Hydrogen as a key enabler of the energy transition: current market & perspectives

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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

Air Liquide: more than 60 years of experience with H2

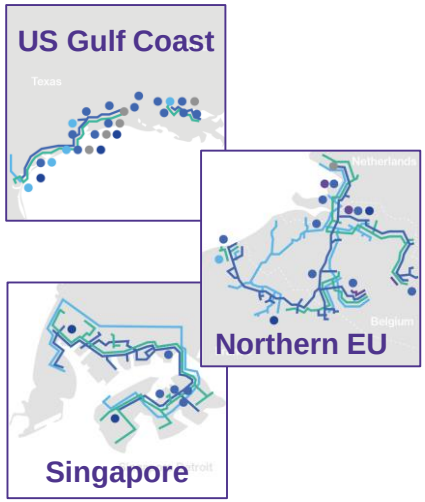
Production & Supply chain

14 bn m3 / yr

Production

Supply-chain (GH2 / LH2)

Distribution Networks



Markets Segments

Process industries

Oil & Gas

Steel, Glass

Electronics

Space Transport

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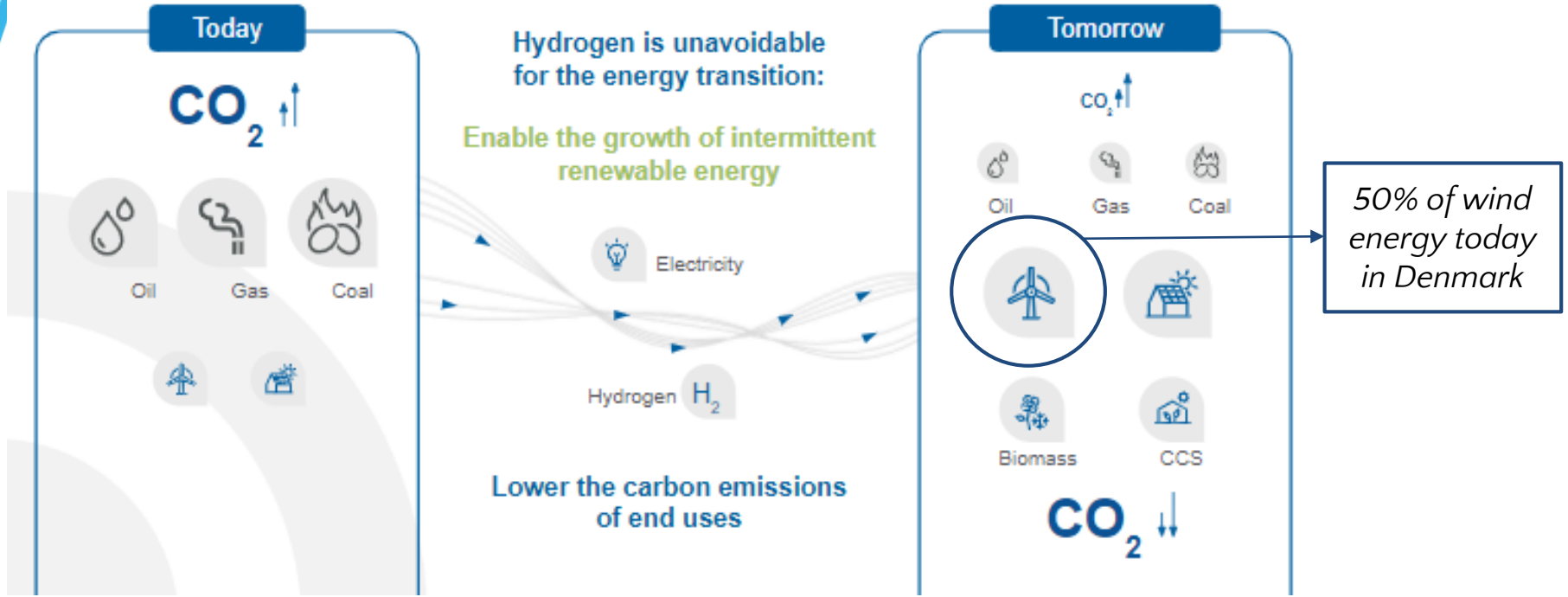
Hydrogen : a key enabler for the energy transition



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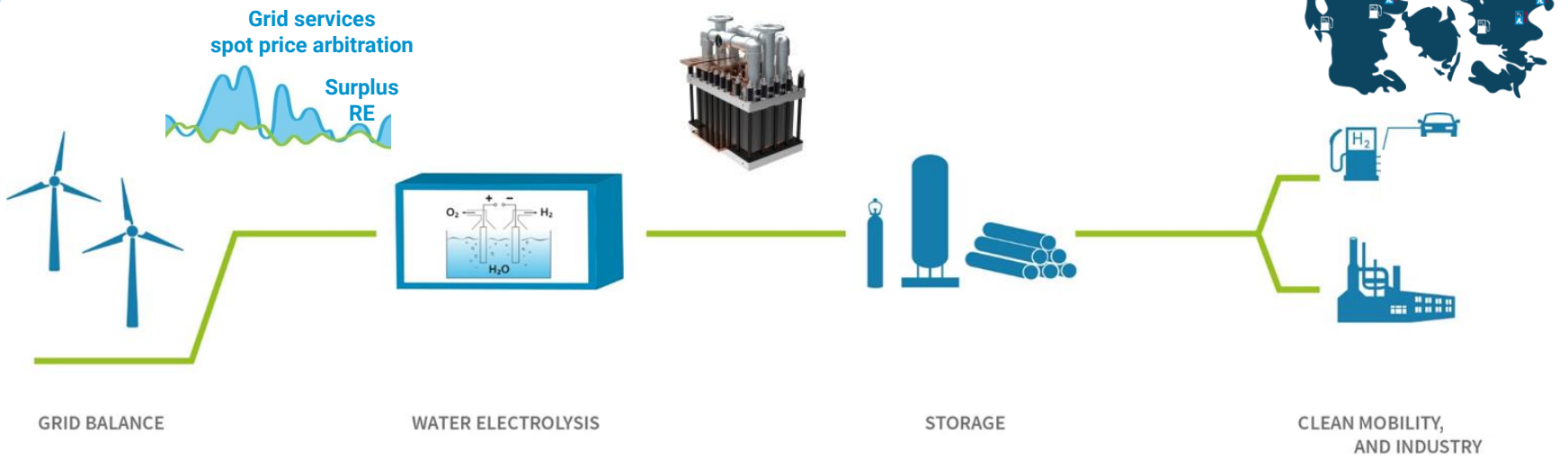
Hybalance project presentation



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Hybalance project: main figures

- Project dates: **Oct. 2015 - Sept. 2020**
- % stage of implementation (duration)16/03/2018: **80%**
- Total project budget: **15 M€**
- FCH JU contribution: **8 M€**
- Other financial contribution: **2,6 M€**
- Partners:

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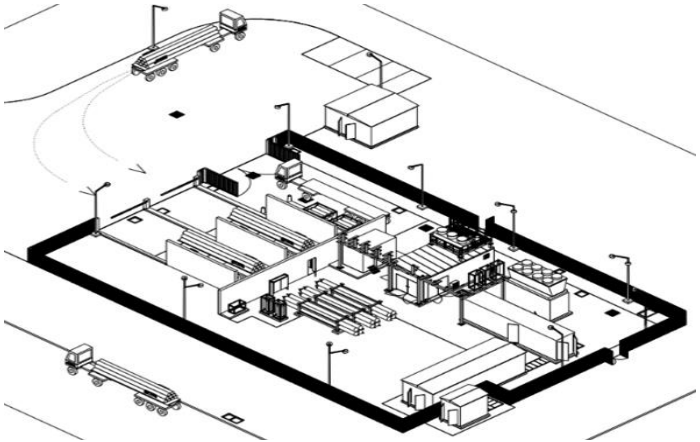
Hybalance construction

Characteristics :
A very flexible plant feeding trailers and a pipe to a local customer, with full redundancy on the stacks



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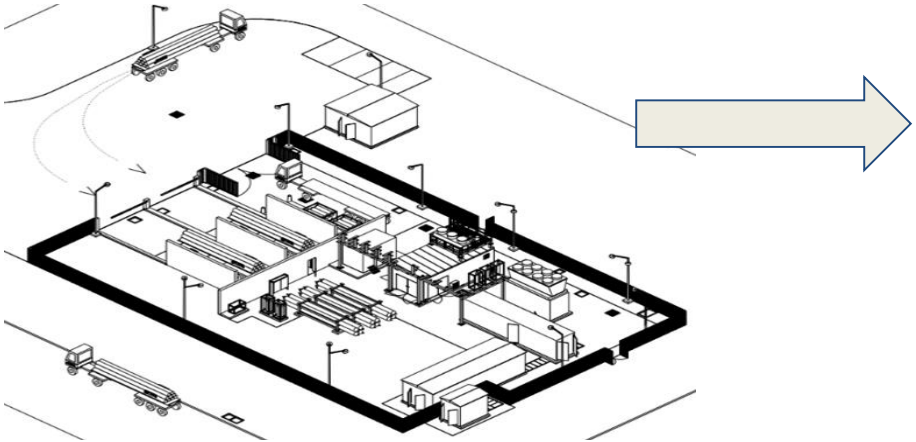

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Hybalance plant – in operation

received funding from the Danish EUDP program, which is administered by the EUDP Board.

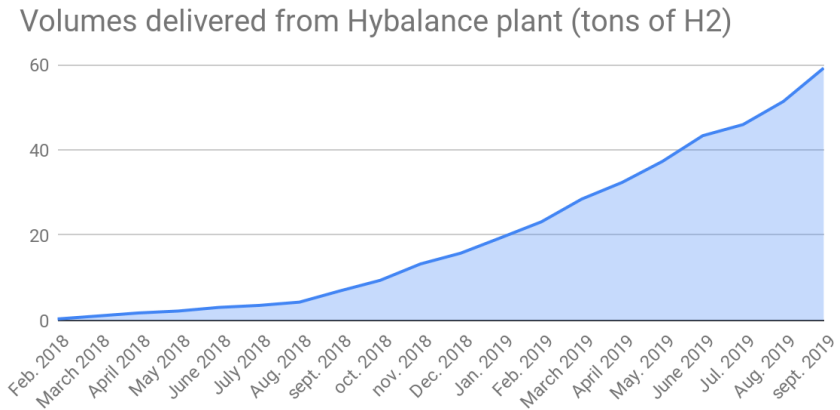
Hybalance : Project flashback

From the start-up S1 2018 ...

- Tests
- Approval process of H2 quality
- Design adaptations
- Connection to pipeline

… a gradual ramp-up ...

- Reliability improvements
- Operational organisation : training



*… **with ~60** tons of Hydrogen produced and **120** trailers filled !*

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Hybalance : a key brick to scale up !

HYBALANCE One of largest PEM In operation

1,25 MW

< 2017

more than 30 electrolyzers in operation **worldwide**

usual range: **50 - 100** Nm^3/h H_2

Mainly Alkaline technology

ONSITE

2018

Hydrogenics announces $20.5m private placement and technology partnership with Air Liquide

2019

20 MW

BECANCOUR
Largest PEM project
Under execution

Air Liquide invests in the world's largest membrane-based electrolyzer to develop its carbon-free hydrogen production

Scale up
Preparing the next step

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Conclusions

Hybalance :

- Represents the first brick of a long term strategy for Air Liquide and confirms Air Liquide interest for the PEM electrolysis
- Grid balancing will be demonstrated during the last project phase

Key drivers for investments in green hydrogen production :

- Serving growth markets ⇒ develop new H2 markets
- Aligning environmental and economics

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Thank you for your attention

hybalance.eu

HyBalance

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