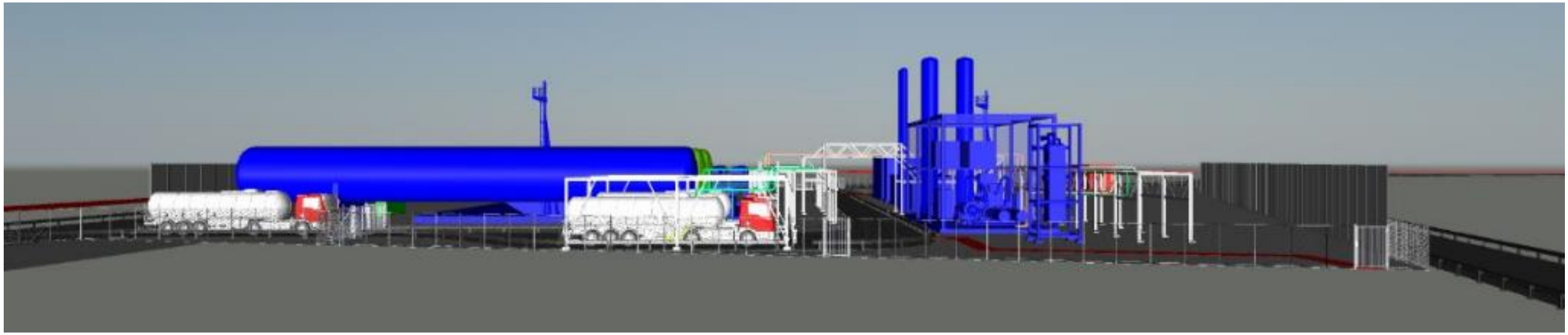


Green LNG

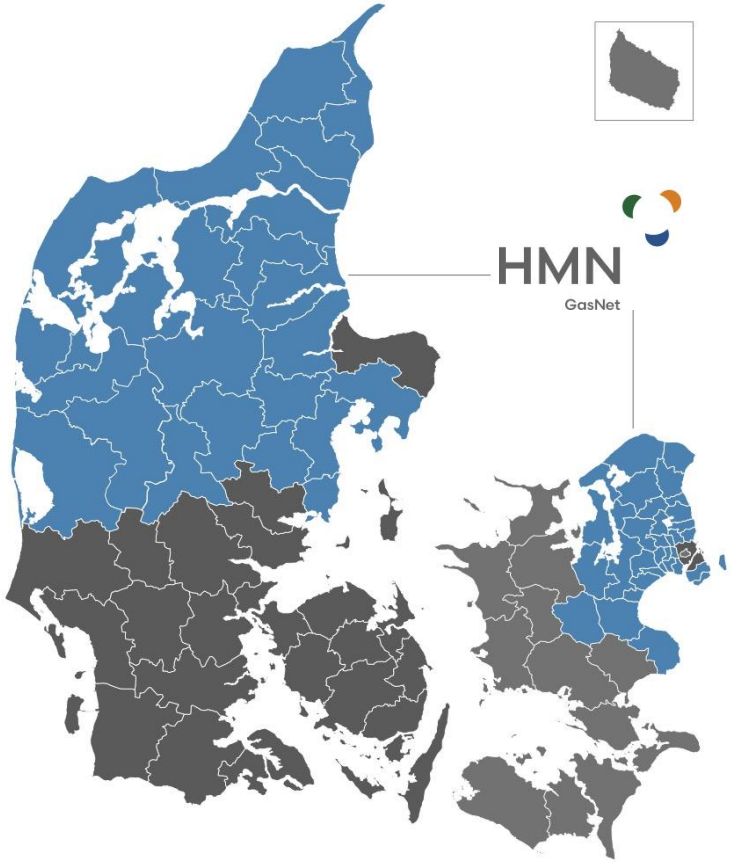
Liquefied Bio Natural Gas in Hirtshals

Small Scale LBNG production in Hirtshals, Denmark

Go LNG – BSR Cluster Meeting, 15th November 2017, Klaipeda.

HMN Naturgas A/S

HMN Group



HMN
NATURGAS I/S

HMN Naturgas I/S
owned by 57 Municipalities
Revenue: 3,805 mill. DKK
Net profit: 266 mill. DKK
365 employees

HMN
GasNet

Distribution
+ 250.000 connected customers
Distributed volume; 1,498 mill. m3

HMN
NATURGAS A/S

Sold to Eniig & SEAS-NVE per 1/12/2017?

33% → Green LNG A/S
(During formation)

Sales
+ 220.000 customers
Volume; 1,121 mill. m3
Net profit; 166 mill. DKK

100%

For sale

HMN
Biogas

HMN
Gastankstationer
CNG

Key figures 2016

The Project

Capacity: 160 ton/day
Storage capacity: 750 – 2.500 tons
Area needs: 15.000 m2
Power capacity: 4 MW

Produced capacity:
~ 56.000 ton = 70,0 mill. m3* (per year)

Price estimate: 50,0 mio. Euro

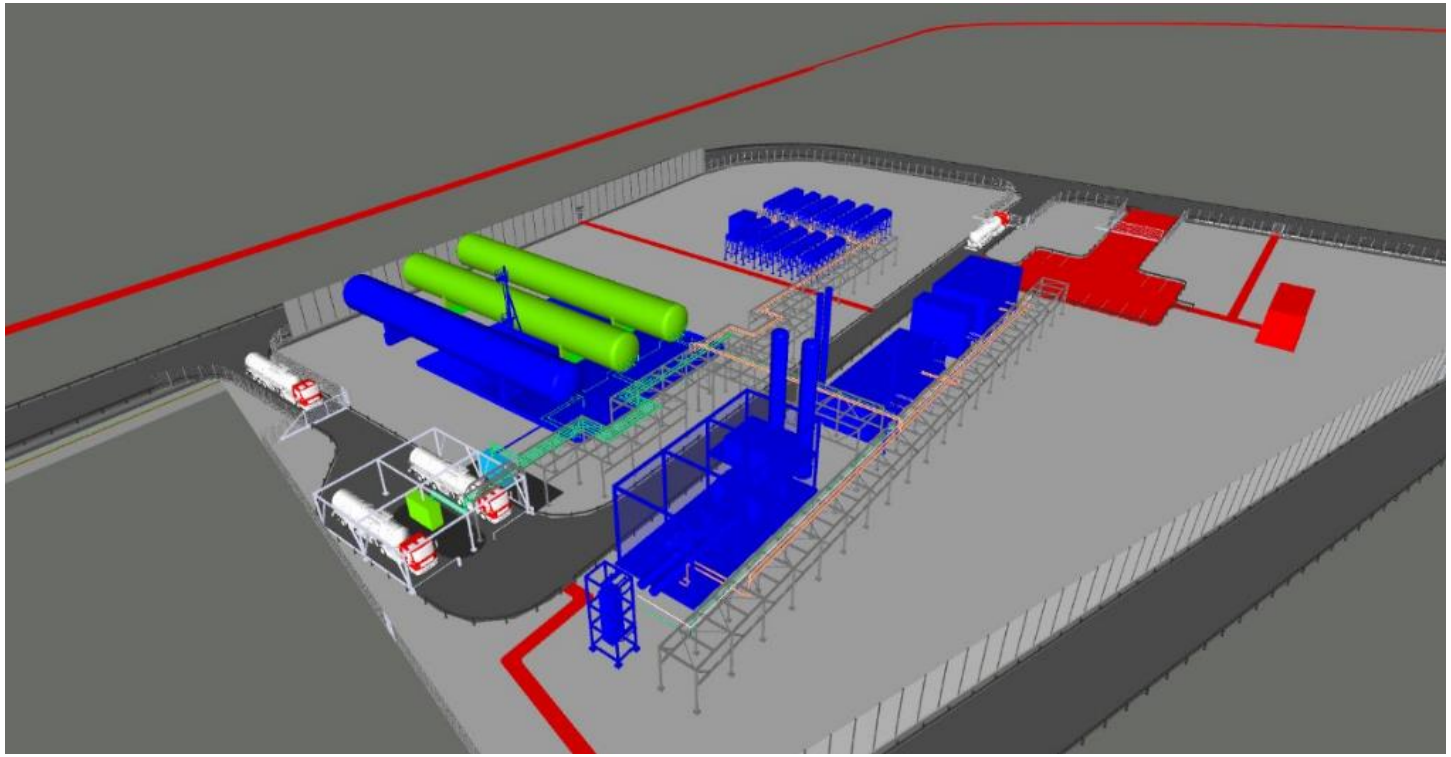
Construction time : 24 – 30 months

First delivery; Q1 - 2020

* 1 ton LNG = ~ 1.250 M3n (danish grid quality)

Figure 3: Planned location for the LNG Plant

The Project



- EIA application
  - Expected approved Q1 2018
- CEF application for Grants
  - In process
  - Expected approved November 2017
- Tender update pr. end October 2017
  - Engineers still calculating
- EPC Contract signing Q1 2018
  - Depending on Grants

Green LNG A/S, established 1st June 2017

Project Partners

Fjord Line

Secure basic consumption

Skangas

Knowledge in
LNG Markets
& handling
& transport
& bunkering

HMN Naturgas

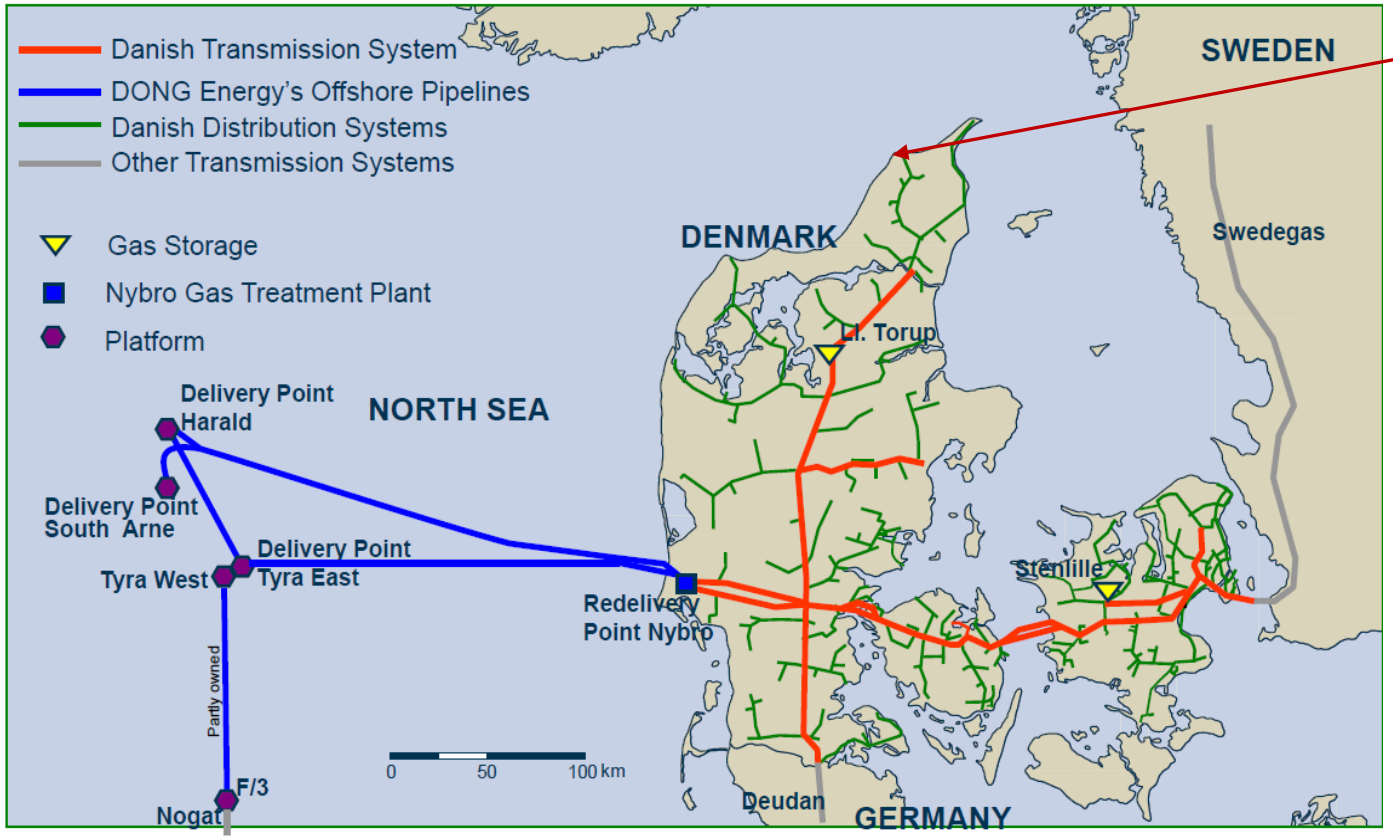
Knowledge in
Energy Markets
& hedging
& gas- & biogas-supply

HMN
NATURGAS A/S

Balancing & Integration

- A liquefier can
  - Secure gas consumption in the gas grid in (summer) nights and weekends
    - And hereby reduce cost to back-compression in the gas grid
  - Reduce power consumption (to zero), in night times whit out wind power
    - And hereby be a part of the power regulation regime
    - And/or optimize power costs according to LNG production
  - Increase power consumption at Power overflow
    - And also here be a part of the power regulation regime
    - And/or optimize power costs according to LNG production
- In all cases it will depend on a calculations which takes into account the storage capacity and supply of customers.

Danish Gas System



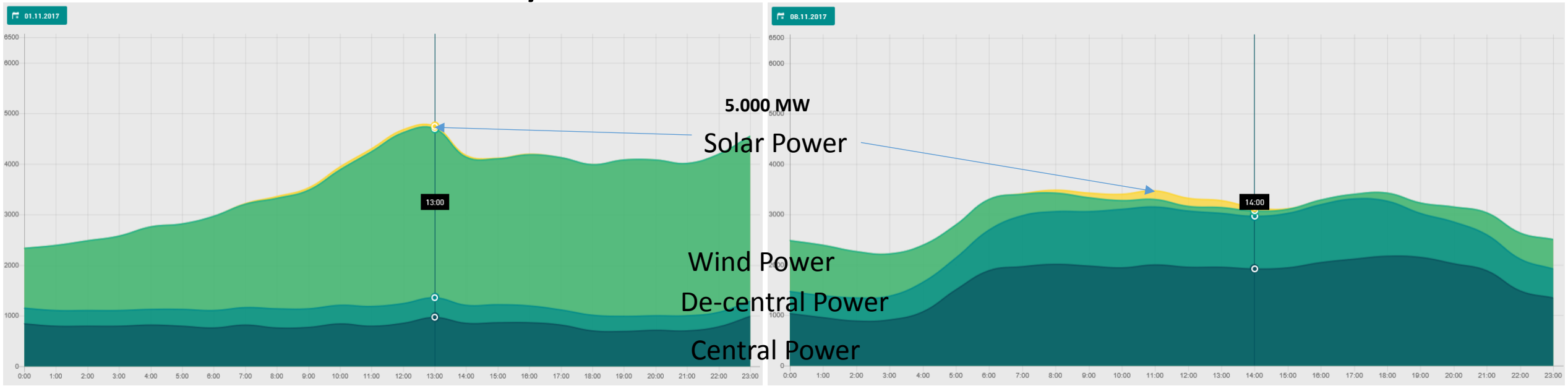
Hirtshals

In 2017 will biogas production in Northern Jutland exceed consumption in summertime.

In 2020 is biogas production expected to exceed consumption.

Balancing services
to save "Back-Compressions costs"

Danish Power System



Power Production in DK, 1st and 8th November 2017

Wind- and Solar-Power are increasing, but difficult to control

Screaming for Power balancing services

Biogas and Carbon reduction

Calculation of carbon reductions can be done in 2 ways;

- The REDcert way;
  - In the process alone
  - Typical carbon reduction based on manure, straw and waste
  - GHG-savings at 85 – 90 %* ~ 8 – 12 g CO2 eq per MJ
- Including derivate effects, as reduction of methane emmissions at fields
  - GHG-savings up to 160 %

- LBG certificate
  - GHG-savings at 83 – 88 %* ~ 8,1 – 12,2 g CO2 eq per MJ
    - @ liquiefier efficiency at 98 %, can be improved by windpower

*Reference; 83,8 g CO2 eq per MJ

Biogas Markets and customers

- Land based customers
  - Trucks at EU's Blue Corridor
  - Off-Grid customers who wants greener image
  - And/or driven by environmental/economical attraction (higher value for customers customer)

- See based customers
  - Ferry in national services (local demands)
  - Local Ships like Tug Boats and supply Ships for Oilfields or Windfarms
  - Long terms; Ship Fleets in international services who wants to reduce the total emission.

- LNG Terminals near Hirtshals, who want to provide customers with a green alternative

- Price for LBG ? As LNG + biogas fee
  - Driven by demand and the value of the exact GHG-savings on the specific biomass.

Distribution of Biogas

Thanks for your attention

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