HyBalance

Webinar September 24, 2020

Balance responsibility and grid balancing

Partner
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Speaker
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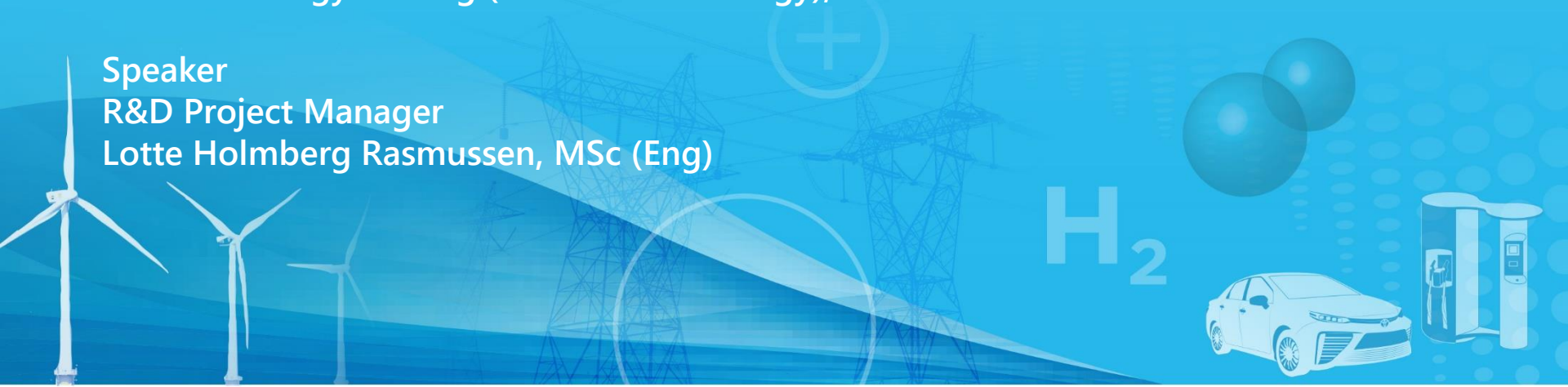
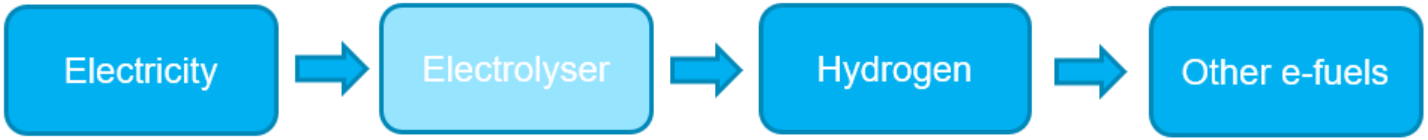


The HyBalance project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking under grant agreement No 671384. The Joint Undertaking receives support from the European Union's Horizon 2020 research and innovation program. www.fch.europa.eu. The HyBalance project has furthermore received funding from the Danish EUDP program, which is administered by the EUDP Board.

HyBalance

Purpose of PtX (production of hydrogen and hydrogen based fuels)



Hydrogen production is **flexible electricity consumption** – converting electricity to fuels

Grid balancing

- Using electricity when prices are low (spot market)
- Using electricity for balancing the electricity grid in the day and hour of operation (ancillary services)
- Thus, grid balancing is done by the electricity markets

There is a need for a BRP

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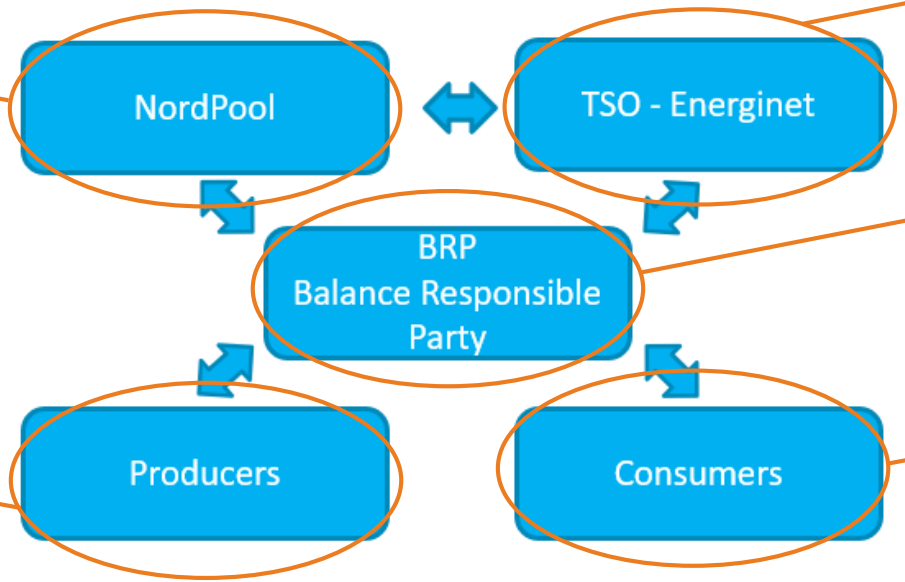
What is a BRP? / How are electricity markets controlled?

Communication links between market actors

TSOs system responsible for the balance
Orders ancillary services from the BRPs

- Spot market
- Financial contracts
- Intraday (Elbas) market



BRPs:
Responsible for production and consumption of own BRP portfolio
Centrica Energy Trading is a BRP

- Powerplants
- Cogeneration of heat and power
- Wind
- Solar (PVs)

Flexible consumer:
HyBalance, Hobro

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CET - Centrica Energy Trading (part of Centrica)

Two main business areas:

- Trading electricity, gas and green certificates across Europe
- Balancing responsible party (BRP) for physical assets

CET BRP customers includes:

- Approximately 200 CHP (cogeneration of heat and power) plants – 1 - 400 MW
- Flexible consumption (e. boilers, heat pumps, EVs, electrolysers)
- Renewables (wind, solar and hydro)
- Utilities and supply companies

- Our BRP business is built on an integration of energy trading and software services to fulfil opportunities for customers with assets in energy markets
- Headquarter in Aalborg, Denmark with offices in the UK, Germany, Sweden, Norway and Singapore.
- "We are our client's eyes in the market focused on Maximizing Value by Managing Risks"

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CET roles in HyBalance: Business case, installations and bidding

Air Liquide · Copenhagen Hydrogen Network (CHN) · HYDROGENICS /Cummins · NEAS ENERGY /CET · HYDROGEN VALLEY

ludwig bölkow systemtechnik · ASSOCIATED PARTNERS: · ENERGINET.DK · AkzoNobel /Nouryon · Sintex

Business case

- Modelling the plant in relevant electricity markets.

Remote control box

- A remote control box has been installed at the HyBalance Hobro plant (Air Liquide access after signals from CET)
- The box and performance of the plant in all electricity markets has been tested by the TSO summer of 2018
- The HyBalance plant performs very well with all requirements

Bidding platform

- Neas Direct is accessed through the internet (Centrica Energy Trading bidding tool)
- Bids in the spot market are made the day before by HyBalance in Neas Direct according to
  - How much hydrogen production is needed the following day
  - Bidding in the lowest price hours – where the plant will make a profit on hydrogen production
- Bidding in the other markets (intraday, regulating power, frequency regulation) follows
  - Up-regulation bids when the plant is in operation
  - Down-regulation bids when the plant is not in operation

Support with optimal strategy for bidding in the different electricity markets

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HyBalance installations and bidding through Neas Direct

The electrolyser at the HyBalance plant can participate in all possible DK1 electricity markets through Neas Direct

- Spot market (day-ahead market)
- Intraday-market (Elbas market)
- Ancillary services
  - Manual reserves (mFRR reserves)
  - Regulating power market (mFRR activation)
  - Regulating special regulating market
  - Automatic reserves (aFRR)
  - Frequency reserves (FCR)

Bids will be sent from CET to NordPool + TSO and information on the winning bids will be returned later – The operation of the plant will be planned according to bids won in the different markets

Centrica Energy Trading …operation officer (24/7) - will keep an eye on the plant performance and will call the plant if not running according to bids in the markets

Monday, October 7, 2019

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Conclusions

- **Grid balancing: Electrolysers (PtX) can participate in all the different electricity markets**
  - Day-ahead/intraday/ancillary services

- Operation strategy
- Most important: Do bid in the different markets in order to catch the best prices and profits
- Participating in the different electricity markets will increase the value of flexibility of an electrolyser
- Every plant unique: Operation strategy based on data and constraints for the plant

- Please also note:
- It is possible to participate in different markets in the same hour
- Variable tariffs (time-of-use-tariffs) can increase the value of flexibility

- CET has optimised and advised on operation strategies for plants for 15 years
- Previously only production plants
- Now also optimization of flexible consumption plants – like electric boilers, heat pumps and electrolysers

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Key take-aways

- Important to see production of green hydrogen as a **flexible electricity consumption**
- ….. needed to off-take variable green electricity consumption
- ….. and balance the grid

- **Large economic value in participating in the different markets**

- **Important to bid in all relevant markets** in order to contribute to the business case of green hydrogen

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Thank you for your attention

hybalance.eu HyBalance

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