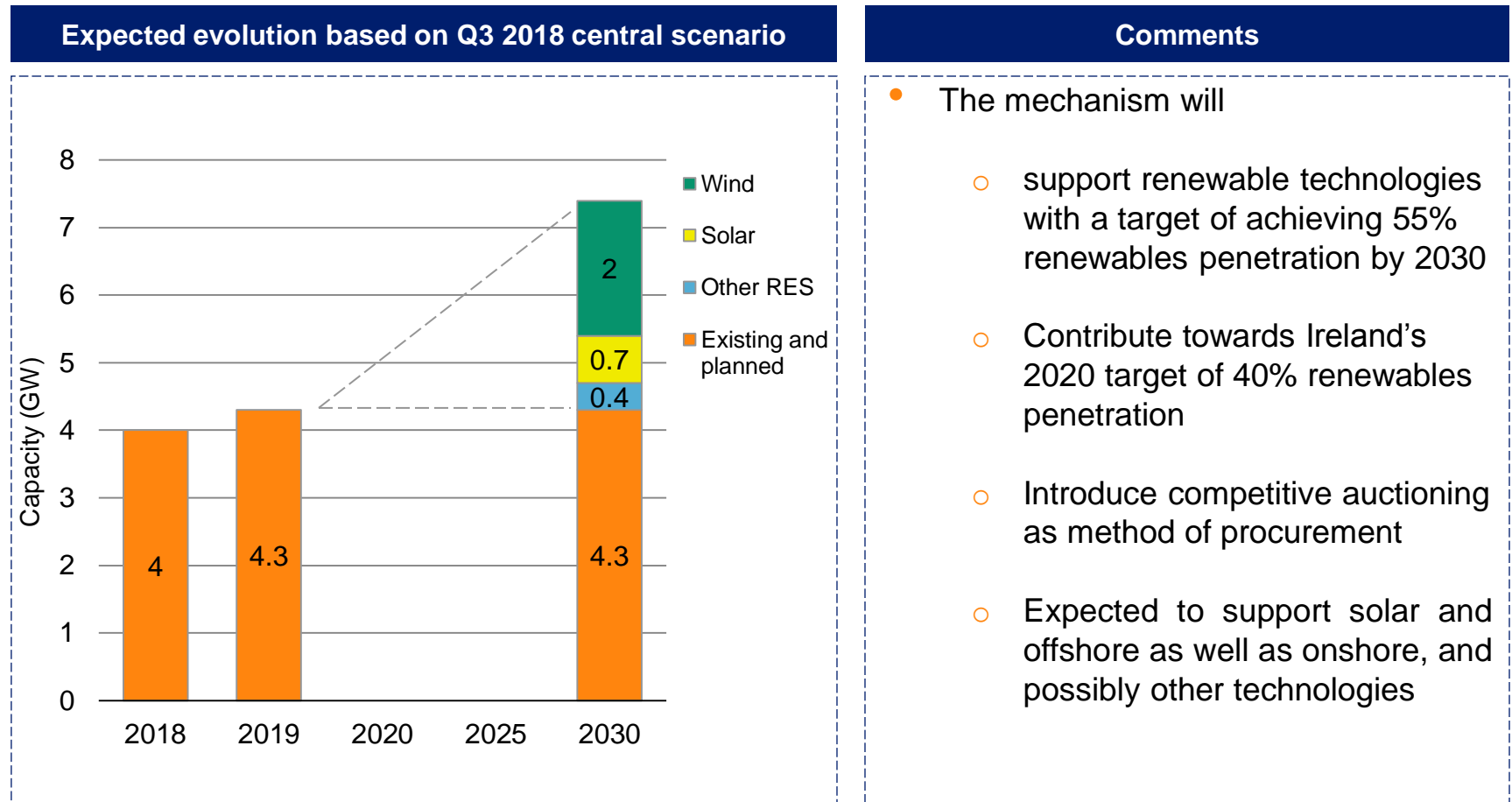
(GW)





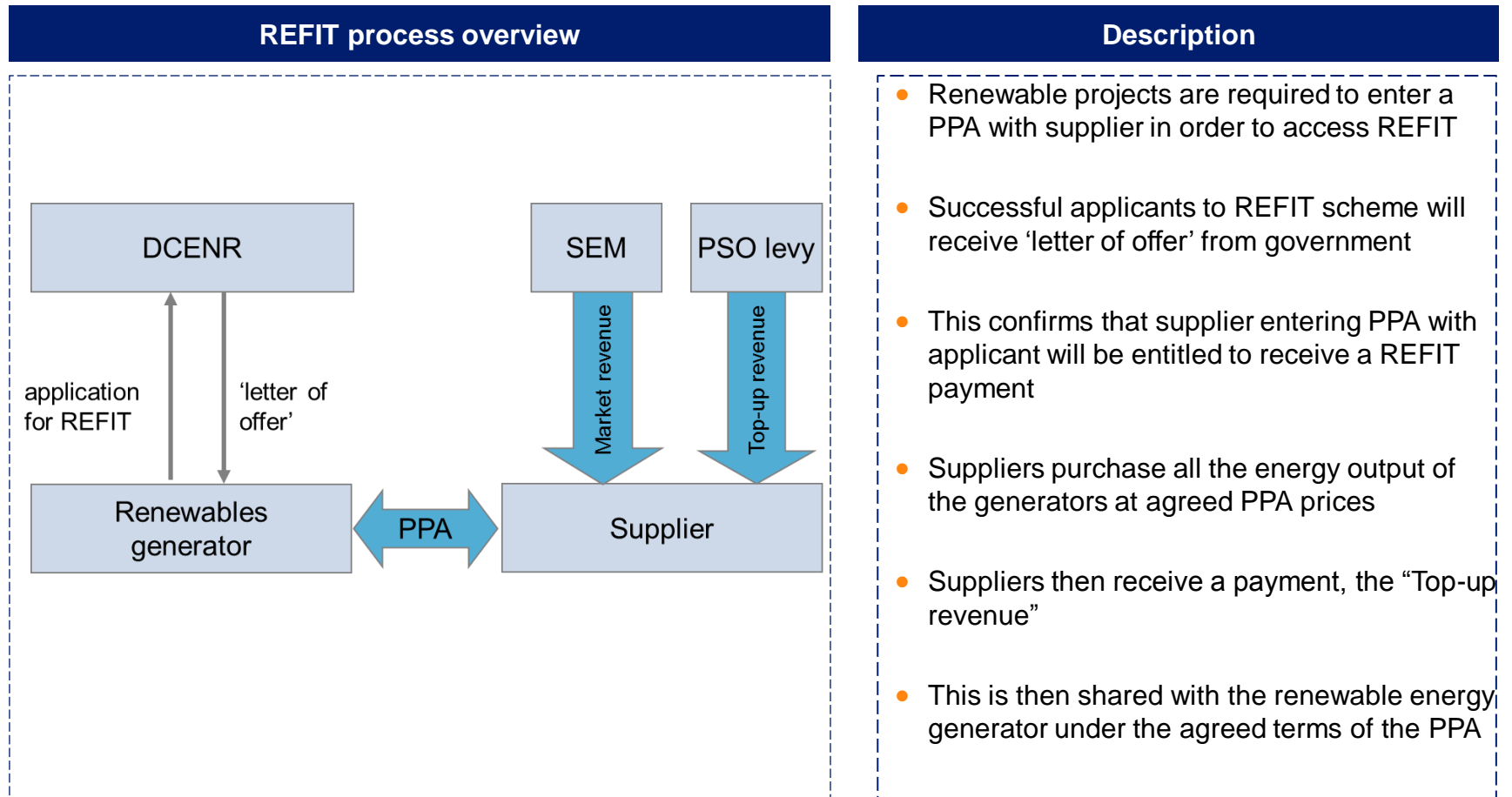
# IN IRELAND SPECIFICALLY, NEW SUPPORT SCHEME (RESS) INTENDED TO SUPPORT DELIVERY OF ADDITIONAL CAPACITY

The new Renewable Electricity Support Scheme (RESS) will incentivise the development of renewables technologies in ROI between 2020 and 2030



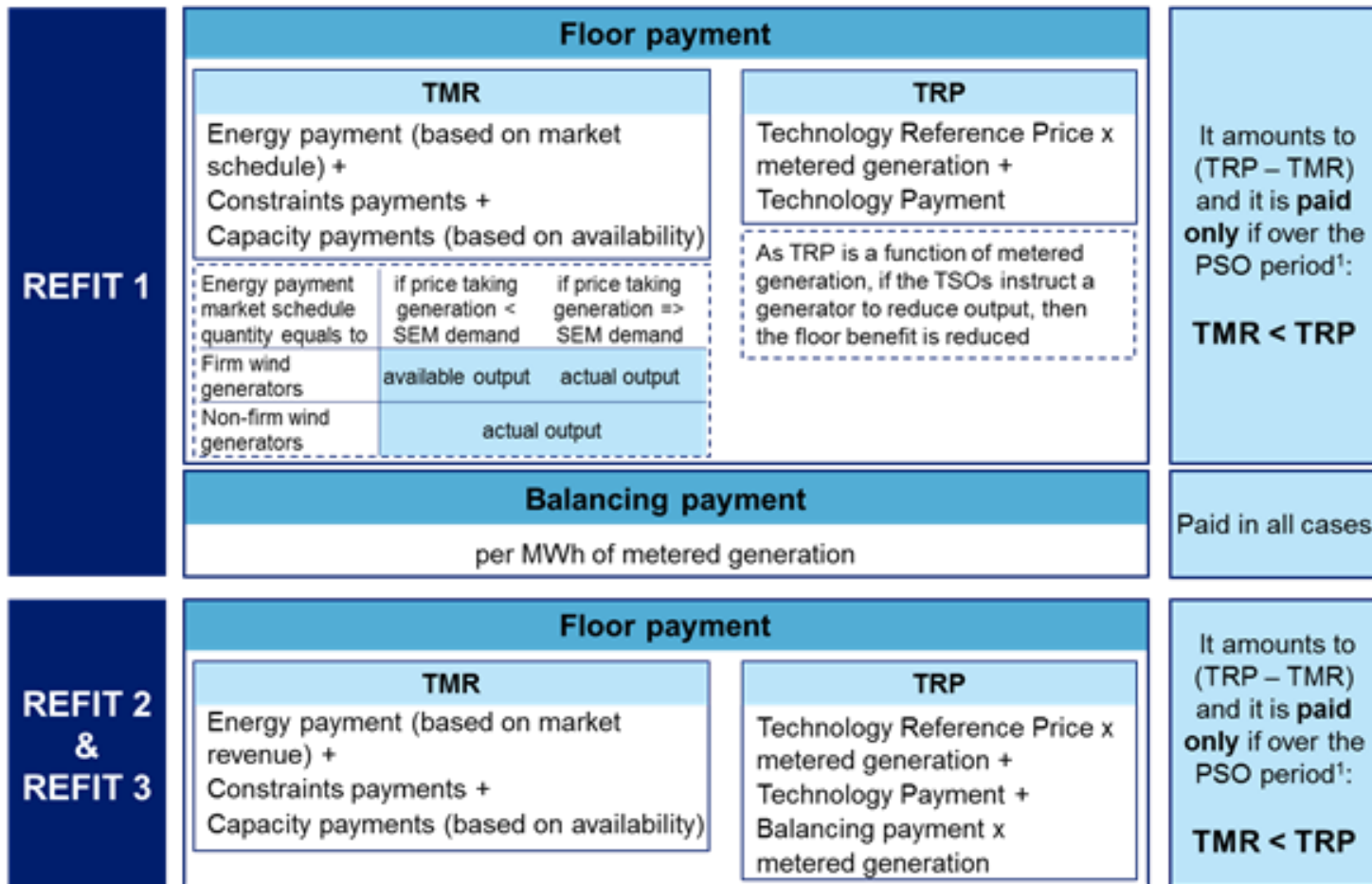
# RESS IS REPLACEMENT FOR THE 'REFIT' SCHEME

The Renewable Energy Feed-In Tariff (REFIT) scheme provided incentive for retailers to enter into PPAs with renewable generators



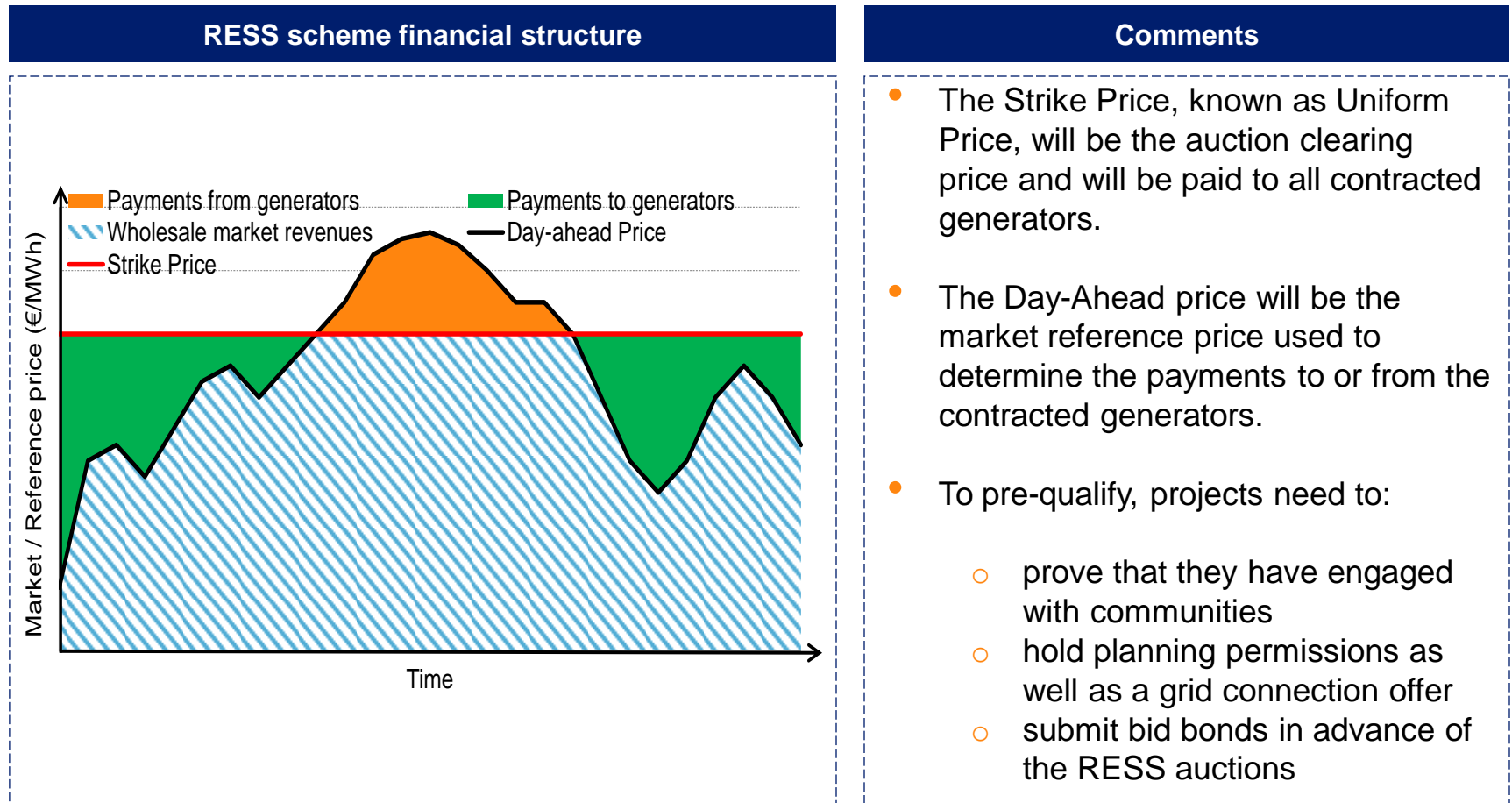
# REFIT PROVIDED FOR A FLOOR AND A BALANCING PAYMENT

Floor payment is intended to cover any shortfall between market revenues and the technology reference price. Balancing payment covers supplier's balancing risk.



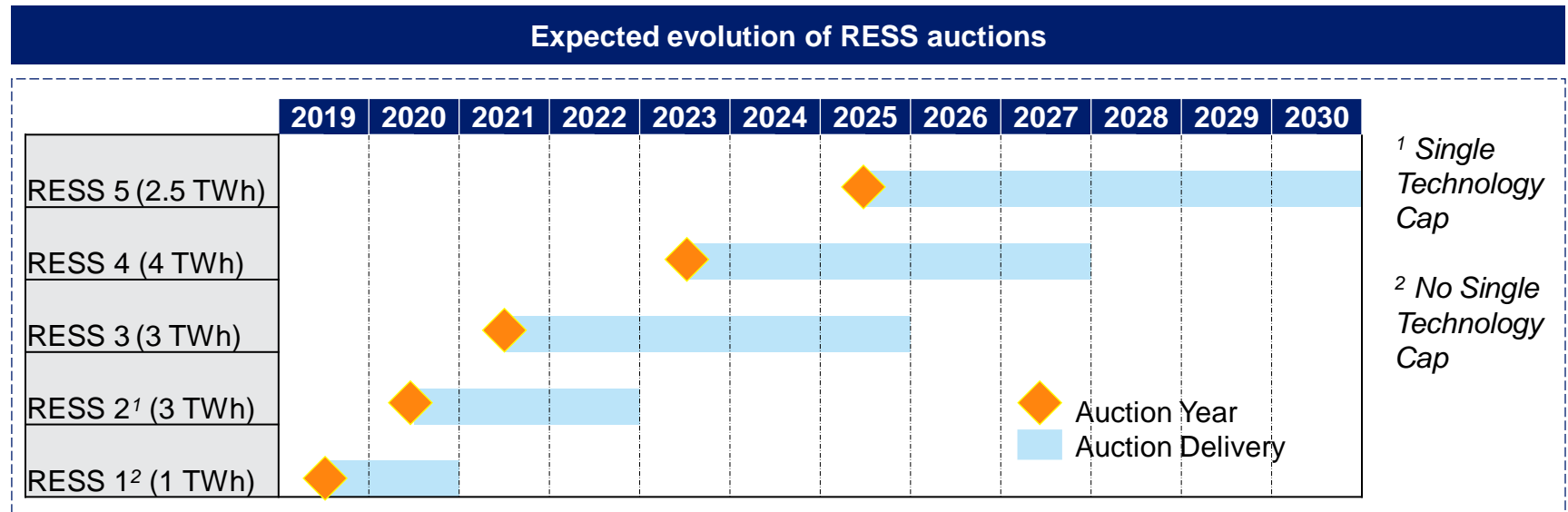
# RESS IS BASED ON AUCTIONING FOR CFD FITS

RESS will be funded through the Public Service Obligation (PSO) and contracted generators will be supported through a Floating Feed in Premium (FFiP) mechanism, in the form of a 2-way Contract For Difference (CFD)



# SERIES OF AUCTIONS ENVISAGED TO SUPPORT DELIVERY FOR 2030

The 2030 renewable target will be delivered through a series of capacity auctions



## Comments

- Each auction will be in the form of a GWh required to be provided by renewable technologies.
- The amount of renewable capacity delivered by each auction will depend on which technology types will be awarded a contract, as the typical load factor varies noticeably between technology types.



# 3 Devil in the detail...

# BUT IMPORTANT DESIGN FEATURES REMAIN TO BE RESOLVED

## Reference price

- RESS high level design sets out a proposal to use the day-ahead market price as reference for CfD settlement. Sounds positive but...
- ...big difference in price certainty if settlement calculated at hourly granularity (e.g. GB) or based on averaged prices (e.g. France).

## Revenue stacking

- Ability to stack revenue streams lowers cost recovery requirements and expected auction prices. But...
- ...will stacking be permitted? E.g. stacking of GoOs in the Netherlands and CRM payments in France

## Up front requirements

- Up front commitment in form of bid bonds proposed to avoid speculative bids. But...
- ...will bid bonds strike right balance? E.g. GB scheme does not require bond and there were speculative solar bids in first round. Now focused on offshore wind which has other upfront commitments anyway so less of issue

## Late delivery

- Essential to incentivise projects to achieve realisation dates. But...
- ... will penalties strike right balance? E.g. in GB, late commissioning results in commensurate reduction in support term, while in Germany for onshore wind 6 month delay results in cancellation of support and €30/kW penalty

# THE DETAILS REALLY MATTER...

The 2010 Anholt auction in Denmark had several stand out features that resulted in there being only a single bidder...



€13-52M opt out penalties

Up to 3% strike price haircut plus fines for late delivery

Standby requirement (aka the loser's curse)

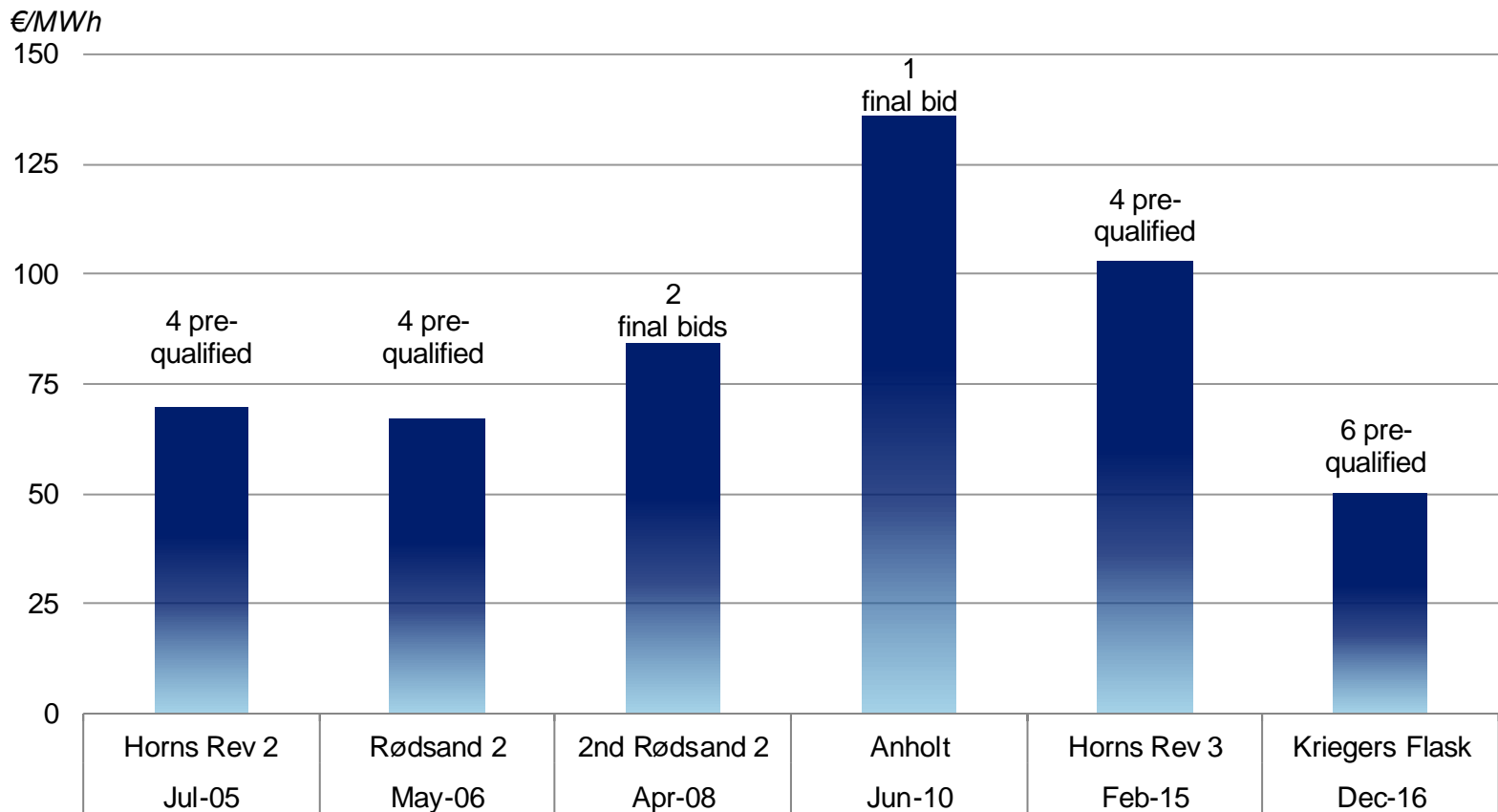


# THE DETAILS REALLY MATTER...

...which unsurprisingly resulted in a high clearing price

Bid prices for offshore wind auctions in Denmark

(€/MWh, nominal money)





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# EX-ANTE MARKETS

Day ahead (DAM) and intraday (IDM) markets were introduced as part of the I-SEM market rules; these are both physical markets

## Day ahead market

- Primary market with 24 periods in the day
- One shot auction with bids starting 19 days before the traded day
- Bids submitted for each hour in the following trading day (runs midnight to midnight CET so 11-11pm Irish time)
- Market clearing is performed by the EUPHEMIA algorithm
  - EUPHEMIA is the price coupling algorithm which has been developed to solve the day-ahead power markets across several European countries.

## Intraday market

- Intra day market split into 48 30 minute periods
- Two types of intraday markets
  - Within zone IDM with continuous trading up to 1 hour before trading period
  - Cross border IDM
    - 3 cross-border intraday auctions (see next slide for timings)
    - Irish Market coupled with the GB market via Moyle and EWIC ICs in the first two
    - Third auction is local only at the start of I-SEM
    - Eventually IDM will be integrated into pan-European XBID platform
- By trading in the IDM, market participants can adjust their Physical Notifications (PNs) up until gate closure. Should result in smaller imbalances.

# BALANCING MARKET

## The third physical market (but it's not an ex-ante market)

- Runs in parallel with the DAM and the IDM
- Market data submission window closes 1hr before the trading period (at gate closure)
- 2 types of balancing actions
  - Energy actions (maintaining the supply and demand balance in the market)
  - Non-energy actions (ensure that the system is secure by addressing reserves, dynamics (Inertia, RoCoF, SNSP), voltage support and thermal transmission constraints)
- Trading period for the BM is 30 minutes (it coincides with the IDM trading period), split into 6 five minute windows
- Participation in the BM is mandatory for all generators with installed capacity greater 10MW; only dispatchable generators are **obliged** to submit offers in the BM
- TSOs can perform balancing actions and instruct plants to move away from their positions from 19 days before the trading period up until real time
- Non-energy actions result in a zero net energy change to the system and are instructed in order to address system issues that would still exist even if the market had perfectly balanced

# FINANCIAL MARKETS

## Forwards market and Financial Transmission Rights

- The Forwards Market (FWM) provides participants with the opportunity to hedge positions in the DAM, IDM and BM via CfDs
  - A CfD purchased in the FWM, is a hedging instrument with a strike price for a quantity of energy delivered on a future day.
  - The contract holder then receives or pays the difference between the contract strike price and the reference price (the relevant market spot price).
  - As a financial trade, the CfD results in a profit or loss in euros, but there is no resultant net energy change.
- 
- A Financial Transmission Right (FTR), purchased in an FTR auction, is a hedging instrument that protects the holder from price differentials between coupled markets
  - If energy flows freely between adjacent “bidding zones” (e.g. the islands of Ireland and Great Britain), then the price in each market will be equal.
  - However, if flow on an interconnector is congested, prices will diverge.
  - FTRs are offered by interconnector owners and the revenues they earn is called “congestion rent”.

# RENEWABLES

## Existing renewables are supported by the REFIT mechanism

	REFIT under SEM	REFIT under I-SEM decision
Energy Payment	<ul style="list-style-type: none"> <li>SMP (gross mandatory DA pool)</li> </ul>	<ul style="list-style-type: none"> <li>Wind &gt; 5MW = Min [80% DAM + 20% BM, 100%DAM]</li> <li>Wind &lt; 5MW = Min [70% DAM + 30% BM, 100%DAM]</li> <li>Peat, hydro &amp; biomass = 100% DAM</li> </ul>
Capacity Payment	<ul style="list-style-type: none"> <li>Fixed annual pot</li> <li>Revenues included in REFIT calculation</li> <li>Costs (suffered by generator) not existent</li> </ul>	<ul style="list-style-type: none"> <li>Assigned through auctions</li> <li>Revenues included in REFIT calculation</li> <li>Costs (difference payments) not considered in the REFIT calculation</li> </ul>
Ancillary Services Revenues	<ul style="list-style-type: none"> <li>Not available *</li> </ul>	<ul style="list-style-type: none"> <li>Not considered in the REFIT calculation</li> <li>Any DS3 revenue additional to REFIT</li> </ul>
Constraint Payment	<ul style="list-style-type: none"> <li>On/off payments system</li> </ul>	<ul style="list-style-type: none"> <li>On/off payments system</li> </ul>