



**CEER Visit
BritNed
28th May 2014**



Safety Introduction



Why BritNed?



Integrate renewables



Security of supply



Integration of European markets
Creating social welfare



BritNed is the owner and operator of a 260 km long HVDC interconnector between Isle of Grain (GB) and Maasvlakte (NL) with a capacity of 1000MW
Total investment : €600 million

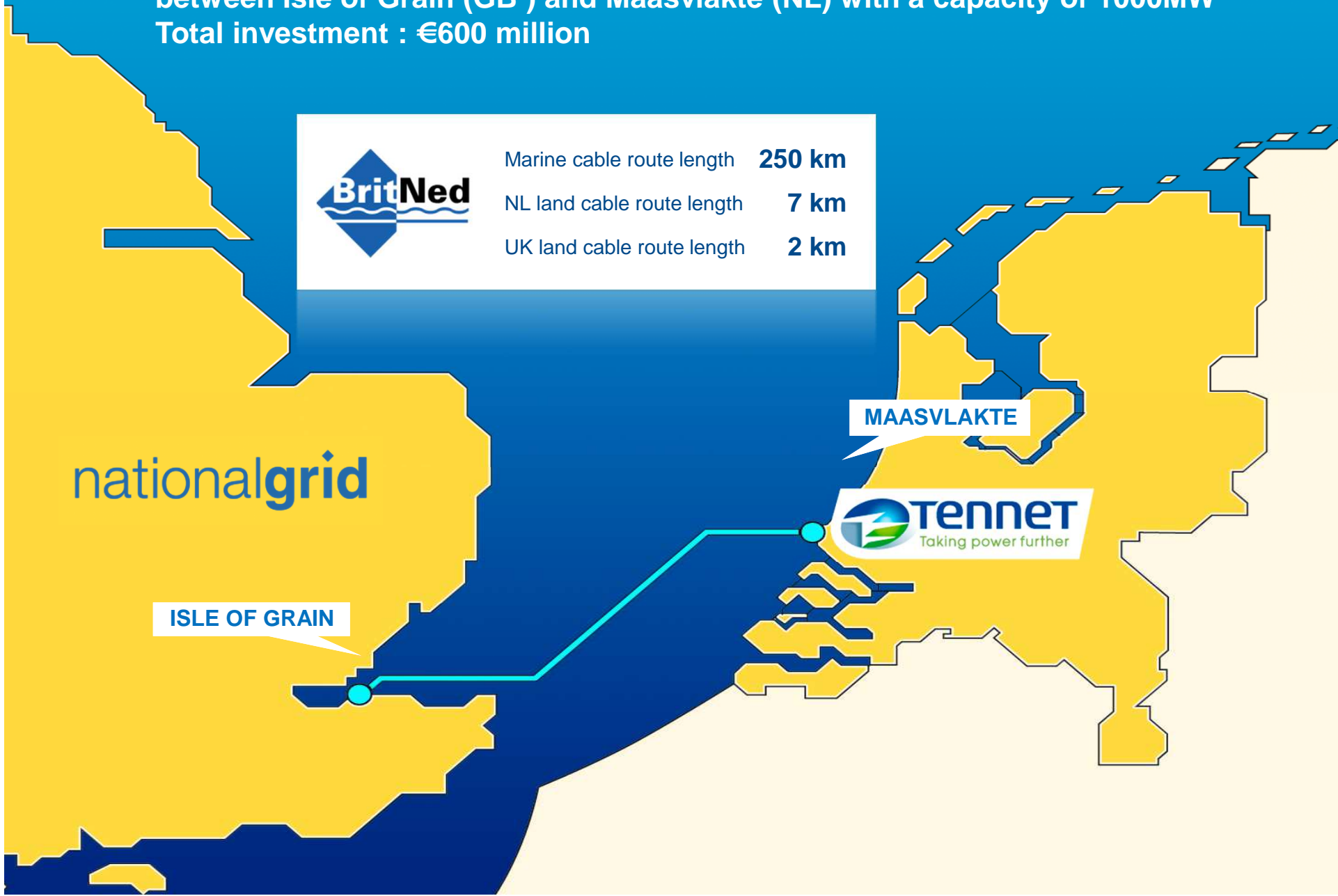
	Marine cable route length	250 km
	NL land cable route length	7 km
	UK land cable route length	2 km

nationalgrid

ISLE OF GRAIN

MAASVLAKTE

 **Tennet**
Taking power further



Agenda

Time	Itinerary item
10.00	Arrival Coffee/tea
10.15	Safety Brief
10.20	Welcome and BritNed Video Presentation Alan Croes, Operations director BritNed
10.35	Design & Construction Presentation Alan Croes, Operations director BritNed
10.50	Commercial Operations Presentation Steve Coomber, Commercial Director BritNed
11.10	Legal and Regulatory Presentation Damian Bach, Head of Legal & Regulatory BritNed
11.25	Questions and Answers
11.40	Change into PPE
11.45	BritNed site tour
13.00	End of Programme



BritNed in Operation: Video Presentation....





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Project & Technical Operations

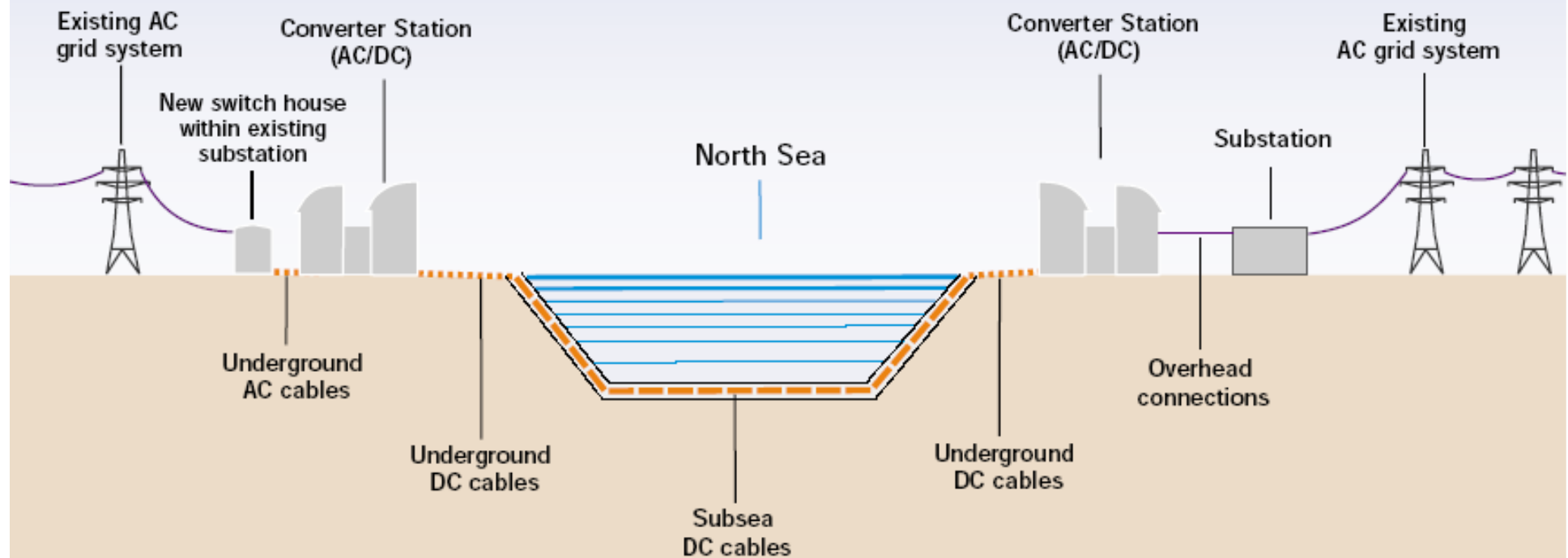


The Interconnector

Design Concept - Import and Export of Electricity

ENGLAND

THE NETHERLANDS

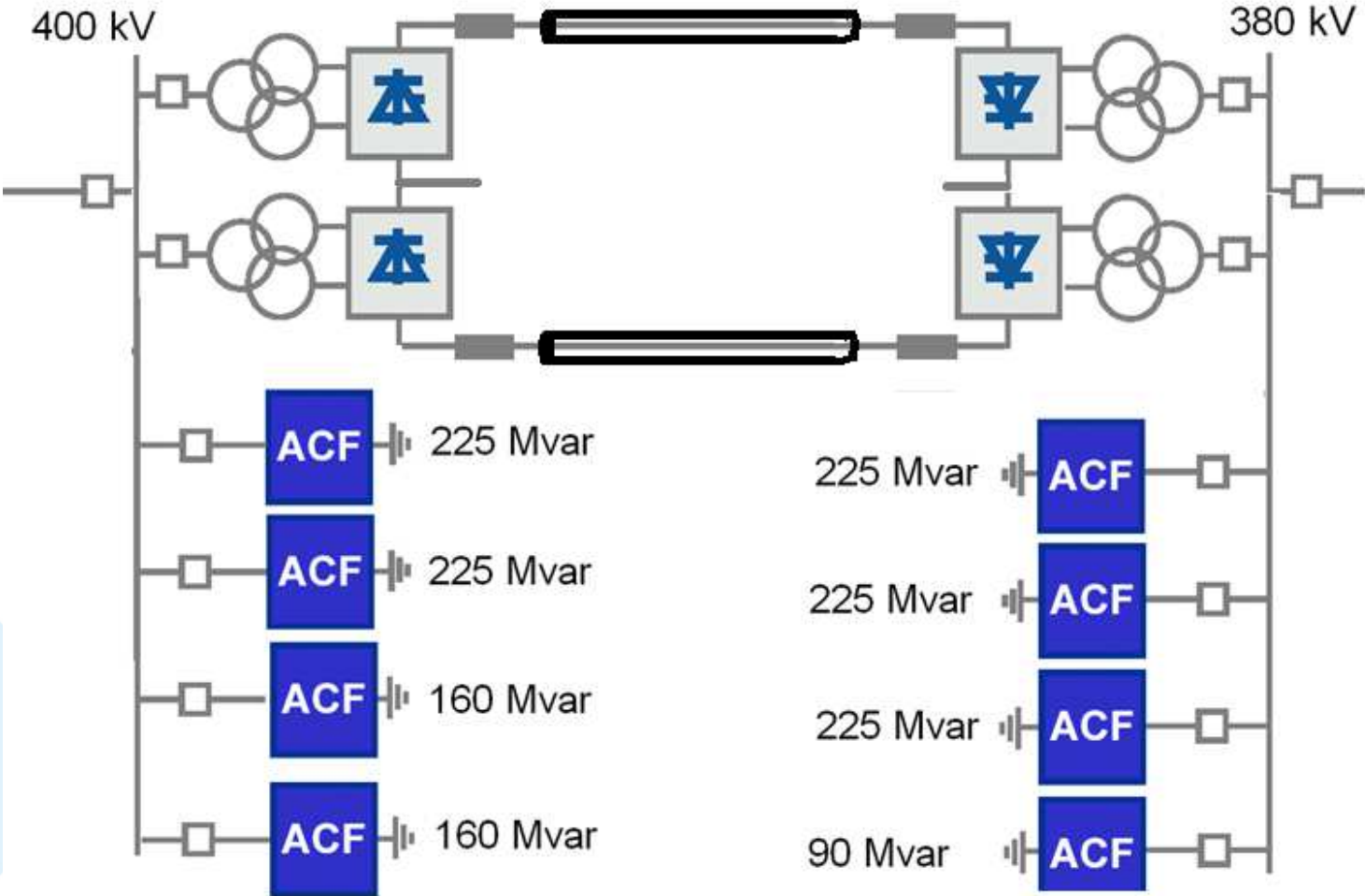


Why HVDC?

- HVDC is a Unique Solution for:
 - Asynchronous Interconnections
 - Controllable Power Flow in Either Direction
 - Low loss transmission
 - Long submarine cable transmissions
 - More economic for long distance



HVDC Converter station – Bipolar HVDC terminal



Burial Systems



Shallow water plough (ETA Ltd)



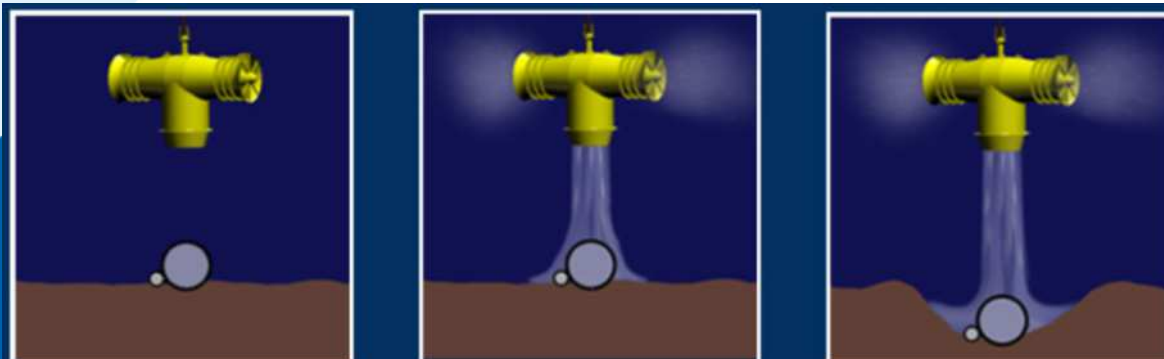
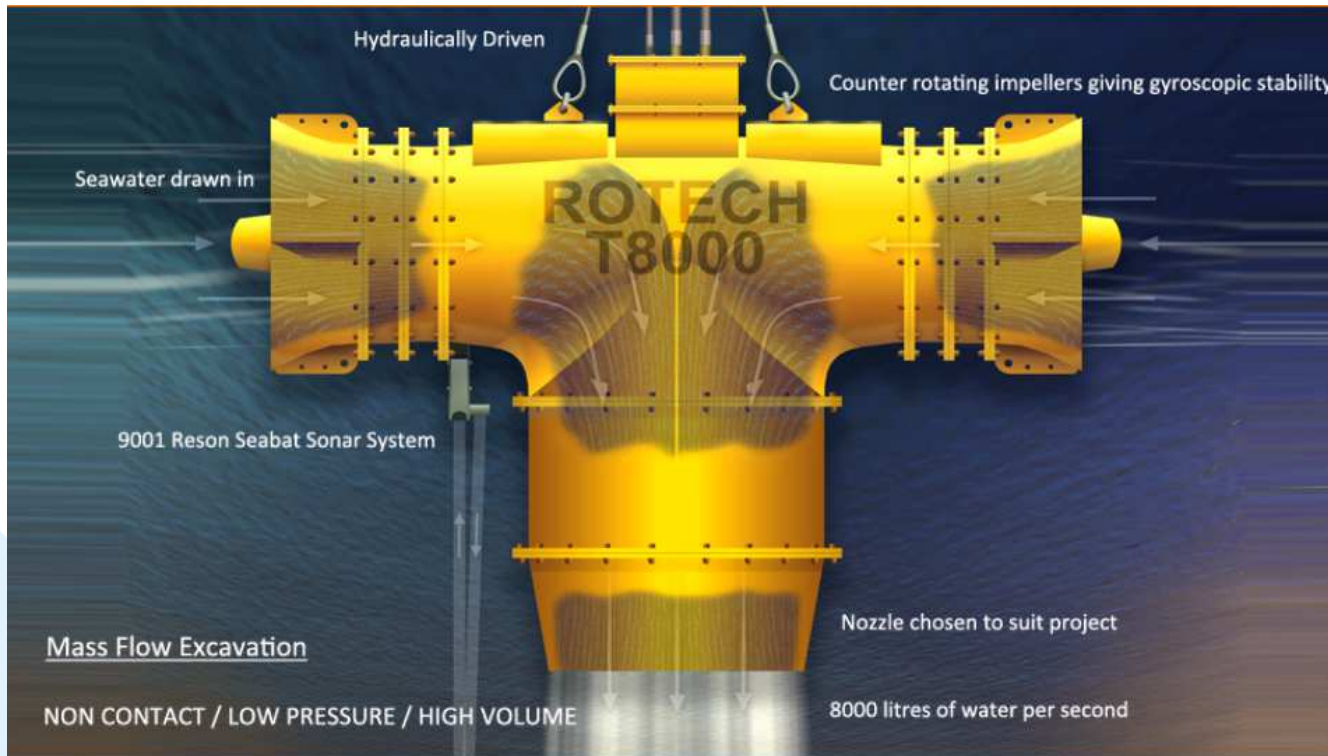
Remotely operated Jetting system



Remotely operated chain trencher



T8000 Mass Flow Excavation tool





Atlantic Guardian carrying out close proximity (50m) touchdown monitoring.
Seen from Team Oman Bridge

DC cable SHES challenges



Successes in the project

Excellent Safety Record

- ◆ Approximately 2,000,000 hours worked to 'go live'
- ◆ 2 LTIs

THE BRITNED INTERCONNECTOR WAS COMMISSIONED ON TIME AND WITHIN BUDGET

Since going into commercial operation on 1 April 2011:-

- In 2011 we achieved 95% technical availability (figure excludes planned outages)
- From 2012 until now (May 1st 2014) the technical availability excluding planned outages is 99,6% and in total 97.7%
- Zero safety or environmental incidents



What does it take to operate the interconnector

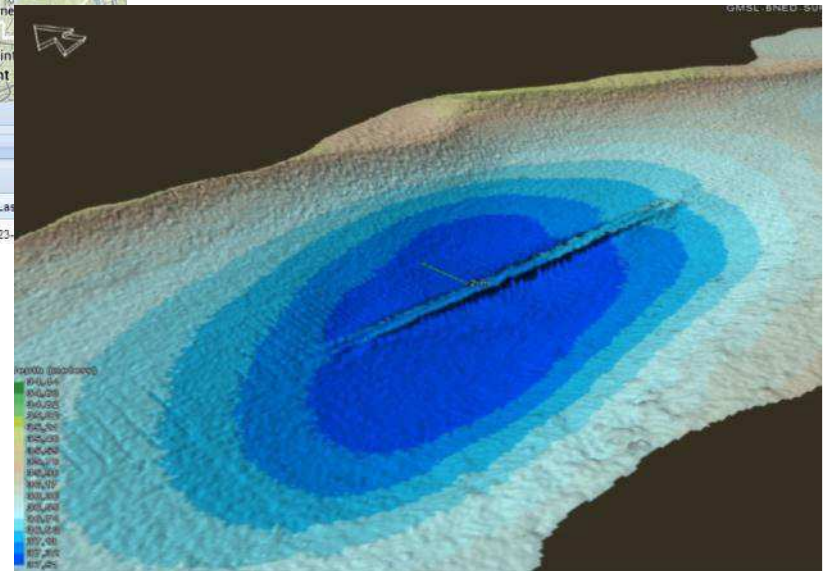
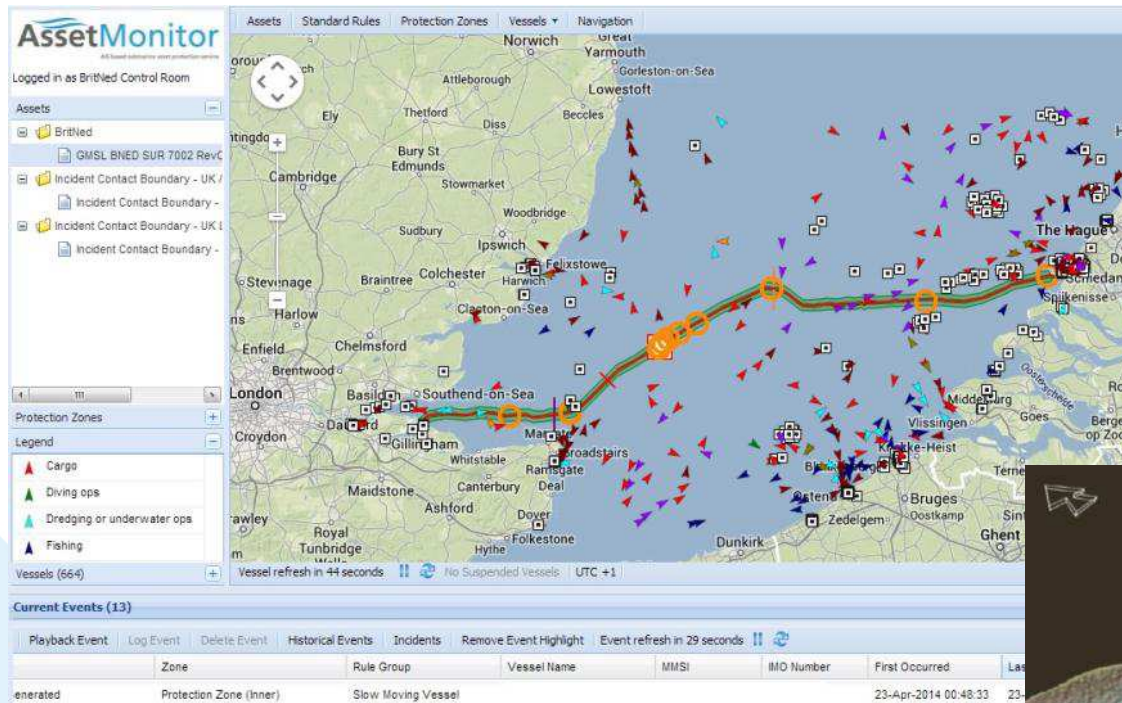
- Two operators on shift 24 hours a day at Grain, one operator on workdays at Maasvlakte. This ensures continuous monitoring of all alarms and threats.
- Support contracts with 24/7 emergency response with National Grid, TenneT, ABB, Siemens and other ancillary contracts.
- On call Engineering manager to oversee / co-ordinate any unplanned event.
- Set of strategic spares, including spare transformers and a spare smoothing reactor to enhance response time thereby reducing system down time.
- Surveys to ensure proper health of the system or protection.

Constraints:

- No opportunities for planned short duration access to the system
- Planned outage strategy to match commercial products, like 2014 auction products.



Monitoring and survey of the cable





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Commercial



BritNed Commercial: Video Presentation....



Auction Types

BritNed offers a blend of explicit and implicit auction products to its customers

Explicit Auctions

- ◆ Sale of capacity only
- ◆ A blend of medium term auctions (no longer than one year) and intraday
- ◆ Separate auction platform (Unicorn systems)
- ◆ Customer signs BritNed User Agreement & post credit as required
- ◆ Similar solution as IFA interconnector

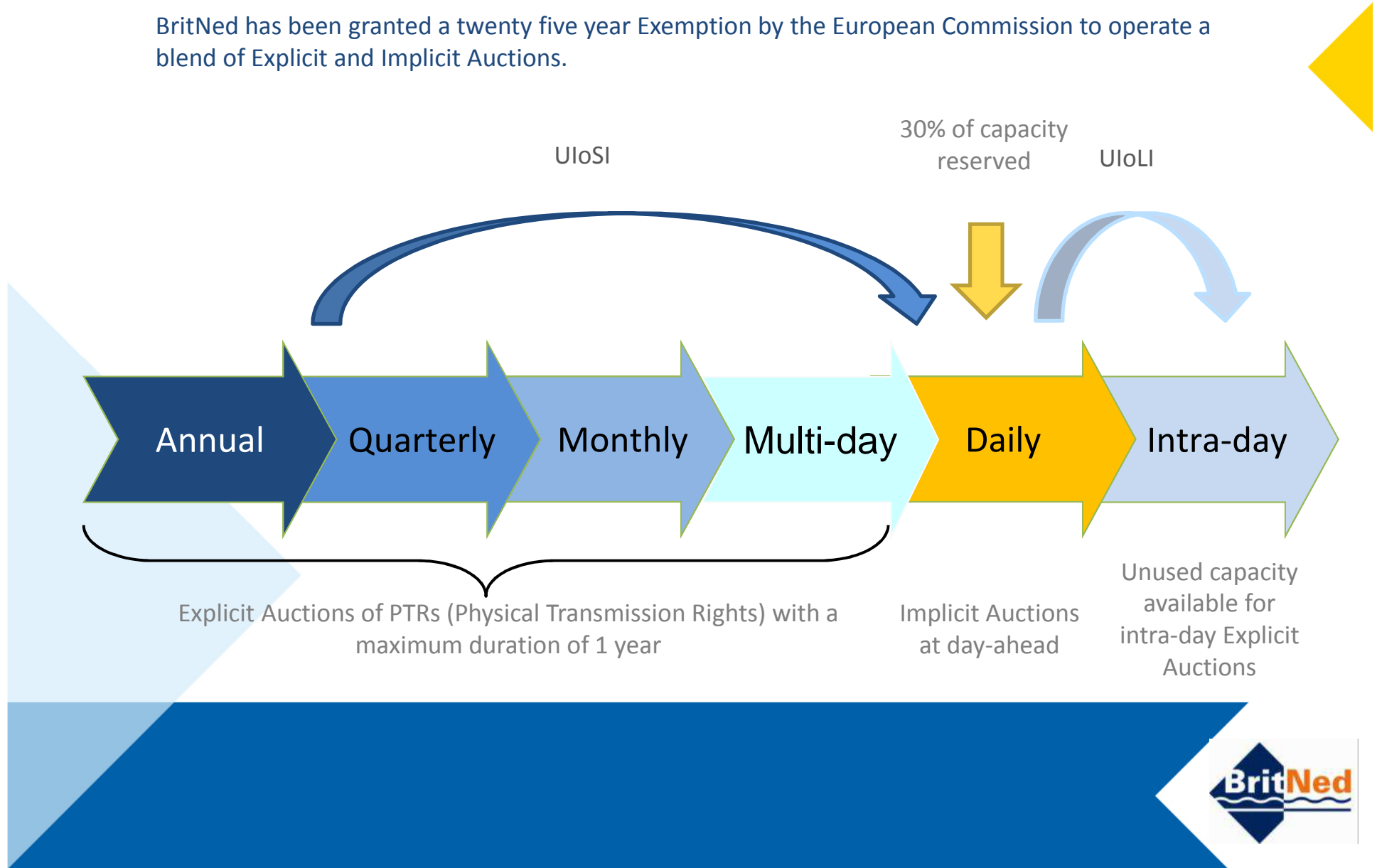
Implicit Auction

- ◆ Sale of capacity plus energy – firm offering
- ◆ Coupling of day-ahead Power Auctions in two markets (GB and NL)
- ◆ In cooperation with APX-ENDEX (operator of spot markets in NL and UK)
- ◆ Auctions enable power generated in one market to be sold in the second market (from low to high price)



BritNed's linked Auction Products

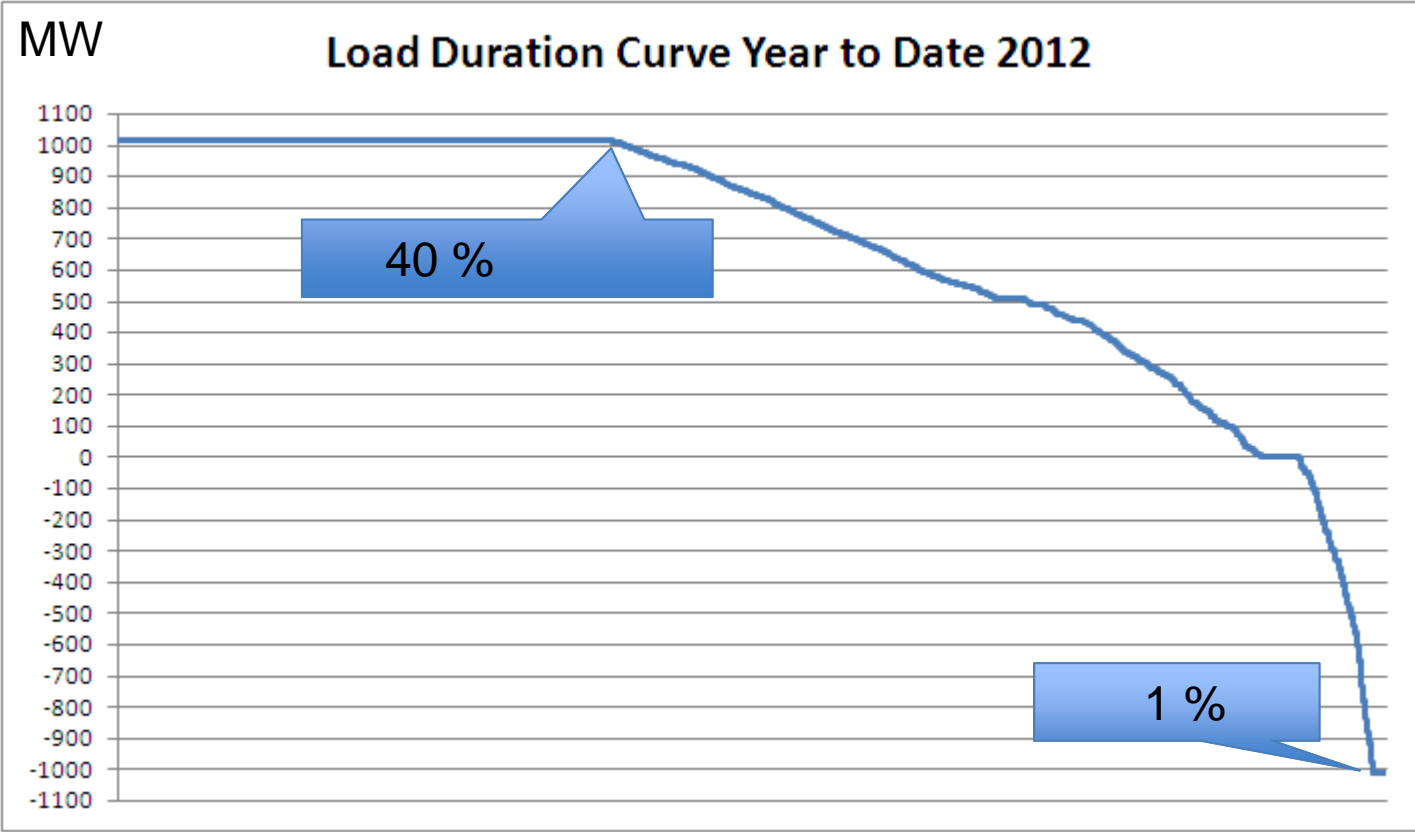
BritNed has been granted a twenty five year Exemption by the European Commission to operate a blend of Explicit and Implicit Auctions.



Load Duration Curve – 2012 to date

NL -> GB

GB -> NL



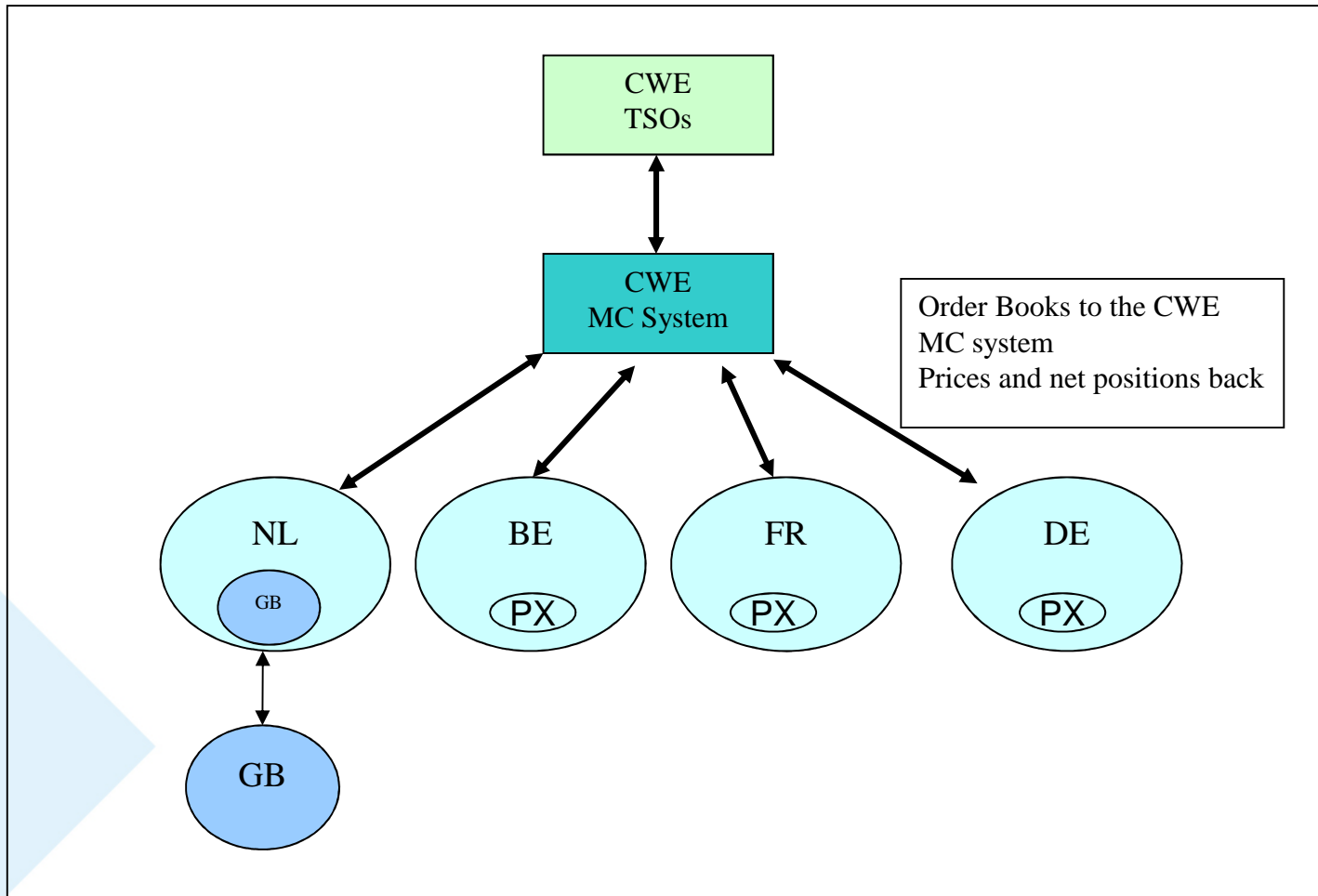
Possible Additional Products

- Emerging regulatory changes may dictate certain required changes in our product offerings
- BritNed continually reviews its product offering and works closely with stakeholders and customers to ensure it aligns with extant market requirements
- Some products currently being considered include:
 - Offering of forward annual products
 - Other short-term products (weekdays & peak/off-peak products)
- Other TSO to TSO Services
 - Frequency Response
 - Other cross-border balancing services

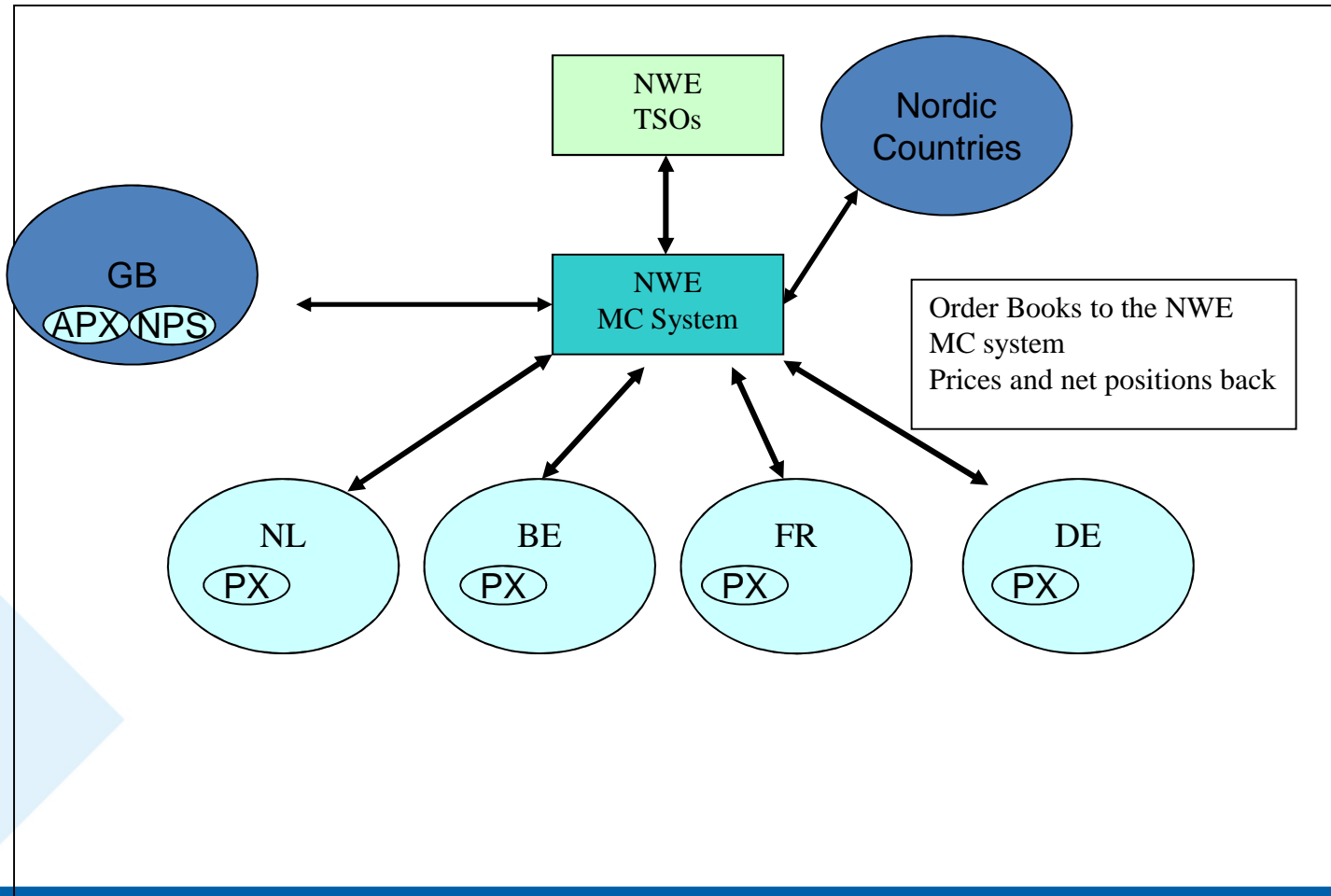


Embedded Implicit solution for BritNed (CWE)

(Developed by APX and operational since April 2011)



NWE Market Coupling solution (Go-Live Feb 2014) and SWE (France, Portugal and Spain) coupled May 2014



Aims to deliver pooled liquidity and one Clearing Price for GB



Key Commercial Risks

- Lack of Market Spread
- Lack of Liquidity
- Asset Reliability & Availability
 - associated imbalance risk
 - complex business processes
- Regulatory Changes
 - Impact on revenue
 - Impact on business processes and associated infrastructure



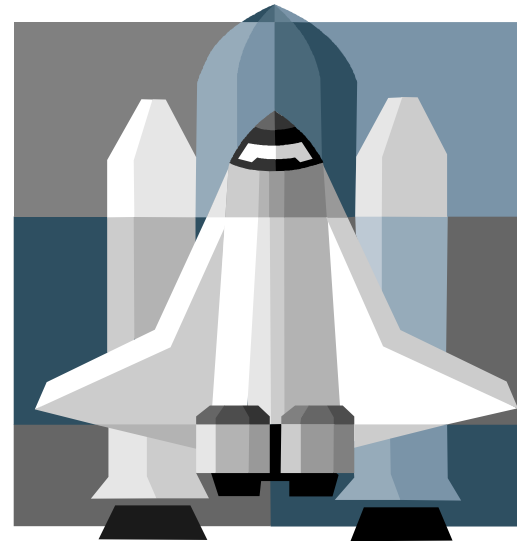


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Legal and Regulatory



The Past (Take Off)

- Connecting The Netherlands with Great Britain
- Discussion on business model – socialised/merchant
- Requirement of Exemption
- Conditions – involvement of NRAs and EU Commission.
- Approval of Access Rules



The Present (In the balance)

- Third Package
- Framework Guidelines
- European Codes
- What does this mean to BritNed?
 - Exemption
 - Compliance with Codes
 - Compliance with Standard licence conditions
 - Changing Regime?
 - Certification



The Future (what can you see?)

- Compliance with the European Network Codes
- Achieving renewable targets
- A coupled Day Ahead market
- An established Intra Day market
- Offerings of ancillary services
- Harmonised products and platform
- More interconnectors
- Price divergence/convergence
- Regime? Merchant/socialised/cap n floor



Questions and Answers....

