SHIPPERS' FORUM

8 December 2022

Safety Guide

Emergency Exits

Defibrillator

Gathering Point

PROGRAMME

13.00 Welcome – *Clement Johan Ulrichsen, Energinet*

13.10 Status on security of supply and EU-regulation – *Jane Glindvad Kristensen, Danish Energy Agency*

13.25 Supply situation – *Christian Meiniche Andersen, Energinet*

13.40 Gas Storage Denmark – *lliana Nygaard, Gas Storage Denmark*

13:55 Danish Utility Regulator – *Peter Lyk-Jensen, Danish Utility Regulator*

14.10 BREAK

14:40 Tariffs – *Nina Synnest Sinvani, Energinet*

14:55 Capacity conversion – *Clement Johan Ulrichsen, Energinet*

15.05 New balancing model and market system – *Clement Johan Ulrichsen & Christian Rutherford, Energinet*

15.25 Hydrogen feasibility study update– *Steen Brostrup Knudsen, Energinet*

15:45 Final remarks – *Clement Johan Ulrichsen, Energinet*

WELCOME

Clement Johan Ulrichsen, Energinet

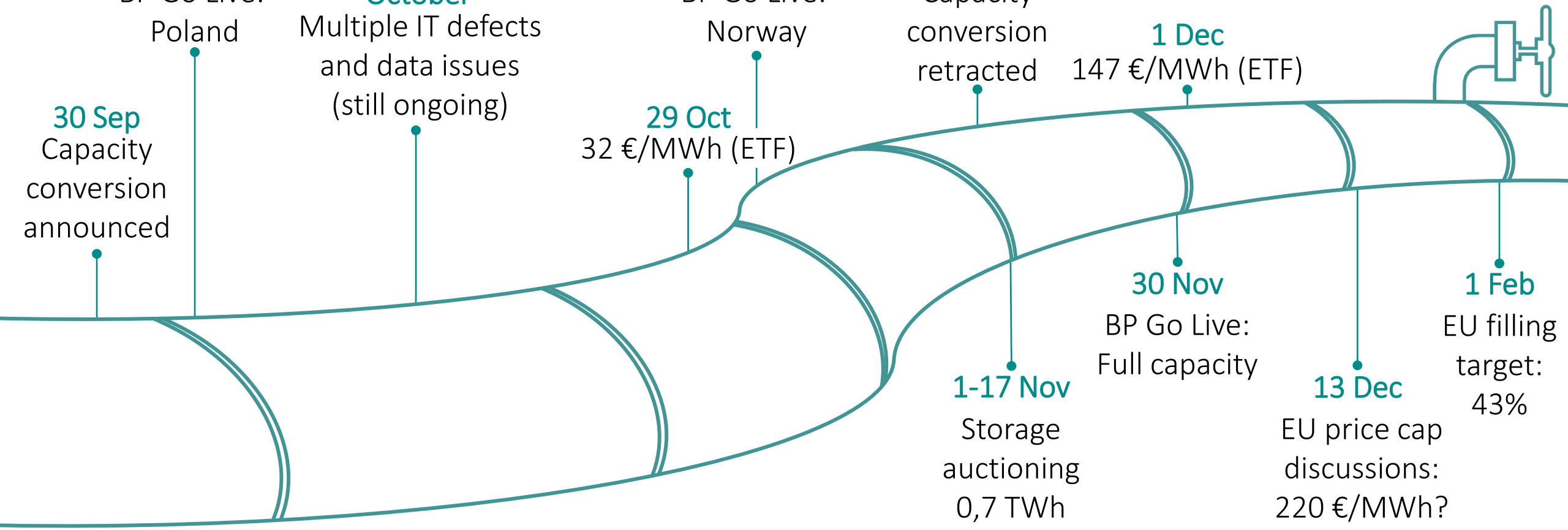
BALTIC PIPE IS IN FULL OPERATION

Capacity made available in 3 overall steps:

- 1 October 2022: 20 per cent of the total capacity was opened from Denmark to Poland
- 1 November 2022: 50 per cent of the total capacity was opened from Norway to Denmark
- 1 December 2022: Baltic Pipe in full operation, enabling the possibility to transport up to 10 billion cubic meters per year from Norway to Poland

ANOTHER FAST-PACED QUARTER

NEARING THE END OF 2022



QUESTIONS

Contact: cju@energinet.dk

Energistyrelsen

Status on Security of Supply and EU-regulation

Head of Division, Jane Glindvad Kristensen

General status on supply

Energy systems are connected and affect each other

Supply situation

	THIS WINTER (22/23)	NEXT WINTER (23/24)
GAS	**Expected stable** Volatile, high prices. Reduced gas from Russia. Increased LNG. Reduced consumption.	**Challenging** Reduced possiblities for storage filling.
ELEC.	**Expected stable** Volatile, high prices. Low production. Slightly reduced consumption.	**Challenging** Low production in Europe.
OIL	**Stable supply** High prices.	**Expected stable** Focus on consequences of EU sanctions.
HEAT & BIOMASS	**Stable supply** Higher prices.	**Stable supply**

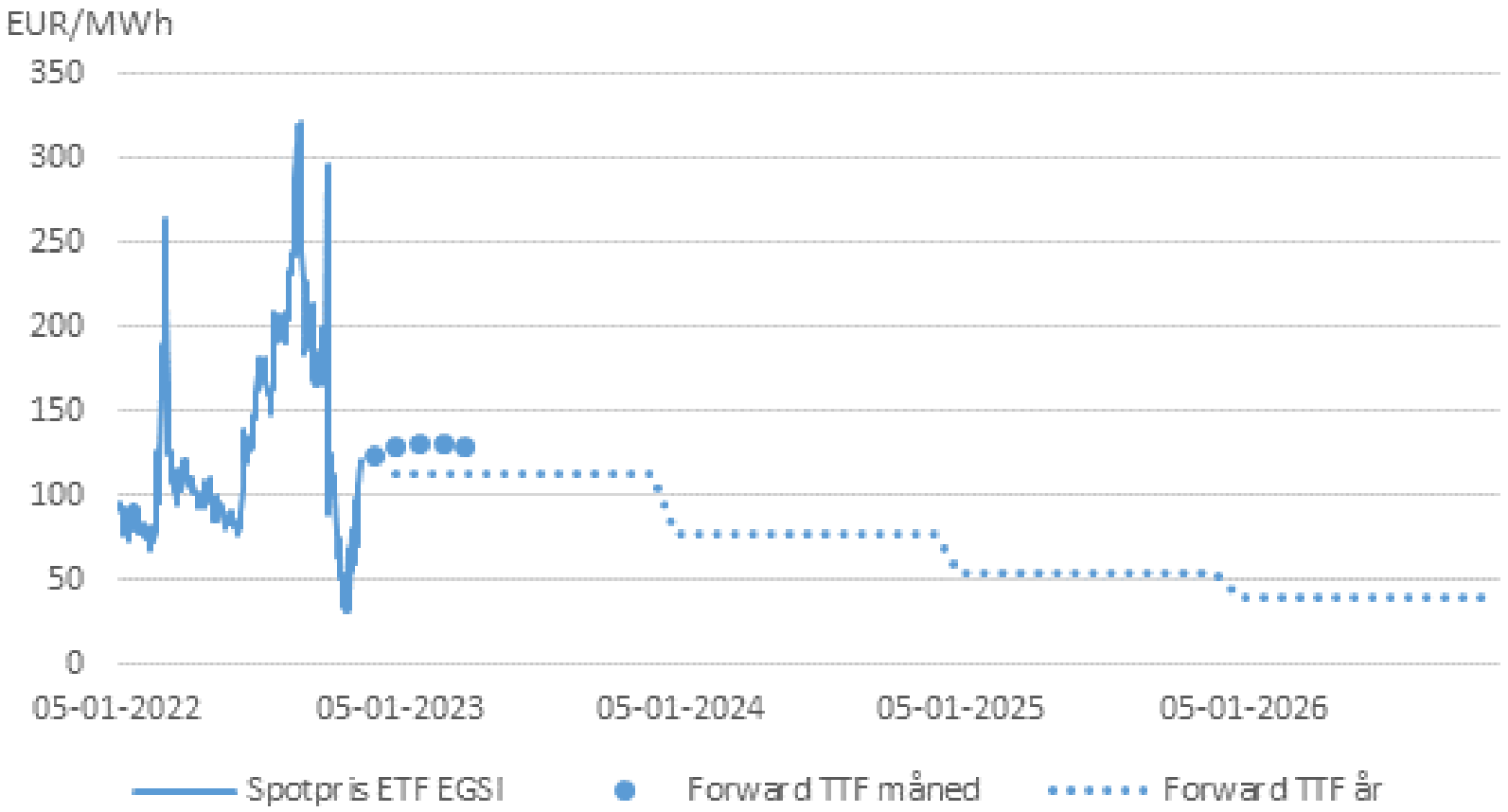
GAS

Status and coming months

More stable gas supply

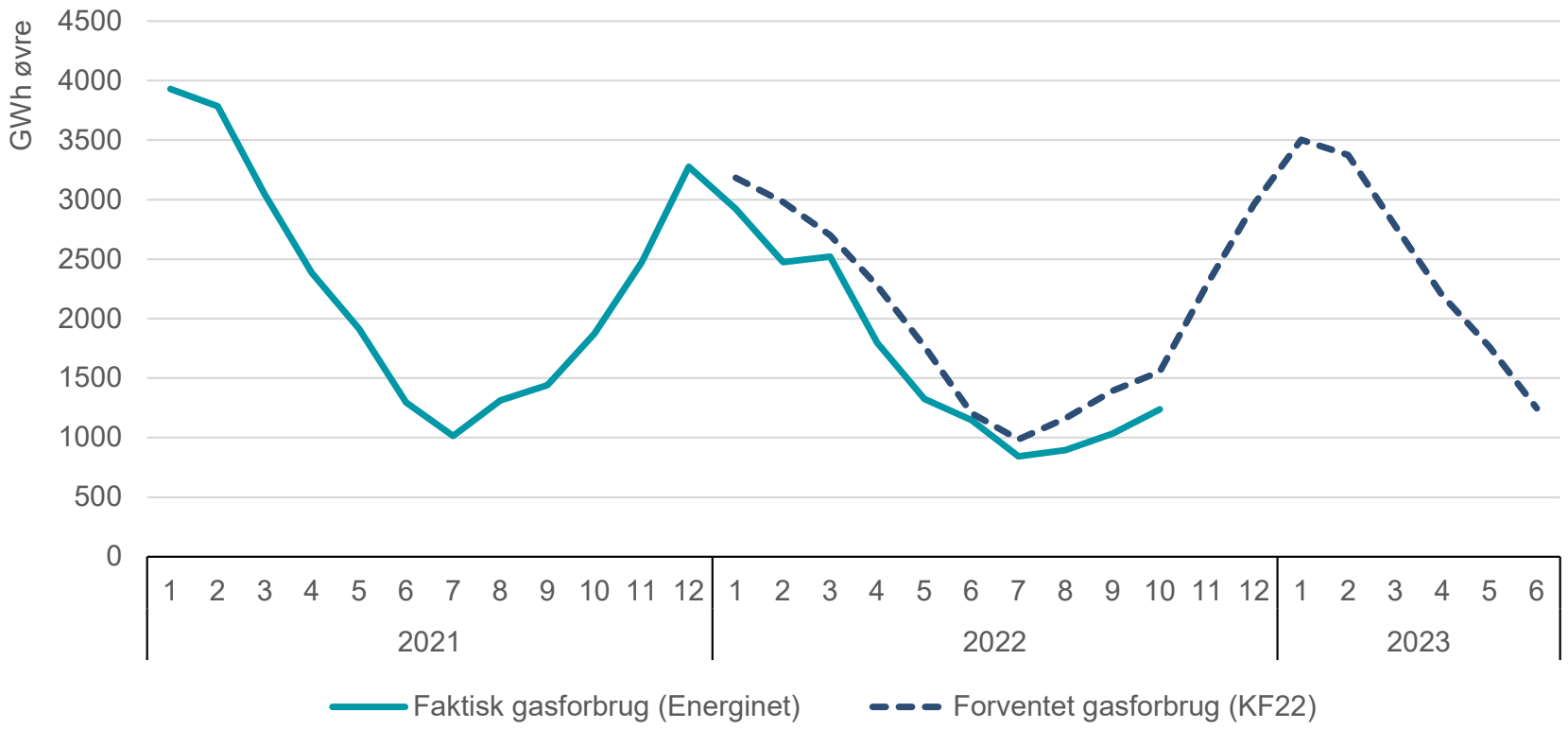
- Danish gas storage is 97% full
- 30 % biomethane in the Danish gas system
- Gas field Tyra reopens in winter 23/24
- Prices has been high and varies a lot
- Ørsted has contraced 8 TWh [and Andel 2.6 TWh]Norwegian gas via Baltic Pipe
- Less Russian gas, but much more LNG in Europe

Forward market for gas



- Current situation of expectations in the market
- The market does currently not expect significant increase in prices the coming months and years.

Gas savings



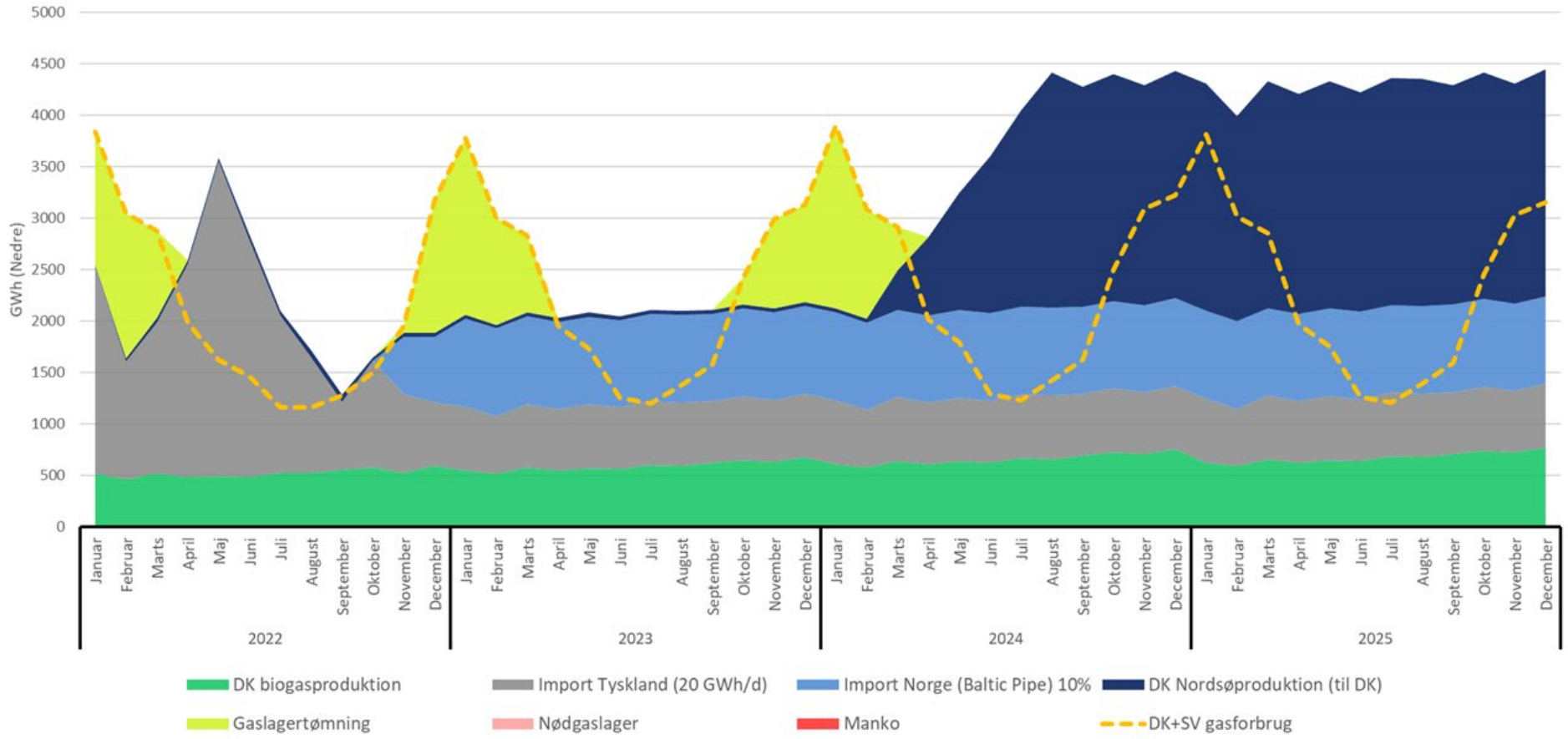
Reduction in gas consumption*

October 2022:	20 pct.
August-October 2022:	23 pct.
April-October 2022:	20 pct.
Since January 2022:	16 pct.

* Pipeline gas, being natural gas + biomethane

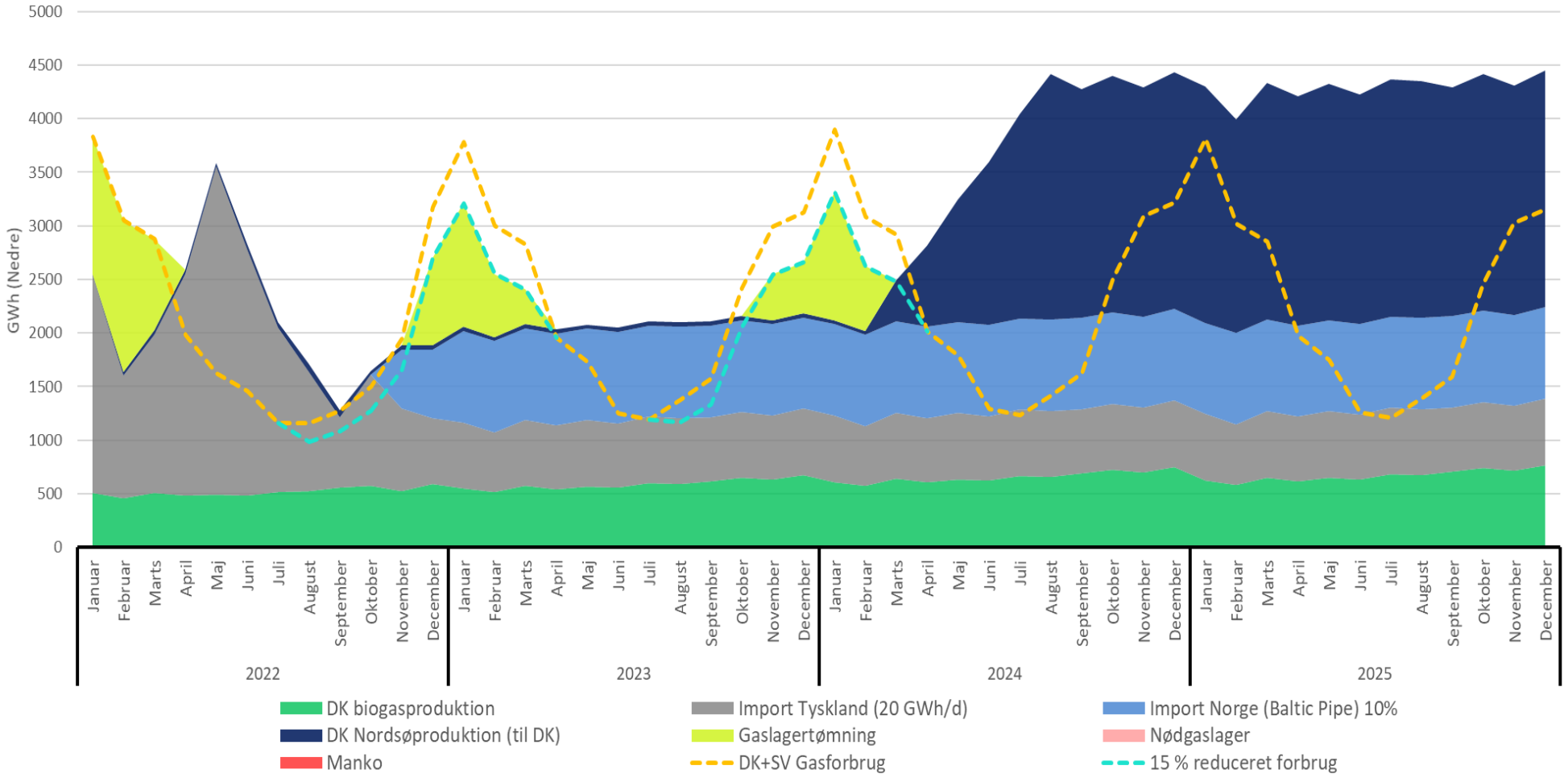
"Main scenario" for gas supply

EU burden sharing and app. 30 pct. reduced import



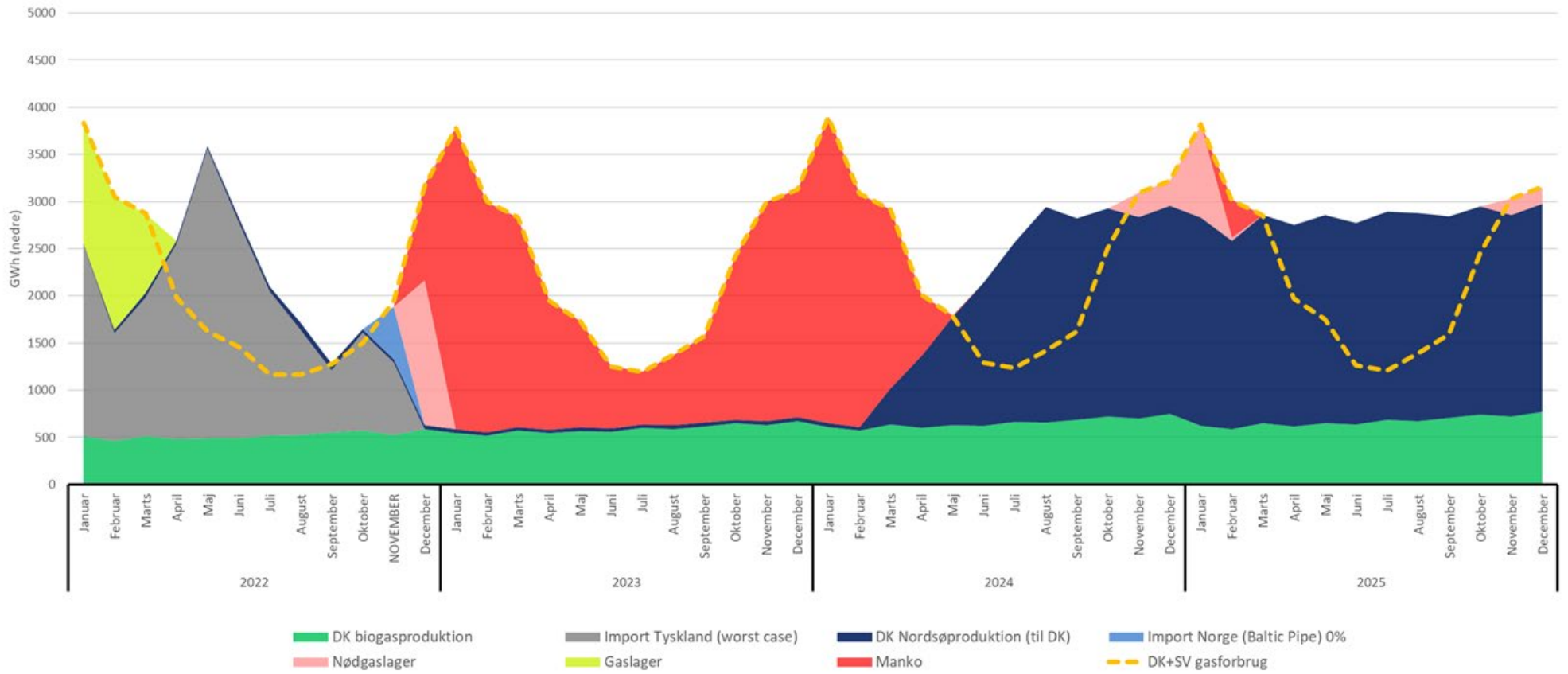
"Energy savings-scenario" for gas supply

15 pct. reduced consumption and app. 30 pct. reduced import



”Market malfunction”-scenario for gas supply

Market stops working



EU-regulation

Two proposals for regulations under on article 122 i the Treaty designed for emergency situations

REGULATION for enhancing solidarity through better coordination of gas purchases, exchange of gas across borders ande reliable benchmarks

- Transparency and information exchange on tender to purchase gas with a volume above 5 TWh/year
- Demand aggregation and joint purchasing trough a service provider
- Participating in demand aggregation and joint puchasig shall be open and transparent for all natural gas undertakings and undertakings consuming gas
- Mandatory use of the service provider with volume of 15 % of the total volume to meet the filling targets.
- Gas Purchasing Consortium

REGULATION for enhancing solidarity through better coordination of gas purchases, exchange of gas across borders ande reliable benchmarks

(continued)

- Intra-day volatility management mechanism
- LNG price benchmark
- Measures for the case of Emergency – Solidarity

Market correction mechanism Regulation

- **Scope:** Temporary mechanism against excessively high gas prices in the EU, which do not reflect world market prices. The mechanism will work on the TTF
- **Timeline:** Council agreement expected in December and entry into force from January 2023
- **Framework:** Should be designed to 1) not jeopardise security of gas supply, 2) continued proper functioning of the energy derivatives market and 3) not increase gas consumption
- **Negotiation:** Two groups of member states. One group wants a mechanism to have a real impact on gas prices and one group is sceptical


Energistyrelsen
Tak for i dag

SUPPLY SITUATION

Christian Meiniche Andersen, Energinet

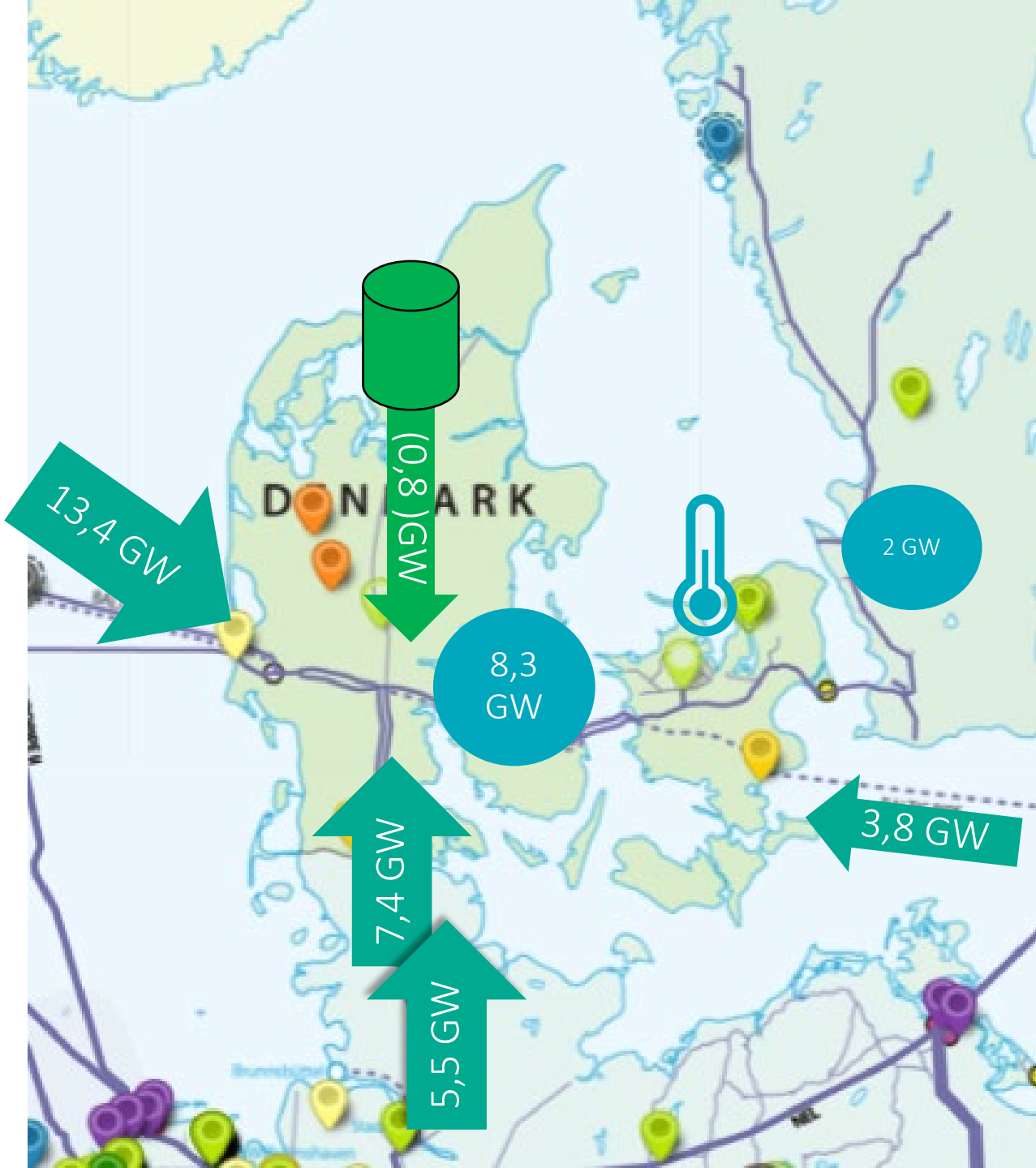
SUPPLY SITUATION

- Infrastructure
- Biogas production
- Storage

FIRM ENTRY CAPACITY DENMARK

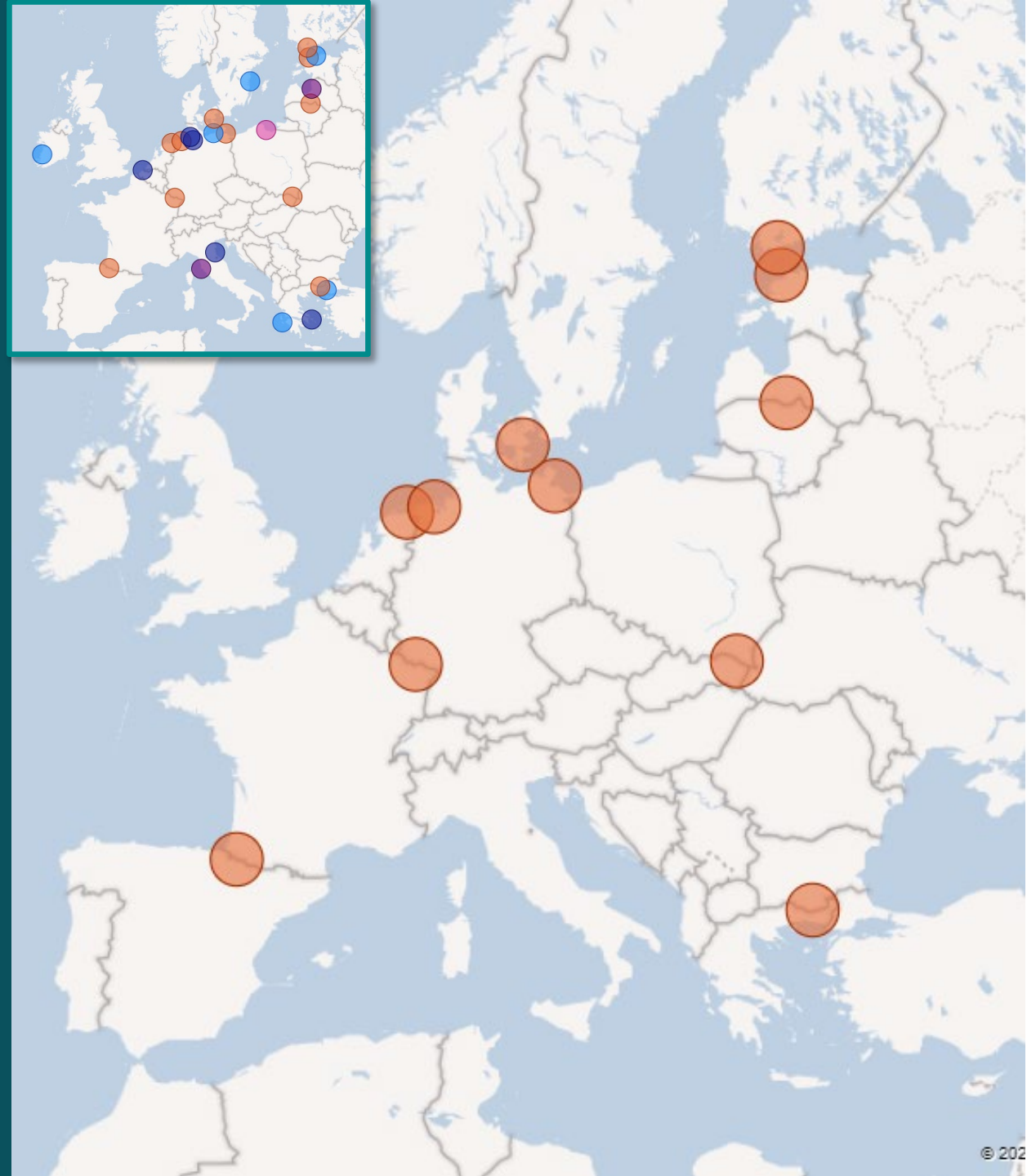
Peak consumption (-13 ^{0}C) DK+S = 10,3 GW

Entry “capacity” = 23,5 GW



GAS INFRASTRUCTURE PROJECTS 2022

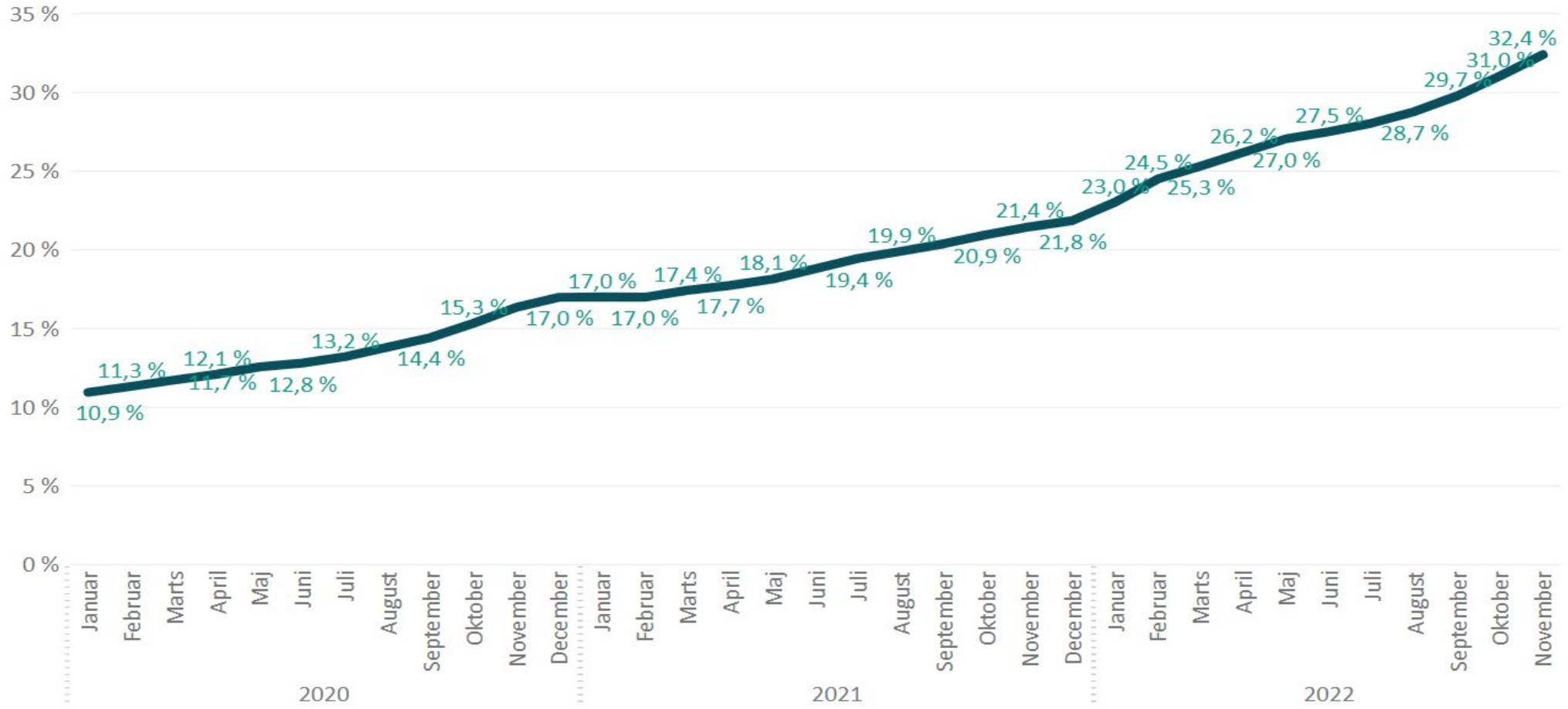
- LNG North Germany + 20 billion m3/year
- New capacity France-Germany up to 3 billion m3/year (interruptible)



Kilde: European Gas Flow dashboard by ENTSOG

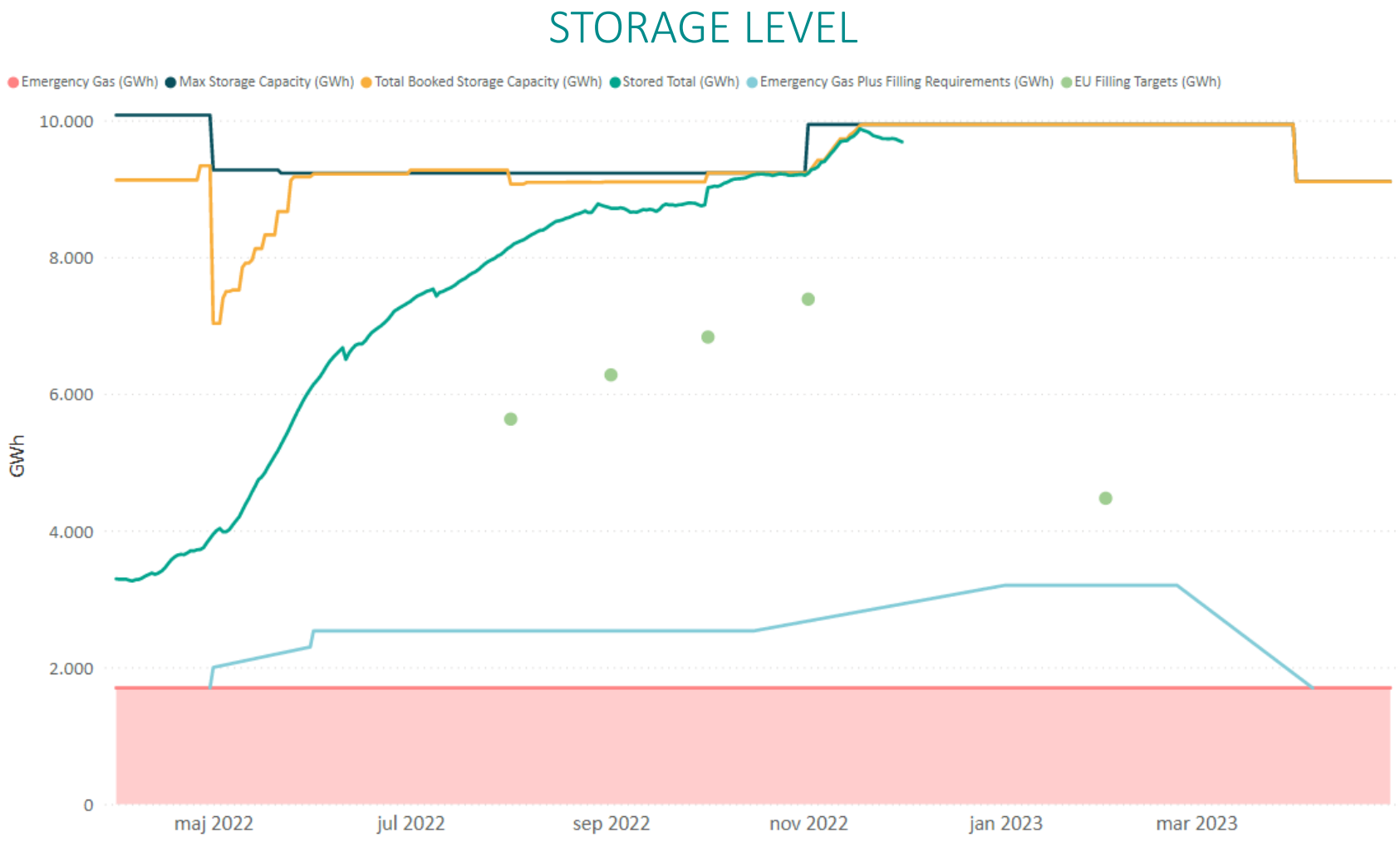
FRACTION OF BIOMETHANE

compared to the last 12 months production and consumption



Source: [Biogas tilført gasnettet bliver til bionaturgas | Energinet]

DANISH STORAGE FILLING

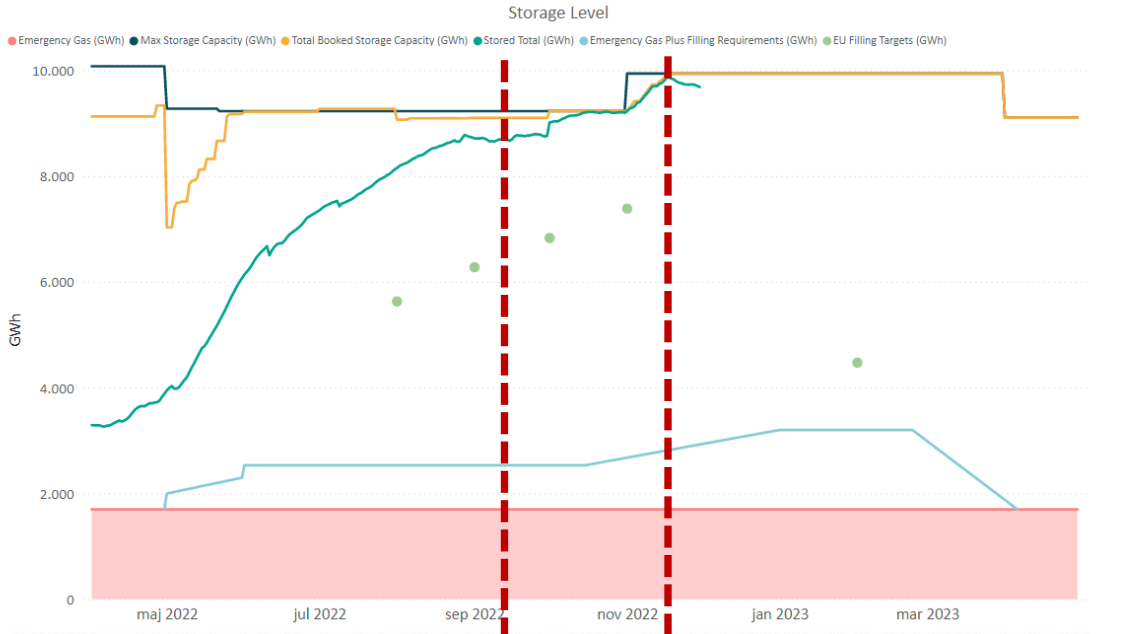


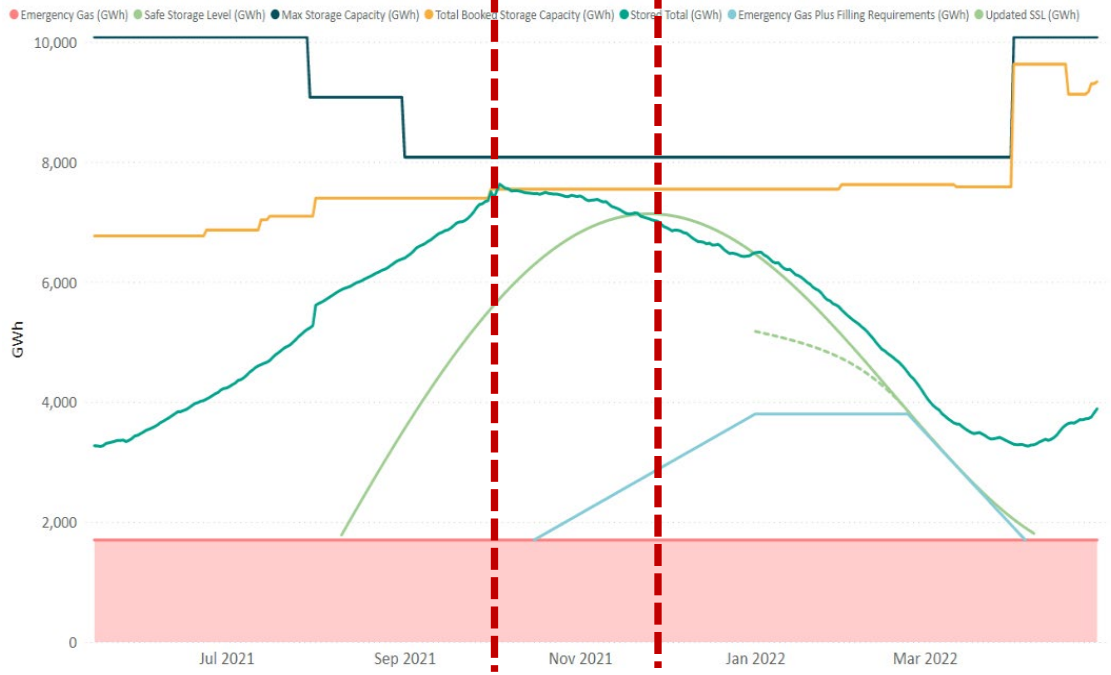
Source: STATUS IN THE DANISH GAS STORAGE FACILITIES | Energinet

Storage filling: 97%

Storage extended with 700 GWh.

Withdrawal from Storage started 18 November





Source: [STATUS IN THE DANISH GAS STORAGE FACILITIES | Energinet]

DANISH STORAGE 2021/2022

Storage booked

- 2022: 9.940 TWh
- 2021: 8.077 TWh

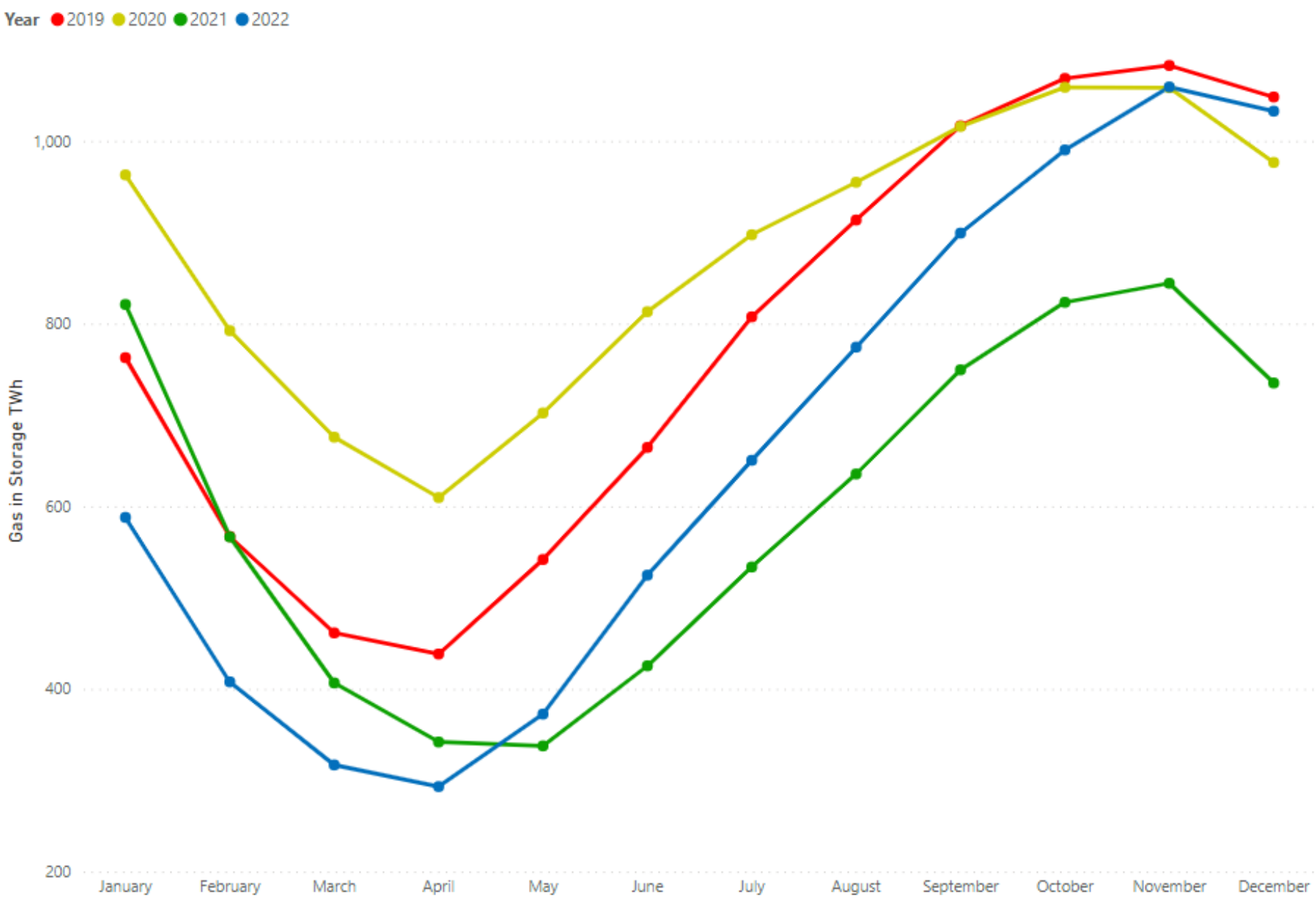
+ 23%

First Withdrawal from storage 1 ½ month later than last year.

EU STORAGE FILLING

Gas in storage November 2022 EU:

- 1033 TWh
- 40% more than November 2021



QUESTIONS

Contact: can@energinet.dk

GAS STORAGE DENMARK

SHIPPER'S FORUM

8 DECEMBER 2022

AGENDA

1. NEW FACE IN THE TEAM
2. CAPACITY OVERVIEW
3. NEW IT-SYSTEM & CUSTOMER PORTAL
    i. NEW FEATURES
    ii. NEW CHALLENGES
    iii. PERFORMANCE PROGRESS
4. MARKET CONSULTATION → GENERAL TERMS & CONDITIONS FOR GAS STORAGE (VER. 17)
5. Q&A

CAPACITY OVERVIEW

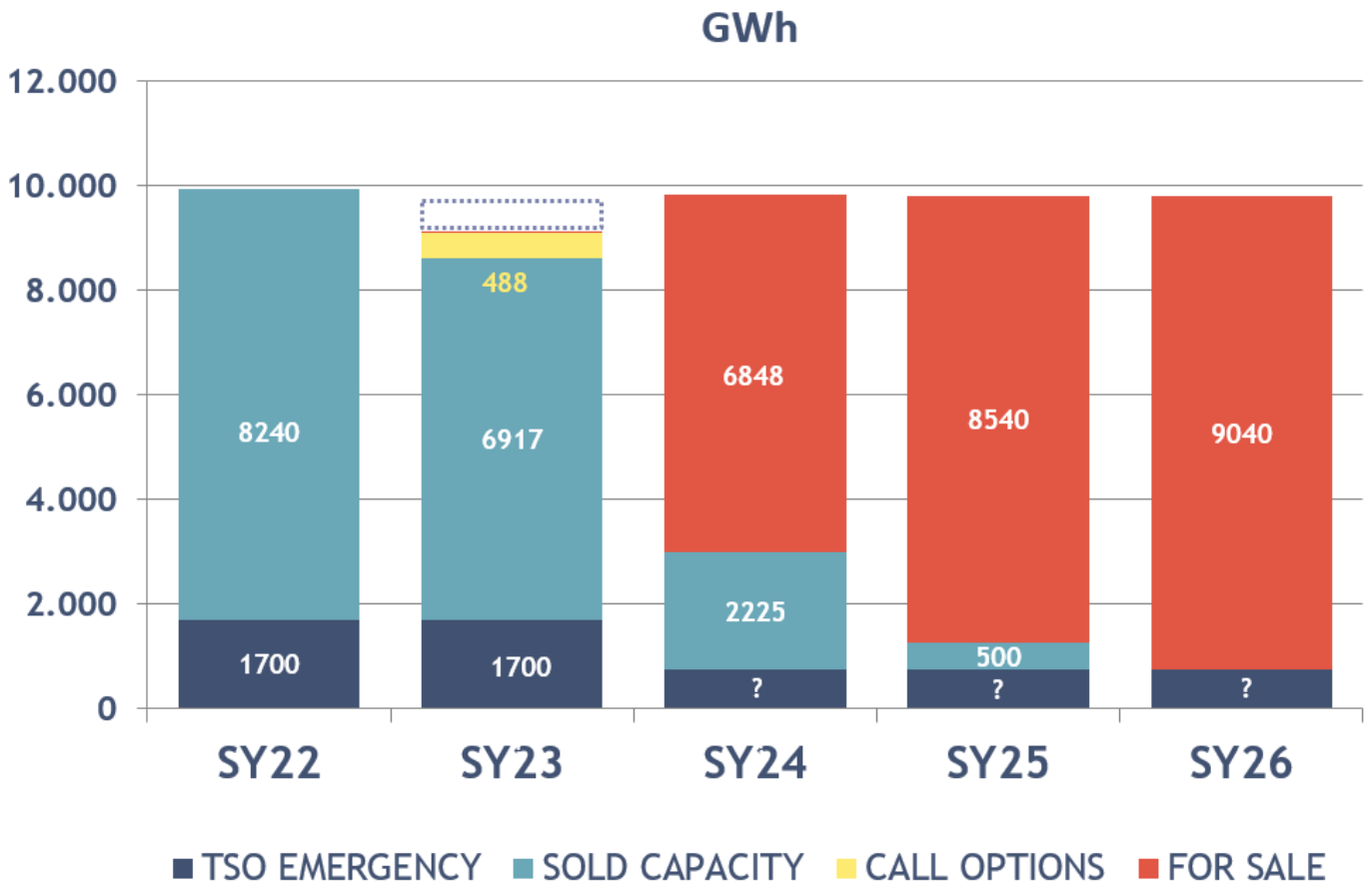
- ❑ 2022 & 2023 - SOLD OUT
- ❑ 2024+ available for sale

Pricing:

- ➢ 120/60: **4.0** €/MWh/year
- ➢ 170/85: **3.5** €/MWh/year
- ➢ 170/170: **3.0** €/MWh/year

Additional flex:

- ➢ Injection: **750** €/MW/year
- ➢ Withdrawal: **2,100** €/MW/year



NEW IT • NEW FEATURES • NEW CHALLENGES

GSD GAS STORAGE DENMARK

INTRODUCED

- Flexible matching … in production now
- Sub-accounting …. possible now
- Invoicing in EUR …. possible now
- New procedure for initiation of transfers …. possible now
- Self-administration of own users …. possible now
- Click & book short-term capacity …. just around the corner

The biggest challenge → communication between TRANSMISSION and STORAGE systems requires tuning

STATUS

✓ Together with our BackOffice we are correcting wrong values for nomination on an ongoing basis
✓ Our IT-supplier SopraSteria is working on fixing detected bugs on an ongoing basis

PERFORMANCE PROGRESS

❑ Deployment of new versions for the both systems on Monday and one more before Christmas
❑ The deployments are expected to solve known problems in storage on nomination and matching

MARKET CONSULTATION → GTCGS (VER. 17)

THE MAJOR CHANGE IS DRIVEN BY NEW IT

Storage customers may request more than one shipper-code in the storage (sub-accounting)

https://gasstorage.dk/News/2022/12/02/GTCGS-version-17-market-consultation

IN GENERAL

- ✓ Additional rights to storage customers introduced → option to choose EUR, sub-accounting, click & book
- ✓ One additional obligation introduced → to administrate own users on the CUSTOMER PORTAL

If you have any comments and/or proposals to this draft version 17.0 of the GTCGS and appendices, please provide us with your written comments no later than Tuesday 20 December 2022 by email to contact@gasstorage.dk

QUESTIONS?

CONTACT

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Iliana Nygaard

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- Tel. No. +45 61243403

Current cases and pipeline

The Danish Utility Regulator

Energinet Shippers' Forum
December 8, 2022
DUR/TERI/PELJ

Current Cases and Pipeline

Current Cases:

1. **Offshore tariff** complaints 2011-2020
   - Expect decisions second half of 2023
   - Comparison to market practice ongoing

   - **Four** new complaints received 2020-21
     - **Decision** on fourth complaint in progress. Consultation period ongoing

2. **Emergency tariff non-protected customers**
   - Addition to tariff methodology decision, May 2022
     - **Approved**, decision September 30, 2022
     - Applicable till September 30, 2024
     - Tariff March-October also approved

Pipeline:

1. **Entry capacity conversion methodology**
   - Consultation ended November 28
   - DUR is prioritising case
   - **Decision** expected early next year

2. **Long and short term capacity quotas, Ellund**
   - NC CAM, article 8.9
   - Consultation ongoing

3. **Balancing model issues**
   - DUR is following the situation
   - Ongoing dialogue with Energinet

Recent publications

ACER:

Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2021

Gas Wholesale Markets Volume
July, 2022
(https://www.acer.europa.eu/electricity/market-monitoring-report#136)

Decarbonised Gases and Hydrogen Volume
October, 2022
(https://www.acer.europa.eu/electricity/market-monitoring-report#136)

Future Regulatory Decisions on Natural Gas Networks: Repurposing, Decommissioning and Reinvestments
November, 2022
(https://www.acer.europa.eu/events-and-engagement/news/acer-publishes-study-future-regulatory-decisions-natural-gas-networks)

Other news:

REMIT Cross-Border Investigatory Group

ACER and NRAs from NL, DE, AU to reinforce scrutiny under REMIT to detect and sanction possible instances of market abuse. Emphasis on:

- Market manipulation
- Inaccurate/misleading information and insider trading

(https://www.acer.europa.eu/events-and-engagement/news/acer-and-3-regulatory-authorities-reinforce-coordination-energy-market-abuse)

BREAK

TARIFFS

Nina Synnest Sinvani, Energinet

SINCE LAST SHIPPERS FORUM

- Adjustment of the tariff the 29 September 2022:
  - WACC assumption reduced to 4% p.a. down from 5.5% p.a.)
  - 44.11 DKK/kWh/h/yr down from 50.57 DKK/kWh/h/yr (13% reduction)
- Clarification on the use of multiplier on non-transmission tariffs
- No invoicing of non-transmission tariff for month of October due to the delayed commissioning of the upstream section of Baltic Pipe (North Sea)

UPDATE ON NEW ECONOMIC REGULATION

Revenue cap regulation coming into force from 1st January 2023

- DUR conducted public consultations of four executive orders on revenue caps and regulatory accounts for the regulated transmission services (electricity and gas) and regulatory tasks of the Energinet Group (26 October to 23 November 2023)
  - Combined revenue cap for gas transmission and system operator activities is expected to be split into separate regulations and revenue caps when urgent legislation is passed close to New Year 2023
  - Upstream activities regulated according to own upstream regulation (nTPA)
  - Market Zone model to ensure regulatory harmonization and a rTPA capacity product covering the entire transmission and upstream system with a uniform capacity tariff
  - Ongoing dialogue between DUR and Energinet to consolidate the regulatory regimes and tariff methodology
- Consultation on DUR decision on WACC-model with Cost of Equity and Cost of Debt parameters for 2023-2024 for gas transmission companies. Indicative non-binding WACC-level of approx. 4.39%.
- Key elements in the future regulation still to be defined. Expect further adjustments through 2023 and consider increased risk of accrued differences carried forward between regulatory periods until regulation reach a steady-state and required new infrastructure investments are internalized in cost base.
- Stakeholder interests:
  - Energinet has emphasised the special role and interests of the shippers in the gas transmission system and strongly encouraged DUR to enter into a direct dialogue with the collective shippers
  - Elections and postponement of required supplementary legislation among reasons that DUR has prioritized development of bridging Gas-SO and TO regulation
  - User Group with DUR on the new economic regulation in the beginning for 2023

QUESTIONS

Contact: nsy@energinet.dk

CAPACITY CONVERSION

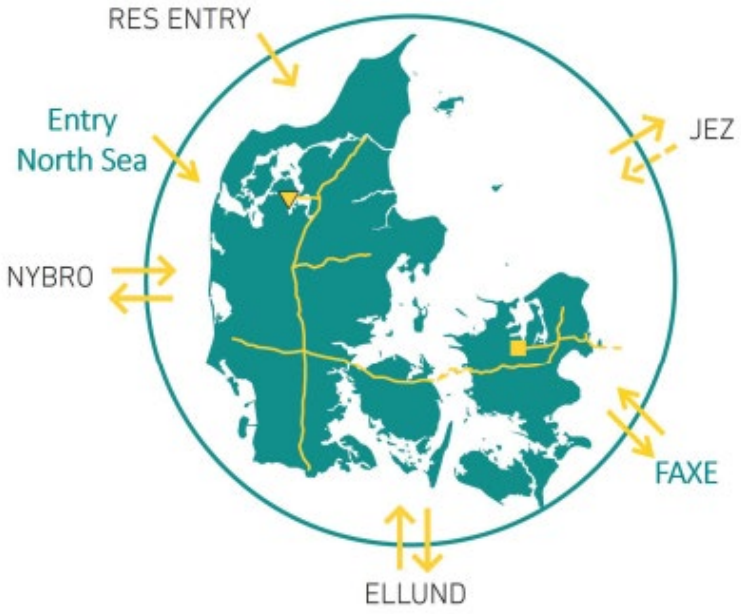
Clement Johan Ulrichsen, Energinet

CAPACITY CONVERSION BETWEEN ENTRY POINTS

Introducing more flexibility to the system

The Service

- Capacity can be re-utilised between the points Entry Ellund, Entry North Sea, Entry Faxe and Entry Nybro.
- If you are successful in booking capacity at one entry point, you will be able to convert existing entry capacity contract to the new contract.

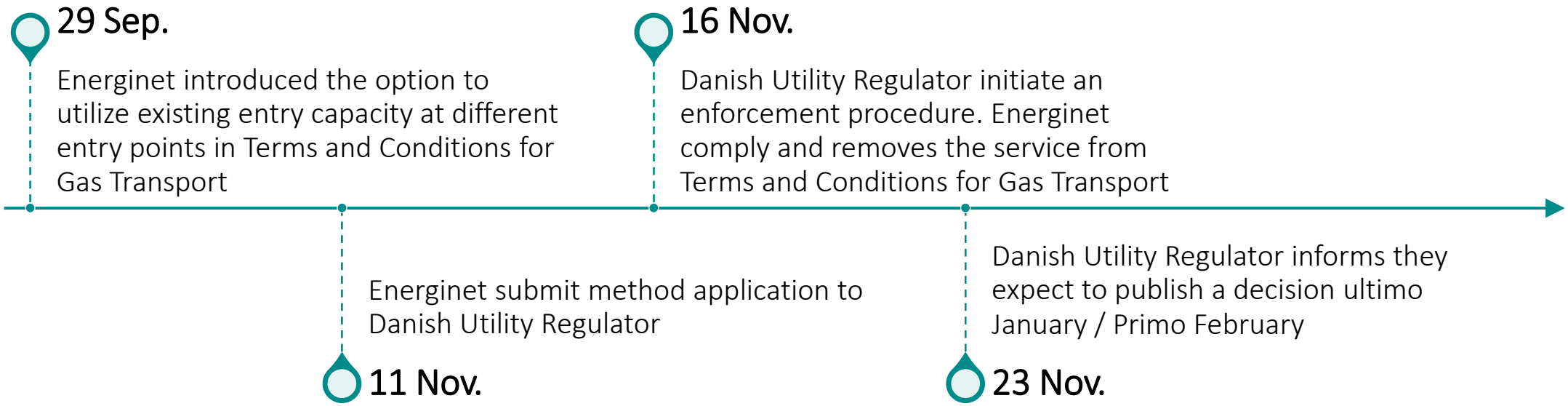


Why

- To increase security of supply for Danish consumers in an uncertain time in the gas market
- To increase efficiency in the use of the system

CAPACITY CONVERSION BETWEEN ENTRY POINTS

Status on the proposed capacity conversion service



QUESTIONS

Contact: cju@energinet.dk

NEW BALANCING MODEL AND MARKET SYSTEM

Clement Johan Ulrichsen and Christian Rutherford, Energinet

STATUS ON THE NEW BALANCING MODEL

The balancing model has been improved since go-live on 1 October. The model is, however, still affected by matching issues and fluctuating data quality

Balancing model as of 8th of December

Robustness of the model

- The technical functions are working largely as intended
- Errors in the model's calculation method have been fixed, but:
- The IT-system still has issues with correctly matching entry/exit points

Data quality

- The frequency of significant data errors has been reduced
- Continuous improvements in our manual data controls helps us detect and resolve data errors more efficiently.
- The quality of data is, however, still not at the desired level

Collaboration with Evida and Nordion

- We have expanded our collaboration with Evida and Nordion.
- We are currently working with Evida to increase the quality of nDMS data
- We are currently working with Nordion to improve the data controls and fallback data

IMPROVEMENT AREAS

We acknowledge that the balancing model is still affected by a not fully configurated IT-system and fluctuating data quality. We are working hard to ensure that the current issues are solved as fast and efficient as possible

Current issues that we are working to resolve

Improvements in the IT-system

- Correct matching of entry/exit points
- Implement a confirmation feature for smoothing profile
- Reintroduce of non-valid allocation after the end of the gas day

Improving the quality of data

- Extend and improve the current data monitoring and control (in collaboration with Evida and Nordion)
- All relevant data is to be published on Energi Data Service
- Resolve the current issues with nDMS data

General improvements

- Improve transparency when we do not trade in the yellow zone as intended
- Weekly stand-up meeting with the market

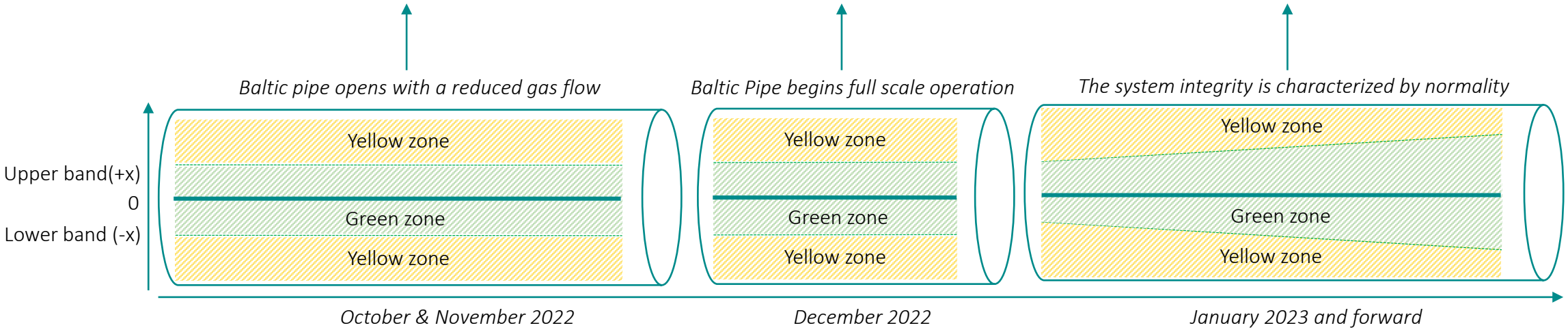
EXPLANATION OF CURRENT GREEN ZONE FLEXIBILITY

Fundamentally, the size of the green zone reflects the available flexibility in the transmission system and the integrity of the system must be considered when determining its size.

During the start-up period, the green zone has been adapted to the reduced gas flow from Baltic Pipe

The robustness of the system integrity needs to strengthen before we can expand the green zone

The size of the green zone will increase as the robustness of the system integrity strengthens



IMBALANCE COSTS FOR OCTOBER 2022

The shippers will be notified of which imbalance costs that will be neutralized, when we have fully assessed the quality of data on the days with yellow zone trades.

Energinet will systematically review the days in October and November 2022 that have been characterized by poor data quality and where the market players' balancing task has been particularly difficult.

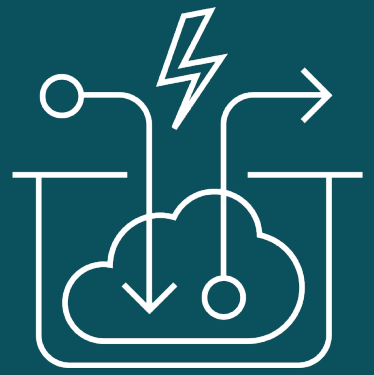
The balancing model has a No Punishment Principle (NPP) which is approved by the Danish Utility Regulator. Energinet expects that a large part of the imbalance costs for days with yellow zone trades will be neutralized by the NPP.

We have recorded 13 days in October 2022 and 11 days in November 2022 where the Accumulated System Balance (ASB) has been in the yellow zone

Shippers will receive specific information concerning their imbalances during December 2022. The final imbalance invoices will be sent out in January

QUESTIONS

Contact: cju@energinet.dk; cru@energinet.dk



HYDROGEN FEASIBILITY STUDY UPDATE

Steen Brostrup Knudsen, Energinet

- Why

DEVELOPMENT IN ELECTROLYSIS CAPACITY

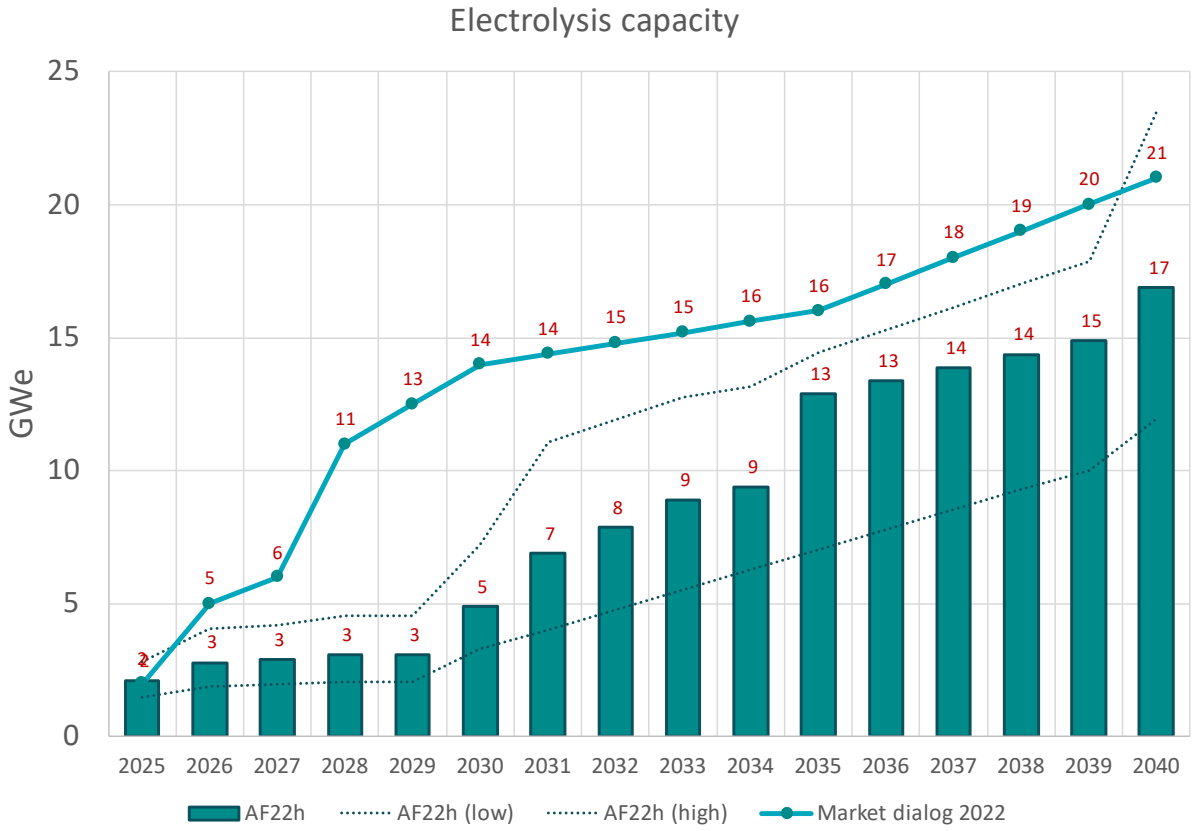
Analysis assumptions:

- The Danish Energy Agency project the electrolysis development based on the PtX strategy and the climate agreement
- Documented in the hearing version of Analysis Assumptions 22 for Energinet
- There is a basic development and a high and low variation

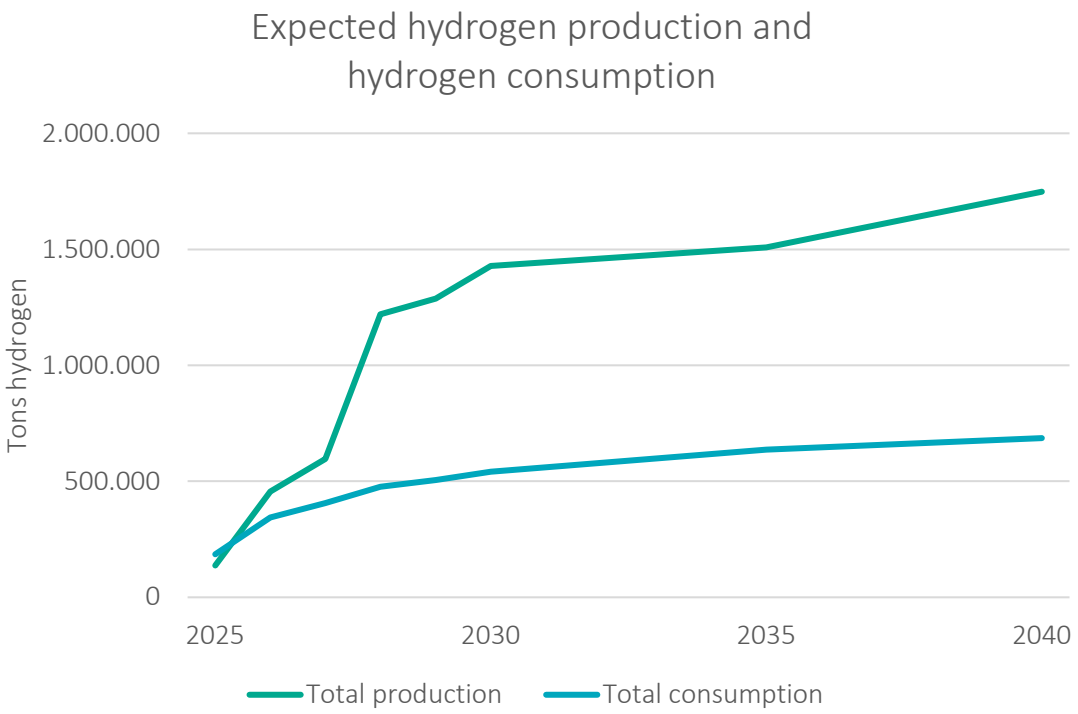
The market indications:

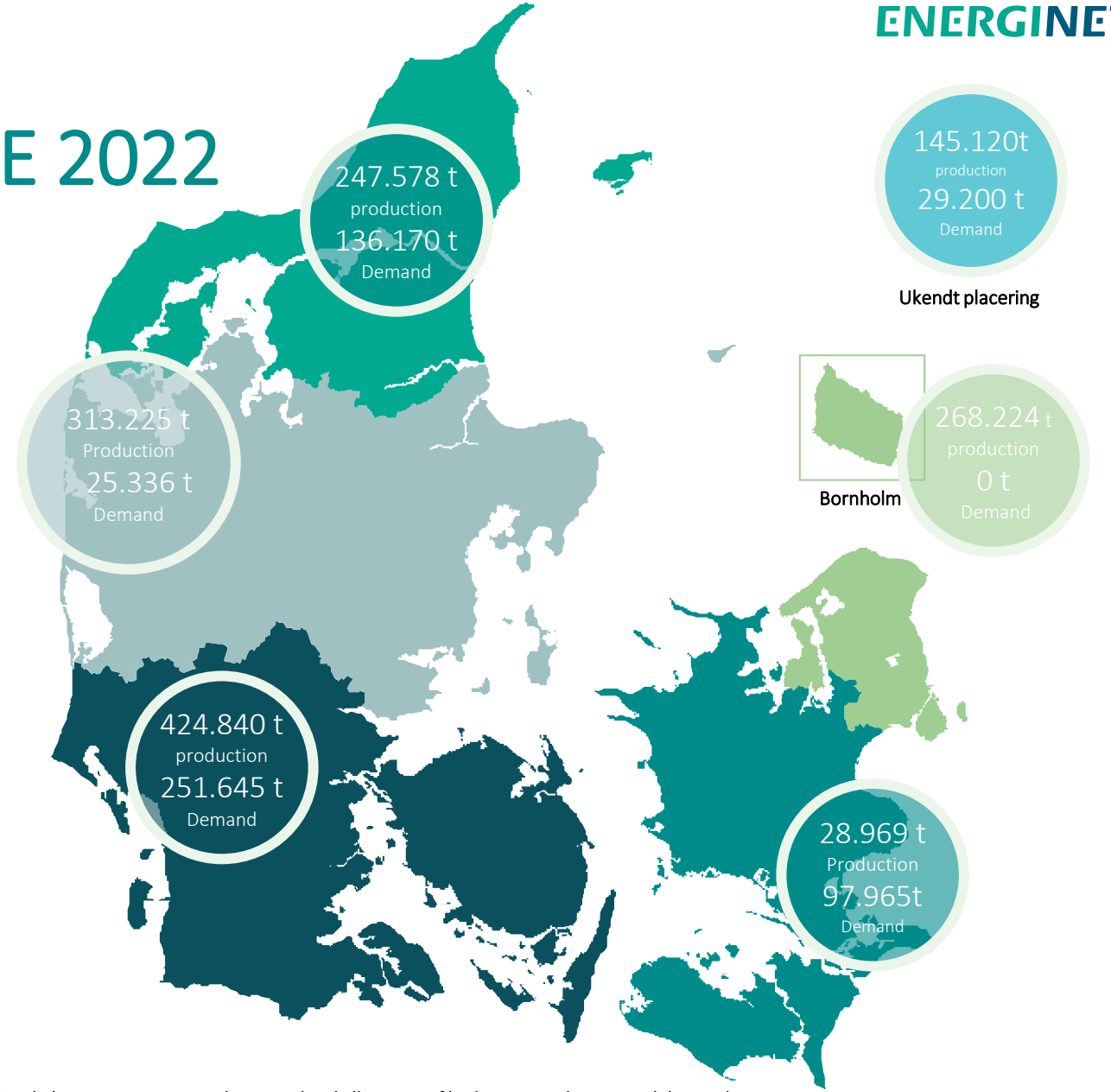
Market dialogue and statements from Hydrogen Industry indicates

- a faster development
- a larger volume



RESULTS MARKET DIALOGUE 2022





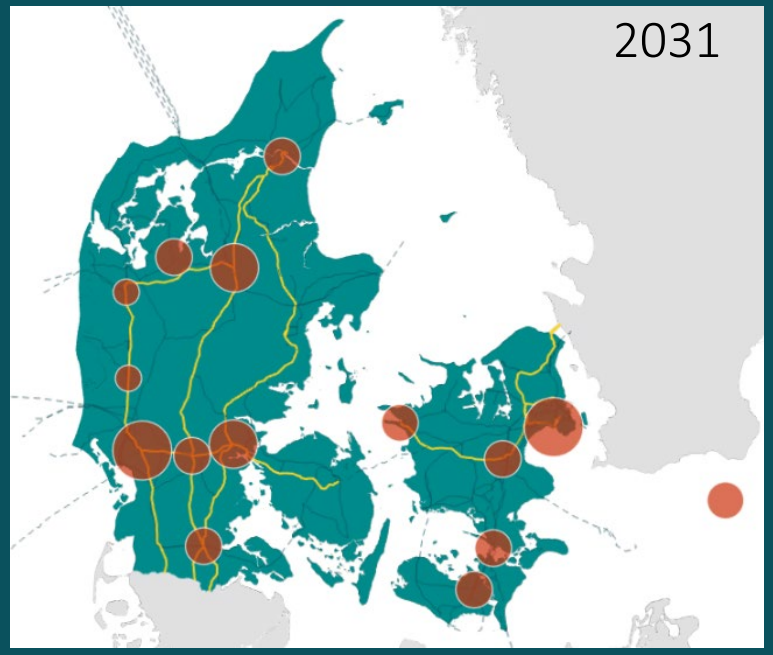
KPMG Market dialogue 2022: Expected geographical allocation of hydrogen production and demand in 2030

ELECTROLYSIS DEVELOPMENT 2025-2040

BASED ON THE POLITICAL AMBITIONS AND USED IN THE PLANNING

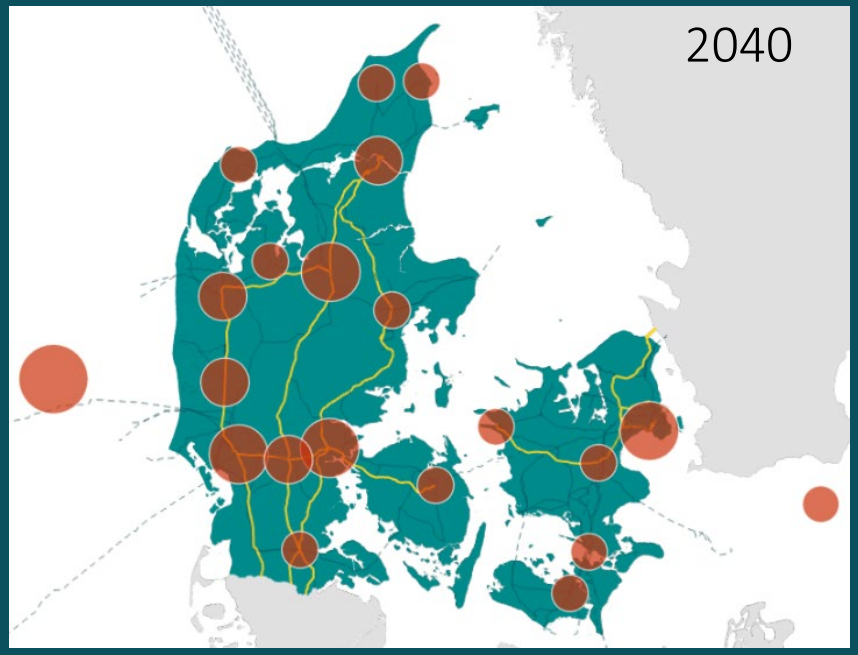
2,1 GWe

(DK1: 1,8 GWe, DK2: 0,3 GWe)



6,9 GWe

(DK1: 4,6 GWe, DK2: 2,3 GWe)



16,9 GWe

(DK1: 9,6 GWe, DK2: 7,3 GWe)

CRITERIA FOR THE CONCEPTUALLY DESIGN

The conceptually design is used for system analysis and determination of socio-economic benefits.

A Jutland backbone

Access to the Lille Torup storage facility

Access to the German hydrogen market

Future proof system, prepared for the long term expectations of hydrogen in Denmark

CRITERIA FOR DETERMINATION OF ALTERNATIVE CORRIDORS

Alternative corridors are input to detailed technical analysis and for cost determination.

Proximity to electricity infrastructure and green electricity supply

Proximity to already known electrolysis projects

Proximity to existing gas pipelines if it can simplify plan processes etc.

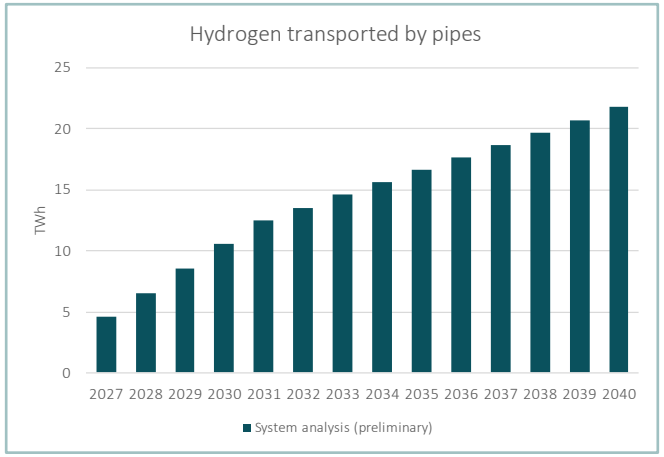
Including potential conversion options of existing gas pipelines

ALTERNATIVE CORRIDORS

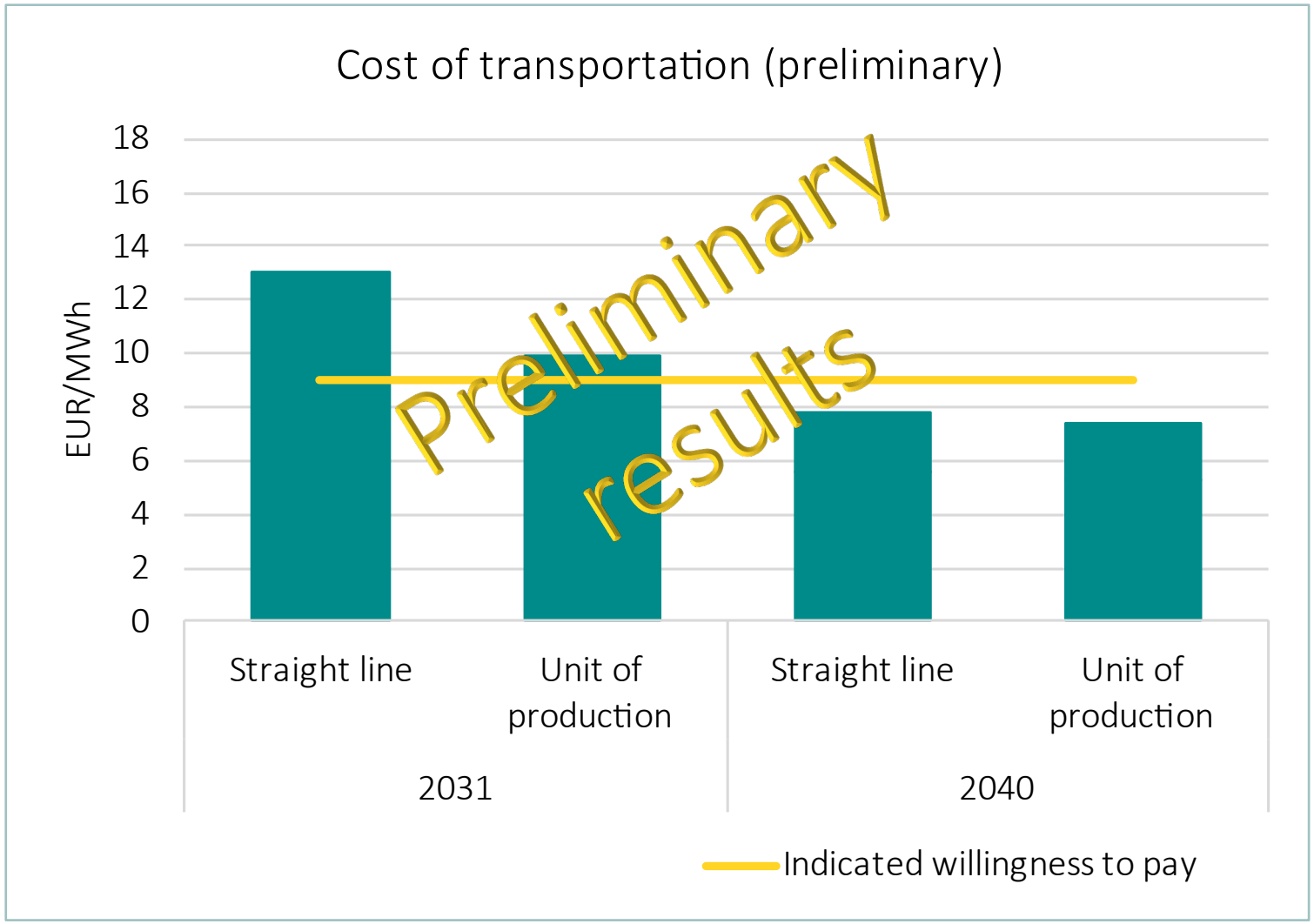
TRANSPORTATION COSTS

GENERAL PRECONDITIONS

- The ”full” backbone is assumed finalized and in operation in 2030
- Capex and Opex estimates
- Pipeline related costs and rough estimates of compression costs in 2040 are included
- All prices in 2022 price-level



Volumes of transported hydrogen based on Energinets system analysis as input to the transportation costs



Assumptions are specified on the following page

KEY ASSUMPTIONS

TRANSPORTATION COSTS

- Both straight line (common Energinet approach) and unit of production depreciation are calculated
- A capital structure of 70% debt and 30% equity is assumed
- Cost of capital is based on the Danish utility regulator's current work in regard to the new economic regulation of Energinet's Gas TO

It has not been discussed with Energinet's auditor or the Danish utility regulator, whether the unit cost depreciation method can be applied.

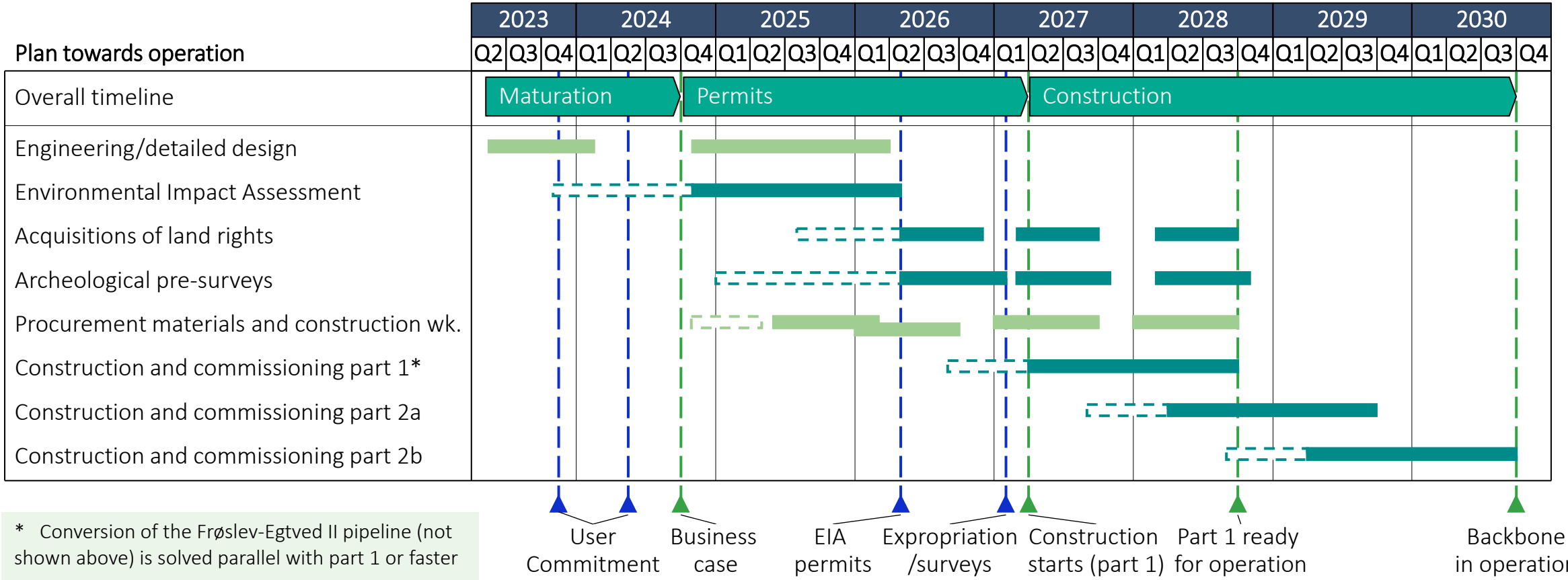
OVERALL TIMELINE – ASSUMPTIONS

Overall assumptions construction timeline

1) Political decision on hydrogen operatorship beginning of 2023 and clarity on authority and legislation in due time before preparation, construction, commissioning and operation of a hydrogen system
2) Business case autumn 2024 and relevant clarity including user commitment in place in due time before that
3) Clarity on and ministerial decision on Environmental Impact Assessment (EIA) process right after investment decision
4) Highest priority to the EIA process at relevant boards / authorities including focus on interfaces
5) The commissioner has calendar space allowing expropriation in line with project timeline/demand
6) Archeological pre-surveys assumes landowner acceptance or expropriation
7) No essential (time consuming) archeological find (risk of time delay)
8) Sufficient and qualified resources for the construction phase
9) Sufficient and qualified suppliers and contractors for the construction phase
10) Coordination in place with other infrastructure owners (neighboring systems)
11) The Frøslev-Egtved II pipeline can be converted to hydrogen
12) Stepwise construction approach optimizing access to suppliers and contractors and allowing efficient hands-on project management

OVERALL TIMELINE TOWARDS OPERATIONS

Preliminary timeline



* Conversion of the Frøslev-Egtved II pipeline (not shown above) is solved parallel with part 1 or faster

A BACKBONE CONSTRUCTED IN 3 STEPS

Illustration of what a stepwise construction approach could look like (proposal)

Part 1

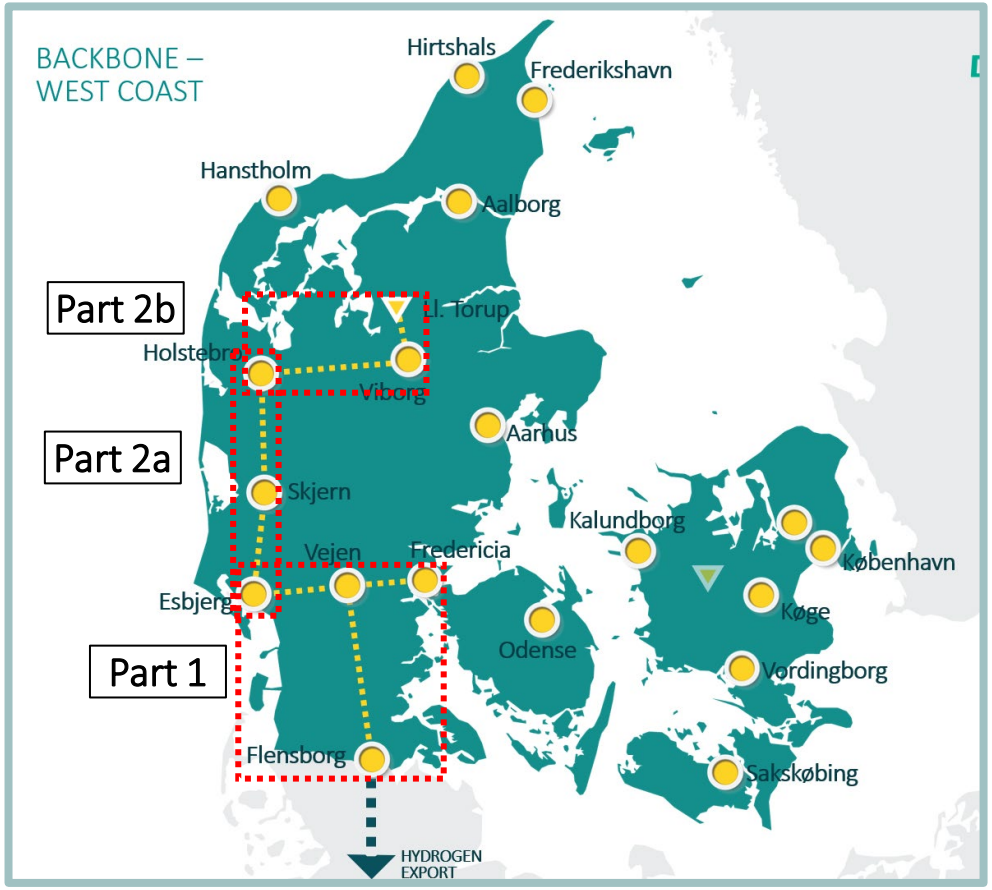
- Connecting producers, consumers and export
- In operation in 2028

Part 2

- Connecting more producers and storage
- In operation in 2030

Part 1, part 2a and part 2b to be constructed in 3 different periods/years

Construction order depending on user need/prioritization

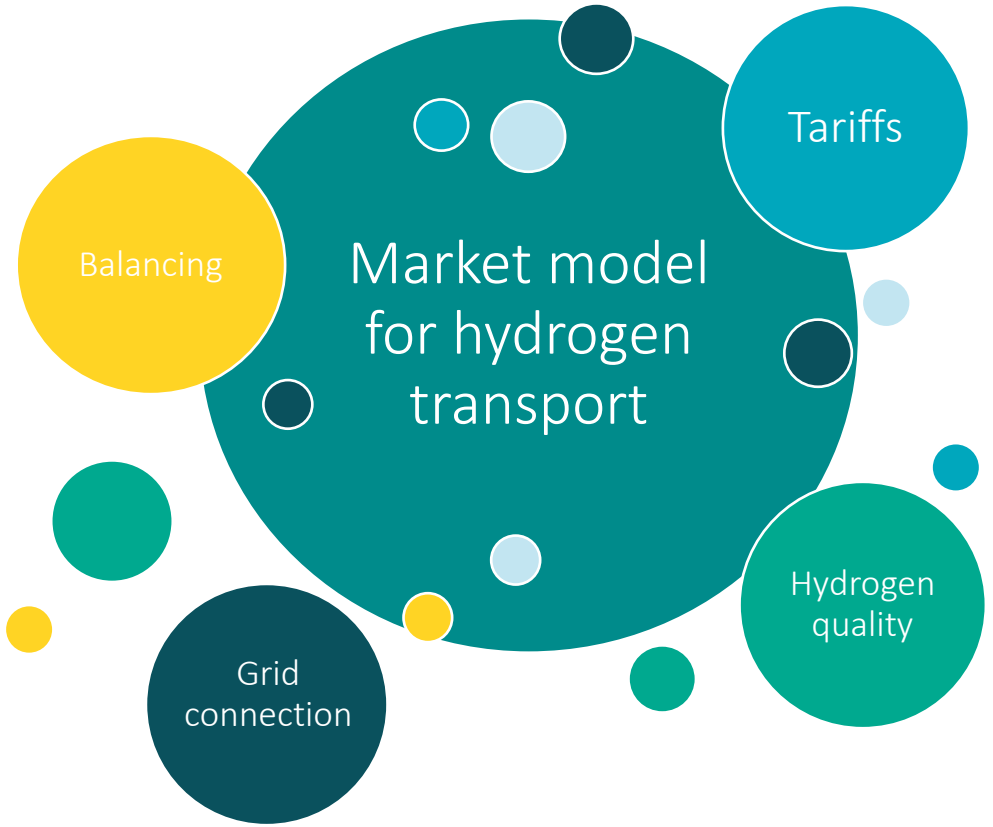


MARKET MODEL FOR HYDROGEN TRANSPORT

Terms and conditions for the use of hydrogen infrastructure

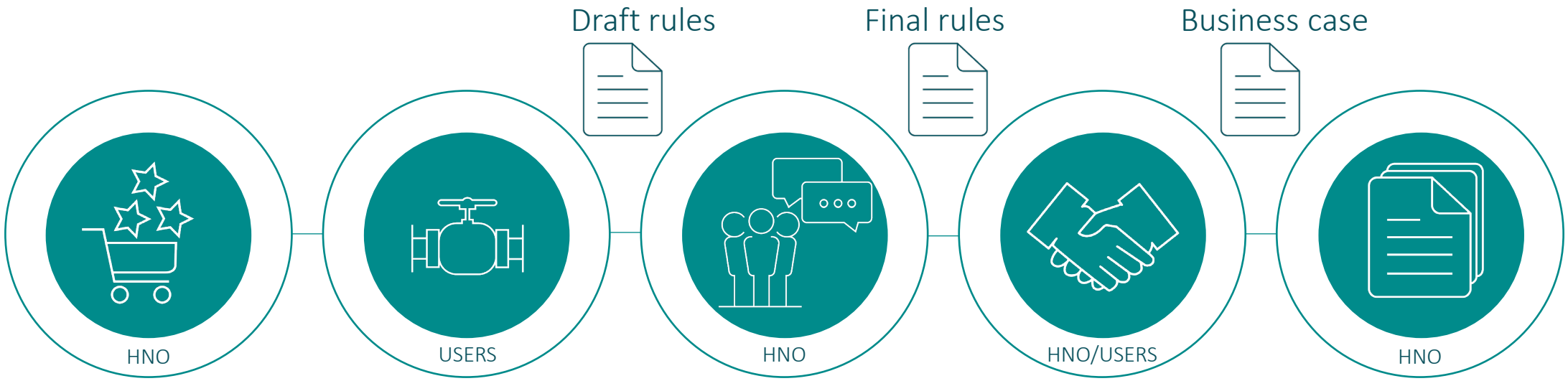
In the feasibility study we focus on:

- Tariffs
  User payment for the use of or access to the infrastructure
- Balancing
  Requirements for users to be in balance
- Hydrogen quality
  Requirements for the hydrogen fed into the grid
- Grid connection
  Requirements and costs for a connection to the grid



PROCESS USER COMMITMENT

Possible steps towards binding commitment



HNO: Hydrogen Network Operator

QUESTIONS

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FINAL REMARKS

Clement Johan Ulrichsen, Energinet

QUESTIONS

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