

A stylized tree graphic in a light green color. It features a vertical trunk and two main branches that curve upwards and outwards, each ending in a large, rounded leaf shape.

Velkommen

2026
Grønne
Gasdage



VELKOMMEN

Grønne Gasdage 2026

2026
Grønne
Gasdage



Grønne Gasdage 2026

9.30 **Velkommen**

9.40 **Klimamål for Danmark - EU - verden.**

Professor og medlem af Klimarådet Marie Münster, DTU

10.00 **Gasmarkedet i en geopolitisk kontekst.**

Lead Trader Henrik Gaarn Christensen, Ørsted

**2026
Grønne
Gasdage**



Velkommen til Grønne Gasdage 2026



Preben Birr-Pedersen
Bestyrelsesleder
IDA Energi



Lars Kaspersen
Direktør
Biogas Danmark



Kristian Nielsen
Sekretariatsleder
Green Gas Denmark

Tak til arrangementsgruppen



Bruno Sander Nielsen	Biogas Danmark
Hans Peter Slente	DI Energi
Jeppe Bjerg	Energinet
Jon Vangborg	HOFOR Bygas
Kasper Gadbert	Biogas Danmark
Kristian Nielsen	Green Gas Denmark
Mads Bunch Larsen	DI Energi
Preben Birr	Birr Holding
Søren Asbjørn Christensen Stenbøg	Ørsted
Thomas Lodahl	Evida
Tina Myken	Biogas Danmark
Tobias Kvorning	Shell Biogas
Tove Kristensen	Makeen Energy

NÆSTE OPLÆG



Klimamål for Danmark - EU - verden.

*Professor og medlem af Klimarådet Marie
Münster, DTU*

2026
Grønne
Gasdage

Klimarådet.

Klimamål for Danmark - EU - verden

Grønne Gasdage 6. maj 2026

Marie Münster

Professor ved DTU, medlem af Klimarådet og
IPCC forfatter



Oversigt

1. Om Klimarådet og klimaloven
2. Klimamål – hvad er status?
3. Gassens rolle

1

Om Klimarådet og klimaloven



Klimarådets roller i henhold til klimaloven



Rådgiver



Vagthund



Offentlig debat



Klimarådet.

2

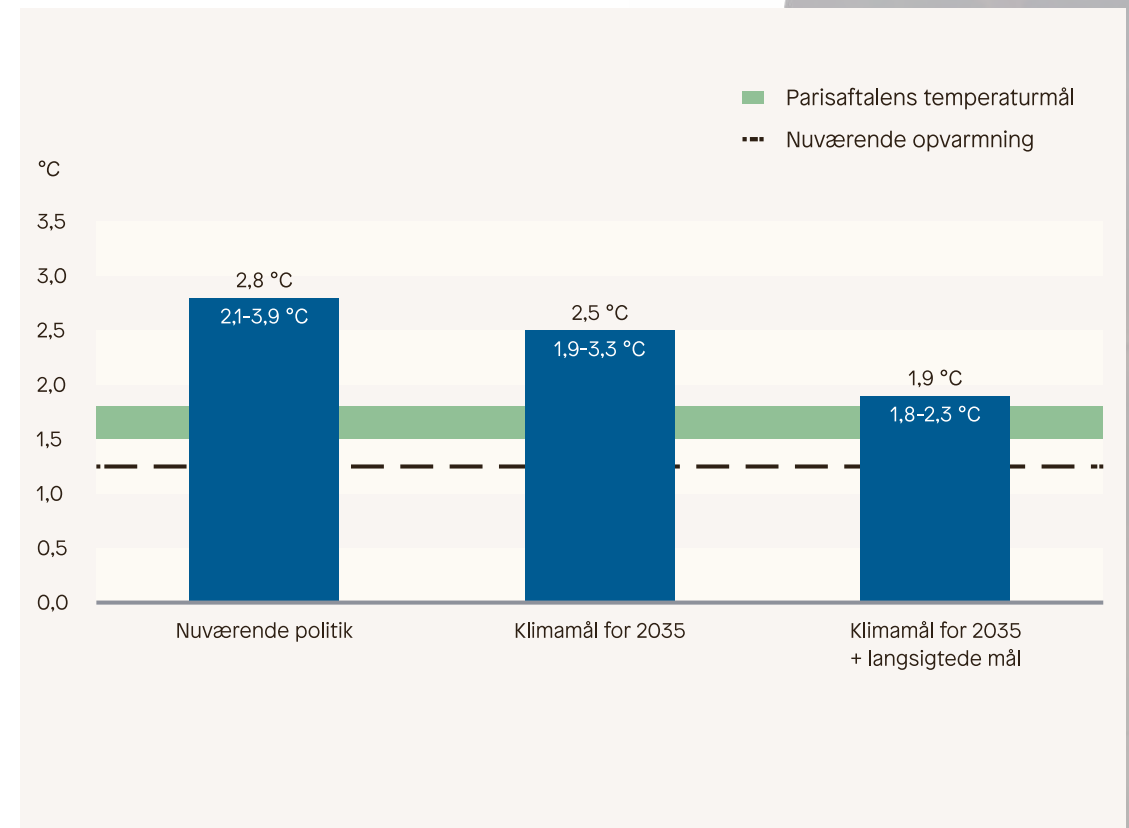
Klimamål – hvad er status?



Den globale klimaindsats præges af både positive og negative tendenser

Negativ tendens: Klimaindsatsten møder øget politisk modstand i mange lande, og på klimatopmødet i COP20 lykkedes det ikke verdens lande at give et klart svar på, hvordan den globale reduktionsindsats skal styrkes.

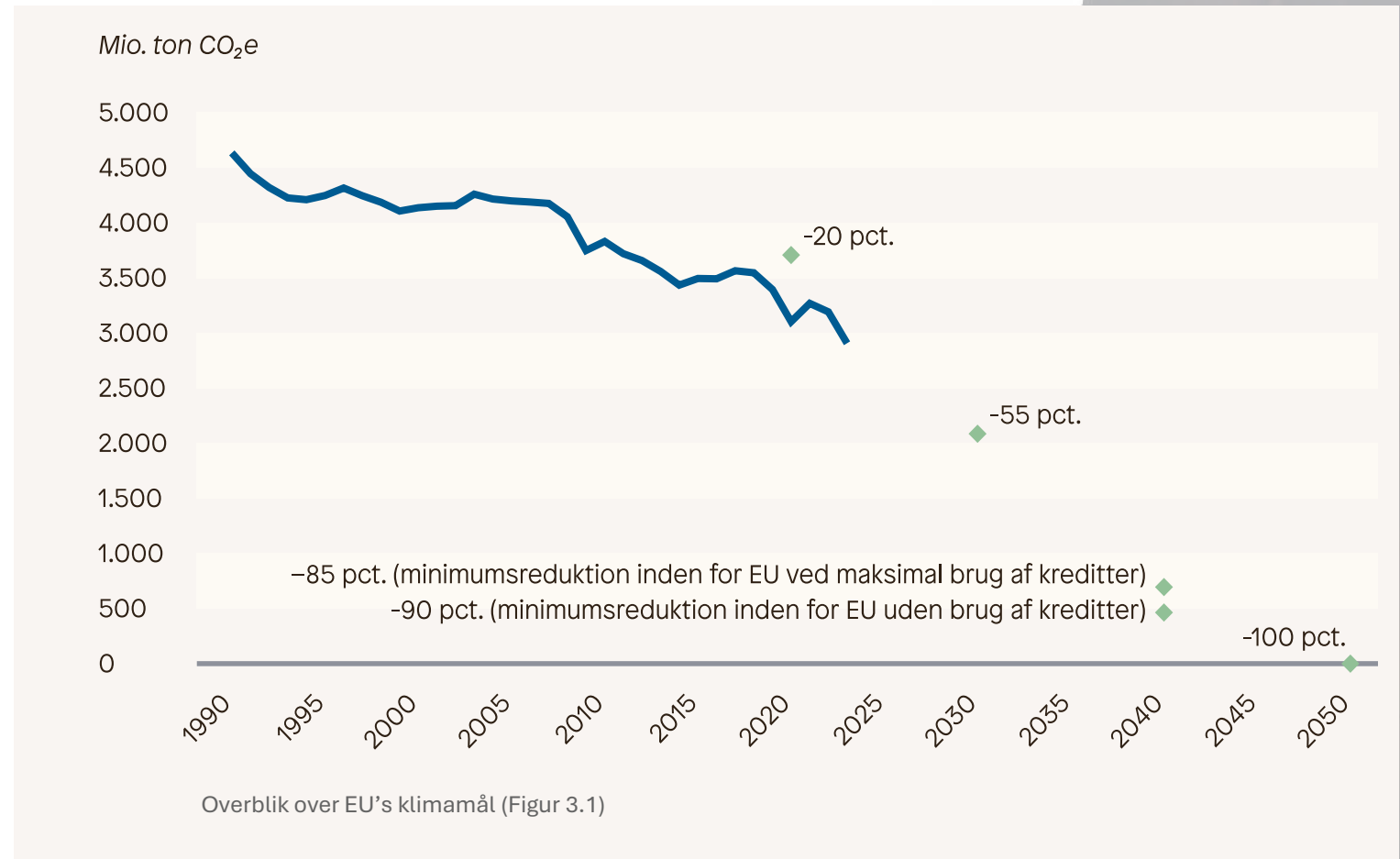
Positiv tendens: Priserne falder på afgørende grønne teknologier, og investeringerne og udbredelsen af grønne løsninger som fx solceller er gået stærkt de seneste år



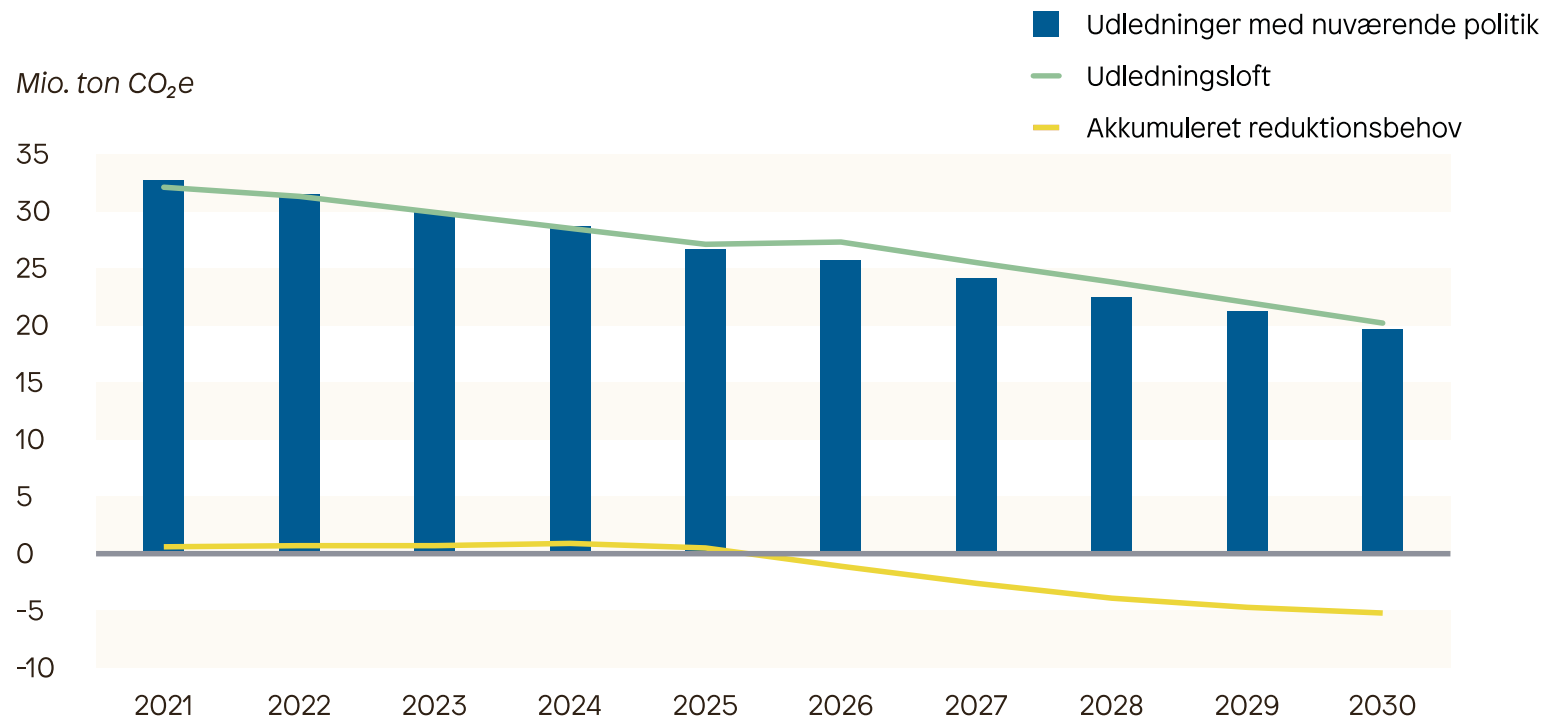
Scenarier for forventede temperaturstigninger frem mod 2100 (Figur 2.2)

EU's klimaregulering skal tilpasses det nye 2040-mål

- EU har vedtaget et klimamål for 2040 på 90 pct. reduktion i forhold til 1990
- EU har besluttet, at op til 5 pct. af målet kan nås ved at bruge internationale kreditter, og at EU's kreditter for permanent kulstoffjernelse skal integreres i kvotehandelssystemet.



Danmark forventes at leve op til de fleste af sine EU-forpligtelser



Danmarks ESR-forpligtelse fra 2021 til 2030 (Figur 5.1)

Danmarks klimamål

2025

50-54 pct. reduktion i forhold til 1990.

2030

70 pct. reduktion i forhold til 1990.

2035

????

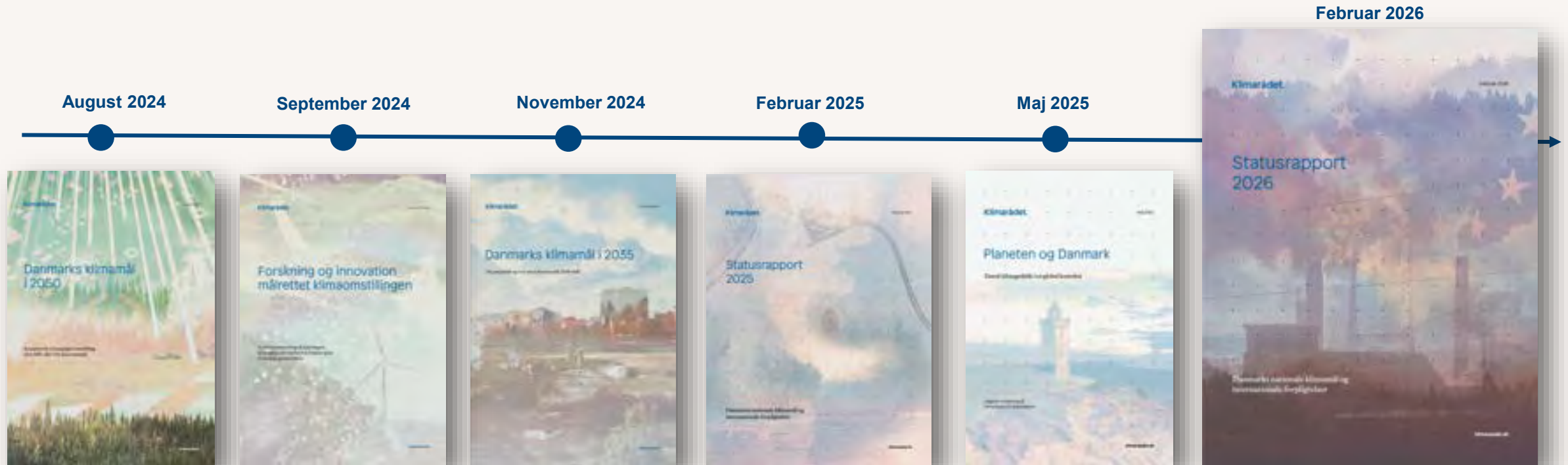
2050

100 pct. reduktion i forhold til 1990.

Mål for 2035, 2040, and 2045 skal fastsættes 10 år i forvejen,



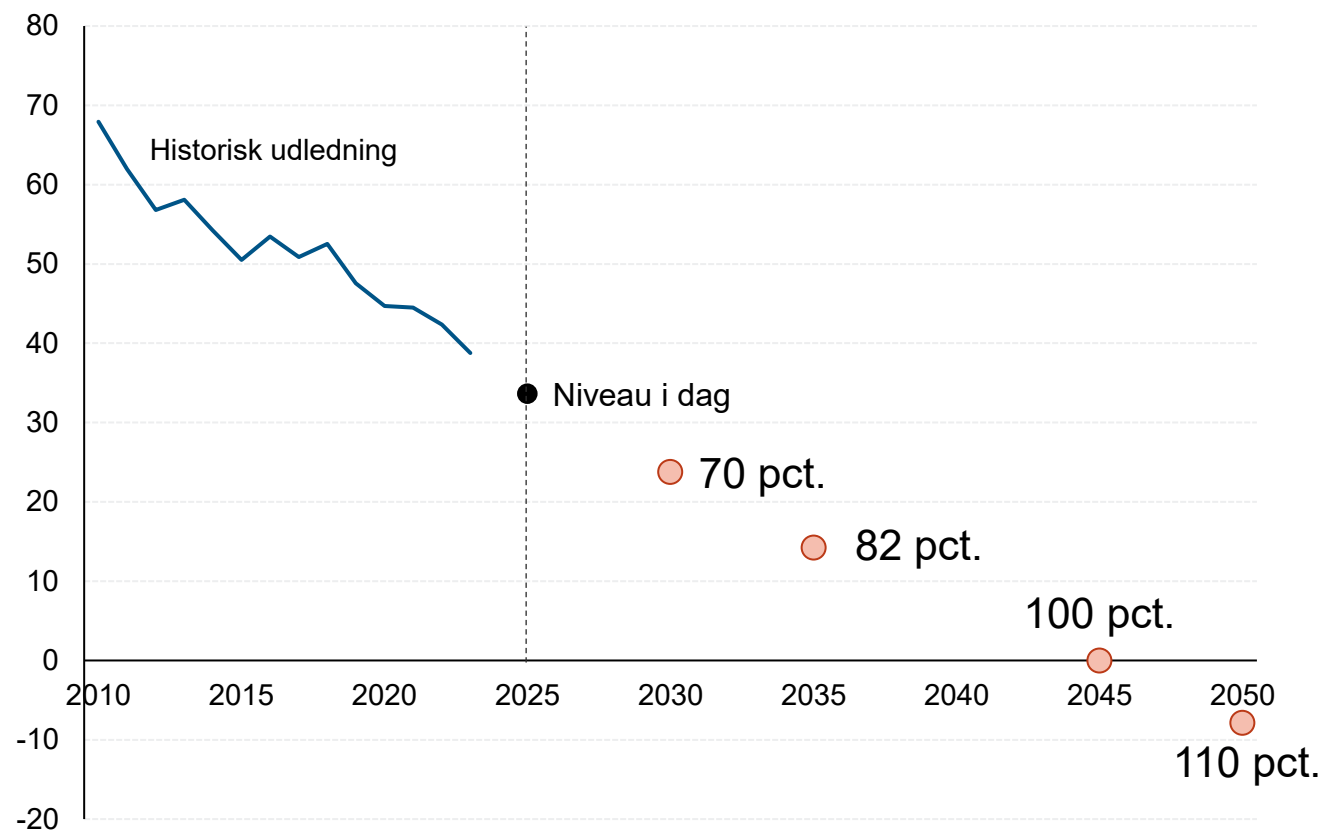
Seneste udgivelser



Analyserne samt Klimarådets øvrige udgivelser og kommenteringer kan findes her: [Udgivelser | Klimarådet](#)

Den større sammenhæng – Danmarks klimaomstilling

Mio. ton CO₂e



Regeringens politik anskueliggør **ikke**, at 2030-målet opfyldes

Klimarådet vurderer, at udledningerne i 2030 bliver højere end regeringens klimafremskrivning viser



Fangst og lagring af CO₂ kommer til at levere mindre end forventet

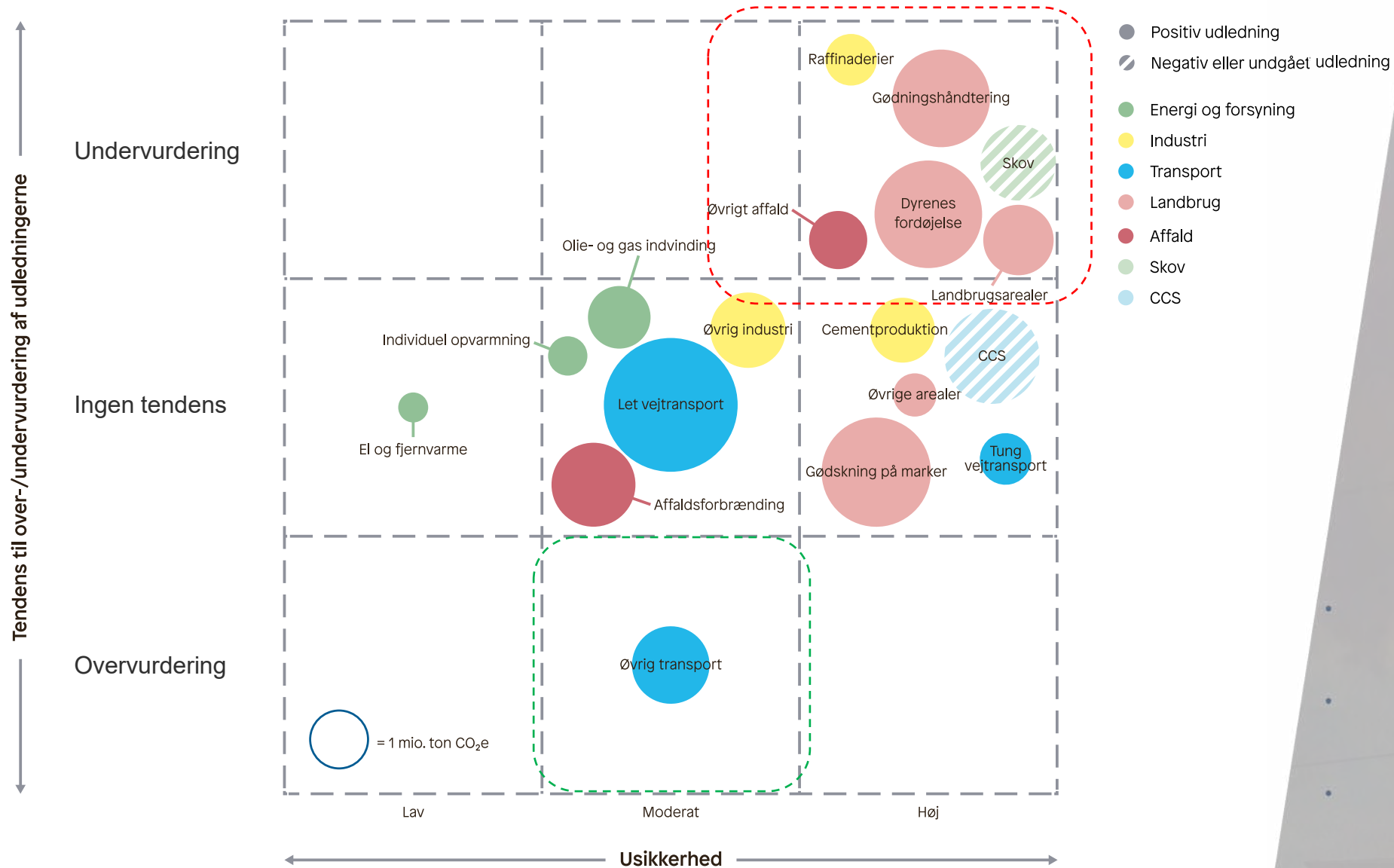


Fremskrivningen undervurderer formentlig udledningerne



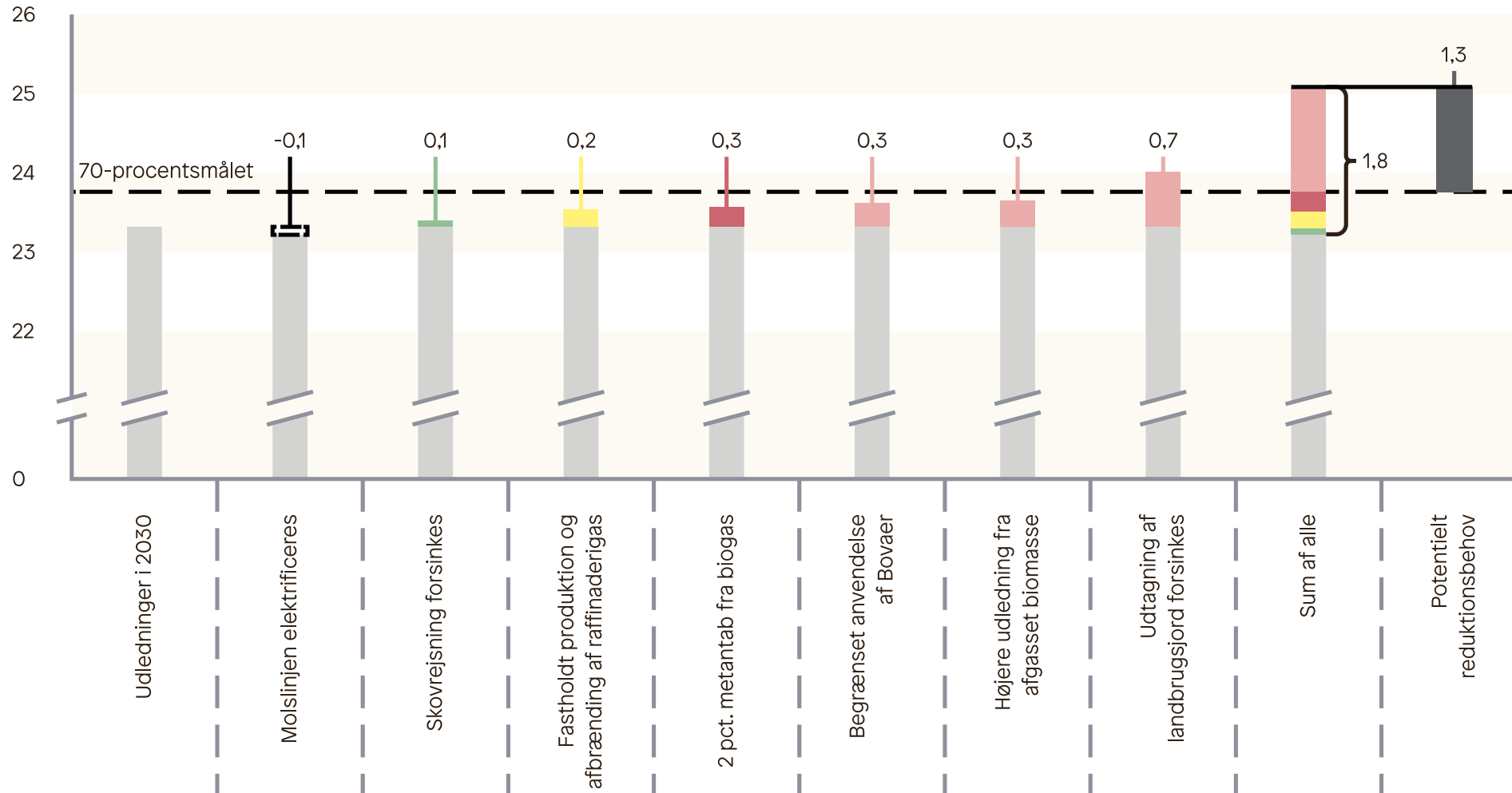
Genbesøg er positive, men effekten er usikker

Fremskrivningen undervurderer udledningerne



Fremskrivningen undervurderer udledningerne

Mio. ton CO₂e



Regeringens politik **anskueliggør**, at dens 2035-mål opfyldes



Danmark vil allerede være forholdsvis tæt på opfylde 2035-målet



Tid til genbesøg

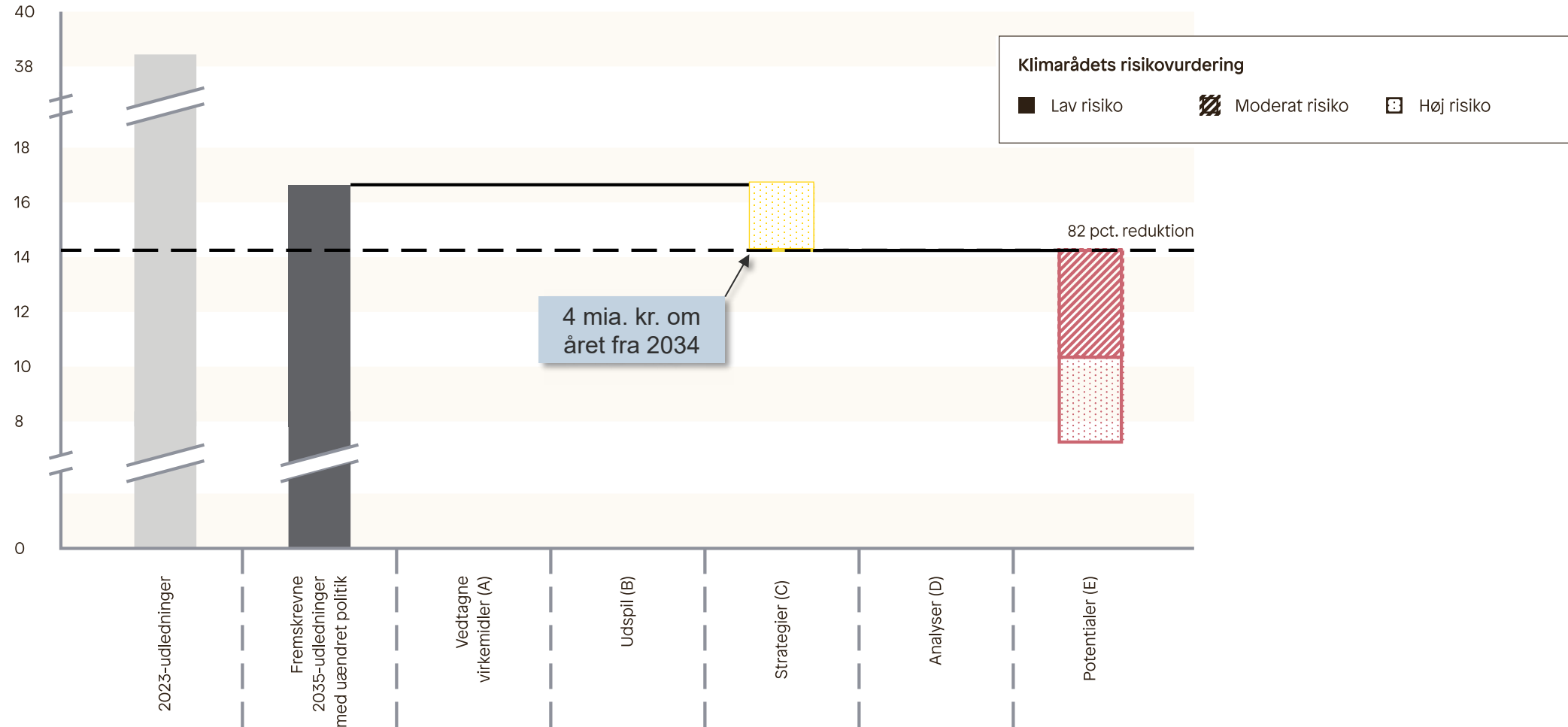


4 mia. kr. om året fra 2034

Men regeringen bør konkretisere sine planer for at nå 2035-målet

Regeringen har sat et mål på 82 pct. og afsat midler

Mio. ton CO₂e



Klimarådets anbefalinger



Anbefalinger



Styrk implementeringen og konkretiser en plan B



Fokusér især på arealer og landbrug



Konkretiser planerne for 2035



Sæt det lange lys på



Brug afgifter som motor i omstillingen frem mod 2035, 2045 og 2050

Klimarådet kigger også på EU og det globale



Statusrapporten dækker både Danmark, EU og den globale udvikling



EU-regulering har stor betydning for omstillingen i Danmark



EU-landene skal til at forhandle reguleringen til at opfylde det nye klimamål for 2040



Klimarådet præsenterer anbefalinger til de kommende EU-forhandlinger

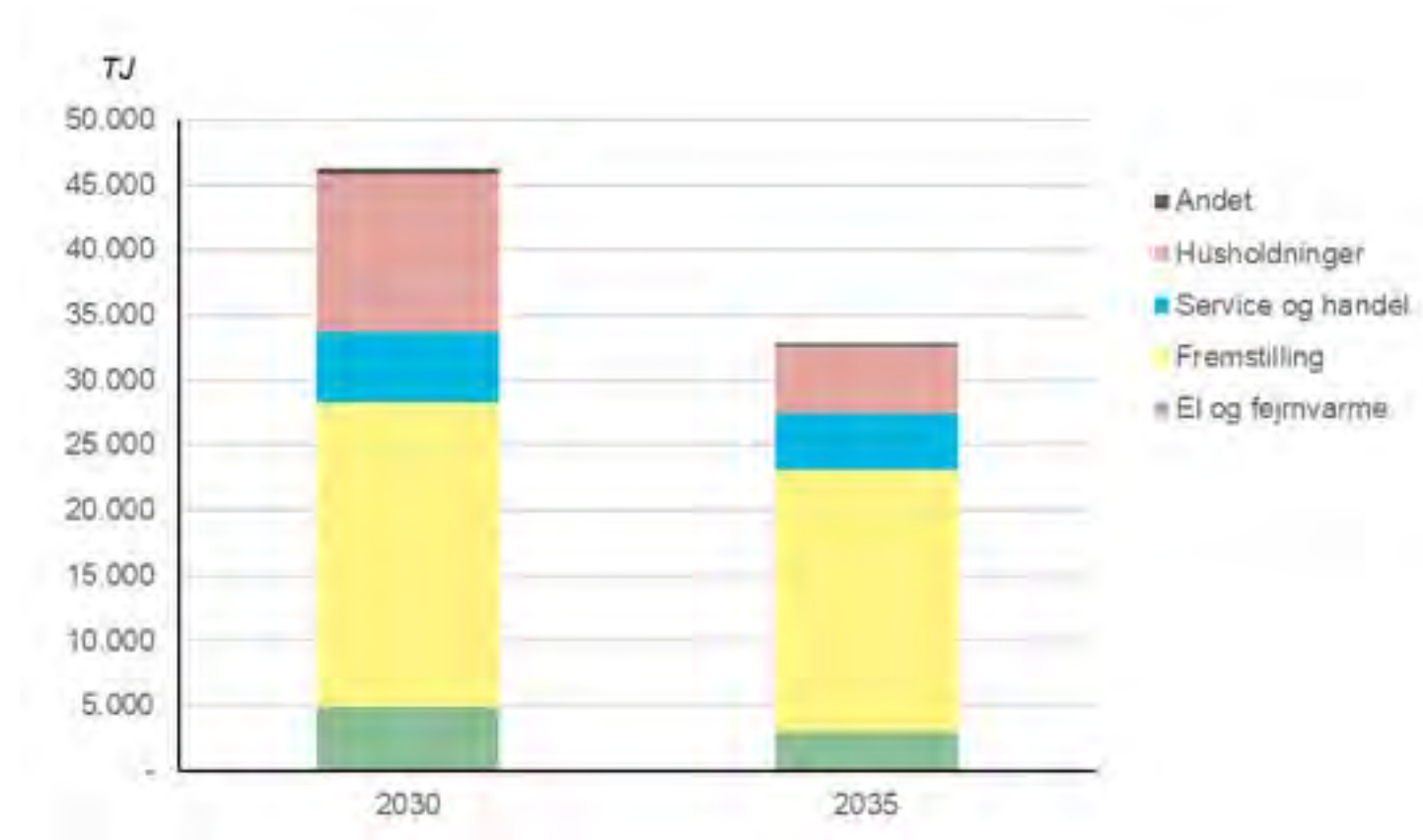
Klimarådet.

3

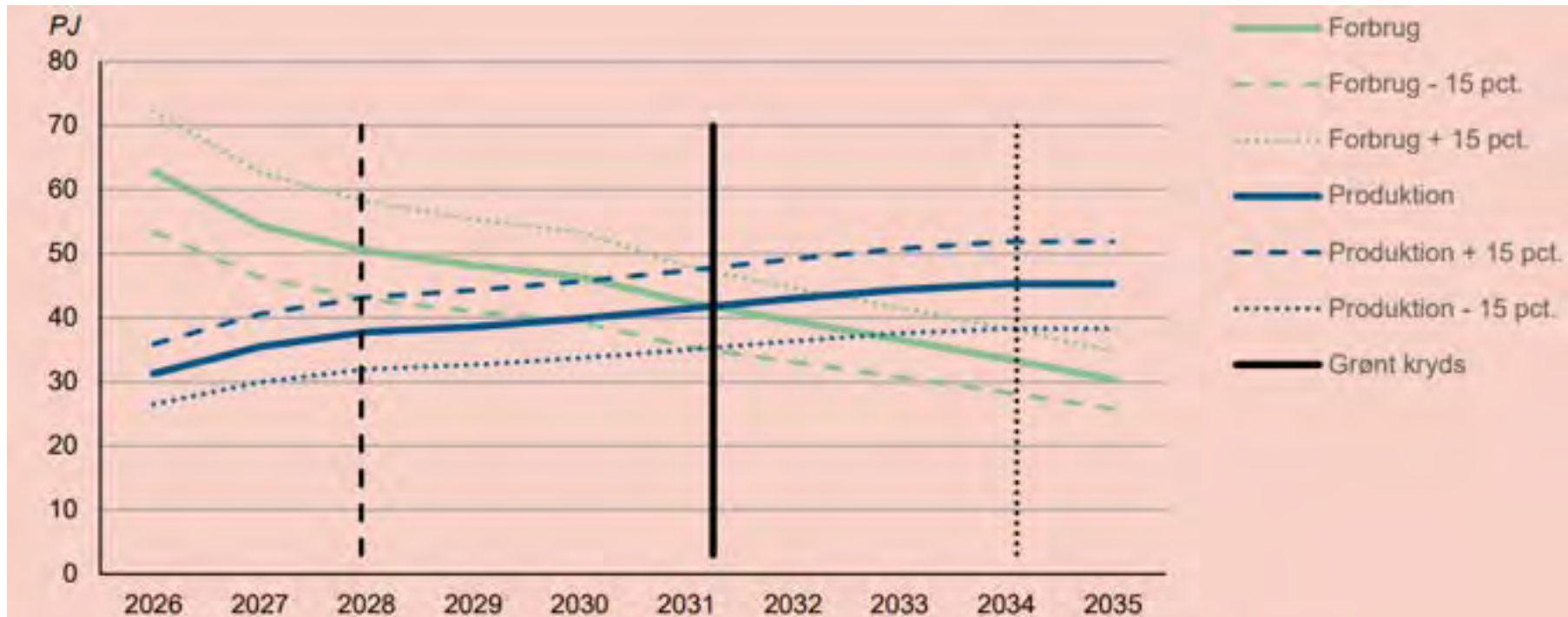
Gassens rolle



Gasforbrug i 2030 og 2035



Usikkerhed om 'Det grønne kryds'



Figur 3.1 Forbrug af ledningsgas, produktion af biogas og markering af grønt kryds i forskellige scenarier

Anm.: Det grønne kryds markerer det tidspunkt, hvor produktion af biogas svarer til forbruget af ledningsgas.

Kilde: Klima-, Energi- og Forsyningsministeriet¹².



Statusrapport 2024

Store datacentre i Danmark

kendte veje og nye spor til 70 procents reduktion

Danmarks globale klimaindsats

Biomassens betydning for grøn omstilling

Det opbyggede CO₂-kvotesystem

Danmarks fremtidige arealanvendelse

Udfordringer og muligheder for grøn omstilling

Udfordringer og muligheder for grøn omstilling

Udfordringer og muligheder for grøn omstilling

Udfordringer og muligheder for grøn omstilling

Udfordringer og muligheder for grøn omstilling

Udfordringer og muligheder for grøn omstilling

Omstilling med omtanke

Udfordringer og muligheder på vej mod et klimaneutralt samfund

Afgifter der forandrer

Omstilling frem mod 2030

Landbrugets omstilling ved en drivhusgasafgift

Statusrapport 2023

Fleere biler på de danske veje

Danmarks klimamål

Danmark og EU's 2030-klimamål

Fra gas til grøn varme

OMSTILLING FREM MOD 2030

Fremtidens vedvarende energi

Biomassens betydning for grøn omstilling

Sikker elforsyning med sol og vind

NÆSTE OPLÆG



Gasmarkedet i en geopolitisk kontekst

Lead Trader Henrik Gaarn Christensen, Ørsted

2026
Grønne
Gasdage

Ørsted-

Gasmarkedet i en geopolitisk kontekst

Henrik Gaarn Christensen

Lead Trader, Ørsted

Ørsted is route-to-market partner for biomethane producers

Sourcing volumes from trusted third-party producers through tailored agreements

Optimization of the plants including de-risking operational offtake and protecting value in volatile conditions through hedging, balancing and real-time market insights etc.



Directing biomethane where certificates and gas create the most value:

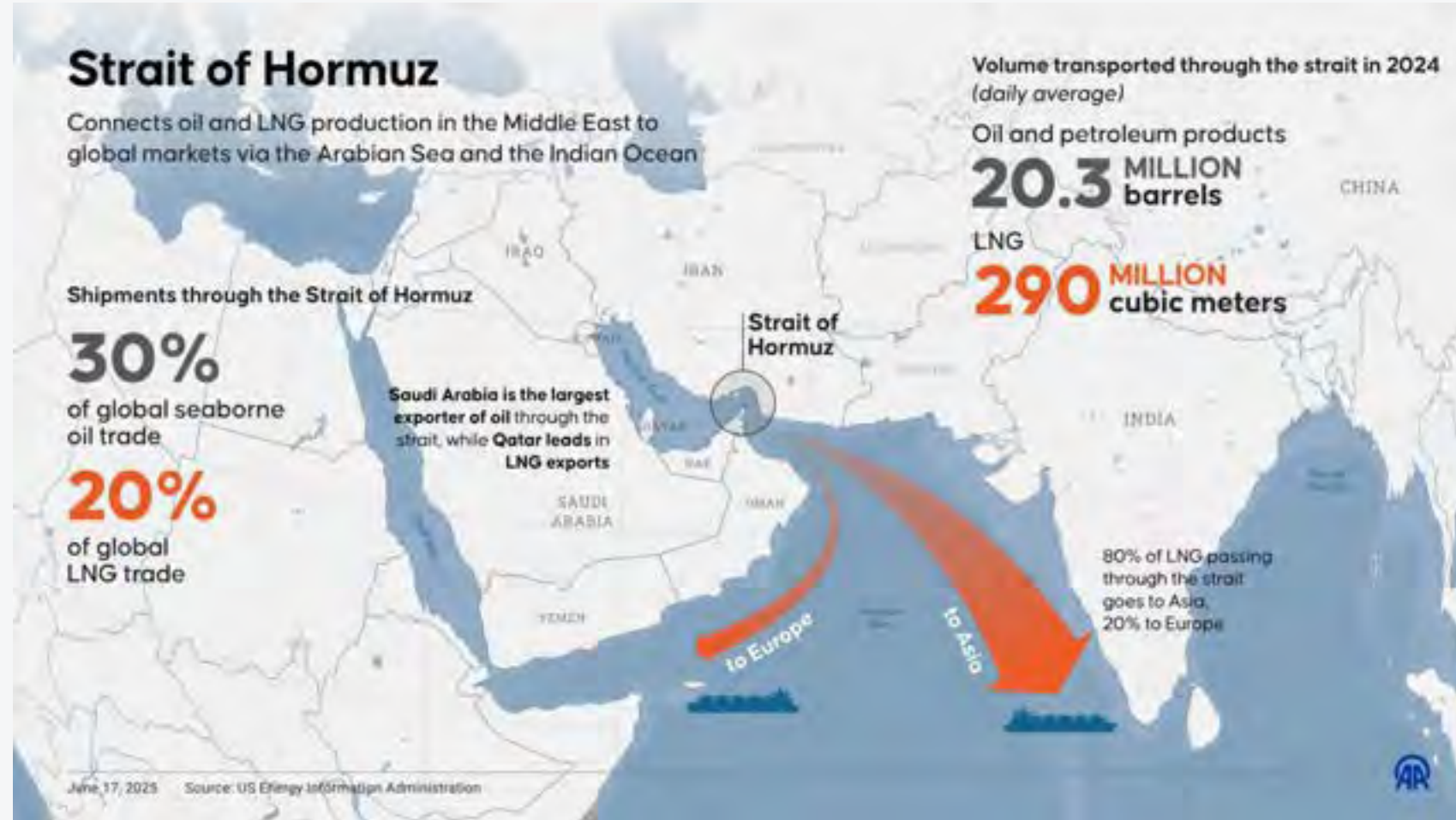
- Wholesale markets across the EU
- Direct customer channels including a large B2B portfolio

Ørsted is significantly growing a European biomethane portfolio with an ambition of reaching 3.5 TWh

28th of February:



Strait of Hormuz



Liquefied Natural Gas (LNG)



Front month TTF



Price reaction oil

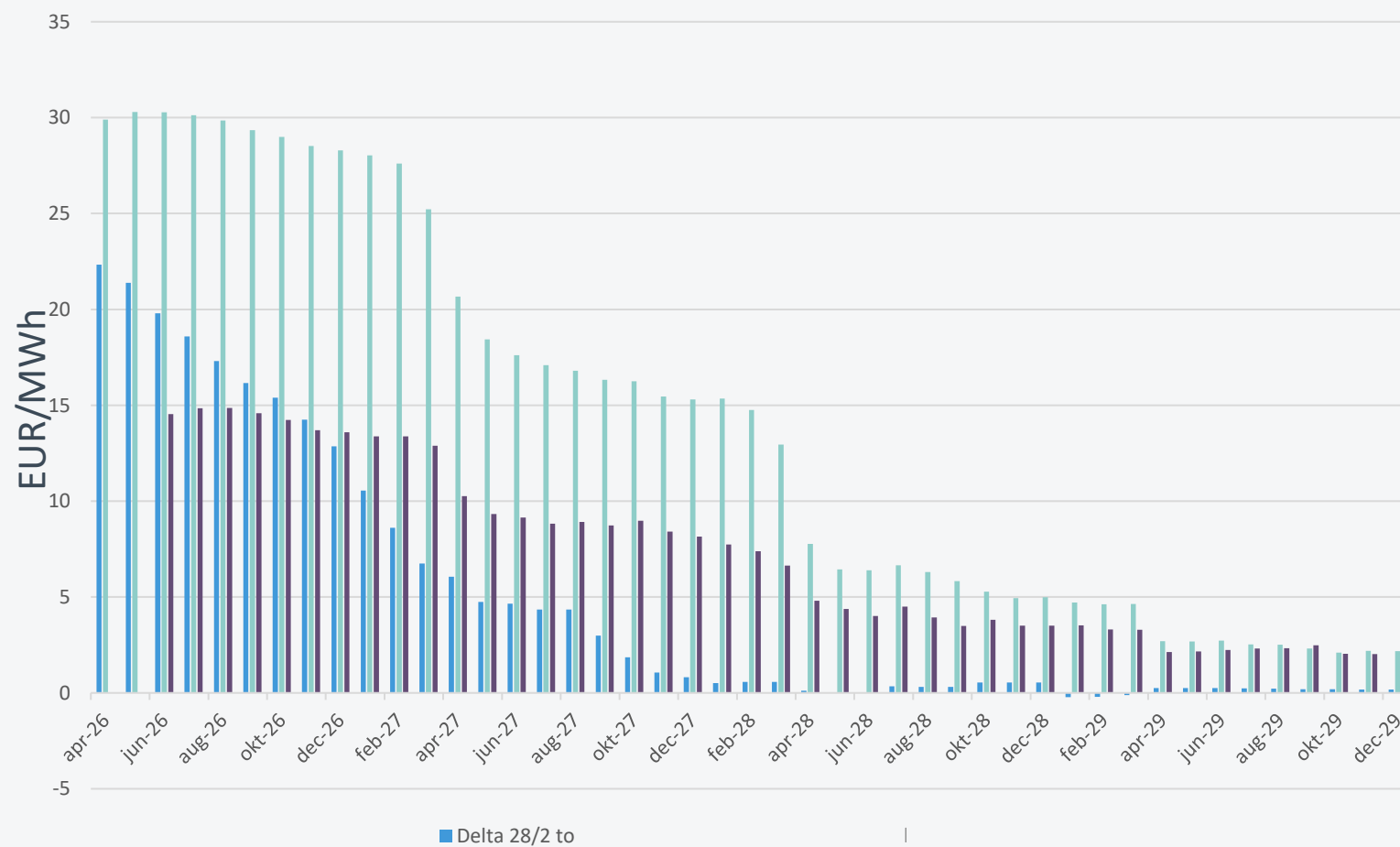
Brent Crude



Front month TTF

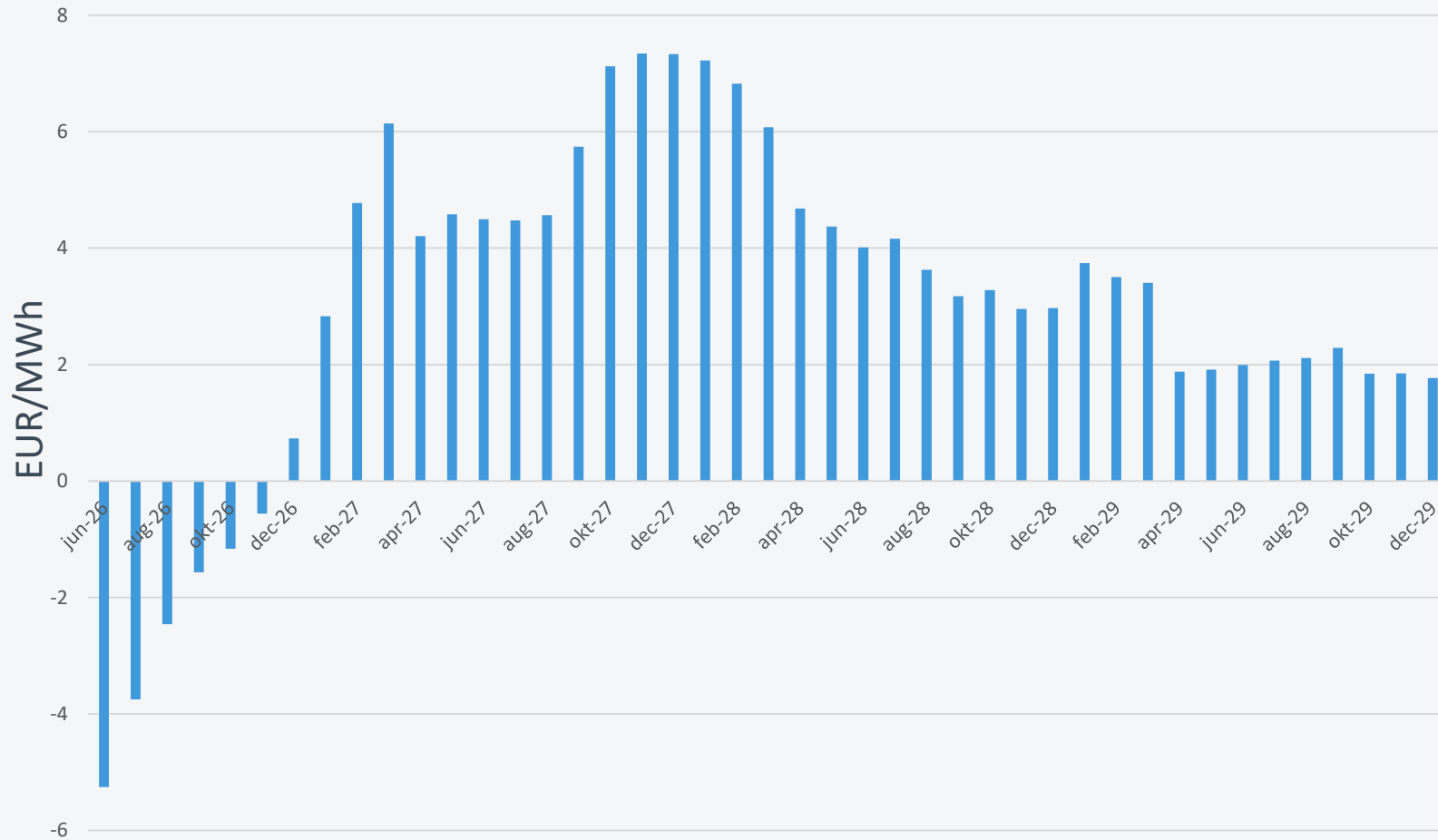


Dynamics of the price reaction

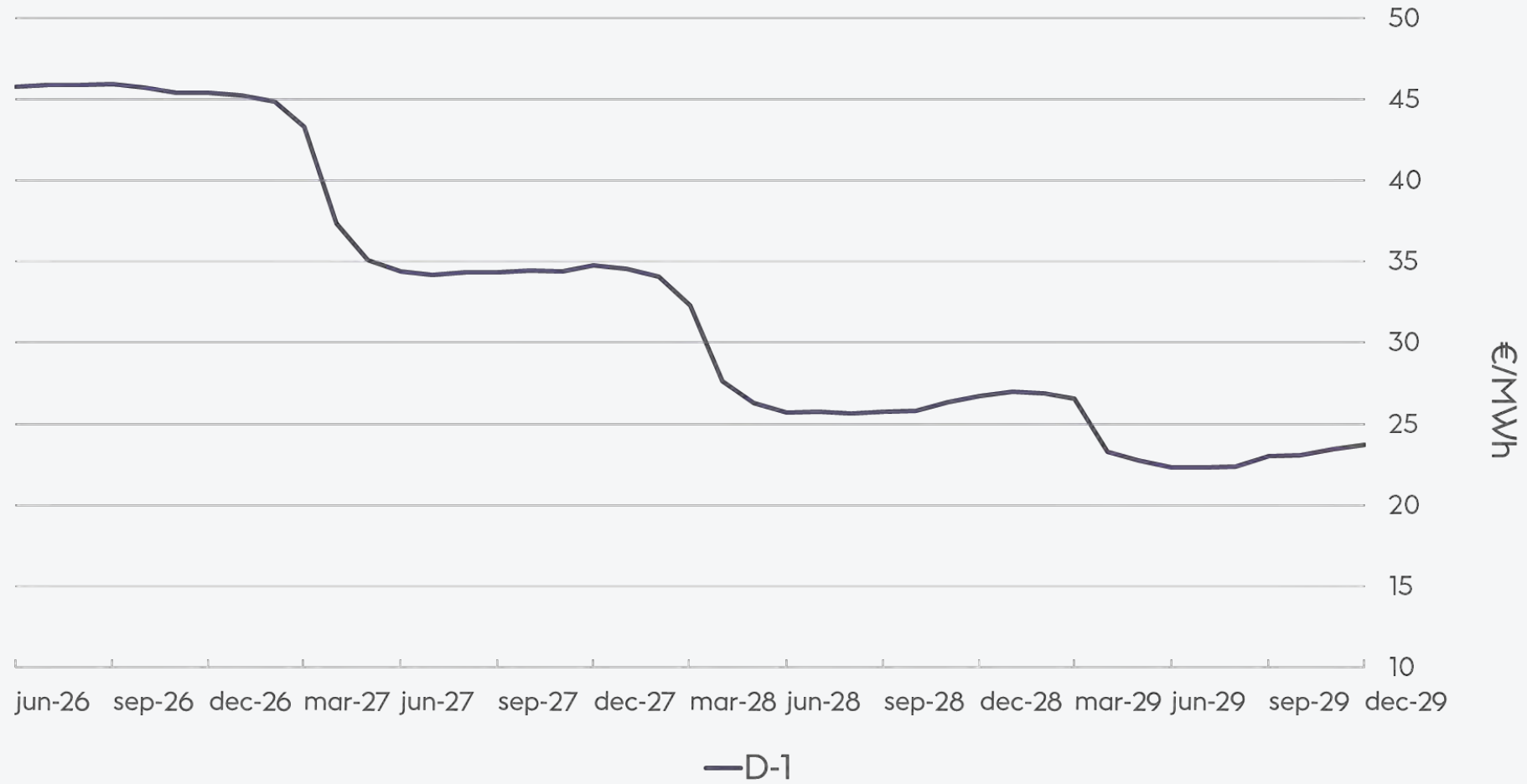


Dynamics of the price reaction

Delta from 3rd of March to 3rd of May



Forward curve gas



A few important steps on the way



Gas infrastructure damaged

Gas Prices Surge as Qatar Shuts World's Largest LNG Export Plant



QatarEnergy's Ras Laffan plant supplies about a fifth of global LNG supply. Photographer: Karim Jaafar/AFP/Getty Images

By [Elena Mazneva](#), [Stephen Stapczynski](#), and [Salma El Wardany](#)

March 2, 2026 at 1:05 PM GMT+1

Updated on March 2, 2026 at 6:32 PM GMT+1

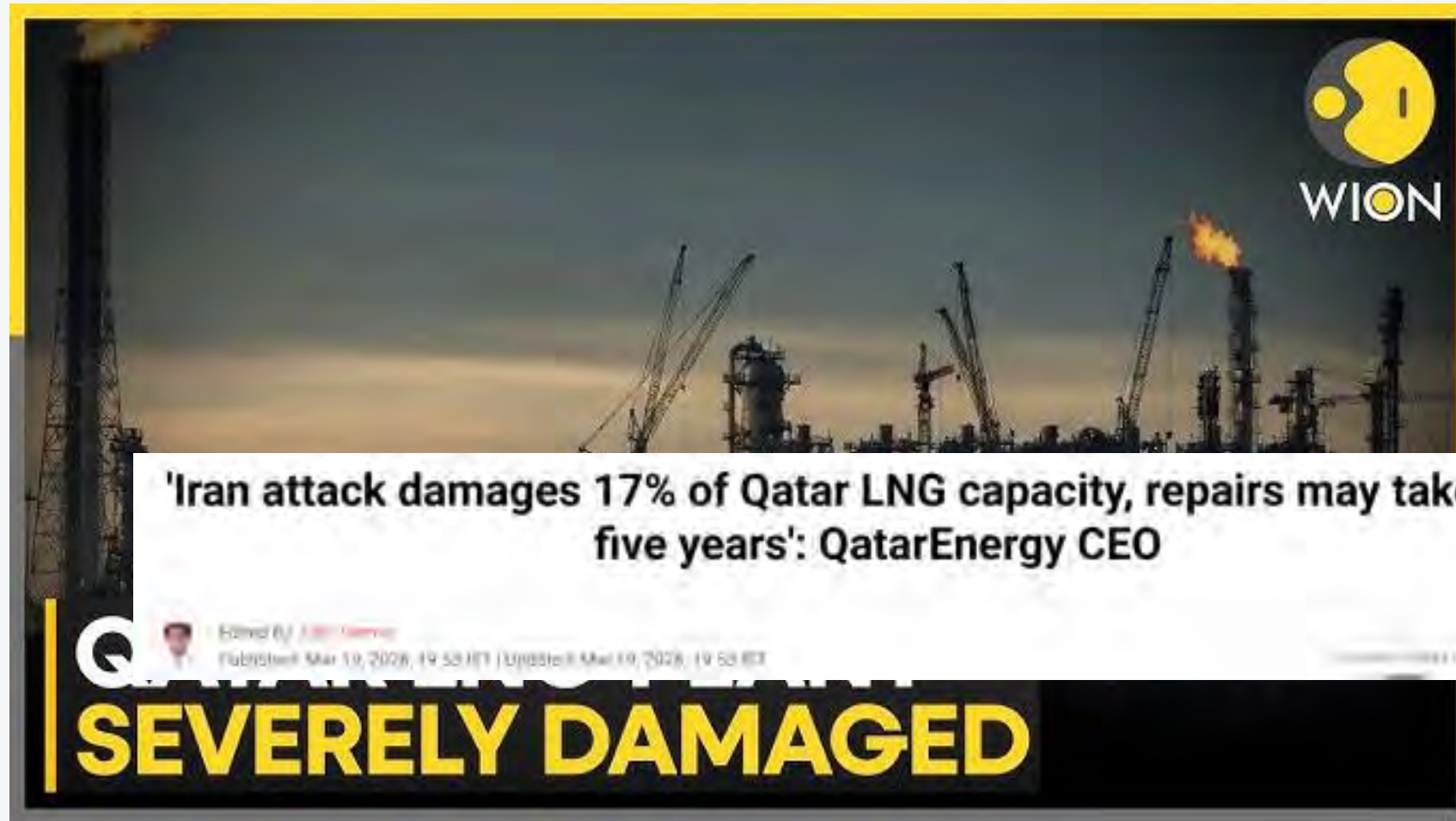
A few important steps on the way



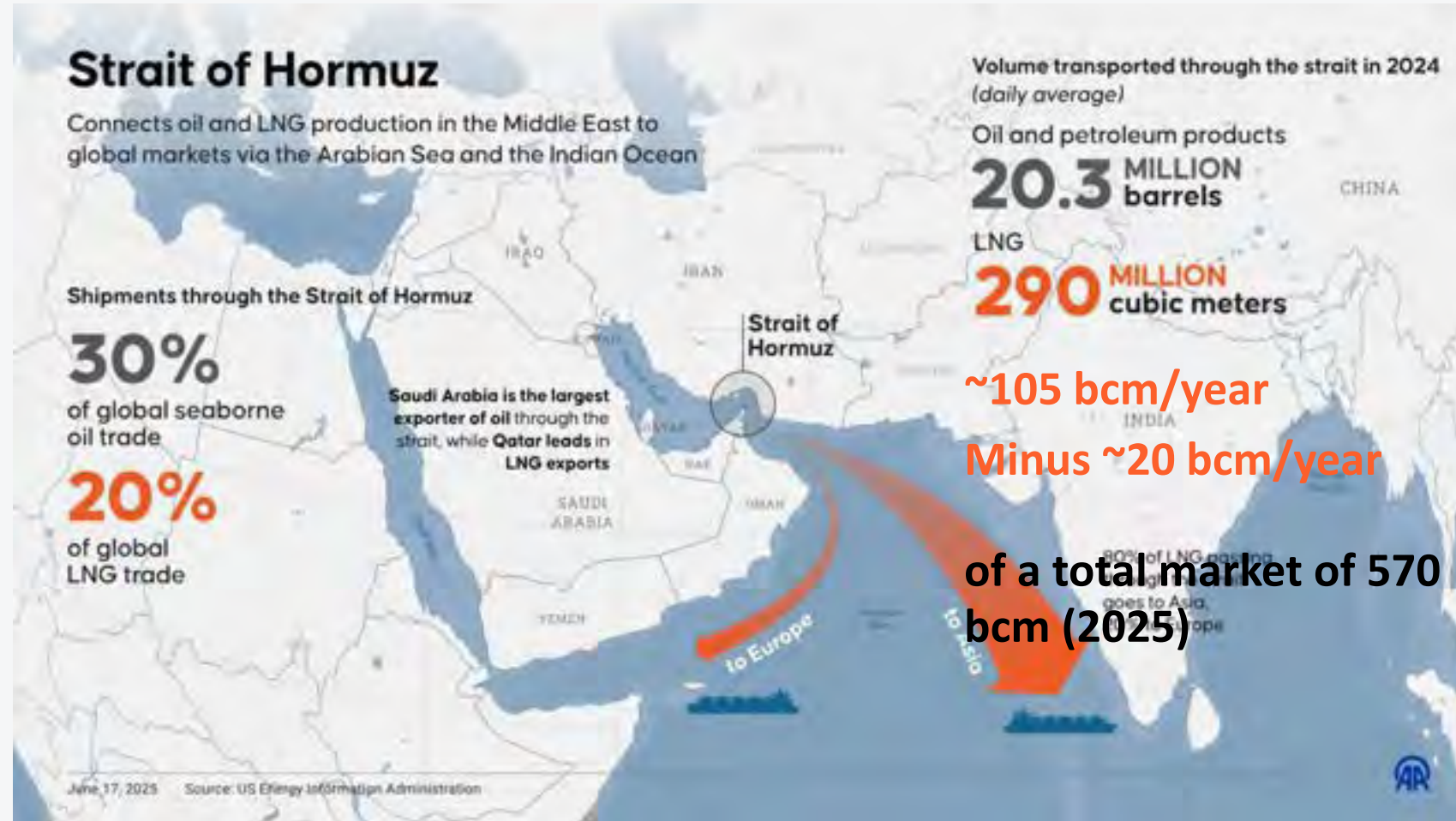
Gas infrastructure damaged



Gas infrastructure damaged



Strait of Hormuz



A few important steps on the way



Truth social



Donald J. Trump
@realDonaldTrump

A whole civilization will die tonight, never to be brought back again. I want that to happen, but it probably will. However, now that we have Complete and Total Regime Change, where different, smarter, and less radicalized minds prevail, maybe something revolutionarily wonderful happen, WHO KNOWS? We will find out tonight, one of the most important moments in the long and complex history of the World. 47 years of extortion, corruption, and death, will finally end. God Bless the Great People of Iran!

[View original Truth Social post.](#)

Next day....



Donald J. Trump
@realDonaldTrump

Based on conversations with Prime Minister Shehbaz Sharif and Field Marshal Asim Munir, of Pakistan, and wherein they requested that I hold off the destructive force being sent tonight to Iran, and subject to the Islamic Republic of Iran agreeing to the COMPLETE, IMMEDIATE, and SAFE OPENING of the Strait of Hormuz, I agree to suspend the bombing and attack of Iran for a period of two weeks. This will be a double sided CEASEFIRE! The reason for doing so is that we have already met and exceeded all Military objectives, and are very far along with a definitive Agreement concerning Longterm PEACE with Iran, and PEACE in the Middle East. We received a 10 point proposal from Iran, and believe it is a workable basis on which to negotiate. Almost all of the various points of past contention have been agreed to between the United States and Iran, but a two week period will allow the Agreement to be finalized and consummated. On behalf of the United States of America, as President, and also representing the Countries of the Middle East, it is an Honor to have this Longterm problem close to resolution. Thank you for your attention to this matter! President DONALD J. TRUMP

Shortly after....

Trump says US to 'blockade' Strait of Hormuz after talks failed over Iran's nuclear ambitions

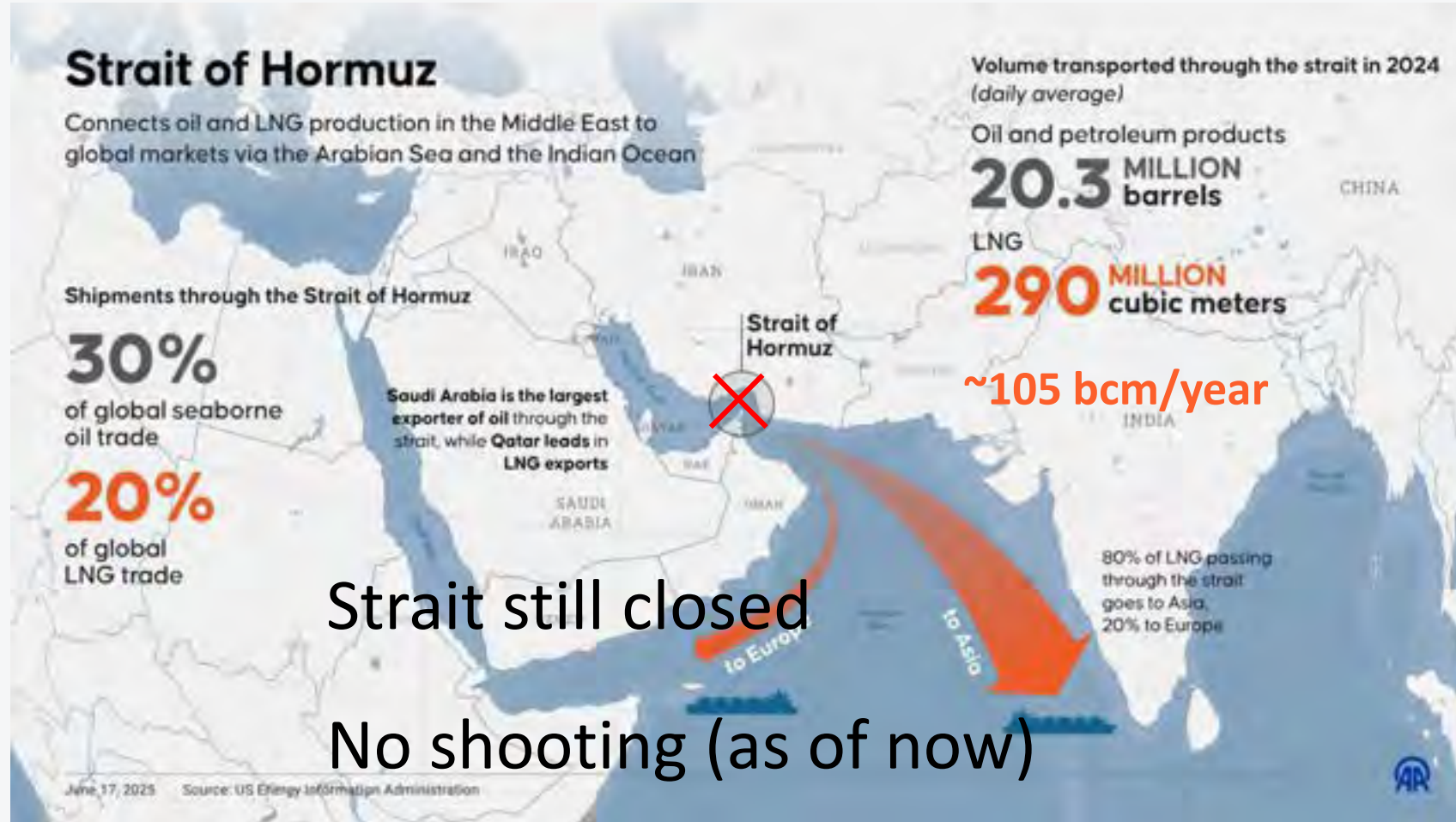
© 11 April 2026



Uncertainty is very high right now



Strait of Hormuz



Monday this week...

LIVE UPDATES

Iran war live: UAE says intercepted missiles, drone sparks fire at oil site

By Stephen Quillen, Edna Mohamed and Alex Millar
Dunfermline

8 May 2024

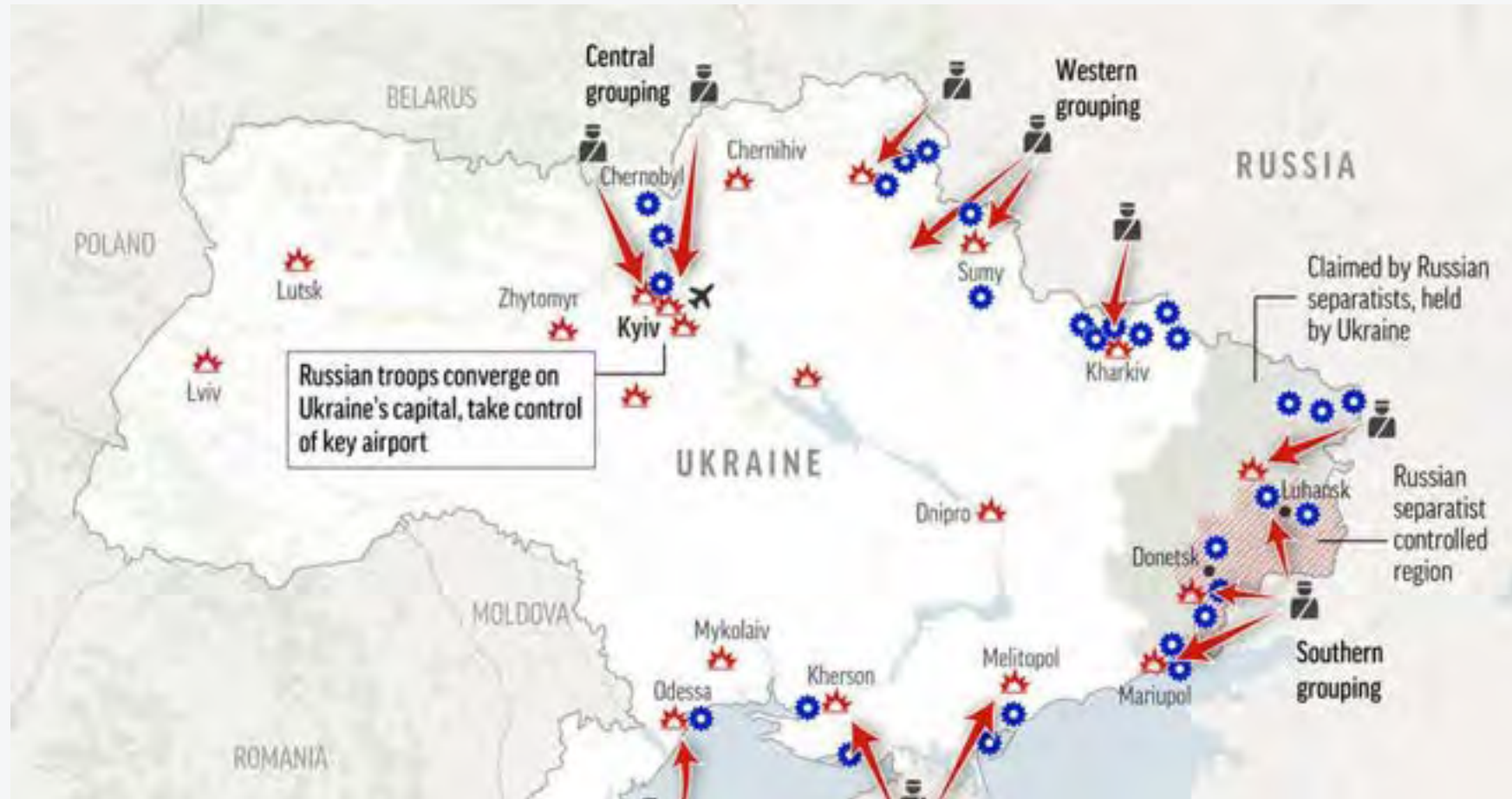
Save Share Add Al Jazeera on Google

- The United Arab Emirates says its forces are responding to an Iranian drone and missile attack, with authorities in Fujairah reporting a fire at an oil facility. No official comment from Iran.
- Two missiles hit a US frigate in the Strait of Hormuz after it ignored warnings from [Iran's navy](#) to halt, state media [quote the army](#) as saying, with the US military saying no vessel was struck.

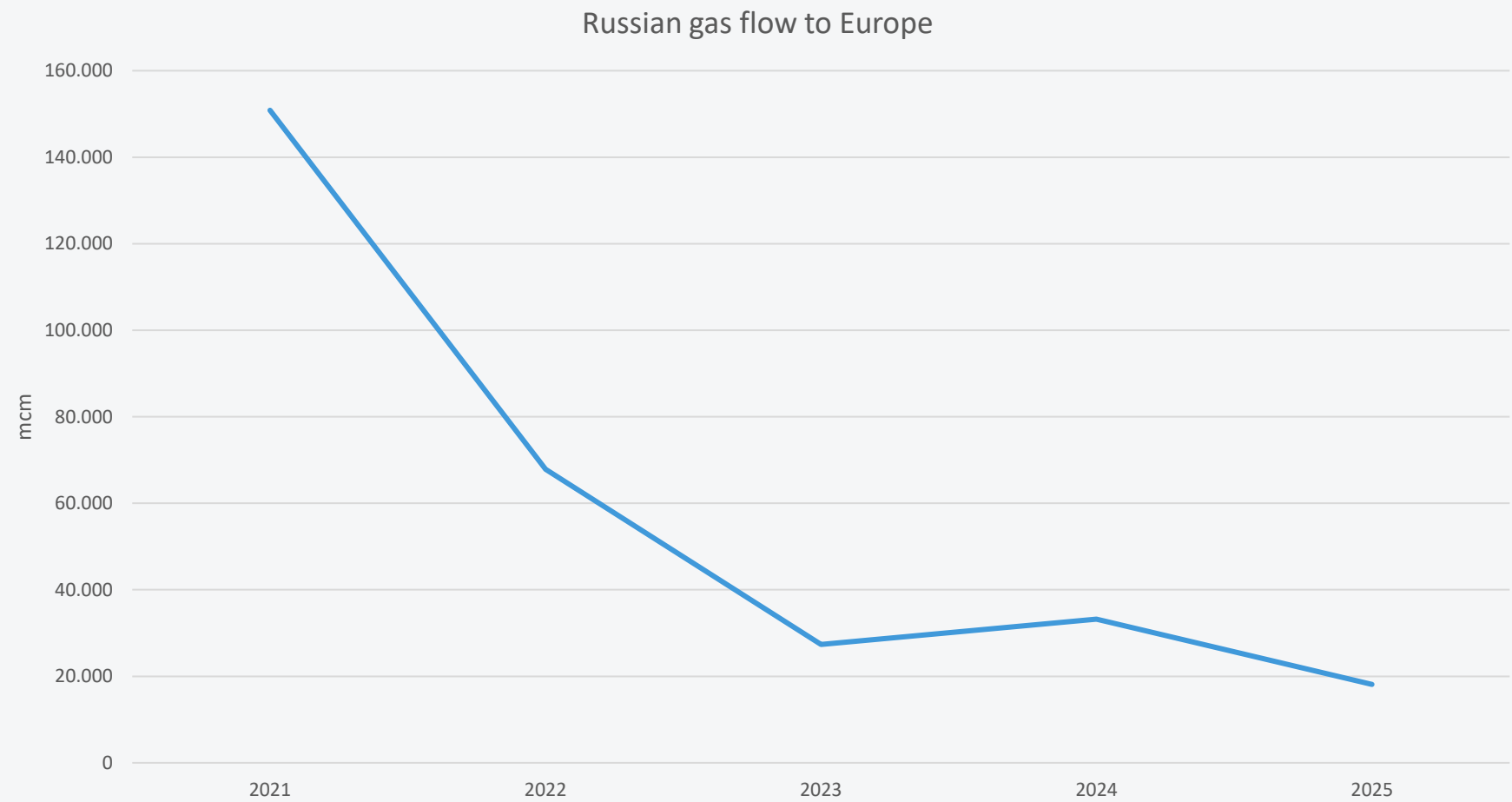
[Read more](#)

Why is all of this so important?

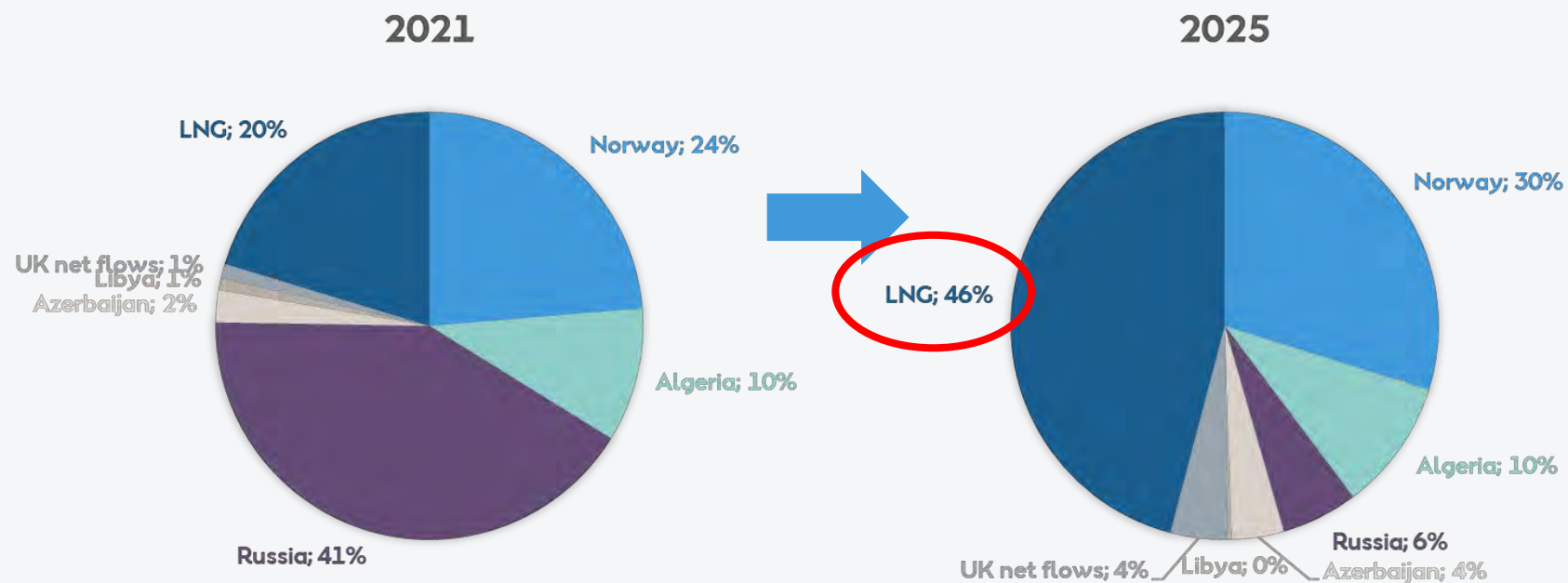
... about 4 years ago:



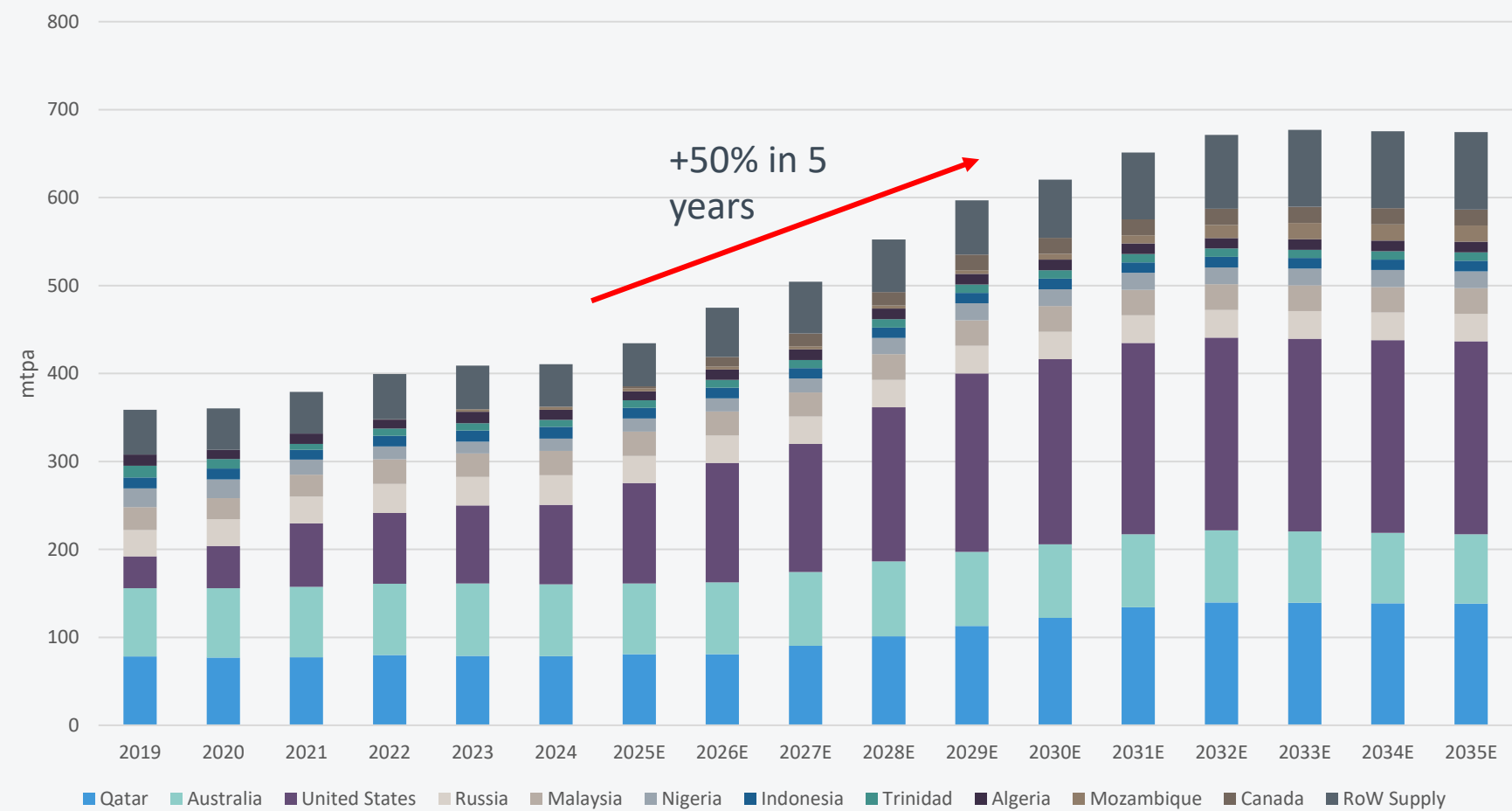
Since the full-scale invasion, Russian gas to Europe has declined by ~85%



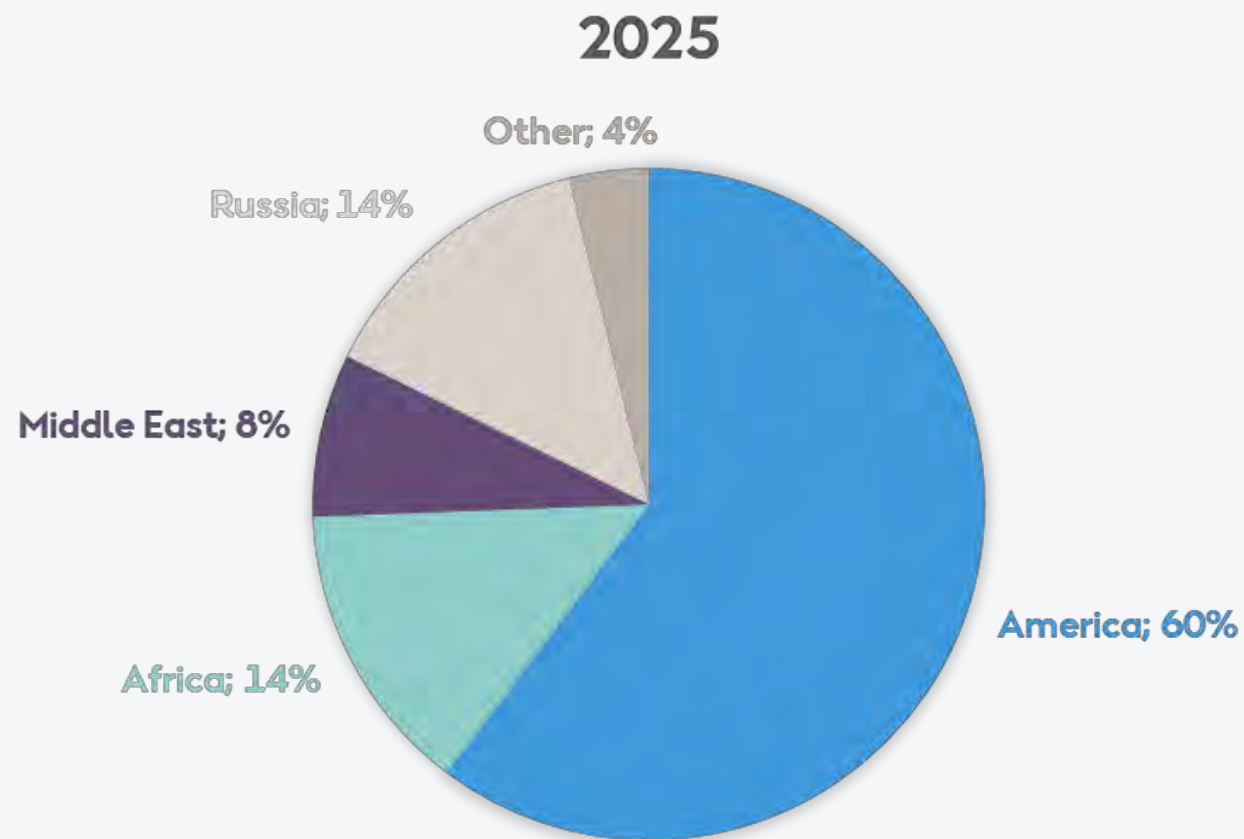
Europe has had to look elsewhere for gas



LNG supply was expected to rise....



Where does Europe get its LNG from



Global gas prices



EUR/MWh

New LNG coming online

MONTEL

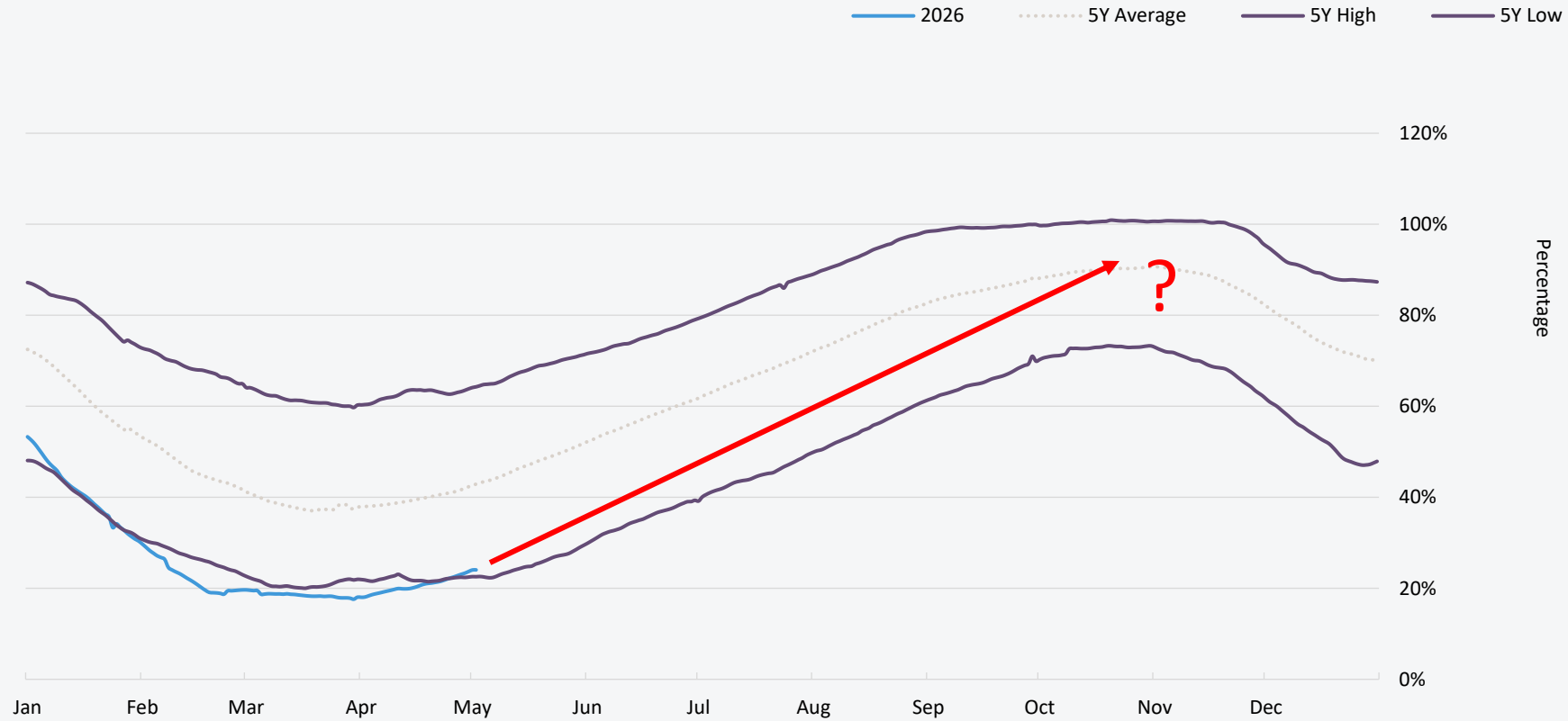
[Print](#) [Add to favorites](#)

US Golden Pass LNG project (21bcm/yr) begins production

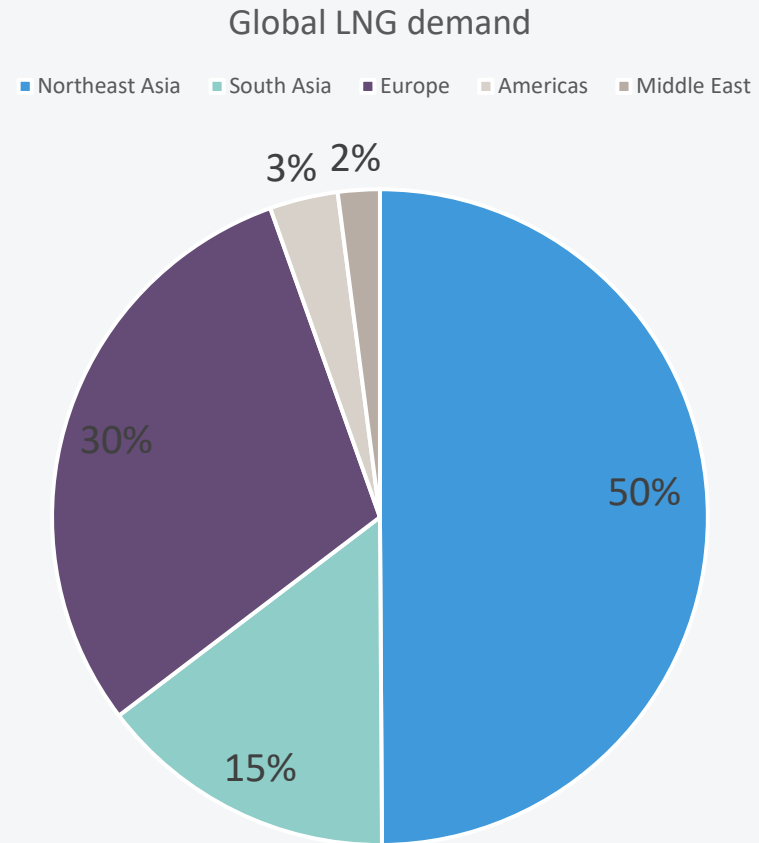
(Montel) Golden Pass LNG, a 21.2bcm/year joint project in the US between QatarEnergy (70%) and ExxonMobil (30%) started producing from one of three LNG trains for the first time on Monday, the terminal operator said.

Duration: The effect on European gas storage

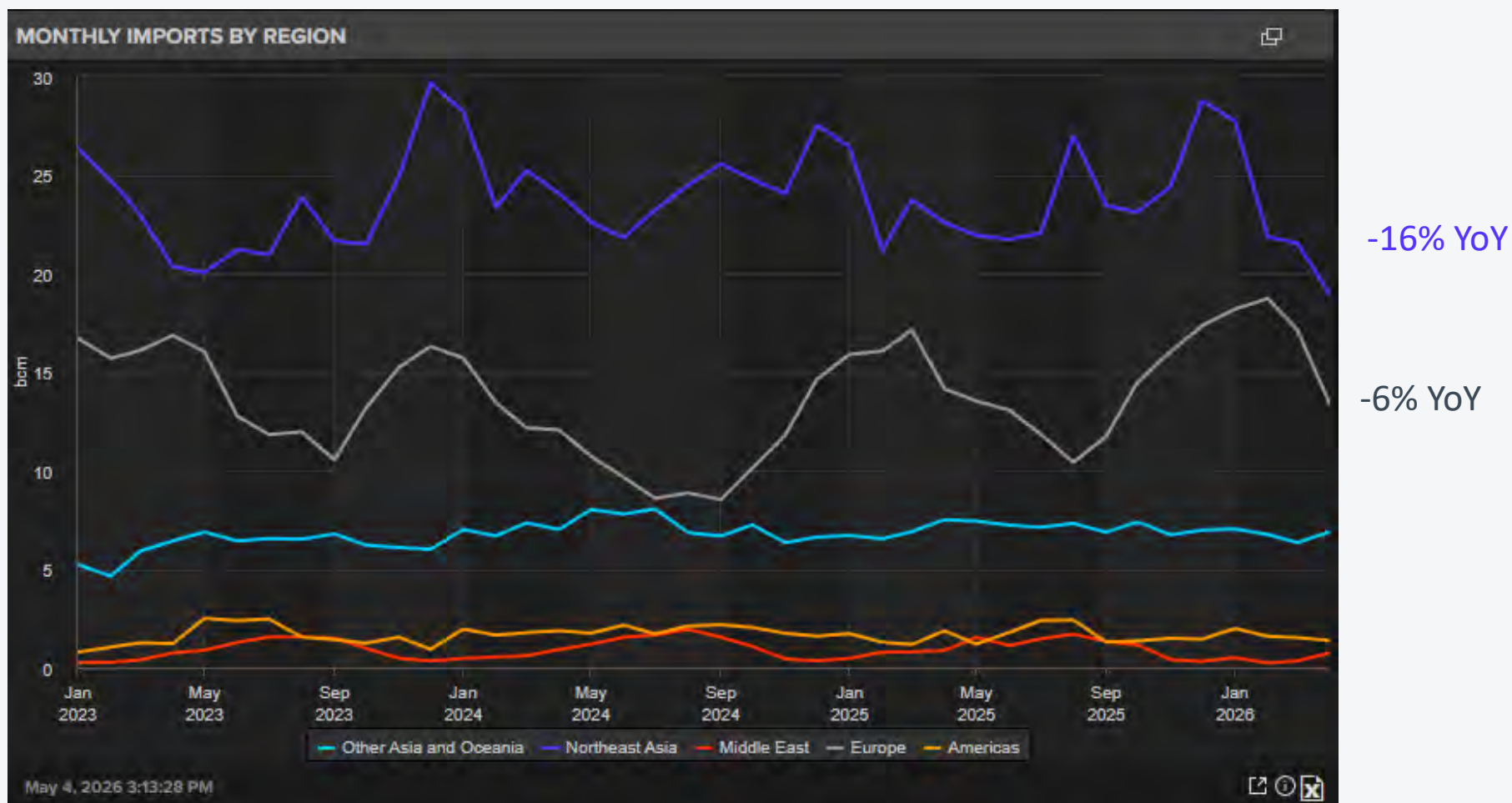
NWE Gas Storage Levels



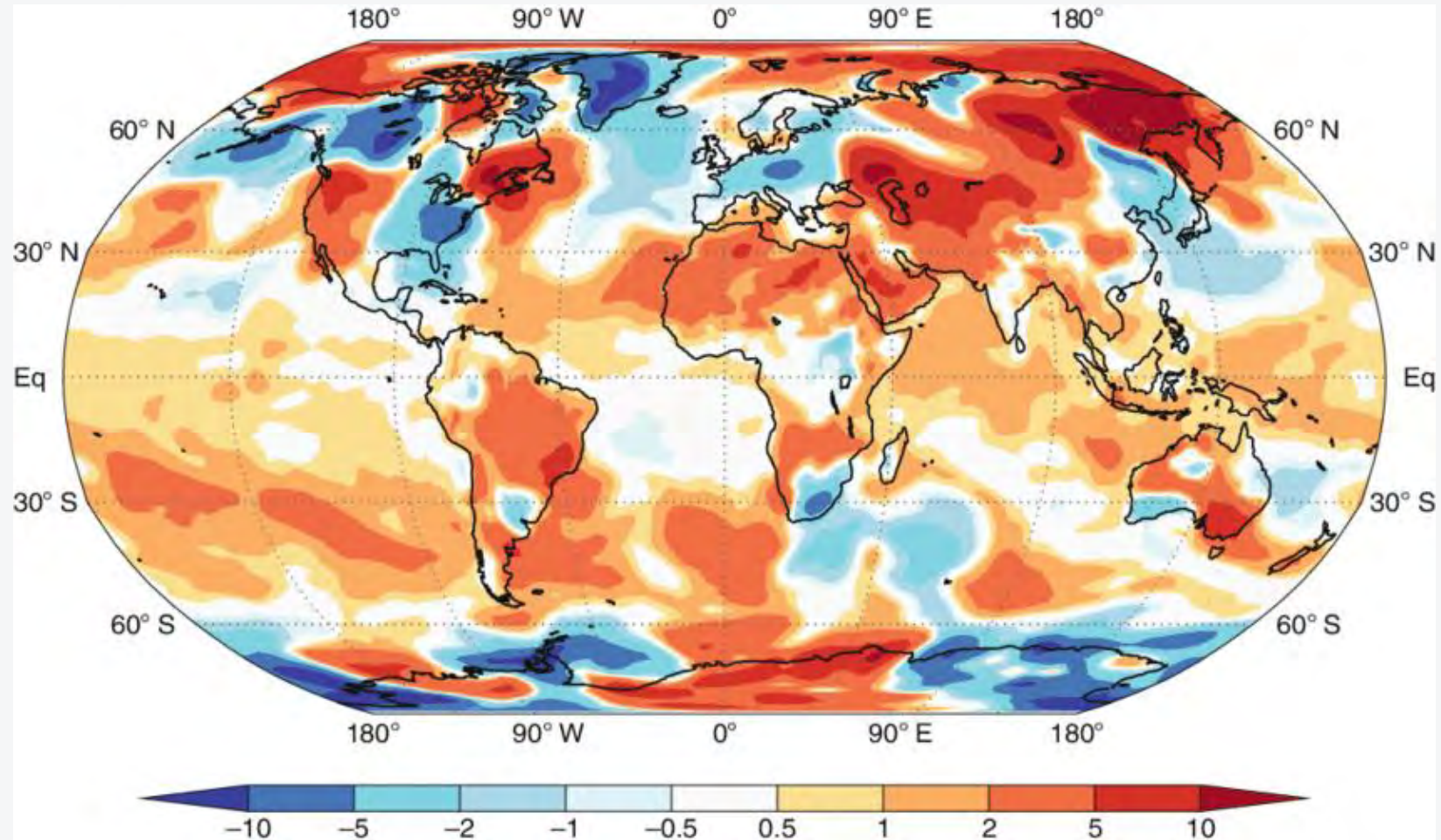
Global LNG demand



Monthly LNG import



Global weather



Conclusion

- Europe is more dependent on LNG now, than ever before
- Disruptions to LNG supply from the Middel East:
 - Supply loss from the closure of the Strait of Hormuz
 - Supply loss due to bombing of infrastructure
- Europe has depleted gas storages due to a cold winter
 - Can we fill up storages before winter?
- Long term LNG supply is still expected to increase

Udstillerne

2 minutters pitch hver



HH
INSTRUMENTS



The logo for Dynelectro consists of a blue and green stylized icon resembling a double helix or a molecular structure, followed by the word "Dynelectro" in a bold, black, sans-serif font.



The logo for EUROMEKANIK features a red stylized globe icon with the word "EUROMEKANIK" in a bold, black, uppercase sans-serif font.



The logo for SulfiLogger features the word "SulfiLogger" in a bold, blue, italicized sans-serif font.







Dynelectro



SulfiLogger

NÆSTE



Pause

Klokken 10.40 til 11.10

Herefter oplæg i de tre spor

**2026
Grønne
Gasdage**

EXPORT

Next presentation 11.10 am



Making Biogas Happen by 2030.

***Chief Executive
Charlotte Morton
World Biogas Association***

**2026
Grønne
Gasdage**



Making Biogas Happen

Charlotte Morton OBE

Green Gas Days



WORLD BIOGAS
ASSOCIATION

About WBA

**Founded in 2016
to lead the global
transition from
waste to vital
bioresources**

**Accredited
member and
partner of key
international
organisations**

**#MBH: the
engine for
regulatory de-
risking, technical
standardisation
and structured
project pipeline
development**

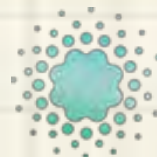


**Food and Agriculture
Organization of the
United Nations**



**CLIMATE &
CLEAN AIR
COALITION**
TO REDUCE SHORT-LIVED
CLIMATE POLLUTANTS

iea



**Global
Methane
Hub**

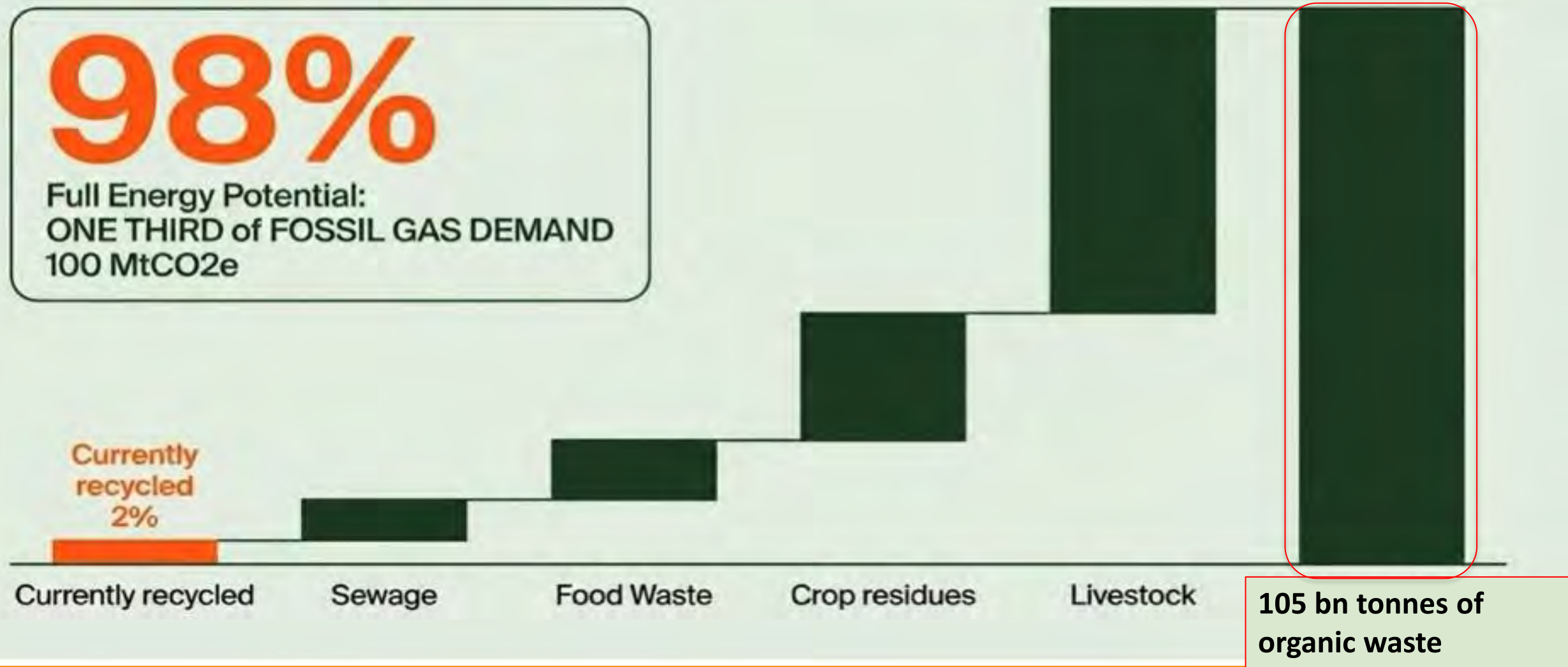


REN21



UNFCCC
NotebookLM

Untapped potential



A \$100BN+ investor-ready infrastructure opportunity

Biogas is the only commercially proven technology capable of simultaneously decarbonising heating, heavy transport, and baseload power.



A **\$100BN+ untapped sector** with the potential to reduce global emissions by 11%.

UN identifies required circular economy systems change as a **\$32 trillion investment opportunity**.

IEA confirms the bioenergy sector will be the **second-fastest growing renewable energy fuel source** by 2050.

Signatories to the Global Methane Pledge represent **70% of the global economy**, providing unprecedented government alignment.

Global biogas market today

40 bcme

of natural gas equivalent of
biogas produced annually

10 bcme

of biomethane produced
annually

USD 2
billion

Investment in the sector
annually

significant growth experienced between 2021 and 2023

Source: IEA, 2025

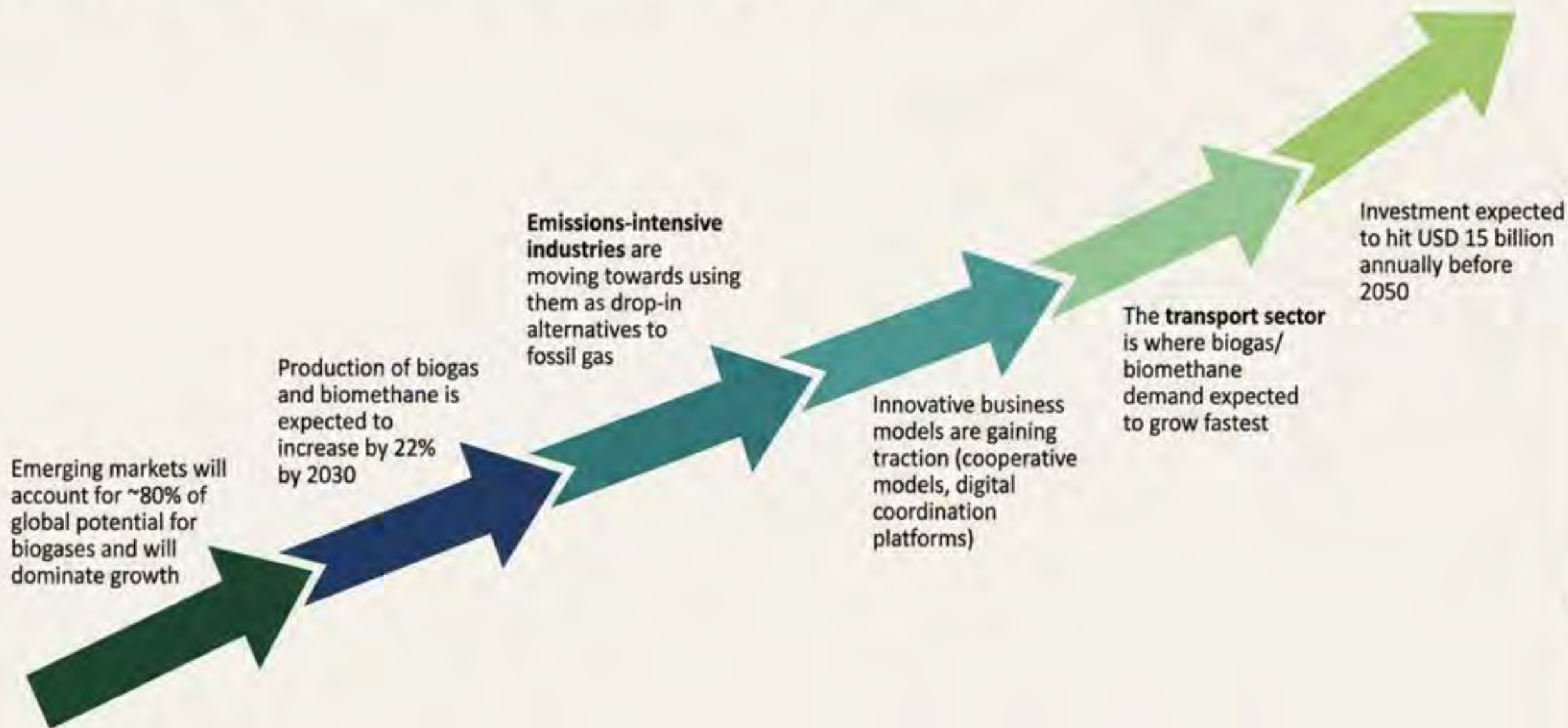


Regional Current Market Insights

Europe	most dominant region with almost half the production of biogas and biomethane worldwide
	EU: 21 bcm of biogases produced annually (7bcm of biomethane)
North America	USA: 15 bcm produced annually (3.6 bcm of biomethane)
	Mexico: 0.11 bcm of biogas per year
Asia	China: 15.9 bcm produced annually. Very little is upgraded to biomethane.
	India: 3.2 bcm per year of CBG
South America	Brazil: 2.9 bcm produced annually (0.075 bcm of biomethane)

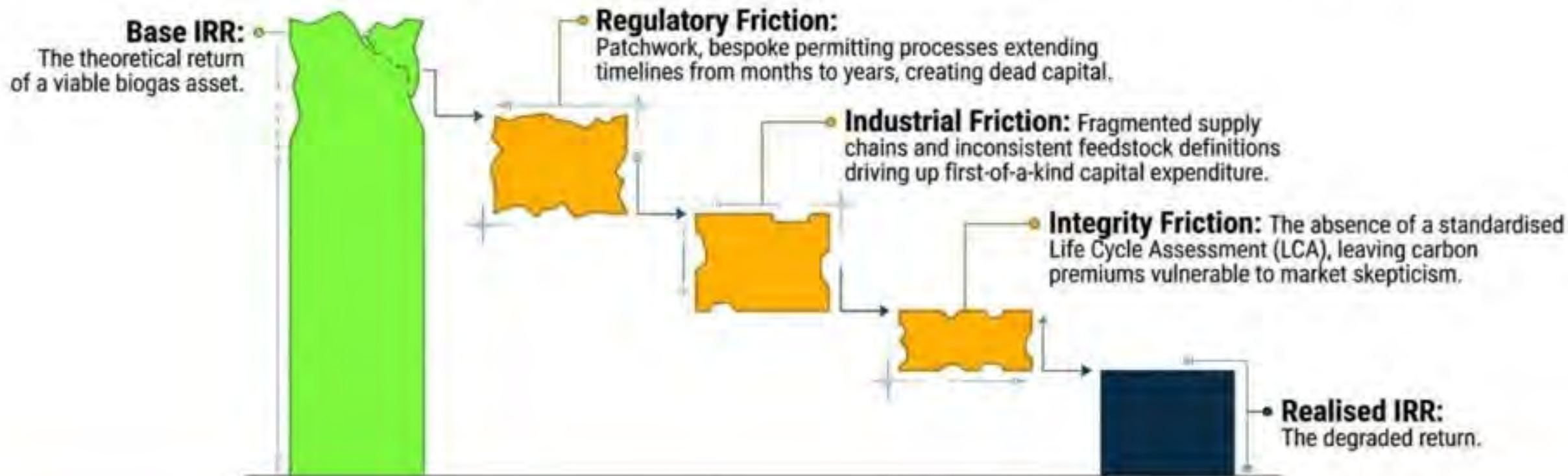
⚠ *Caveat: The figures above are estimates based on varied sources, public reports, and conversion assumptions. Actual numbers may vary.*

Global biogas market – looking forward



Capital is No Longer the Bottleneck; Standardisation Is

Theoretical project returns are continually eroded by bespoke operational realities. The industry currently lacks the global operating system required to standardise asset delivery.



Key Takeaway: We must move away from isolated waste management mentalities toward unified energy infrastructure deployment.

#MBH: From Fragmentation to Global Industrialisation

The Paradigm Shift Matrix

	Current State (Waste Management)	Target State (Energy Infrastructure)
Investment Scale	Single-asset, bespoke project finance	Repeatable, portfolio-scale capital deployment
Supply Chain	Fragmented, localized, with high first-of-a-kind engineering costs	Standardised components, global procurement, predictable CapEx
Human Capital	Informal, localized knowledge transfer	Globally certified, professionalised workforce mitigating operational risk
Data & Performance	Siloed, reactive asset management	AI-driven, predictive benchmarking across cross-border portfolios

Protecting the Asset

Without an audited, globally recognised standard, the intrinsic value of the biogas—its carbon intensity—is vulnerable to regulatory shifts and market skepticism.

ADCS
(Anaerobic Digestion
Certification Scheme):
Ensuring operational
excellence and safety
benchmarking.

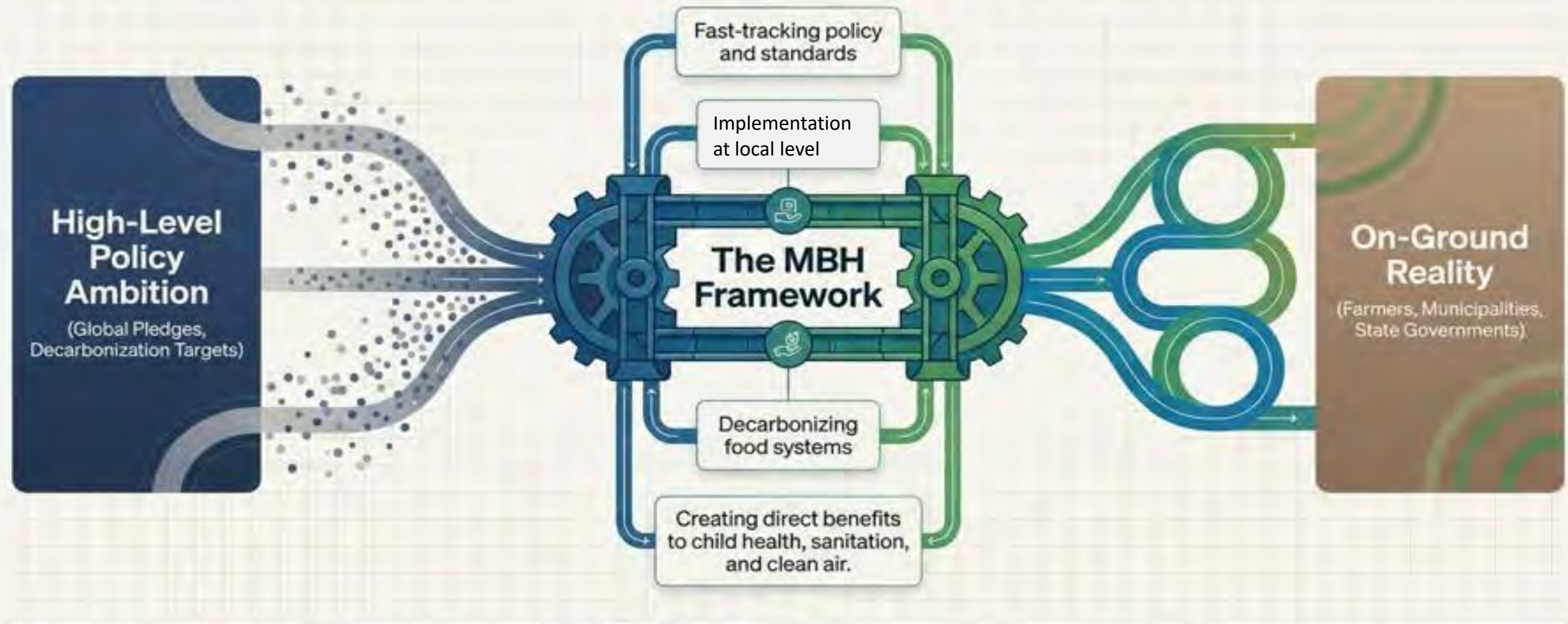


**Bankable
Biogas Asset**
& Carbon Revenue

standardised LCA:
Providing the definitive,
audited methodology
for calculating carbon
intensity.

These frameworks ensure regulatory compliance for carbon reporting,
locking in the asset's Green Premium and preventing margin erosion.

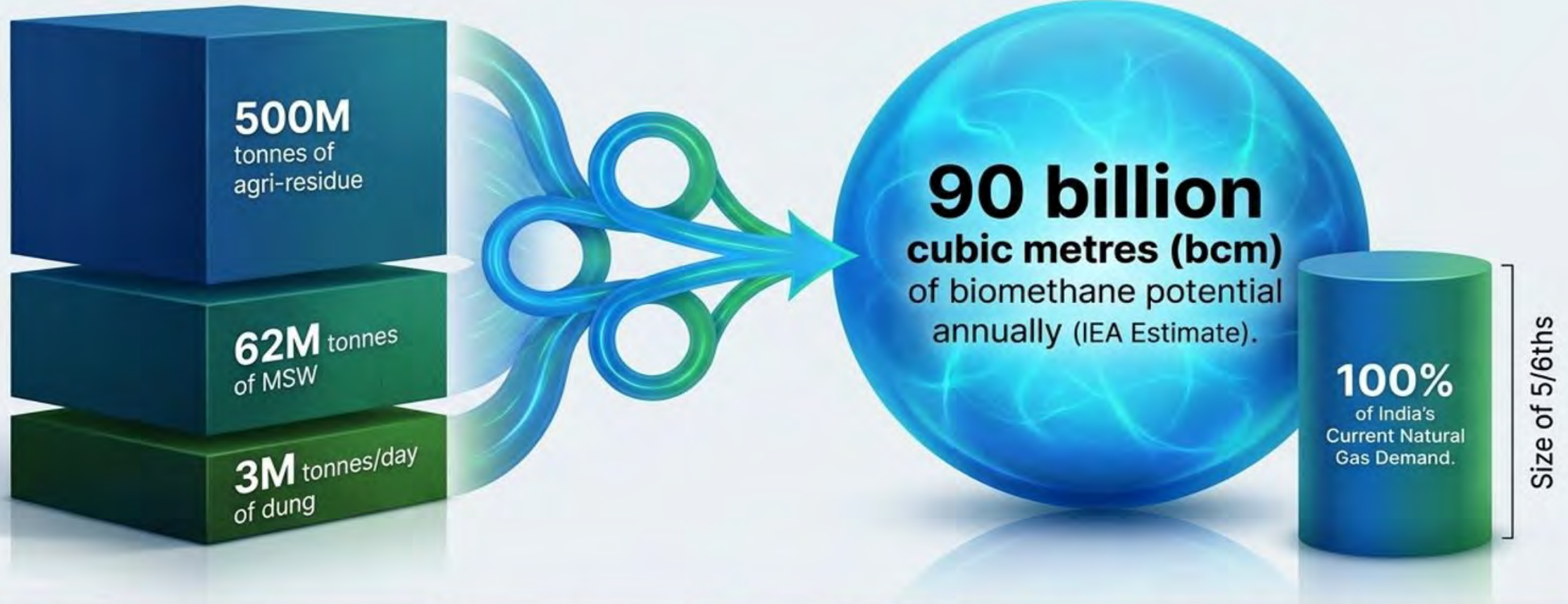
MBH provides the institutional architecture needed to move from policy ambition to on-ground execution.



We aren't just building plants; we are operationalizing a systemic transition for organic waste.

India's unutilized organic waste holds the volumetric power to eclipse its entire natural gas demand.

The Waste Stack



India's waste alone can power a full circular energy system, replacing fossil fuels while eliminating waste burning.

#MBH Implementation in India

- **National-Level Advocacy:** Establishes unified policies, standards, and financing frameworks—working on building consensus for National Biogas Mission.
- **State-Level Implementation:** Enables localized action plans aligned with feedstock, infrastructure, and market realities—turning biogas potential into scalable, on-ground projects.

Integrated Impact of state execution with national alignment to scale biogas adoption, drive investments, and support India's clean energy transition



A single intervention point unlocks a multi-sector circular economy

Multiple outcomes from a single solution



The framework operates with global backing and requires cross-ministerial consensus



Insight: The policy groundwork is established. The immediate mandate is strategic partnerships to scale implementation.

National Biogas Mission

1

National Roadmap

Time-bound deployment targets across transport, industry, and city gas

Coordinated policy across ministries

2

National Biogas Fund

Blended finance through guarantees and risk-sharing

Concessional capital to lower project costs

3

Standards & Markets

National certification scheme

Lifecycle assessments and carbon market access

Formalised feedstock supply chains and digestate markets

4

People & Institutions

Capacity building at state and municipal level

Public-private partnerships

Inclusive job growth

Built on the WBA's Global Biogas Regulatory Framework (GBRF) and AD Certification Scheme International (ADCS)



WORLD BIOGAS
ASSOCIATION

www.worldbiogasassociation.org

Join Us!

Charlotte Morton OBE

Chief Executive

cmorton@worldbiogasassociation.org

The presenter does not wish to share this presentation as it contains confidential information.
The presenter does not wish to share this presentation as it contains confidential information.



EXPORT

Next presentation 11.40 am

International investor perspective on biogas

Associate Will Johnson
Arjun Infrastructure Partners

The presenter does not wish to share this presentation as it contains confidential information.

2026
Grønne
Gasdage

NEXT



Lunch

12.10 pm to 1.10 pm

**2026
Grønne
Gasdage**

Biogas Markets

Next presentation 13.10 pm



India: The Next Big Market for Biogas

*Biofuels Specialist Dr. Rahul Jain
Global Biofuels Alliance – World Bank India*

And

*Energy Adviser Prithvi Sai Penumadu. Trade
Council of Denmark in India*

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India's Biomethane Landscape & Opportunities:

- About India
- India's Rising Gas Demand & Import Dependence
- Why Biofuels Make Sense for India
- Feedstock Base for CBG in India
- Various Applications of CBG
- Present CBG Landscape: Existing and Upcoming Plants
- Ministries Involved
- Major Driving Policies in India
- State Level Policies
- Case Studies & Learnings
- Challenges and Opportunities

Presented By:
Rahul Jain, PhD



India

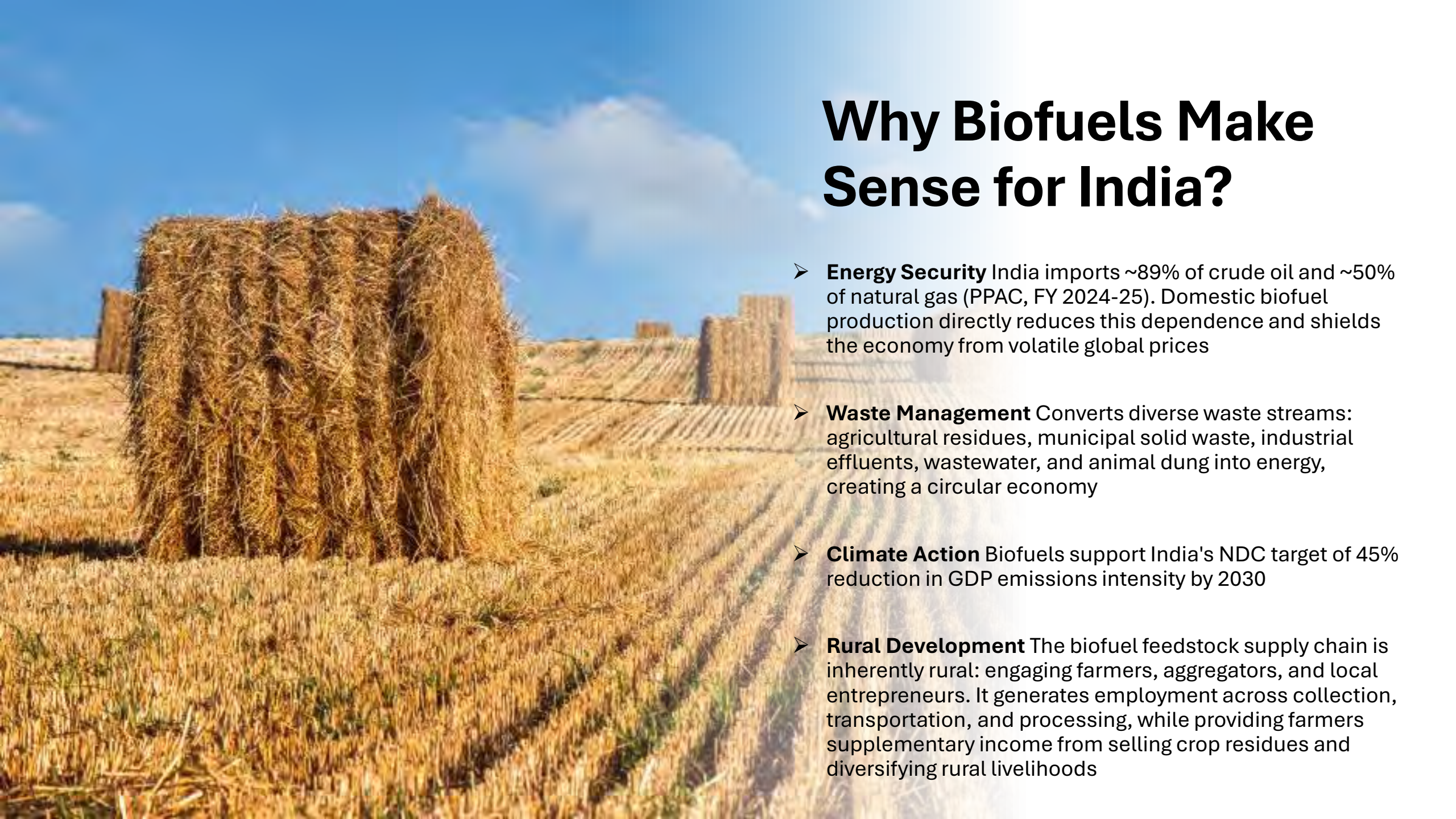
- **World's Most Populous Nation:** ~1.43+ billion people
- **7th largest country in the world by land area,** covering approximately 3.28 million square kilometres (km²) (75 times larger than Denmark)
- **Fastest Growing Major Economy:** ~6–7% GDP growth
- **5th Largest Economy Globally** (~\$3.7 trillion GDP)
- **Young Workforce:** Median age ~28 years, one of the youngest large economies
- **Startup Hub:** 3rd largest startup ecosystem globally
- **Energy Demand Hub:** Among top 3 global energy consumers
- **Clean Energy Push:** 500 GW non-fossil capacity target by 2030



India's Rising Gas Demand & Import Dependence

- India's oil and gas demand is expected to grow sharply, with gas consumption projected to **triple by 2030** and overall energy demand rising significantly by 2050
- Total natural gas consumption stood at **~71 BCM (~195 MMSCMD)** in 2024–25
- Over **50% of gas demand is met through LNG imports**, indicating high import dependence
- West Asia dominates supply, with countries like **Qatar, UAE, and Oman** contributing **~70%** of LNG imports
- **CBG/Biomethane** presents a **strong domestic alternative** to reduce reliance on imported gas
- As per IEA estimates, utilizing just **one-third of India's CBG potential** could offset the entire LNG import requirement



A large, rectangular haystack made of golden-brown straw stands prominently in the foreground of a harvested field. The field is covered in a layer of straw, and several other smaller haystacks are visible in the background. The sky is a clear, vibrant blue with a few wispy white clouds. The overall scene is bright and sunny, suggesting a clear day in a rural setting.

Why Biofuels Make Sense for India?

- **Energy Security** India imports ~89% of crude oil and ~50% of natural gas (PPAC, FY 2024-25). Domestic biofuel production directly reduces this dependence and shields the economy from volatile global prices
- **Waste Management** Converts diverse waste streams: agricultural residues, municipal solid waste, industrial effluents, wastewater, and animal dung into energy, creating a circular economy
- **Climate Action** Biofuels support India's NDC target of 45% reduction in GDP emissions intensity by 2030
- **Rural Development** The biofuel feedstock supply chain is inherently rural: engaging farmers, aggregators, and local entrepreneurs. It generates employment across collection, transportation, and processing, while providing farmers supplementary income from selling crop residues and diversifying rural livelihoods

Feedstocks for CBG production



ANIMAL WASTE



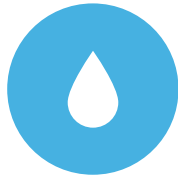
AGRICULTURAL
RESIDUE



INDUSTRIAL WASTE



MUNICIPAL SOLID
WASTE/LANDFILLS



LIQUID EFFLUENT



ENERGY CROPS

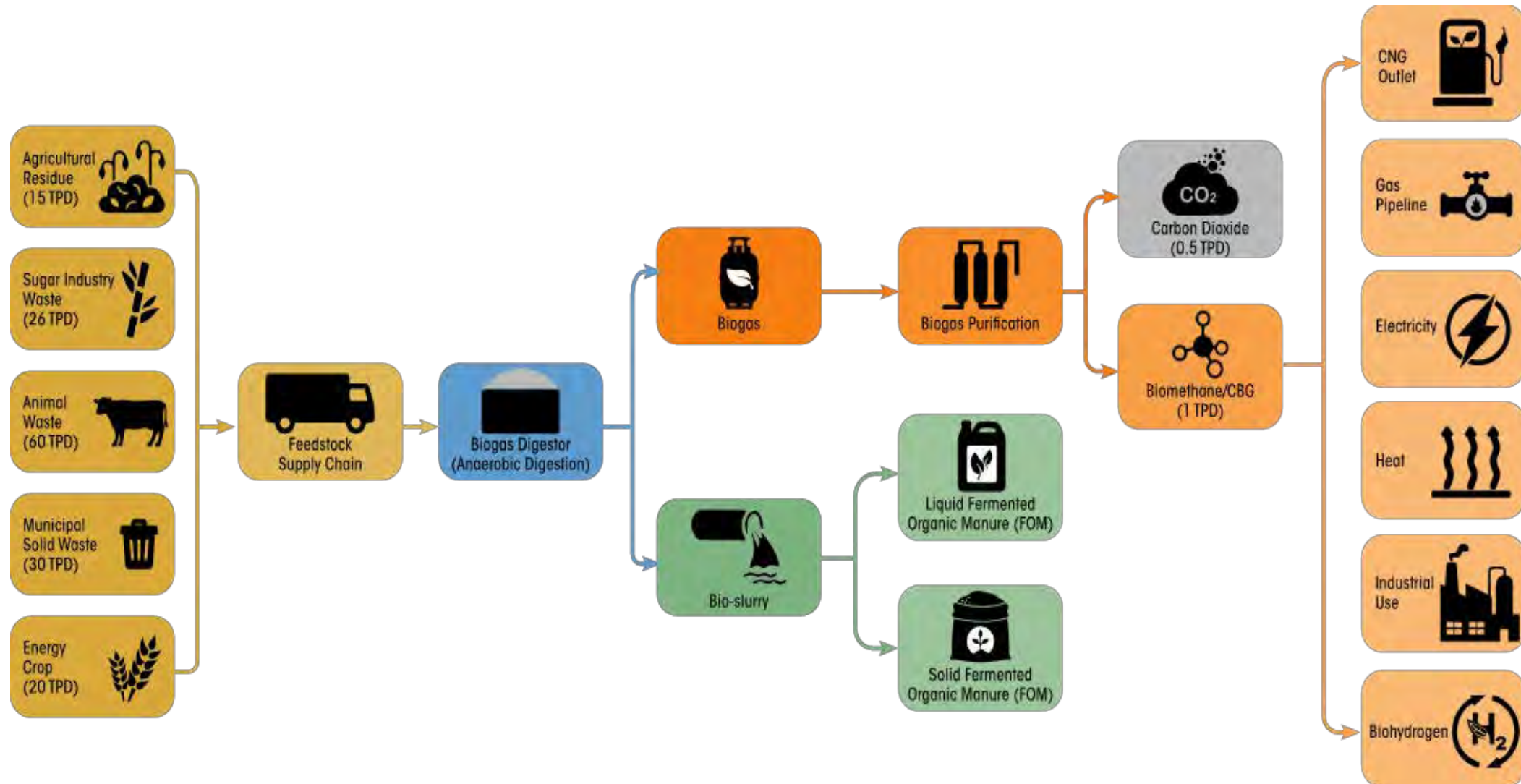


Feedstock Base for CBG in India

- India has an estimated **CBG potential of ~90 BCME annually**. This potential is **~1.2 times India's current natural gas demand (IEA)**
- **Feedstock mix:**
 - ~45% from crop residues
 - ~30% from animal manure
 - ~24% from biowaste (primarily municipal solid waste, along with industrial waste & wastewater)
- **Key feedstocks driving ~70% of potential:** Paddy straw, press mud, animal manure, and segregated organic MSW
- **Regional distribution highlights:**
 - Press mud: Uttar Pradesh, Maharashtra, Karnataka
 - Paddy straw: Uttar Pradesh, West Bengal, Andhra Pradesh
 - Animal manure: High potential in Uttar Pradesh, West Bengal, Madhya Pradesh, Bihar
 - Municipal waste: Widely available across urban centres
- **Napier grass is emerging as an additional feedstock**, owing to its high biomass yield, ability to grow on marginal lands, multiple harvest cycles,



Feedstocks Conversion Efficiency



Various Applications of CBG



Vehicular Fuel



Generate Electricity



Gas Pipeline for
Domestic
Households



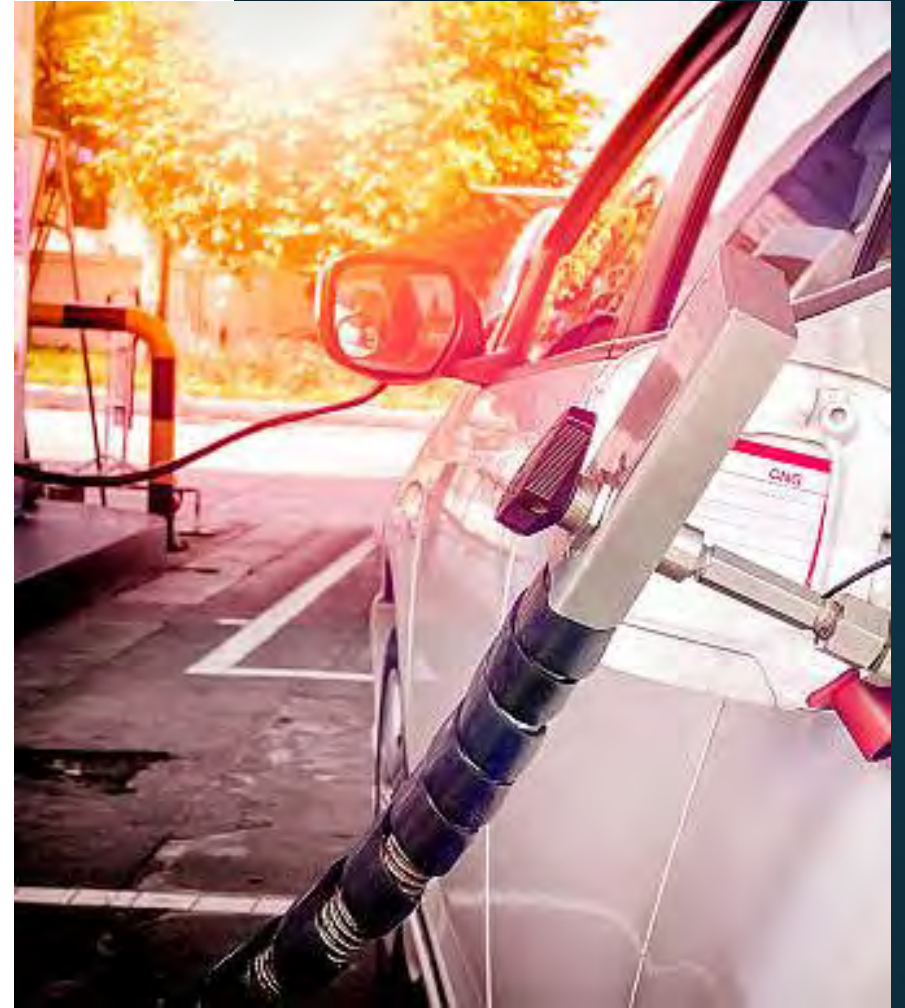
Commercial Use by
Eateries



Industrial Fuel

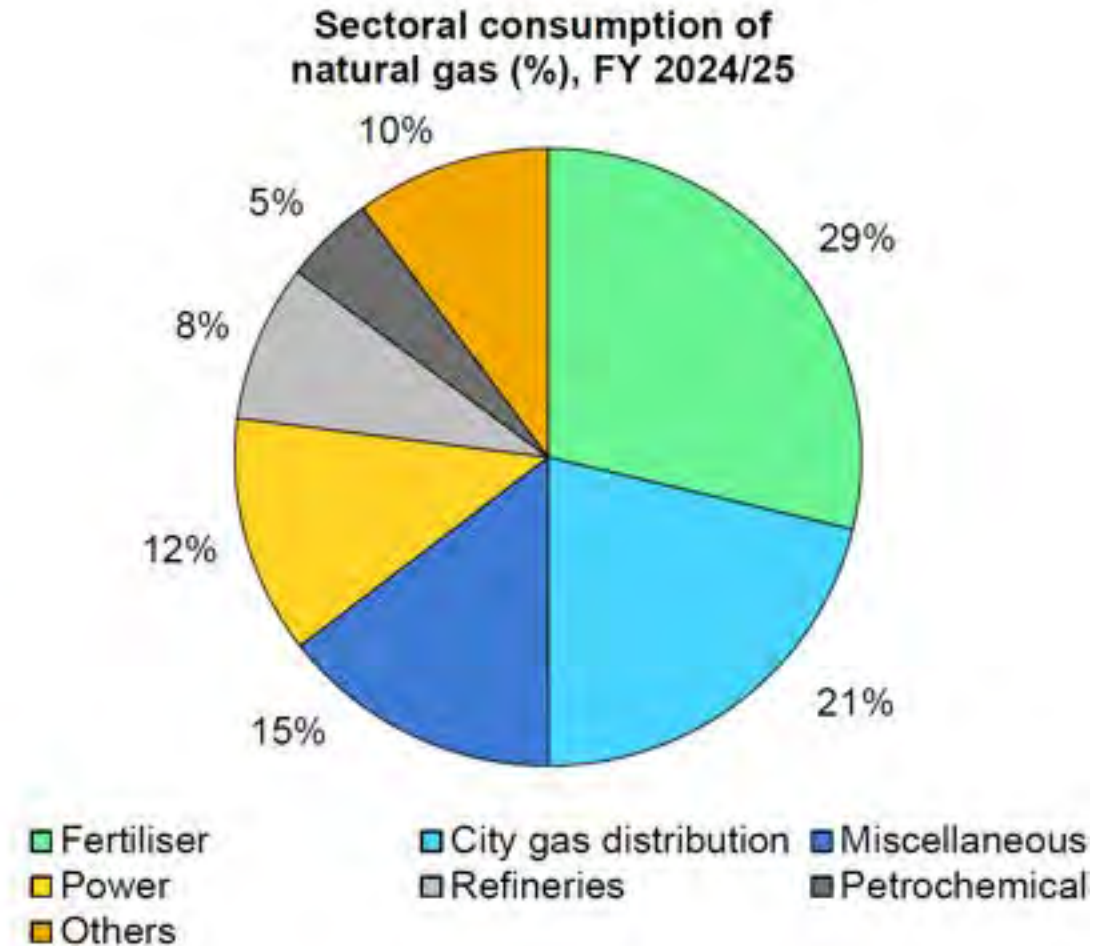


Feedstock for Green
Hydrogen



Natural Gas Demand & Emerging CBG Opportunity

- ~50% of natural gas consumption, led by **fertilizers** (29%), refineries (8%) and petrochemicals (5%)
- **CGD networks account for ~21%** of national gas consumption, serving domestic, transport, commercial and industrial segments
- **Rising industry interest:** Driven by voluntary decarbonization commitments and focus on lowering emissions intensity
- Government targets increasing gas share in energy mix from **6.7% to 15% by 2030**
- **CBG Blending Obligation (CBO):** Mandates phased CBG blending in CGD networks: 1% (FY26), 3% (FY27), 4% (FY28), scaling to 5% from FY29 onwards

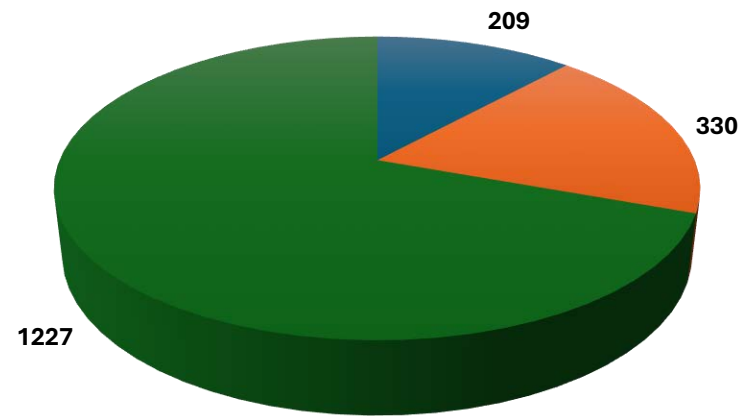


Biogas Current Scenario

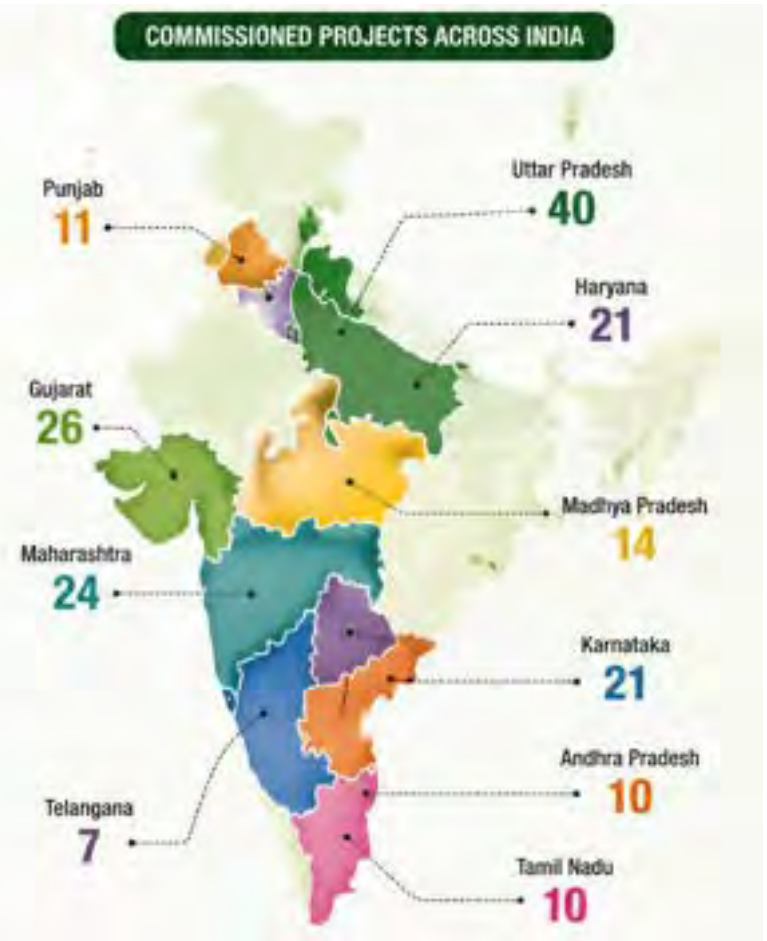
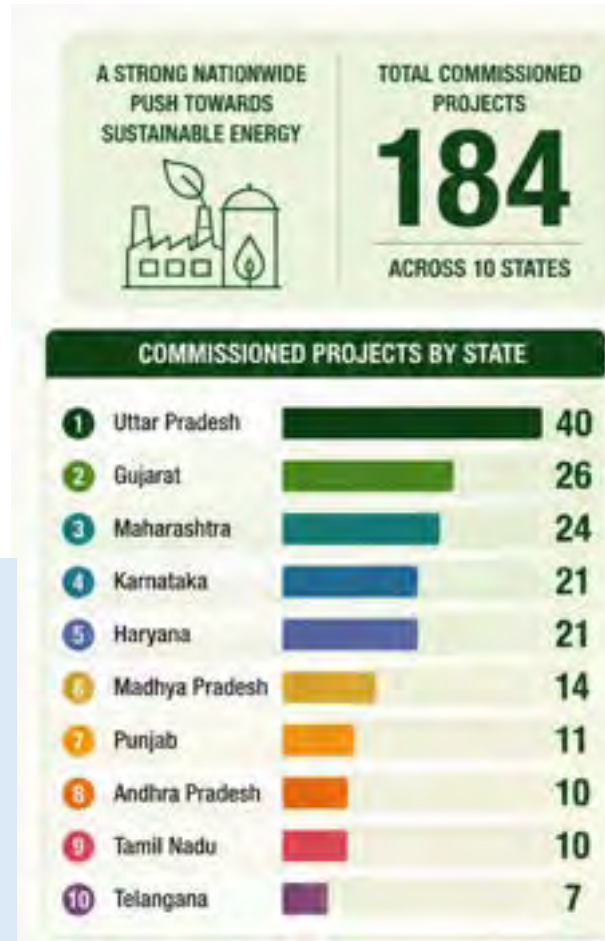
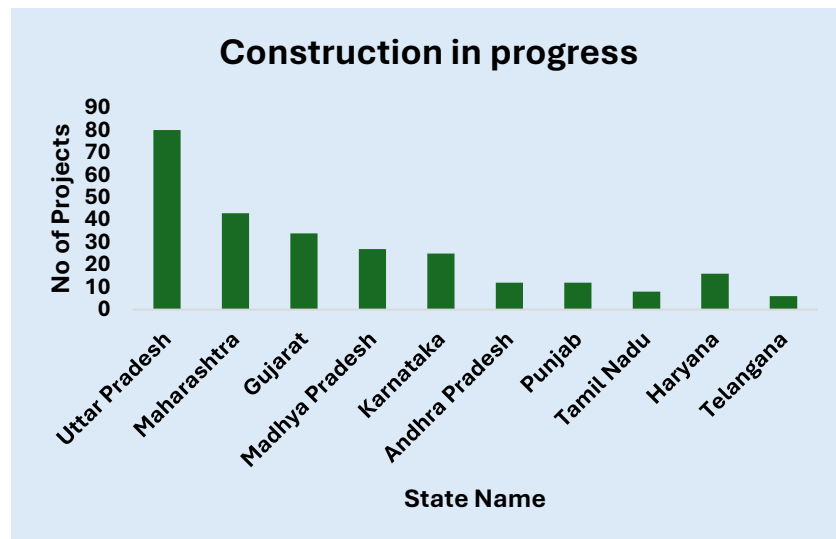
- Over 5.1 million small biogas plants installed since 1981, primarily for clean cooking in rural households.
- Annual installations have declined sharply from ~168,000/year (1980s–90s) to ~15,000/year since 2020.
- ~82% of plants are over 15 years old, with only ~7% installed in the last decade.
- Only ~500,000 plants are currently functional, with average utilization at ~35%.
- Plants often stop operating within ~6 years due to technical issues and poor maintenance
- Small plants contribute ~643 million cubic meters/year of biogas.
- 361 medium & large plants (~11.5 MW capacity) supported by MNRE, mainly for off-grid power and heat.



CBG Present Landscape



■ Commissioned ■ Under Construction ■ Yet to Start Construction



Ministries Involved

Primary Ministry



Secondary Ministries



Associated Ministries



CBG Supportive Policies

- Sustainable Alternative Towards Affordable Transportation (SATAT)
- Waste to Energy Scheme
- Market Development Assistance (MDA)
- Biomass Aggregation Machinery (BAM)
- CBG-CGD Synchronization Scheme
- Development of Pipeline Infrastructure (DPI)
- Special Assistance to States for Capital Investment (SASCI) 2026-27
- State Specific Incentives



SATAT Scheme

- **Launch Date and Year:** 1 October 2018
- **Concerned Ministry:** Ministry of Petroleum and Natural Gas (MoPNG)
- **Support Area:** Gas Offtake
- **Key Highlights:**
 - To achieve a production target of 15 million tonnes of CBG by 5,000 plants across India
 - Assurance of CBG offtake at a fixed procurement price from the plants by Oil and Gas Marketing Companies
 - Pricing linked to CNG Retail Selling Price (RSP) to ensure market parity. Market-based pricing at ~85% of CNG RSP. Floor price of ~₹46/kg (excl. taxes) secured till ~2029 to ensure project viability



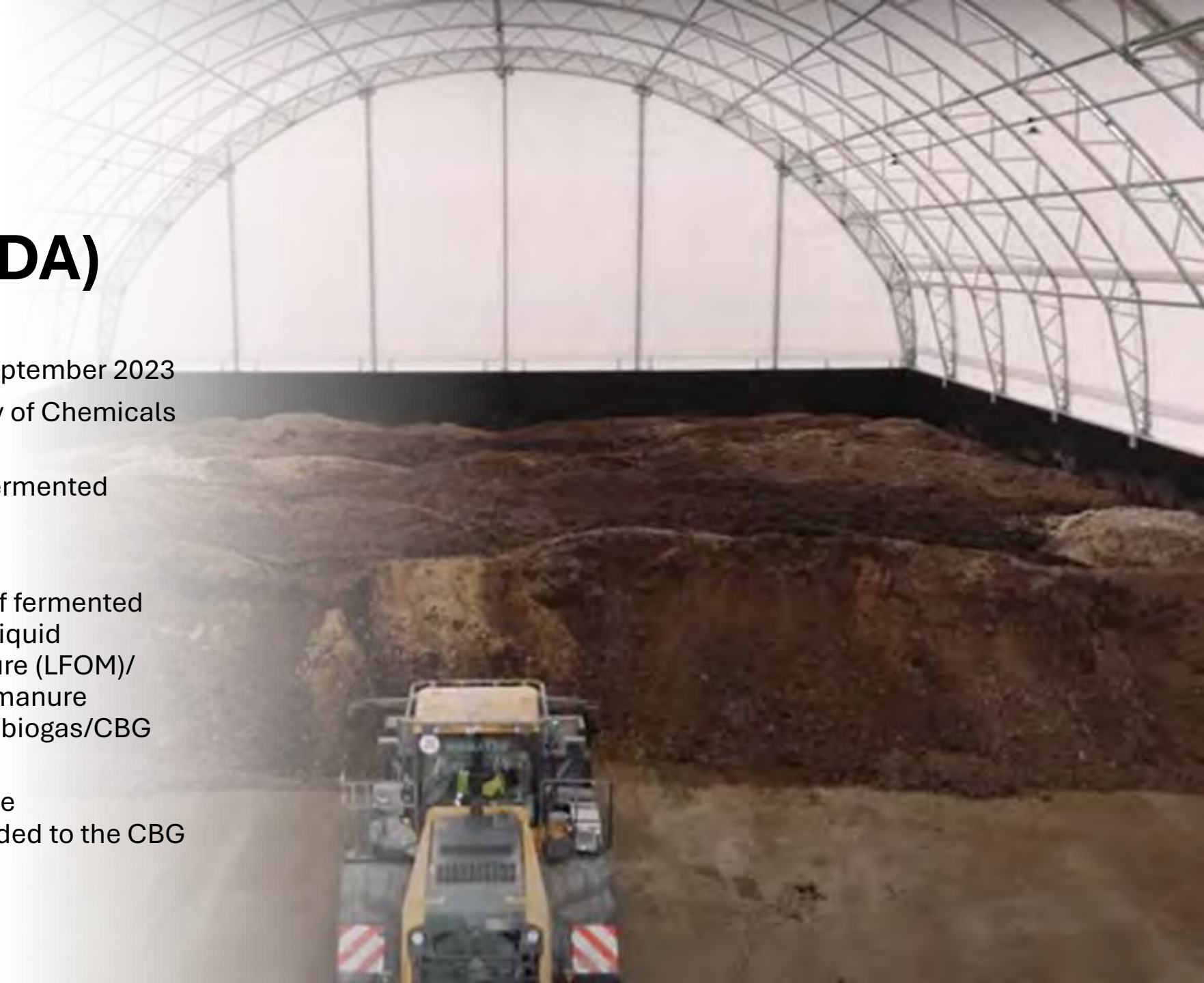
National Bioenergy Programme (Waste To Energy)

- **Launch Date and Year:** 2 November 2022
- **Concerned Ministry:** The Ministry of New and Renewable Energy (MNRE)
- **Support Area:** Incentive on Plant CAPEX
- **Key Highlights:**
 - Facilitate establishing projects that convert urban, industrial and agricultural waste/residues into CBG
 - CBG project developers are eligible to receive Central Financial Assistance (CFA) of Rs 4 crore for new CBG plants with a capacity of 4,800 kg/day and Rs 3 crore for existing plants with 4,800 kg/day capacity of CBG production.
 - Maximum CFA of Rs. 10.0 Cr/project for both cases



Market Development Assistance (MDA)

- **Launch Date and Year:** 20 September 2023
- **Concerned Ministry:** Ministry of Chemicals and Fertilizers
- **Support Area:** Incentive for fermented organic manure (FOM)
- **Key Highlights:**
 - Scheme for promotion of fermented organic manure (FOM)/ liquid fermented organic manure (LFOM)/ Phosphate rich organic manure (PROM) produced in the biogas/CBG units
 - MDA @Rs 1500/ton of the FOM/LFOM/PROM provided to the CBG producers



Biomass Aggregation Machinery (BAM)

- **Launch Date and Year:** 2 February 2024
- **Concerned Ministry:** Ministry of Petroleum and Natural Gas (MoPNG)
- **Support Area:** Incentive on biomass aggregation machinery
- **Key Highlights:**
 - Support biomass collection for the initial 100 biomass-based CBG plants by providing financial assistance to CBG producers for procurement of biomass aggregation machinery
 - A maximum financial assistance of 50% of the procurement cost of biomass aggregation machinery or Rs. 90 lakh per set (whichever is less).
 - All the existing and upcoming CBG projects using at least 50% biomass (Agri residue) as feedstock and have an installed CBG production capacity of at least 2 TPD are eligible to avail the assistance



CBG-CGD Synchronization Scheme

- **Launch Date and Year:** 26 October 2021
- **Concerned Ministry:** Ministry of Petroleum and Natural Gas (MoPNG)
- **Support Area:** Integrates CBG into City Gas Distribution (CGD) networks for CNG/PNG use
- **Key Highlights:**
 - Enable seamless offtake of CBG produced from plants by connecting them directly to the existing City Gas Distribution (CGD) grid.
 - **GAIL (India) Limited** operates the scheme, allowing CBG to be commingled with natural gas at the Uniform Base Price (UBP).
 - The scheme now includes direct injection of compressed biogas into the gas pipeline network, and is extended until **December 31, 2047**

The National Biofuels Coordination Committee approved a Mandatory Blending Obligation (CBO) to start in FY 2025-26:

FY 2025-26: 1%

FY 2026-27: 3%

FY 2027-28: 4%

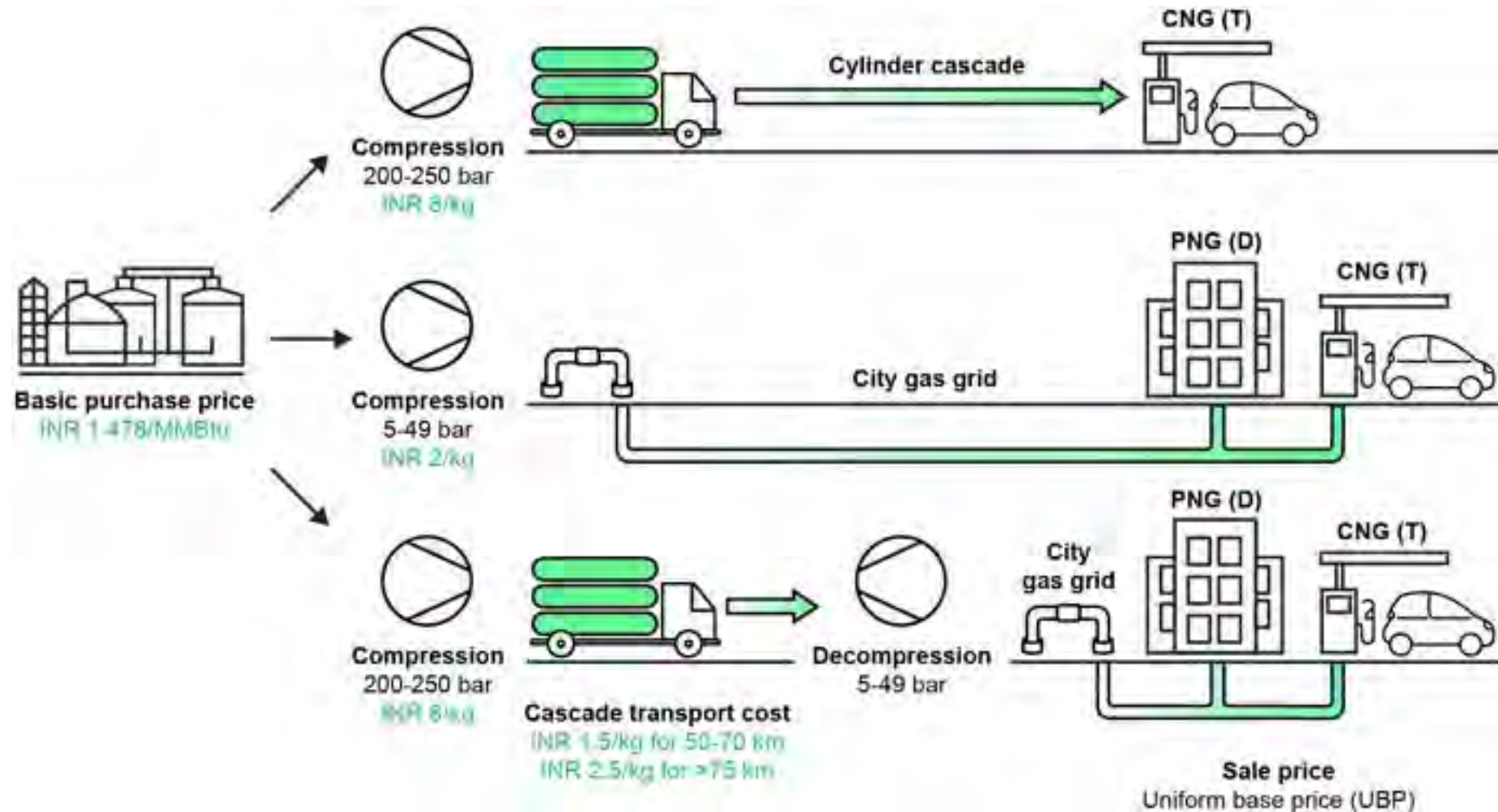
FY 2028-29 onwards: 5%

Development of Pipeline Infrastructure (DPI)

- **Launch Date and Year:** 26 June 2024
- **Concerned Ministry:** Ministry of Petroleum and Natural Gas (MoPNG)
- **Support Area:** Incentive on pipeline infrastructure until 2028-29
- **Key Highlights:**
 - Financial Assistance for laying of pipeline (Steel/MDPE) up to 50 Km provided @ 50% of the project cost or Rs. 0.5 crore per km, whichever is less
 - In case of connectivity where only MDPE pipeline is used the FA shall be restricted to 50% of project cost or 0.075 crores per km whichever is lower
 - FA would be allowed for pipelines up to 75 Km. (Steel/ MDPE) and upper ceiling for FA for pipeline would be Rs. 28.75 crore per project

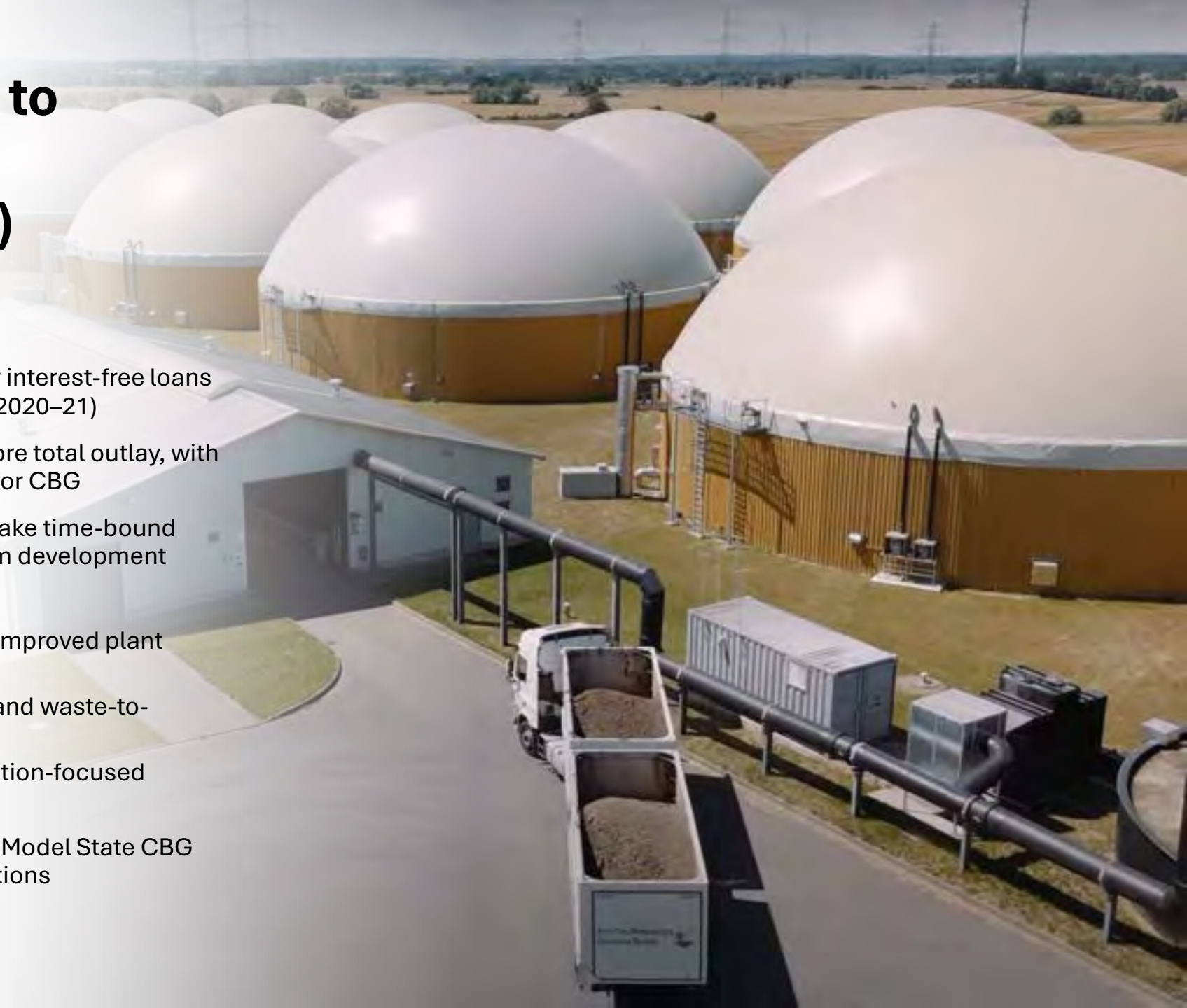


CBG Offtake Models and Pricing



Special Assistance to States for Capital Investment (SASCI) 2026-27

- **Long-Term Financial Support:** 50-year interest-free loans provided to States under SASCI (since 2020–21)
- **Significant Allocation:** Rs 2,00,000 crore total outlay, with Rs 3,000 crore earmarked specifically for CBG
- **Objective:** Incentivize States to undertake time-bound reforms and accelerate CBG ecosystem development
- **Key Focus Areas:**
 - Faster project commissioning & improved plant utilization
 - Strengthening feedstock supply and waste-to-energy convergence
 - Building an investor-ready, execution-focused ecosystem at State level
- **Policy Push:** MoPNG has introduced a Model State CBG Policy to guide and align State-level actions



Existing State Bioenergy Policies

State	Name of the Policy	Duration	Capital Subsidy
Andhra Pradesh	Integrated Clean Energy Policy	2024 - 2029	20% Capital subsidy , up to Rs 1 Cr/TPD, disbursed over 5 years
Uttar Pradesh	Bioenergy Policy	2022 - 2027	INR 75 L per ton , up to Rs 20 Cr
Madhya Pradesh	Biofuel project promotion scheme/RE policy	2025 - 2030	Up to Rs 200 Crs can be provided and 50% assistance on infrastructure (up to 50 cr) can be given
Haryana	Bioenergy policy	2018 – Not Defined	100% exemption on transmission, cross-subsidy charges
Gujarat	Biotechnology (BT) Policy	2022 - 2027	25% of GFCI with a ceiling of Rs 40 Crores
Bihar	Biofuels production promotion policy	2023 - 2028	15% of the Cost of Plant and Machinery , up to Rs. 5 Crs
Rajasthan	Rajasthan Biomass and Waste-To-Energy policy	2023	25% of FCI , up to a maximum of Rs 50 Cr

An aerial photograph of a wastewater treatment plant. The image shows several large circular tanks. One tank in the center-left contains a thick, brown sludge layer. Another tank to its right is filled with dark, clear water. A third, smaller tank in the bottom-left corner contains green water. A central building with a flat roof and various pipes and structures is situated between the tanks. The surrounding area is a mix of dirt and grass.

Case Studies

Verbio AG, Sangrur, Punjab

- **Plant Start Date:** October 2022
- **CBG Production Capacity:** 33 TPD
- **Feedstock Used:** Paddy straw, maize straw, sugarcane trash
- **Daily Feedstock Requirement:** 300 TPD
- **Land Requirement:** 20 acres
- **Biogas Purification Method:** Amines (Chemical Based)
- **Gas Offtake Method:** Dispensed at Nearby CNG Pumps using Cascades (13 ROs)
- **Plant Cost:** INR 230 cr (155 million DKK)
- **Challenge:**
 - No gas pipeline in vicinity. Complete gas offtake is a challenge
- **Innovative Practices**
 - Advanced crop residue aggregation machinery
 - Strong connect with nearby farmer community with digital assets
 - Retrofitted the in-house transportation vehicles and gas delivery trucks to utilize CBG as fuel





FOM Production



CBG Offtake Through Cascades



Paddy Straw Bails (400 Kg each)



Inhouse Farm Equipments for Feedstock Procurement

Mittal Enterprises, Garhmukteshwar, Uttar Pradesh

- **Plant Start Date:** Jan 2023
- **CBG Production Capacity:** 8 TPD
- **Number of Digesters:** 2
- **Feedstock Used:** Pressmud
- **Daily Feedstock Requirement:** 200 TPD
- **Land Requirement:** 4 acres
- **Biogas Purification Method:** Water Scrubbing Technology
- **Gas Offtake Method:** Agreement with CGD entity (IGL) for complete offtake
- **Digestate Production:** 33 tons solid, 40,000 L liquid
- **Plant Cost:** INR 26 cr (17.5 million DKK)
- **Challenge:**
 - Marketing and monetizing liquid digestate remains difficult
 - The water scrubbing system consumes significant electricity and generates substantial volumes of wastewater
 - Rising annual costs of pressmud (input feedstock) are impacting operations
 - Inconsistent CBG output due to inadequate scientific process control and limited availability of skilled manpower





Solid Liquid Separator



Water Scrubbing Column

Indian Potash Limited

- **Name:** Indian Potash Limited
- **Location:** Uttar Pradesh, India
- **Installation Date:** October - 2020
- **Production Capacity:** 10 TPD
- **Feedstock:** : Pressmud (Sugar Industry Waste)
- **Feedstock Requirement:** 300 TPD
- **Application Area:** Gas produced is used as a vehicular fuel using cascades
- **Innovative Practice:** Solid and liquid digestate produced at the plant are enriched with other nutrients and marketed in different forms to farmers





Hingonia Cow Shelter, Jaipur, Rajasthan

- **Plant Start Date:** Jan 2023
- **CBG Production Capacity:** 6 TPD
- **Number of Digesters:** 2
- **Feedstock Used:** Cattle waste
- **Daily Feedstock Requirement:** 300 TPD
- **Land Requirement:** 5 acres
- **Biogas Purification Method:** Pressure Swing Adsorption
- **Gas Offtake Method:** Gas Grid to Akshaya Patra foundation kitchen to prepare meals for children; in cascades to nearby industry
- **Plant Cost:** INR 38 cr (26 million DKK)
- **Challenges:**
 - Thermophilic digesters were deployed; however, operating costs increased due to higher electricity consumption
 - Digestate monetization continues to be a challenge
 - Production yields fell short of expectations
 - CBG plants based on animal waste are comparatively less economically viable due to lower gas conversion efficiency compared to other feedstocks





Biogas Digesters

Purification Unit

GWMC and Hindustan Waste Treatment Pvt Ltd, Goa

- **Plant Start Date:** May 2016
- **Biogas Production Capacity:** 17000 m³/day
- **Three gas engines** (170 kilowatts, 600 KW, 600 KW): 1.37 MW of electricity daily
- **Feedstock Used:** Organic fraction of MSW
- **Daily Feedstock Requirement:** 150 TPD
- **Electricity Offtake Method:** 32 MW in a month (22-22 MW to grid at Rs 5/unit)
- **Digestate Production:** 35 tons (8 tons compost) @Rs 4/kg
- **Plant Cost:** INR 250 cr of the total integrated facility (*169 million DKK*)
- **GWMC pays INR 2209.6 + 18% GST to the plant operator** for treating 1 ton of waste
- **Innovative Practices:**
 - The Govt of Goa demonstrated **unwavering political will in forming** GWMC. The entity, which is distinct from municipalities, is headed by the chief minister of Goa
 - GWMC pays **Rs 2209.6 + 18% GST to the plant operator for treating 1 tonne of waste**
 - Due to a consistent **information, education and communication strategy** employed by GWMC, the level of waste segregation has shown significant improvement — rising from **60% in 2016 to an impressive 90% presently**
 - A **plant monitoring committee comprising bureaucrats from technical backgrounds** ensures regular monitoring and suggests solutions to operational challenges. Moreover, incentives tied to the plant's performance have been offered to motivate GWMC staff, encouraging dedication and efficiency.





Sainsons Paper Industries Pvt Ltd, Kurukshetra, Haryana

- **Plant Start Date:** 01-04-2023
- **Bio-CNG Production Capacity:** 3 TPD
- **Feedstock Used:** Paper Industry Effluent
- **Daily Feedstock Requirement:** 3500 KID
- **Land Requirement:** 3 acres
- **Biogas Purification Method:** vacuum pressure swing adsorption (VPSA) technology
- **Gas Offtake Method:** Cascades to nearby Retail Outlet
- **Plant Cost:** INR 16 cr (11 million DKK)
- **Innovative Practices**
 - Plant addresses the challenge of managing 3,500 kilolitres per day (COD 4,000-6,000 ppm) of effluent from the daily production of 350 tonnes of kraft paper
 - Recover 200 Kgs per day of sulphur during hydrogen sulphide purification, with potential applications in fertilizers
 - The energy required for the paper mill is sourced from a 9 MW biomass power plant, using agricultural and waste residues as raw materials. To generate 9 MW of power, approximately 400 tons of agricultural waste is needed daily, mainly consisting of paddy straw procured from within a 20 km radius.





Paddy Straw Feedstock



Kraft Paper



Digester



Purification Unit

Challenges & Opportunities

+

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○

- Limited availability of advanced feedstock pre-treatment technologies
- Inadequate solutions for efficient feedstock storage
- Poor waste segregation remains a key barrier for municipal waste utilization
- Operational challenges such as digester maintenance and foaming issues persist
- Lack of scientific advanced handy instruments for real-time monitoring of feedstock and digester performance
- Heavy reliance on CSTR digesters with limited adoption of alternative technologies like gasification/mixed feedstock technology
- Biogenic CO₂ is largely not captured or utilized
- Absence of high-purity gas upgrading systems, with dependence on PSA technology
- Bio-LNG production remains largely untapped
- Limited digestate upgrading solutions and weak monetization of liquid digestate
- Plants are not yet developed as integrated biorefineries
- Wastewater as a potential feedstock remains largely underutilized.



Thank You



**MINISTRY OF FOREIGN AFFAIRS
OF DENMARK**
The Trade Council

The Trade Council in India

An overview on the Energy Sector

agenda

- Green Strategic Partnership and Indo-Danish Energy Partnership
- Focus Sectors in Energy
- Trade Council – The New Economic Diplomacy Department
- Case Stories in India
- Activities in 2026



the green strategic partnership between India & Denmark

Signed September 28, 2020

- State visit by Prime Minister of Denmark, H.E. Mette Frederiksen to India October 9-11 2021.
- Prime Minister of India H.E. Shri. Narendra Modi on official visit to Denmark May 3-4 2022.
- The Comprehensive Green Strategic Partnership will be a continuation to the current GSP from 2026.

Green Strategic Partnership focus

- Energy and Climate change, Environment/Water and circular economy
- Sustainable Urban Development including Smart Cities
- Business, Trade, and Shipping
- Science, Technology, Innovation, and Digitization
- Food and Agriculture
- Health and Life Sciences
- Cultural Cooperation, People-to-People contacts, and Labour mobility
- Multilateral Cooperation

INDEP

- G2G cooperation strengthening cross-sectoral energy planning with a focus on offshore wind, system integration, long term planning, and Power-to-X.

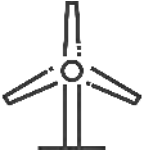
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*DENMARK HAS THE SKILLS
INDIA HAS THE SCALE*

Indian Prime Minister **Narendra Modi** during meeting in India with Danish Prime Minister Mette Frederiksen - January 18 2019



Focus Sectors in Energy



- **Wind power** India's renewable energy is progressing at scale with more than 60% of electricity generated is being from renewable sources. Wind contributes to 66 GW of electricity primarily from onshore but India is also considering offshore due its CUF.



- **Power to X** The current Green Hydrogen and Ammonia off-take tenders in India have achieved major benchmarks globally and the pace at which the sector is progressing favours BoP technology providers a edge to the key projects



- **Bio-energy** The bioenergy industry is the emerging sector in the green energy transition – offering lucrative opportunities for international companies that are looking to co-develop and produce the Bio energy projects.



- **Energy Efficiency** India's energy transition has entered a decisive phase where the focus is shifting from capacity expansion to achieving Energy efficiency (EE) across industries, transport, buildings, utilities, and municipalities offering immediate, cost-effective pathways for reducing emissions and improving competitiveness



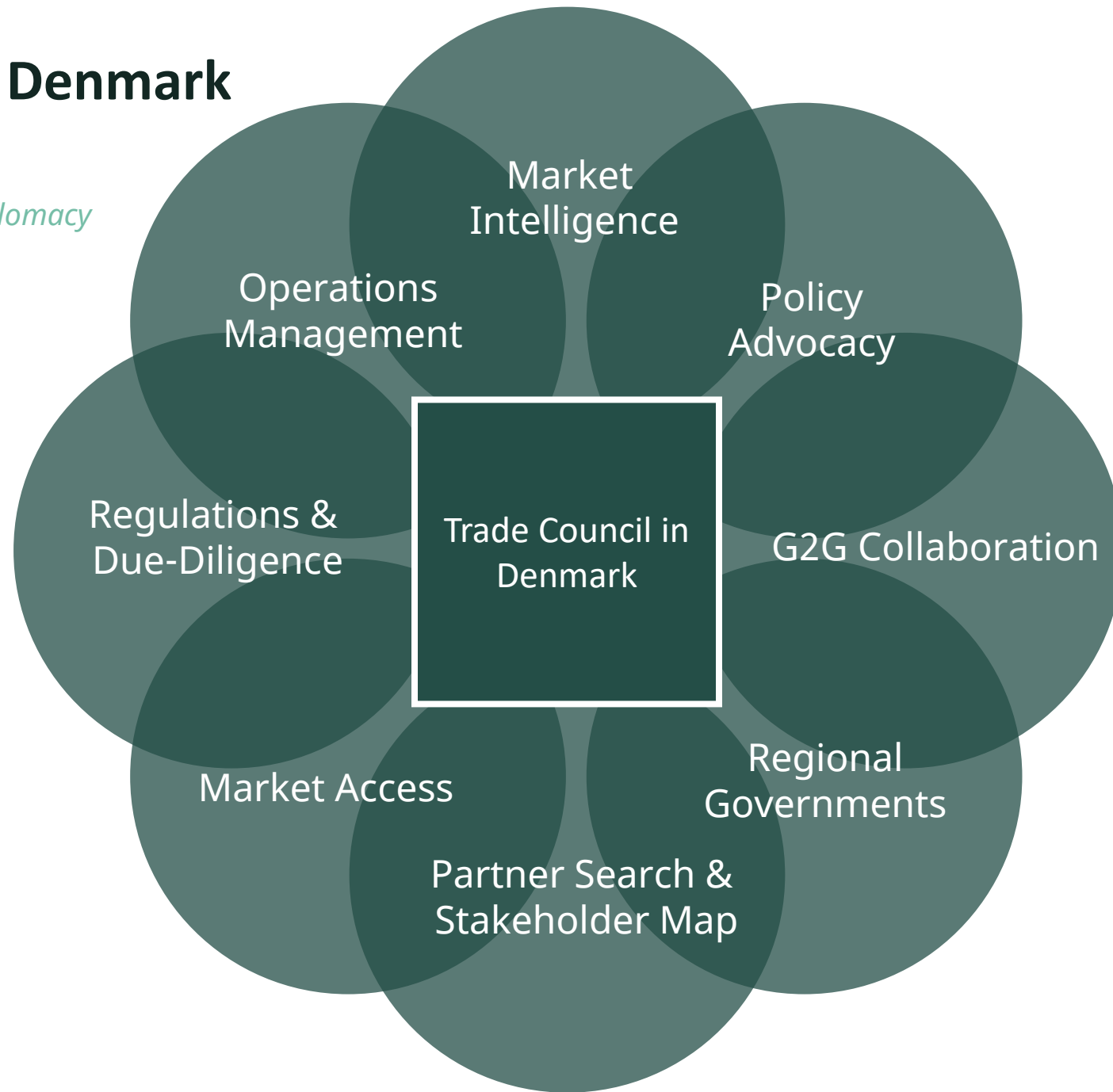
- **Data centres** India's data centre sector is experiencing exponential growth, driven by digital transformation, AI workloads, and 5G rollout. Projections indicate a significant increase in data centre capacity from 1.5 GW in 2025 to 8-10 GW by 2030



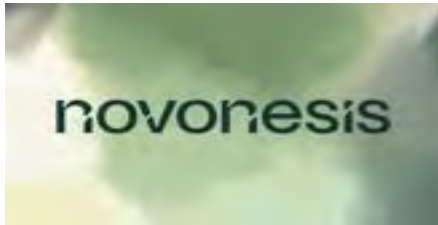
- **Carbon Capture, Utilisation, and Storage (CCUS)** Clear policy goals from 2026, government funding, and a research and administrative infrastructure in place

Trade Council of Denmark in India

The Pathway for Economic Diplomacy



Case Studies in India for Green Fuels



Novonesis (formerly Novozymes) is the world's largest producer of industrial enzymes and microbial solutions. In the biogas/CBG sector, Novonesis supplies an enzyme 'toolbox' and specialised microbial strains, that accelerate anaerobic digestion of agricultural, food and organic waste. This in turn boosts biogas output, cutting retention time, and improving digester efficiency for CBG plant operators across India.



BWE is a Danish engineering company with 180+ years of heritage. They specialise in biomass and waste-to-energy boiler systems. For the biogas and bioenergy sector, BWE designs and supplies complete 'boiler islands'. These include, air pre-heaters, burners and DeNOx systems. Their deep expertise in high-efficiency straw and agri-residue firing, makes it a key technology partner for large bio-energy plants in India.



Mash Makes started as a project on the Technological University of Denmark centered around technology that could convert various waste streams (mainly residue biomass) into different energy products. The technology from Mash Makes can convert shells from cashew nuts into valuable commodities such as Biochar and Biofuels. Today Mash Makes potential of becoming a main driver in the future energy mix.



Jwala Bioenergy ApS is a project developer platform mobilizing technology, capital and knowhow to develop biogas projects in India, focusing on production of upgraded biogas at scale from agricultural wastes for blending in the local City Gas Distribution (CGD) grids and for global exports as bioLNG. Jwala Bioenergy is developing 2.5 MILLION NM3/YR BIOMETHANE PROJECT PUNJAB, INDIA.

BIOGAS Activities in India - 2026

Biogas Activities in India	
Month	Activity
August 25 th	Virtual Roundtable with Danish and Indian Companies
October	Biogas Delegation to India – 5 days
November	Virtual Roundtable with Indian Government and Danish stakeholders

Draft Delegation Program	
Day	Activity
October 6 th	Site visit to CBG plant in Uttar Pradesh
October 7 th – Fore Noon	Roundtable Sessions with Biogas companies
October 7 th - Afternoon	Interaction with - Ministry of Petroleum and Natural Gas - Ministry of New and Renewable Energy
October 8 th	World Biogas Association Congress
October 9 th	World Biogas Association Congress



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the report



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Questions?

Contact:

Prithvi Sai Penumadu – Adviser Energy | E-mail: pripen@um.dk | Mob: 9740500418

Girisha Arora – Adviser Water | E-mail: giraro@um.dk

EXPORT

Next presentation 13.40 pm



The Nordic biogas markets

*Sales Director Karsten Hjorth, Lundsby
Renewable Solutions*

and

CEO Anders Damgaard Nielsen, Assentoft Silo

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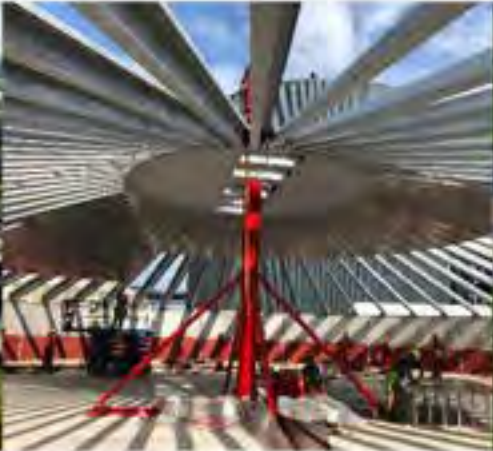


The Nordic biogas markets



assentoft silo

LUNDSBY
RENEWABLE SOLUTIONS



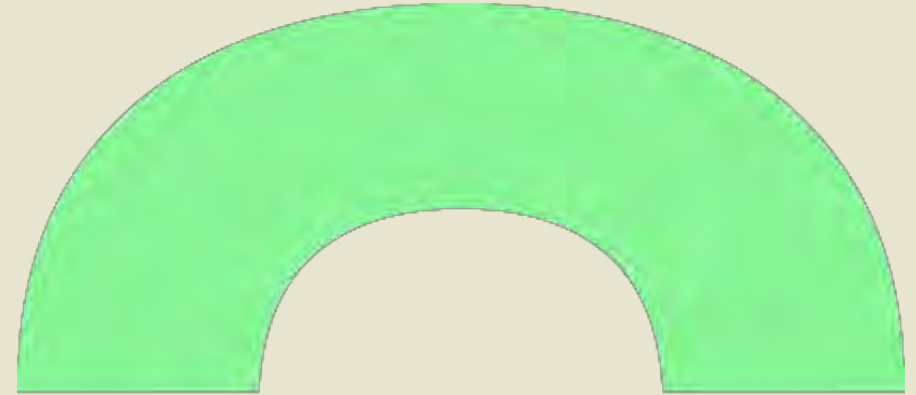
WE BUILD

Biogas plants

**Based on quality
and 30 years of
experience**

WE ARE

a leading solution provider in
EPC turnkey projects



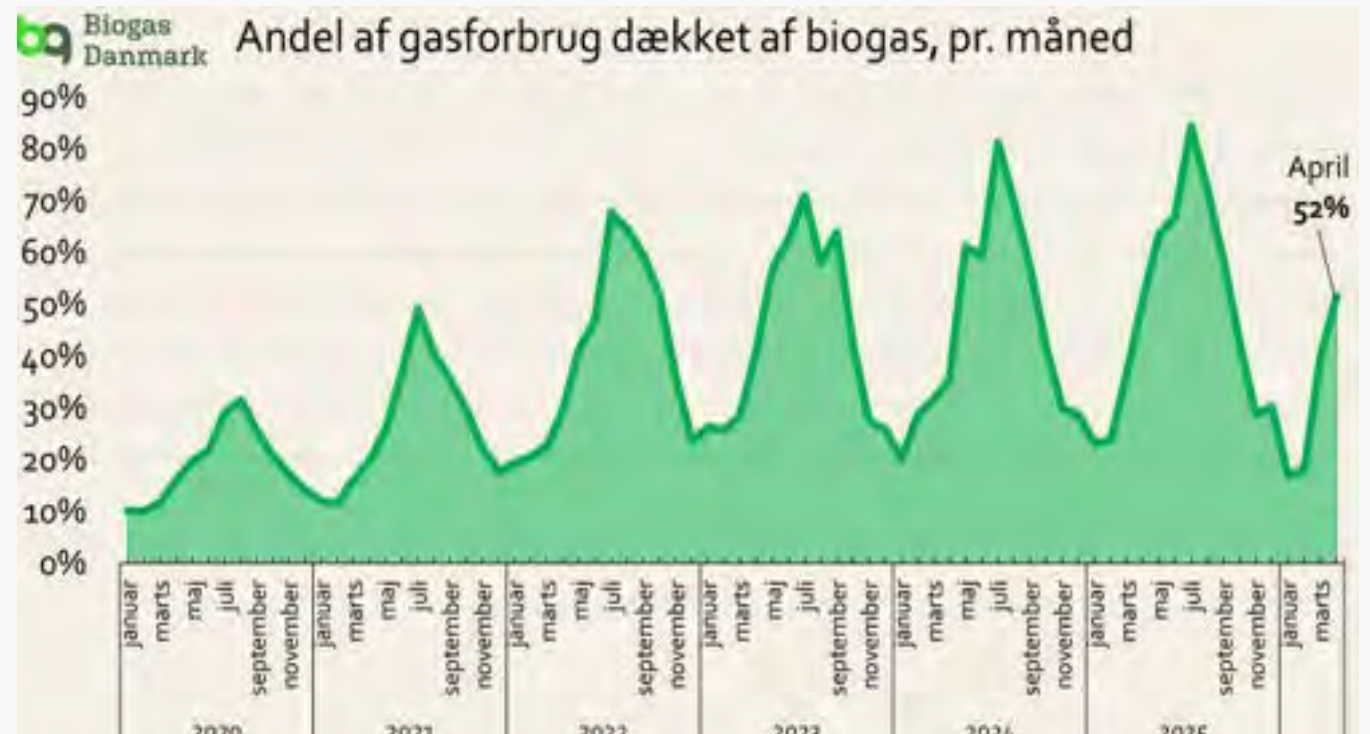
The Nordic Region as a Biogas Hub

Strong Ambitions,
Diverse Markets



Denmark as a pioneer

- Approximately 40% of gas consumption is currently covered by biomethane
- The goal is to have 100% biogas in the gas grid by 2035



Graf fra Biogas Danmark

Danish subsidy program drove growth

- Production subsidies introduced in 2012
- Focus on operating subsidies rather than capital subsidies





The expansion has come to a halt

- The subsidy program effectively ended in 2018
- Last major project completed in 2025:

Tønder Biogas
– one of Europe's
largest biogas plants

Energy has become a matter of security policy





Sweden as an engine of growth

- Production support + Klimatklivet grants
- Supports biomethane and LBG production
- Reduces CAPEX for new projects
- Linked to CO₂ reduction

The Next Wave of Nordic Markets

Finland

- Growing market
- Focus on circular value chains and transport fuels
- Long geographical distances and dispersed biomass





The Next Wave of Nordic Markets

Norway

- Support through Enova
- High interest, smaller project sizes
- Small farms and a fragmented biomass supply

What have we learned?

- Political frameworks drive market development
- Cultural understanding is important—even in the Nordic region
- Partnerships and suppliers are crucial





- **Family-owned since 1940**
- **Active in biogas since the 1980s**
- **Specialists in tank solutions**
- **Design, production and installation**
- **Focused on tank technology**

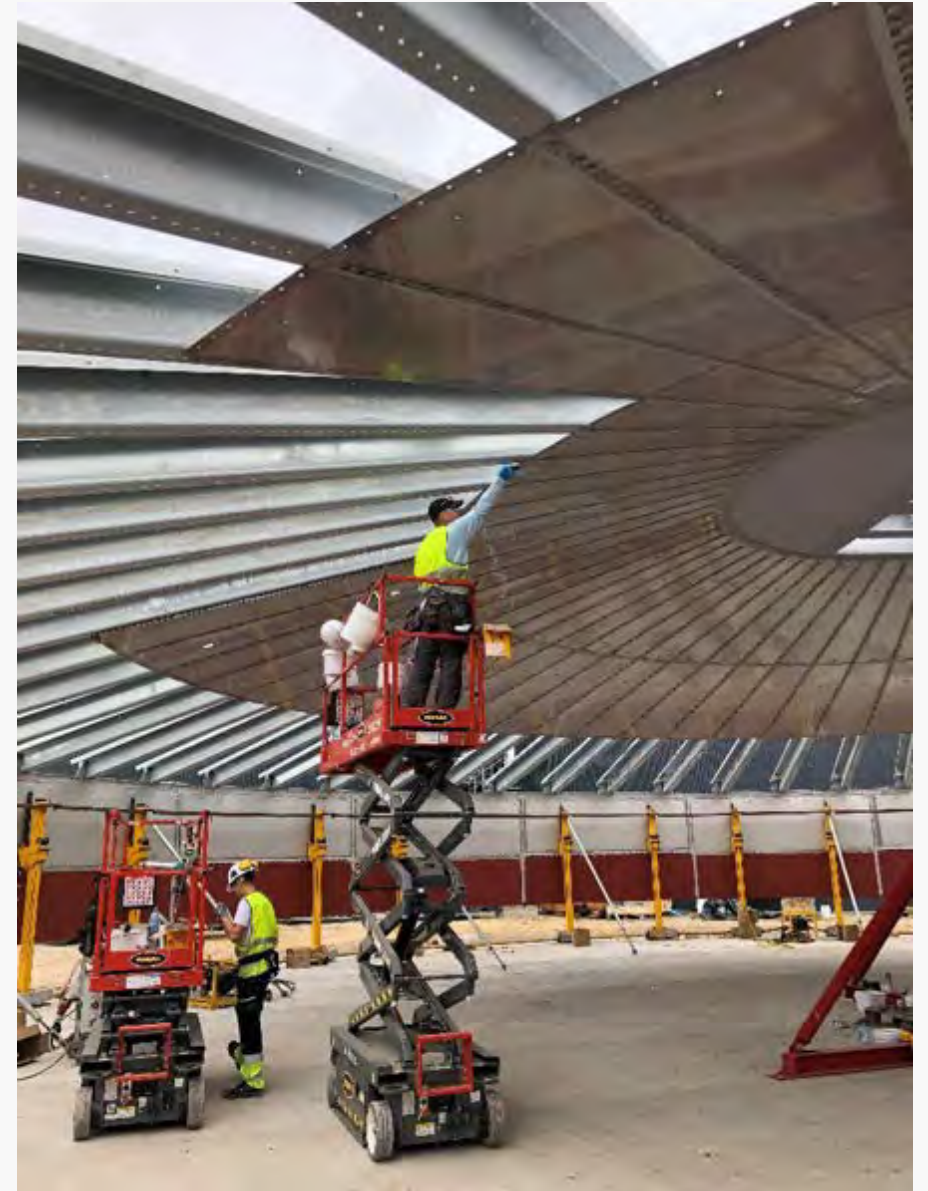


Main Focus Areas

- Biogas is our primary market
- Also serving agriculture and industry

Production Setup

- Danish production and supply chain
- Manufacturing through own facilities and close partners



Client Segments

- EPC contractors
- In-house developers
- Farm-based plants
- Wastewater facilities

Design Approach

- Client requirements
 - our expertise

Industry Position

- Close client collaboration
- Mature Danish biogas industry



The Scandinavian Markets

Denmark

- In-house developers
- Farm-based plants
- Wastewater facilities

Sweden

- Large-scale projects
- Structured project development
- Heavy EPC/consultant involvement



The Scandinavian Markets

Norway

- Growing in-house expertise
- Oil & gas mindset influences projects
- Strong subsidy opportunities

Finland

- Emerging market
- Driven by large-scale investors



NEXT



Break

2.10 pm to 2.40 pm

Biogas for Eastern Europe and the colours of hydrogen
Next presentation 2.40 pm



Poland, the Czech Republic, Slovakia and Romania as biogas markets

CEO Morten Gyllenborg, Renew Energy

Biogas for Eastern Europe and the colours of hydrogen
Next presentation 3.10 pm



Colors of Hydrogen – Does It Have to Be Fully Green?

*Partner & Associate Director Mogens Holm,
Boston Consulting Group*

Low-carbon Hydrogen

Import and sector coupling in Europe

Grønne Gasdage

MAJ 2026

Presenter



Mogens Holm

Partner

Copenhagen

Holm.mogens@bcg.com

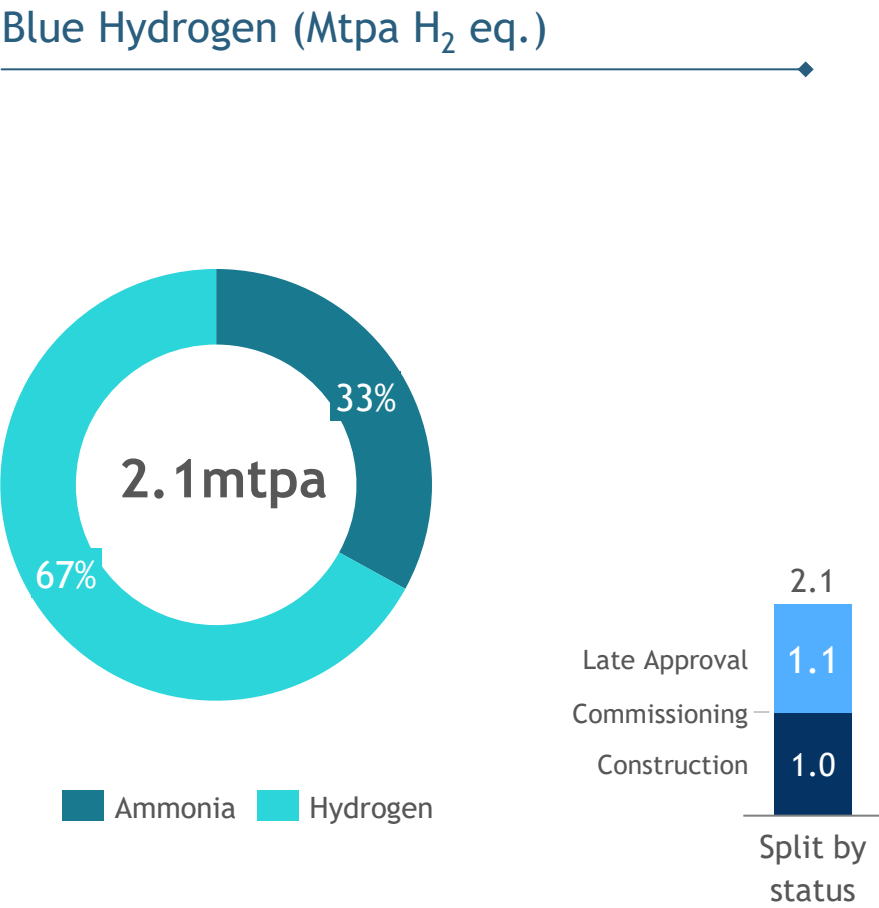
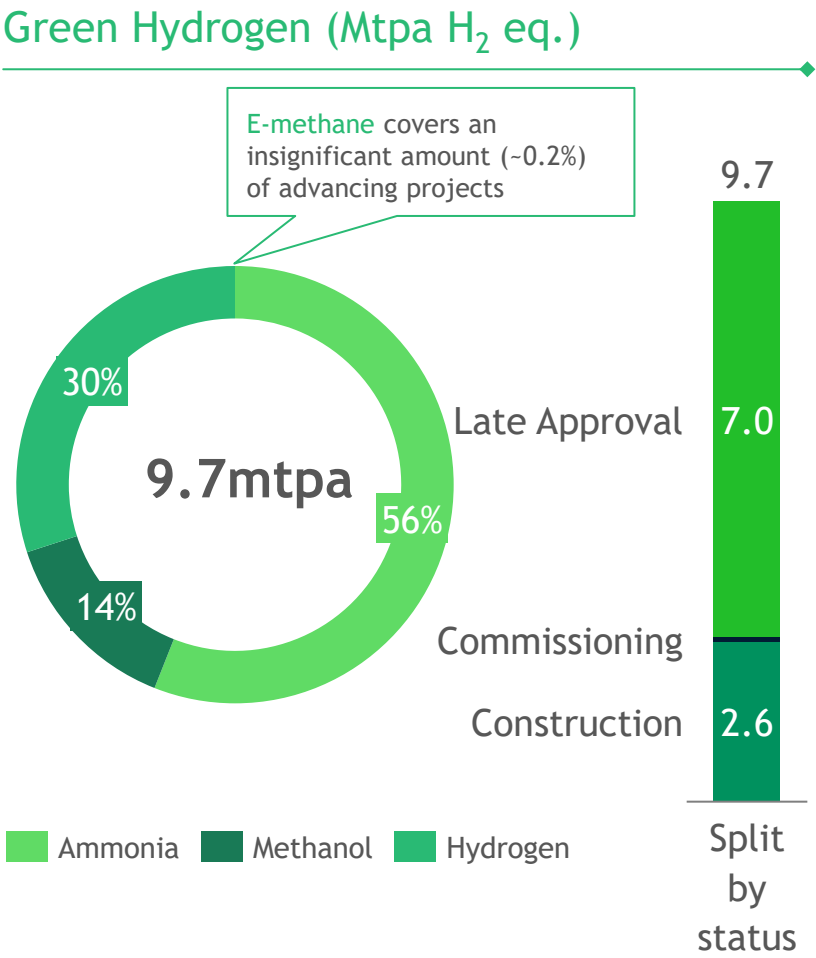
+45 29 69 69 72

AGENDA

**Will imported
low-carbon
hydrogen
dominate
Europe?**

**Can different
technologies
complement
each other?**

Current Momentum: More than half of all advanced and in-construction low-carbon hydrogen projects for 2030 will actually produce ammonia

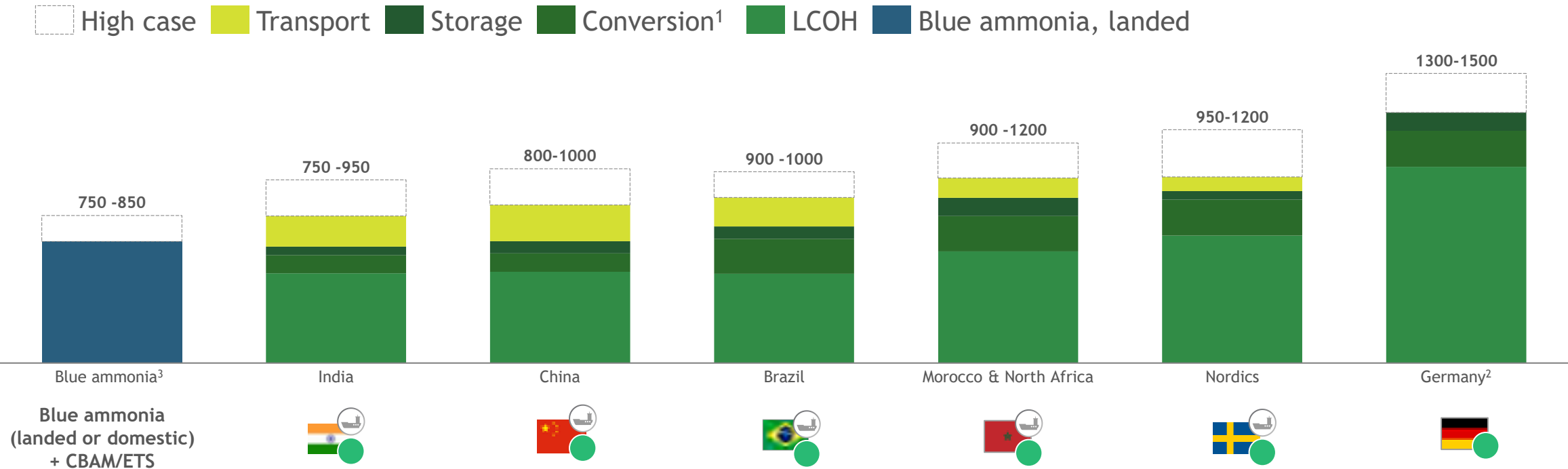


Note: Advanced projects and in construction; doesn't include active/completed. "Air Product Ascension Parish" blue project (0.65 Mtpa) on-hold from May 2025 included in "Late approval" and "Exxon Baytown" (0.9 Mtpa) not included. Source: GlobalData - December 2025; BCG analysis

RoW producer reaction derivatives: Asia has the potential to become a credible cost and volume leader in export of green molecules by 2030

Ammonia landed costs in EU (Hamburg, Germany)

Green Ammonia LCOA €/ton NH₃, 2030

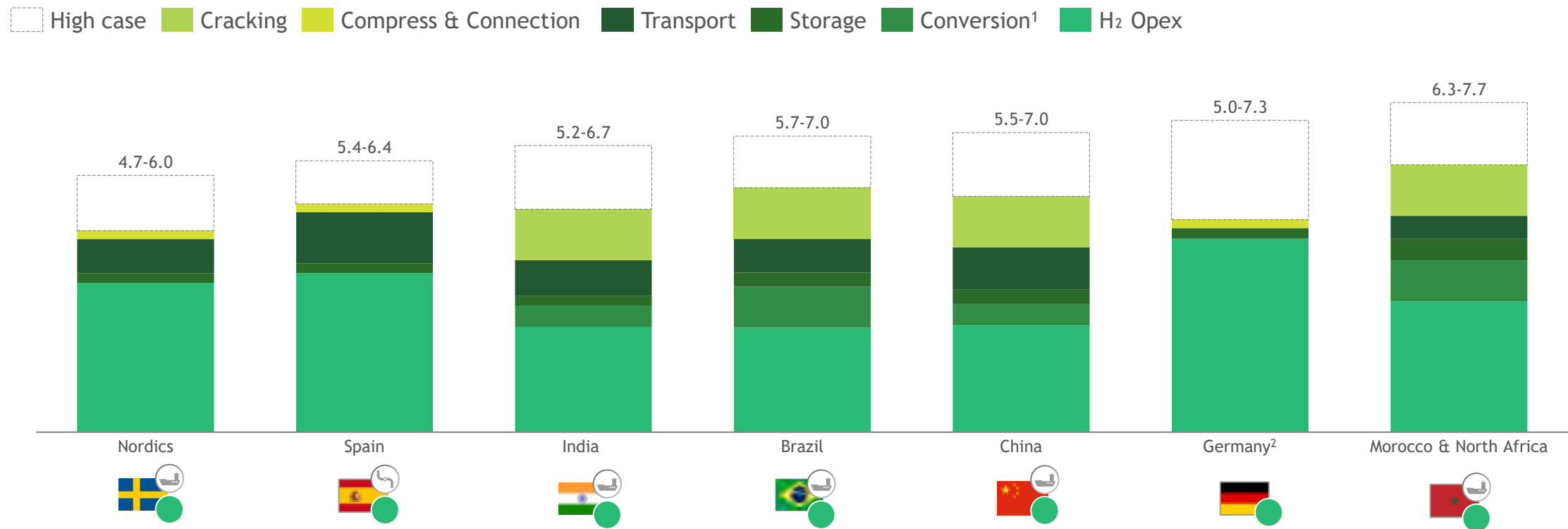


1. Rep. figures in conversion for large scale plants, depending on plant size and market scalation, could be higher; 2. In Germany low range for onshore & large range for offshore wind, with ammonia plant co-located with hydrogen production, included buffer storage of H₂ & storage of NH₃; 3. Range incl. CBAM & RED III both for local/imported blue ammonia excl. US IRA
Note: For each country, owned RES assumed; estimated WACCs; shipping distance calculated from port of Hamburg & incl. 500km of truck/pipeline transport; Conversion used 0.191 H₂/NH₃ | Source: BCG H₂COST Model and BGC Hydrogen Logistics Model 2025; BCG analysis

RoW producer reaction H2: If cracking scale and demonstrate competitiveness, Asia landed H2 in EU is competitive vs. domestic production

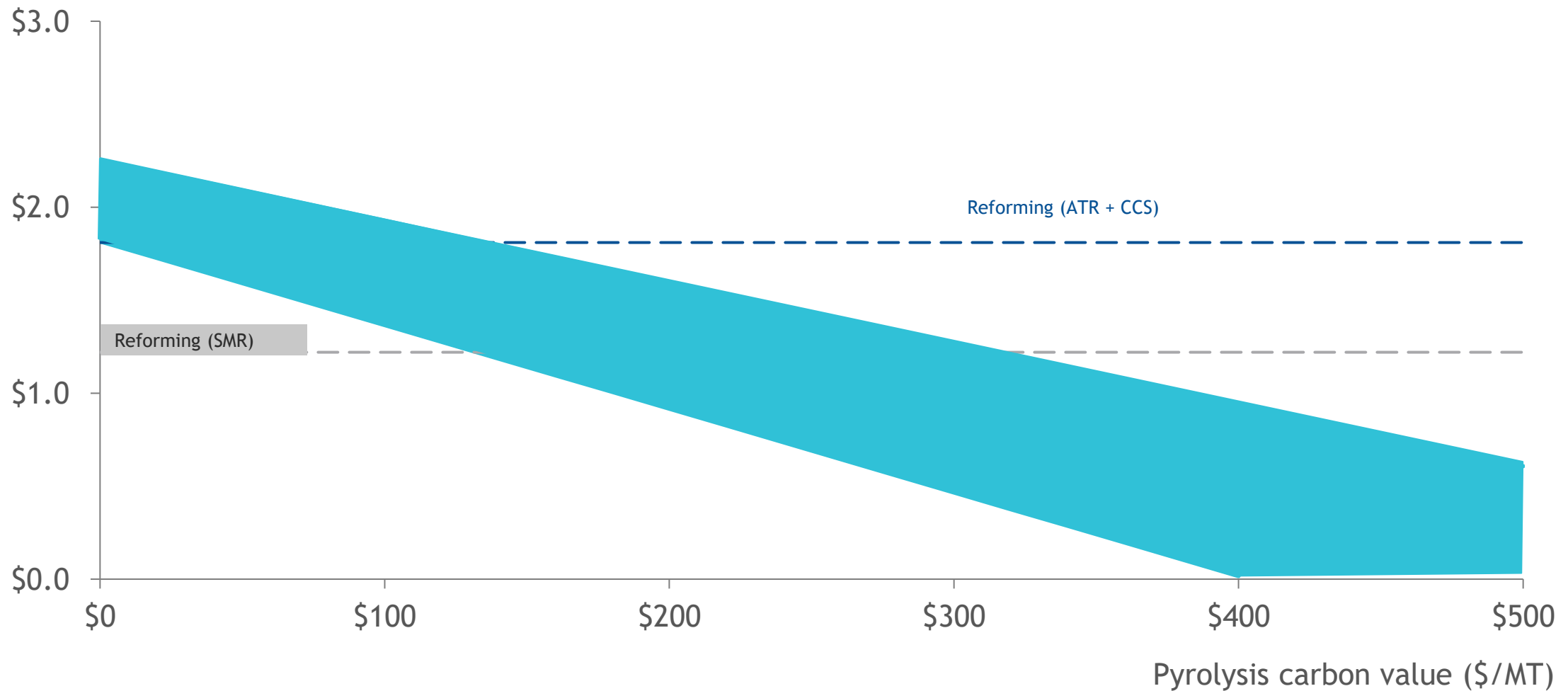
Hydrogen landed costs in Europe (Hamburg, Germany)

Green Hydrogen LCOH €/kg H2, >2030



1. Rep. figures in conversion for large scale plants, depending on plant size and market scalation, could be higher; 2. In Germany low range for onshore & large range for offshore wind and assumed captive/on-site demand. Note: For each country, owned RES assumed; estimated WACCs; shipping distance calculated from port of Hamburg & incl. 500km of truck/pipeline transport except for Spain in which H₂ pipeline transportation is assumed; Conversion used 0.191 H₂/NH₃; Cracking range from 1.2 to 1.7 \$/kg H₂
Source: BCG H₂COST Model and BGC Hydrogen Logistics Model 2025; BCG analysis

Gamechangers: Methane pyrolysis could be lowest cost H₂ option in many locations, especially with carbon monetization

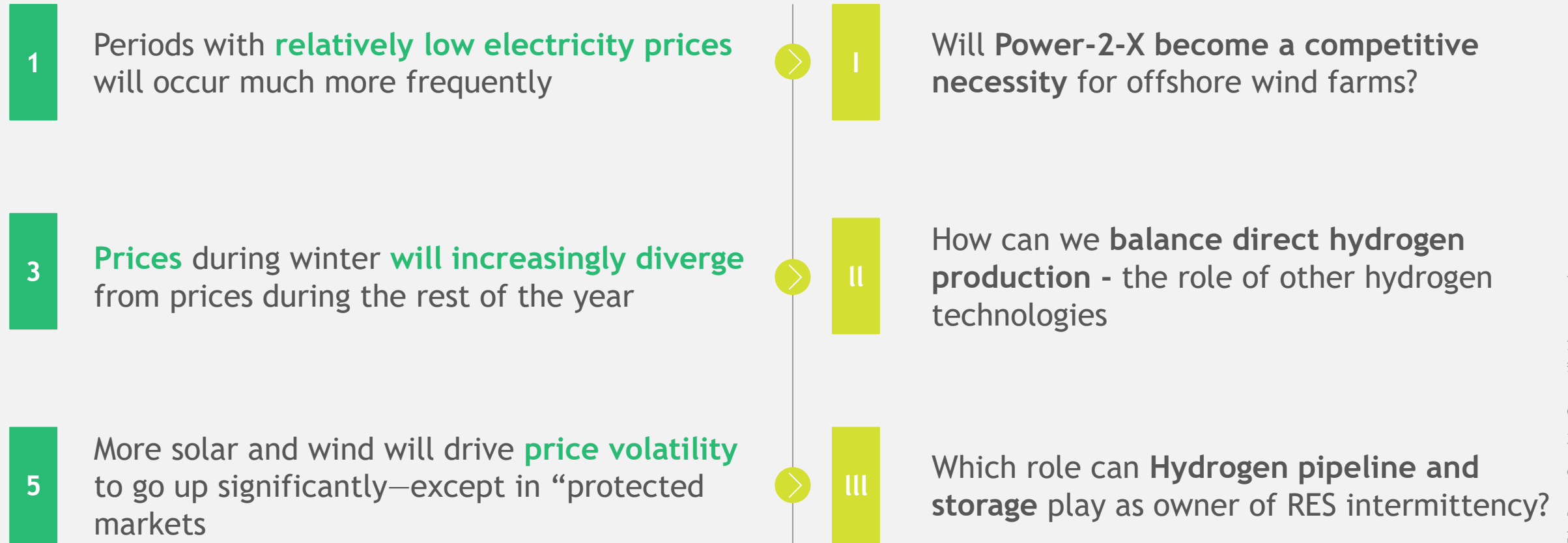


Note: Assumes similar Capex between e-fluid bed pyrolysis and H₂-fired pyrolysis - to be further validated
Source: EM and BCG analysis

Will imported low-carbon hydrogen dominate Europe?

- Can difference technologies complement each other?

Three power price dynamics impacting the case for Danish Power-to-X sector coupling

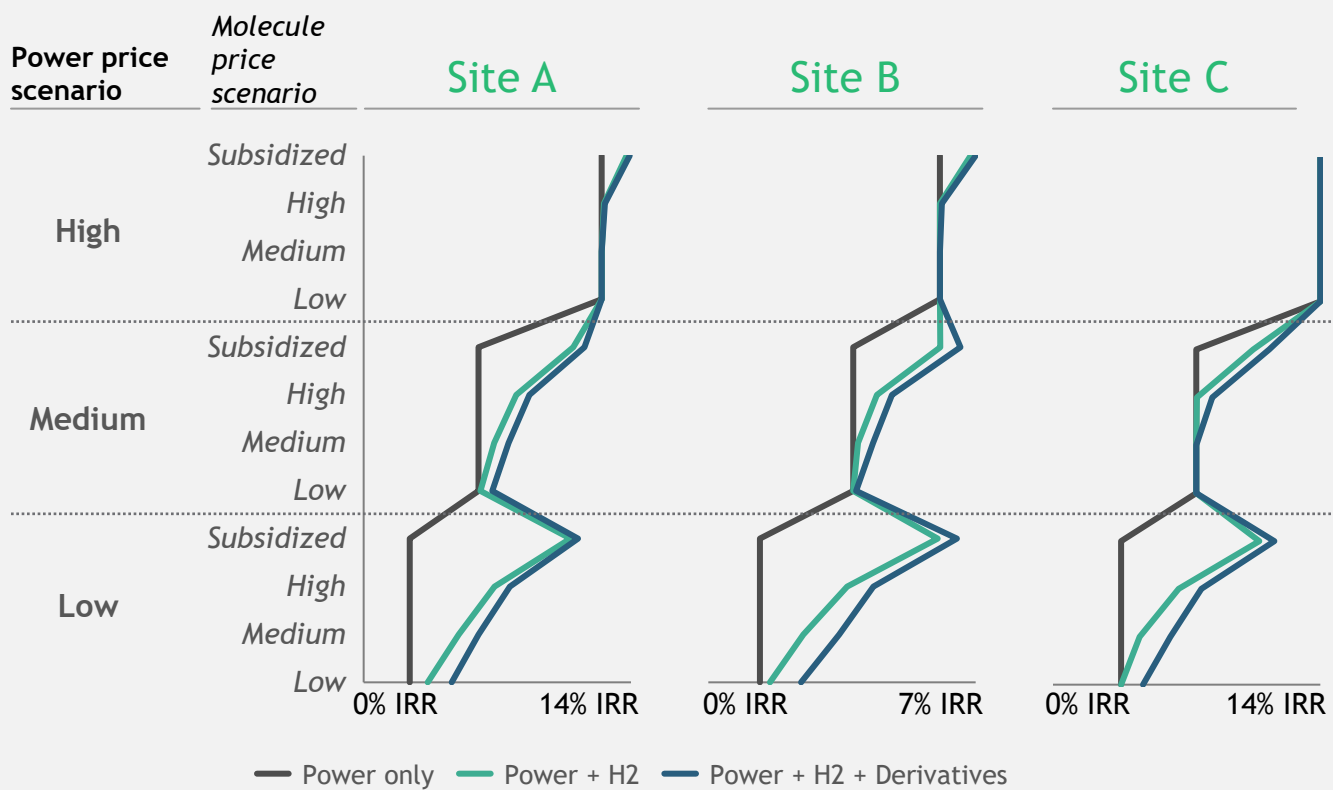




Integrating Power-to-X improves IRR across all scenarios including the opportunity to hedge downside power market risks

IRR across selected sites only power, power + H₂ and power + H₂ + derivative

Nominal unlevered post-tax IRR; across price scenarios



H₂ optionality provides substantial downside protection for a future with low power and/or high/subsidized molecule price scenarios (by postponing electrolyzer investment decision)

Note: Note no downside of H₂ or derivatives as timely decision for 0 MW electrolyzer or 0 t/d derivative plant is assumed
Source: BCG PtX Project optimizer model, sample European offshore sites

II

Outside low-cost power price hours is dispatchable blue H2 is most competitive providing and a potential export case for Norway

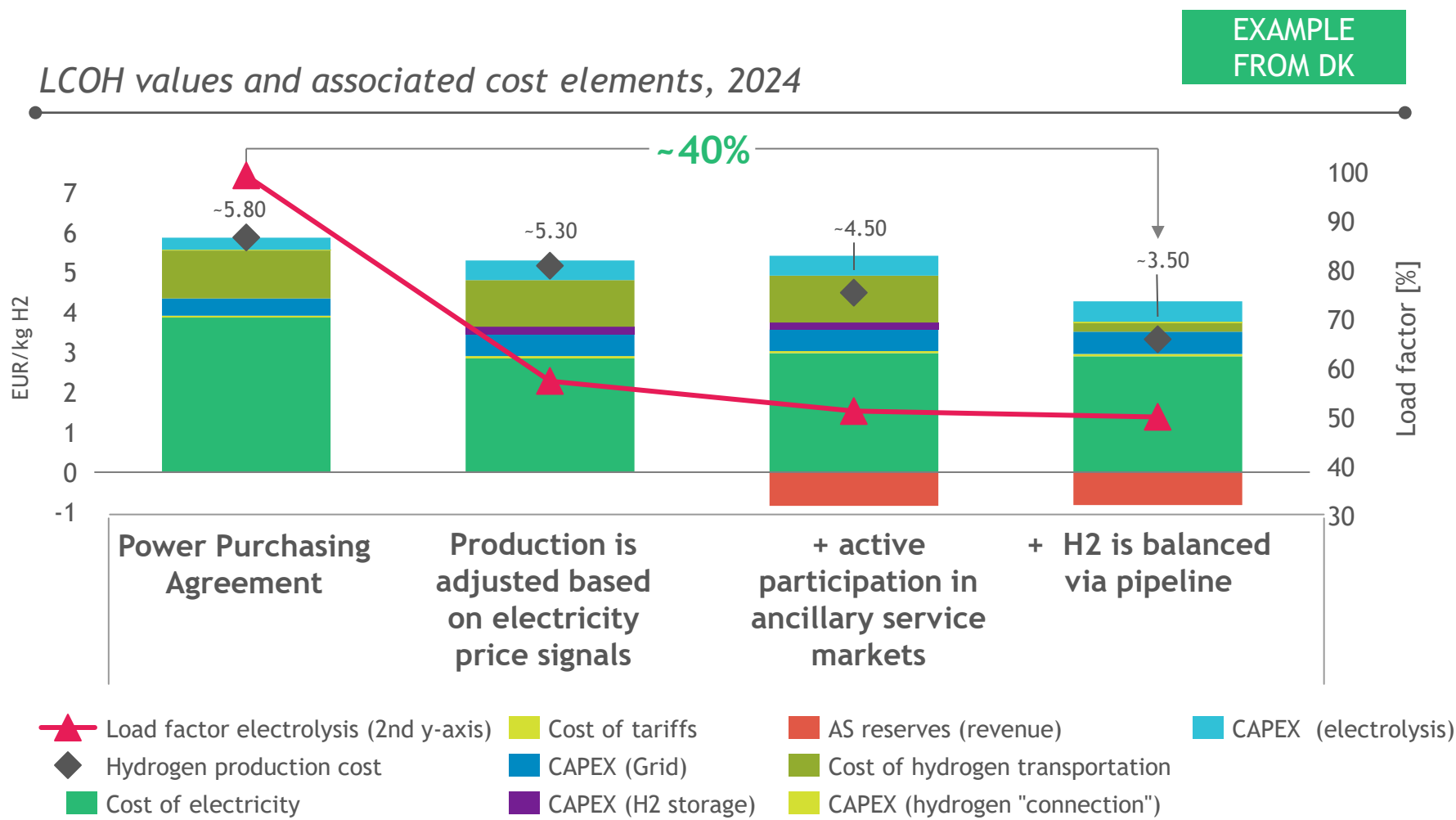


Note: Model makes trade-off between installing extra ATR capacity or incurring higher electrolyser hydrogen cost for a limited volume

Note: For the electrolysis production, the average marginal cost for the following buckets of electricity prices: below 25 €/MWh, between 25 and 50 €/MWh, between 50 and 75 €/MWh, between 75 and 100 €/MWh. Note: 2030 reference scenario

Source: BCG modeling

III Integrated H2 producers can reduce LCoH by ~40% leveraging ancillary services participation and H2 pipeline connection



- Key takeaways
 - By optimizing electricity use, and adjusting production based on grid capacity, H2 producers can cut costs compared to PPAs
 - Participating in ancillary services allows H2 producers to earn revenue by balancing the grid
 - Consequently, leveraging both grid balancing services & transportation efficiency lowers LCOH ~40%

Source: Energinet; BCG analysis

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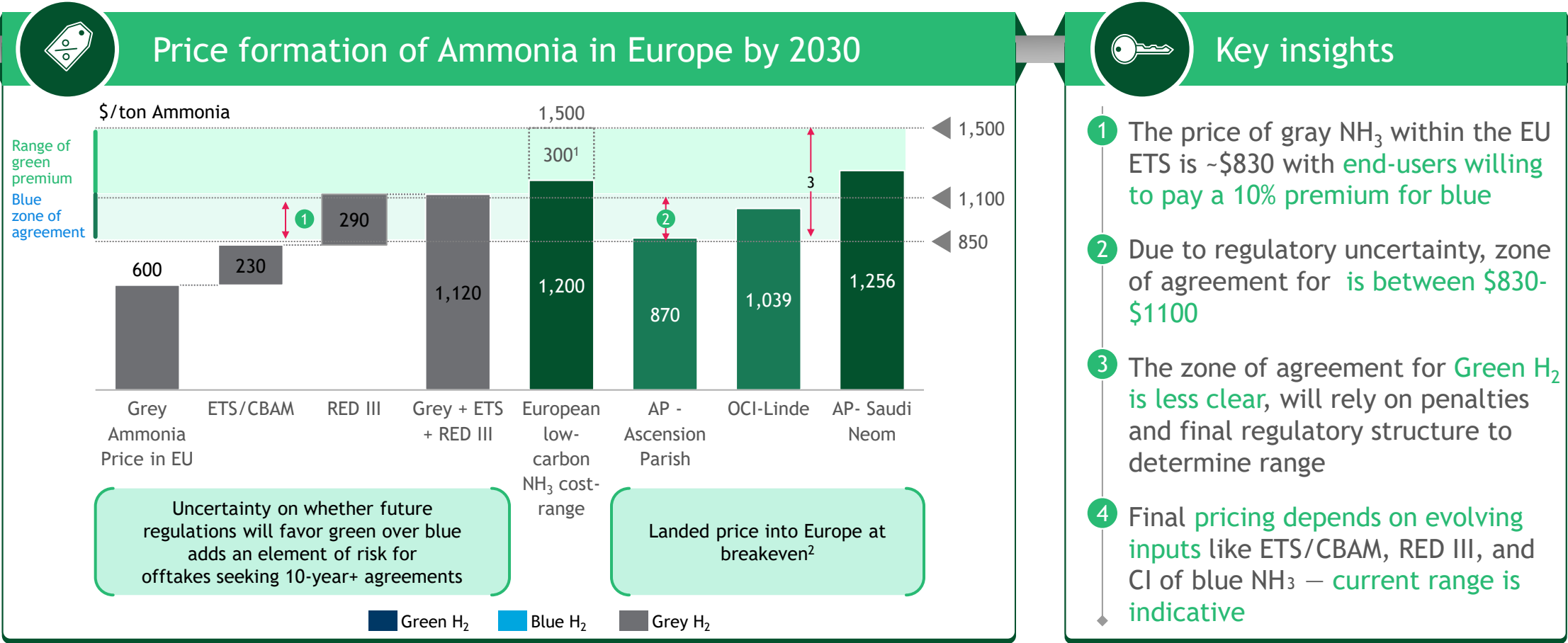
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Unused Slides

Pricing: EU willingness-to-pay for ammonia in 2030 likely ranges from \$830-1,100/t, driven by ETS/CBAM which is perceived as a stable framework

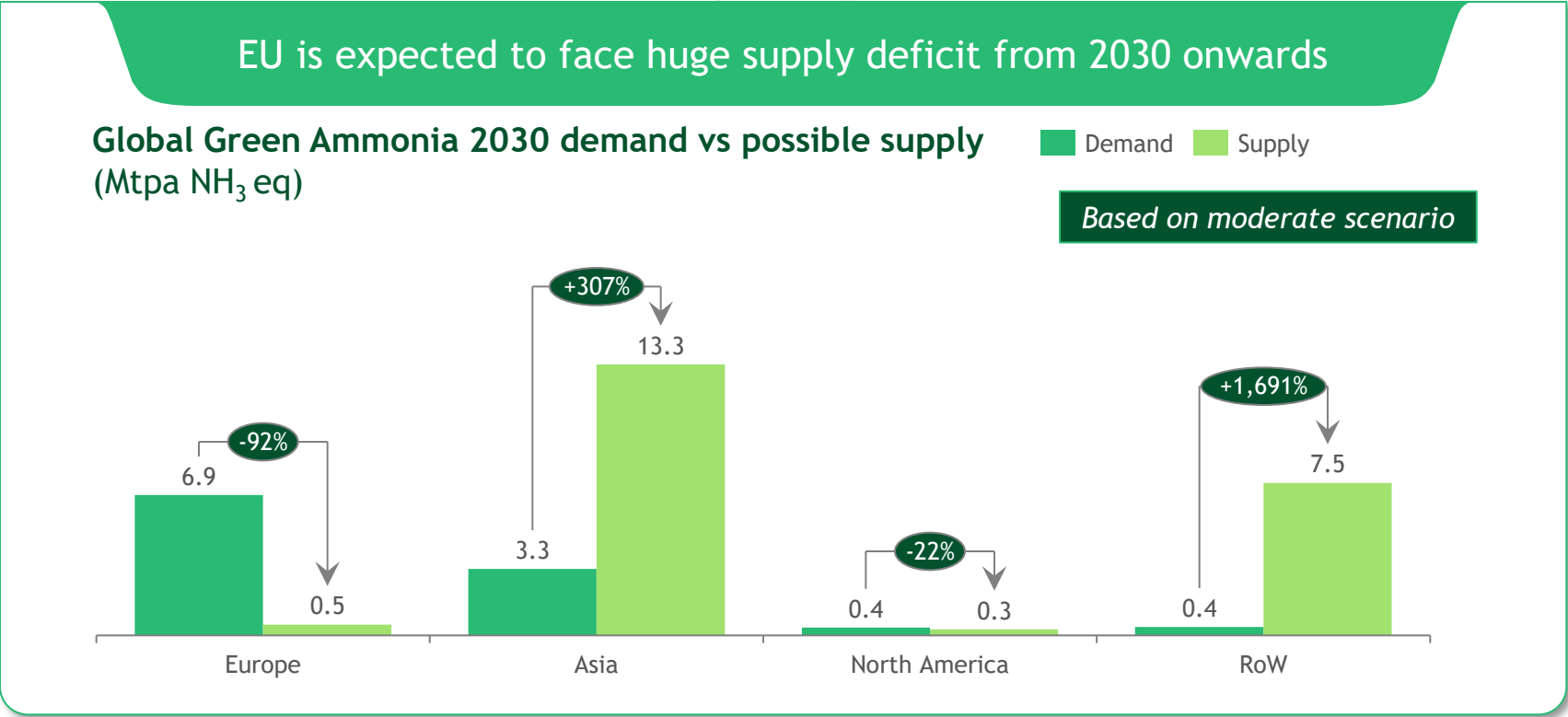


1. Price range for Europe's low-carbon NH₃ is \$1200-1500/ton. Additional \$300/ton reflects the upper bound 2. For Ascension Parish and OCI-Linde, price represents 10% unlevered IRR for the project. For AP-Saudi Neom, price reflects 10% IRR from Air Products' perspective Note: Assuming a RED III penalty of Eur 300 per ton CO₂ and ETS Eur 100 per ton CO₂, with the same free allowances as for EU ETS Source: S&P Global, Interviews with industry leaders; BCG analysis

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Export: Asia will be the key Green Ammonia exporter to Europe



EU makes up significant portion of global demand with very little domestic supply to meet its demand needs by 2030 & beyond - **the success of EU policy will significantly impact global low carbon NH₃ export markets**

However high uncertainties surround full implementation of policies, potentially reducing demand



- Most countries delayed RED III implementation
- EU auditors call the 2030 hydrogen goals unrealistic
- Several member states are pushing back on the phase-out of free ETS allowances

Note: Demand following scenario where EU policies partially materialize, RFNBO target reduced to 36%, 1-2 year implementation lag, extension of free ETS allowances
Source: IEA WEO 2025 Extended Data Set (expected demand); Global Data 2025 H2 Project dataset (Forecasted 2030 Supply); BCG Analysis

Biogas for Eastern Europe and the colours of hydrogen
Next presentation 3.40 pm



What Do We Need Hydrogen For? Why, Where, How, and When?

Senior Analyst Karsten Capiion, CONCITO

What Do We Need Hydrogen For?

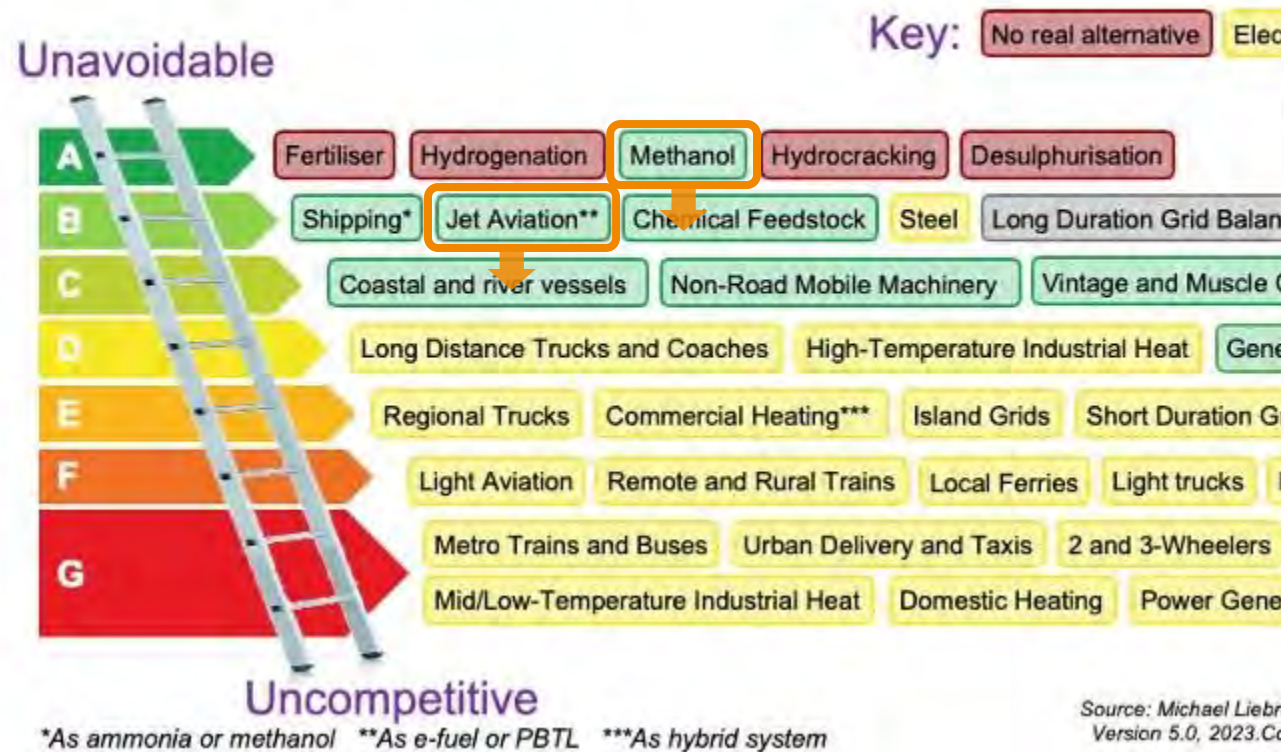
Why, Where, How, and When?

06.05.2026

Why?

Hydrogen can decarbonise everything – but better options in most sectors

Hydrogen Ladder 5.0



Michael Liebreich • 1st
Speaker, analyst, advisor, investor in the future economy. Host of Cleanm...
Tyr • 1

Karsten is one of the clearest thinkers out there on the climate impacts of various ways of using carbon, however you get hold of it.

I strongly recommend you follow him and think about what he says. I'm usually a year or two behind :-)



The political infatuation with green fuels should be reconsidered

- *Green fuels has been the go-to solution for industry and politicians.*
 - *"Find the next thing that burns"*
 - *"What we have now in the color green"*
 - *"Resilience!"*
- *Area is scarce → Biofuels are limited*
- *Clean energy is scarce (short term) and expensive*

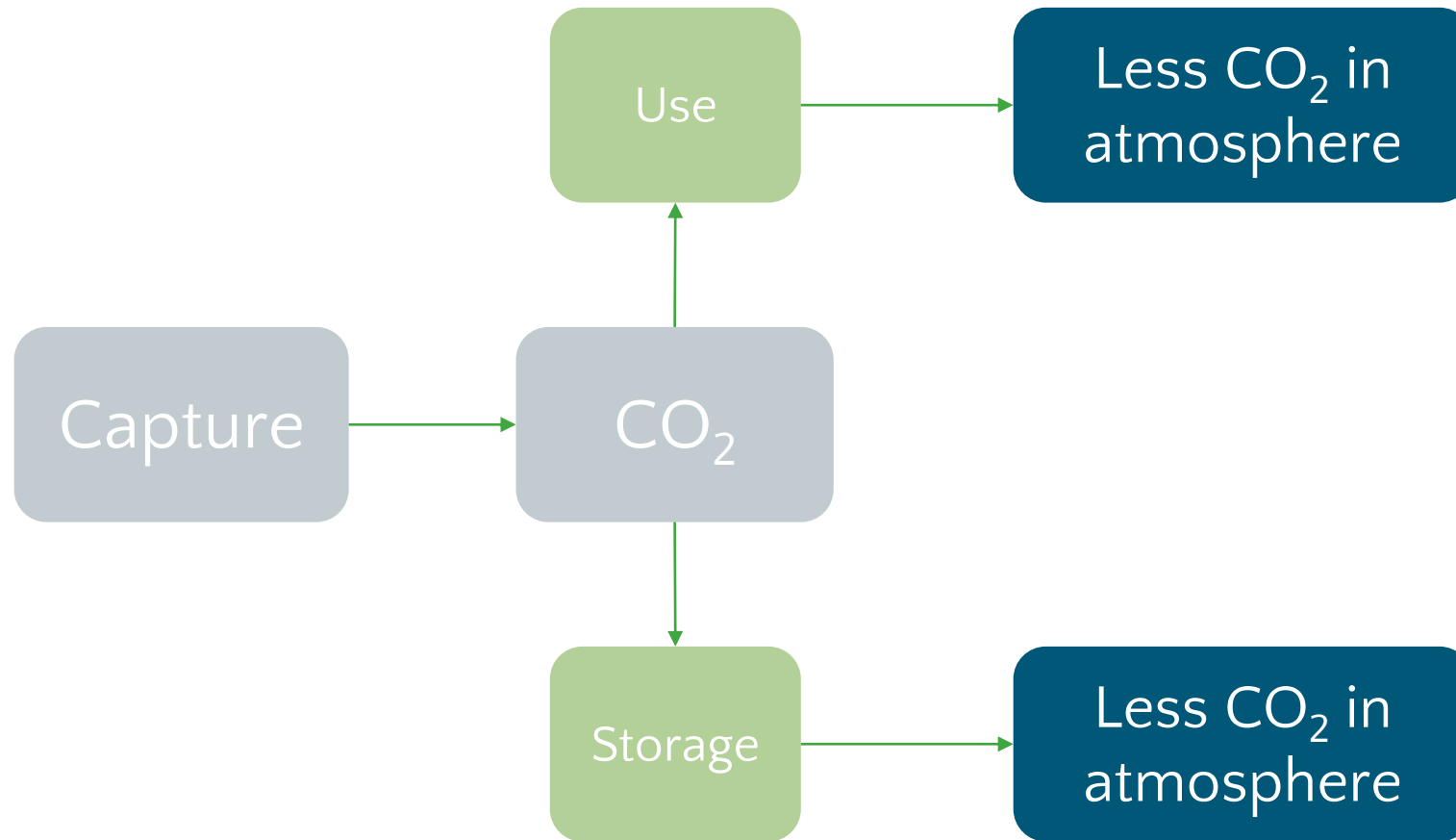
"Den politiske forelskelse i grønne brændsler bør genovervejes"

"Everything becomes more costly if we use resources inefficiently, and Europe cannot afford that when our competitiveness is under pressure.

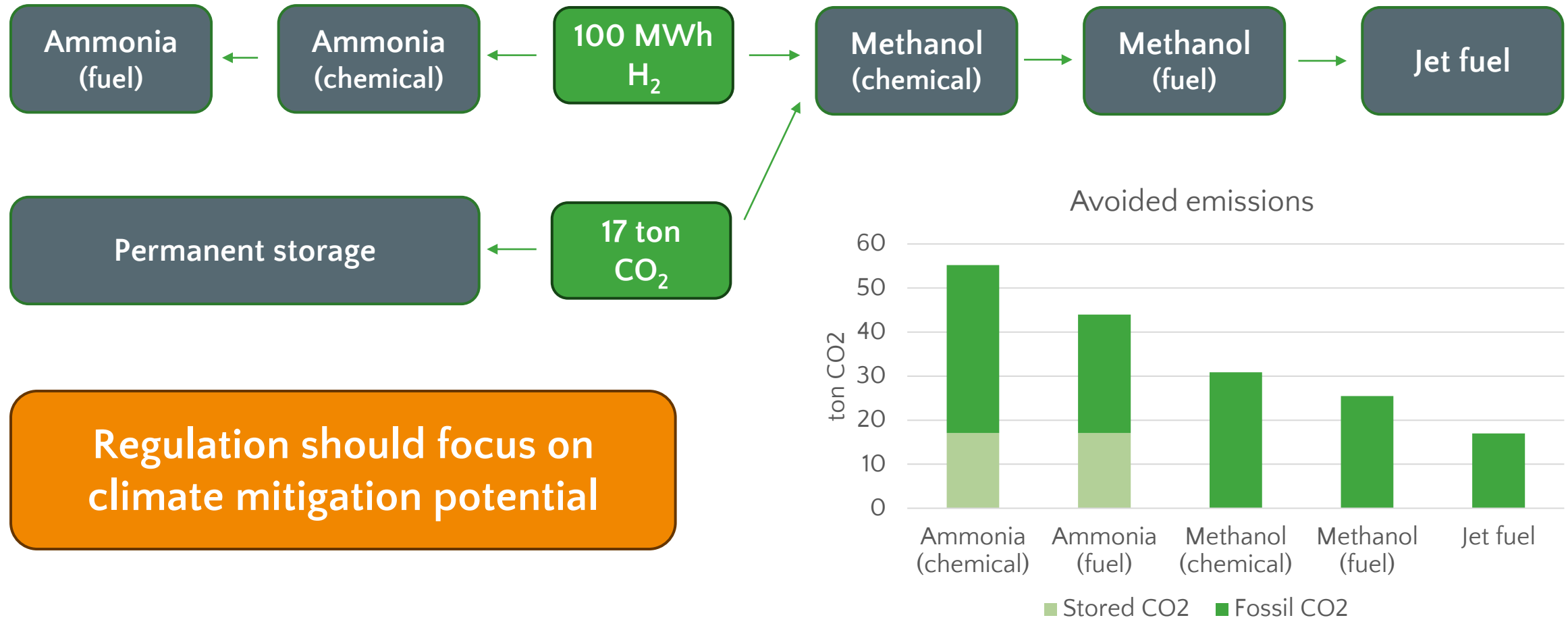
There is potential to make the transition smarter and cheaper without compromising our climate goals, but it requires that we dare to think beyond green fuels."

Where?

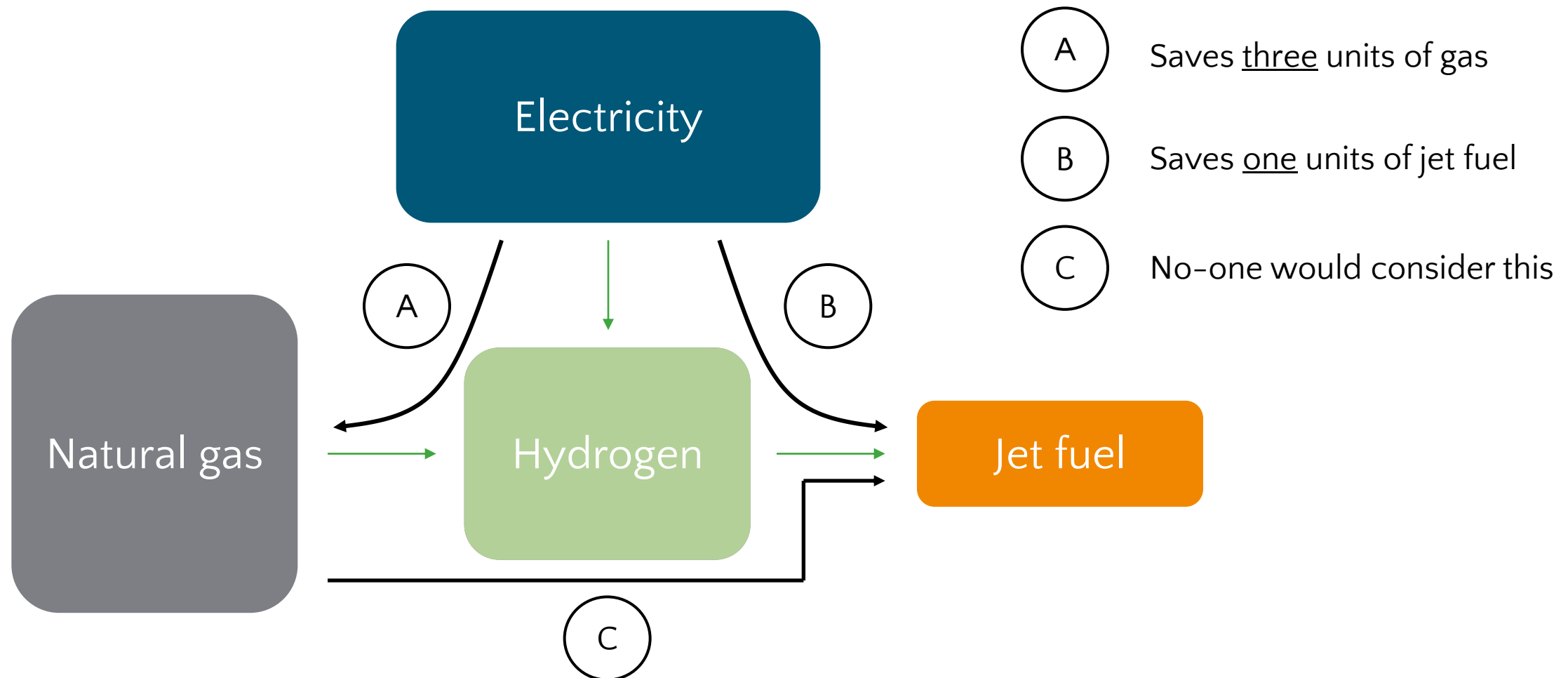
Storage is also a valuable use of carbon



Greatest climate benefit when H₂ and CO₂ is used separately and for chemicals



Use green hydrogen to replace grey



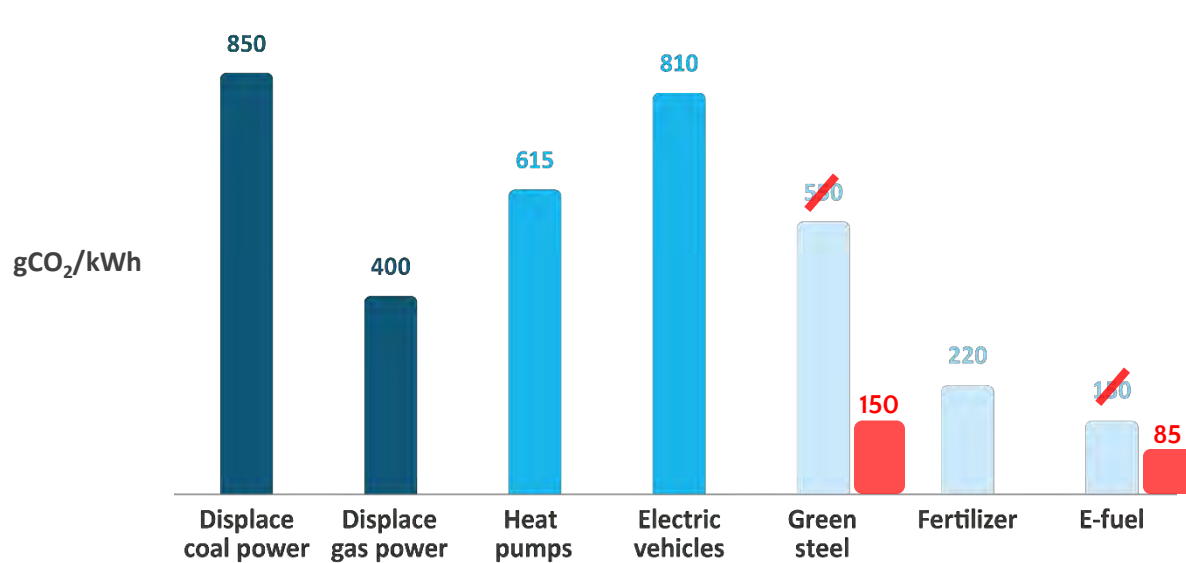
E-fuels or storage

- Report published in March 2025 on carbon-based e-fuels
- Short-term impacts and long-term viability
- Focus on climate benefits and resource efficiency
 - Clean electricity / hydrogen
 - CO₂
 - Money

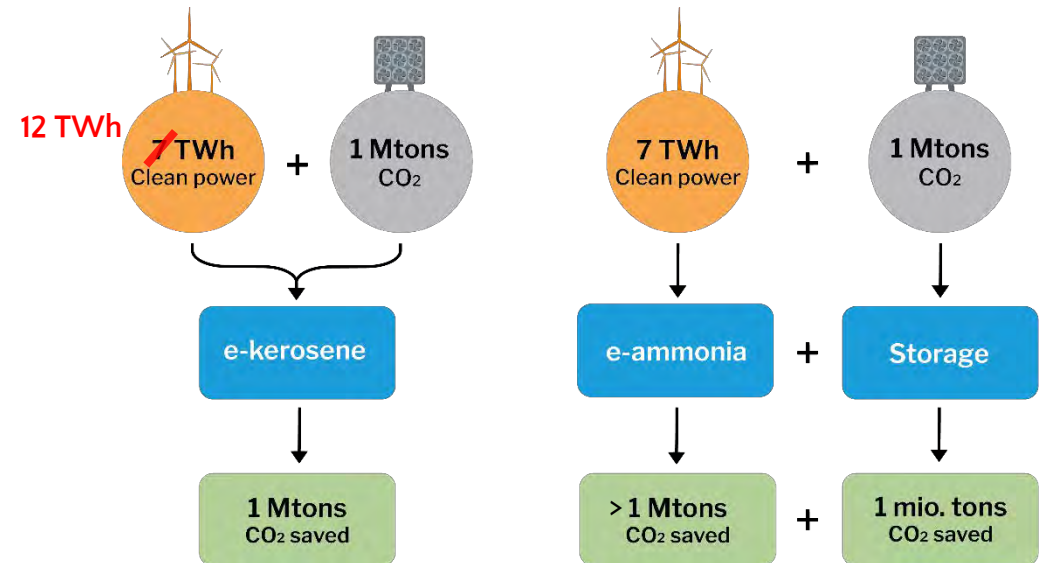


E-fuels is an inefficient use of resources

- 1.5–~~6~~⁹ times more fossil displacement when using clean electricity in other sectors

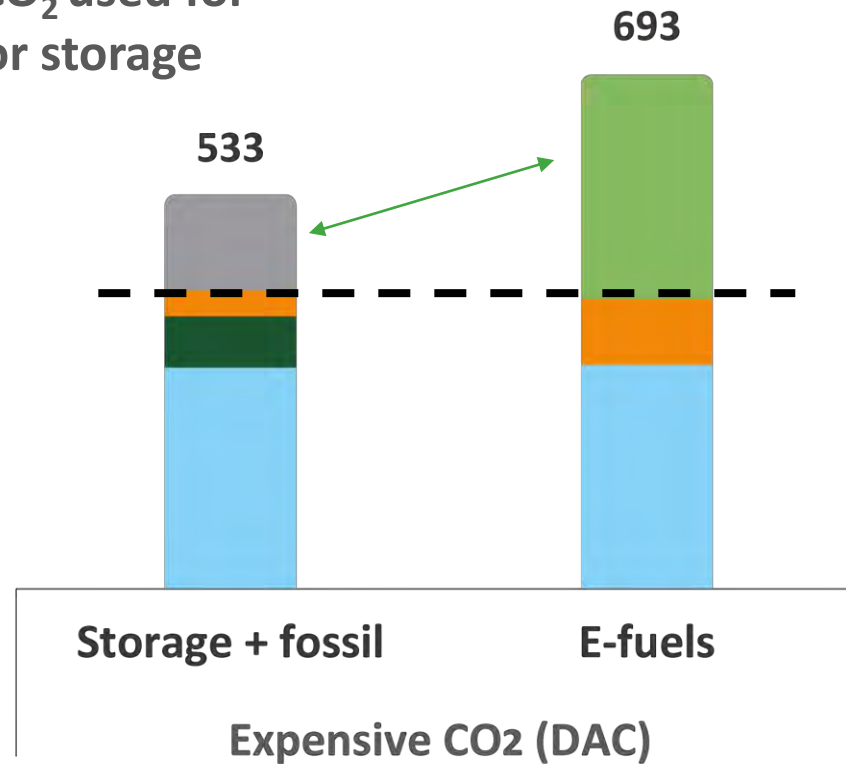


- On top of this carbon can be stored cheaply
- **At least twice the climate benefit of using input separately**



Challenging economics long term (2050)

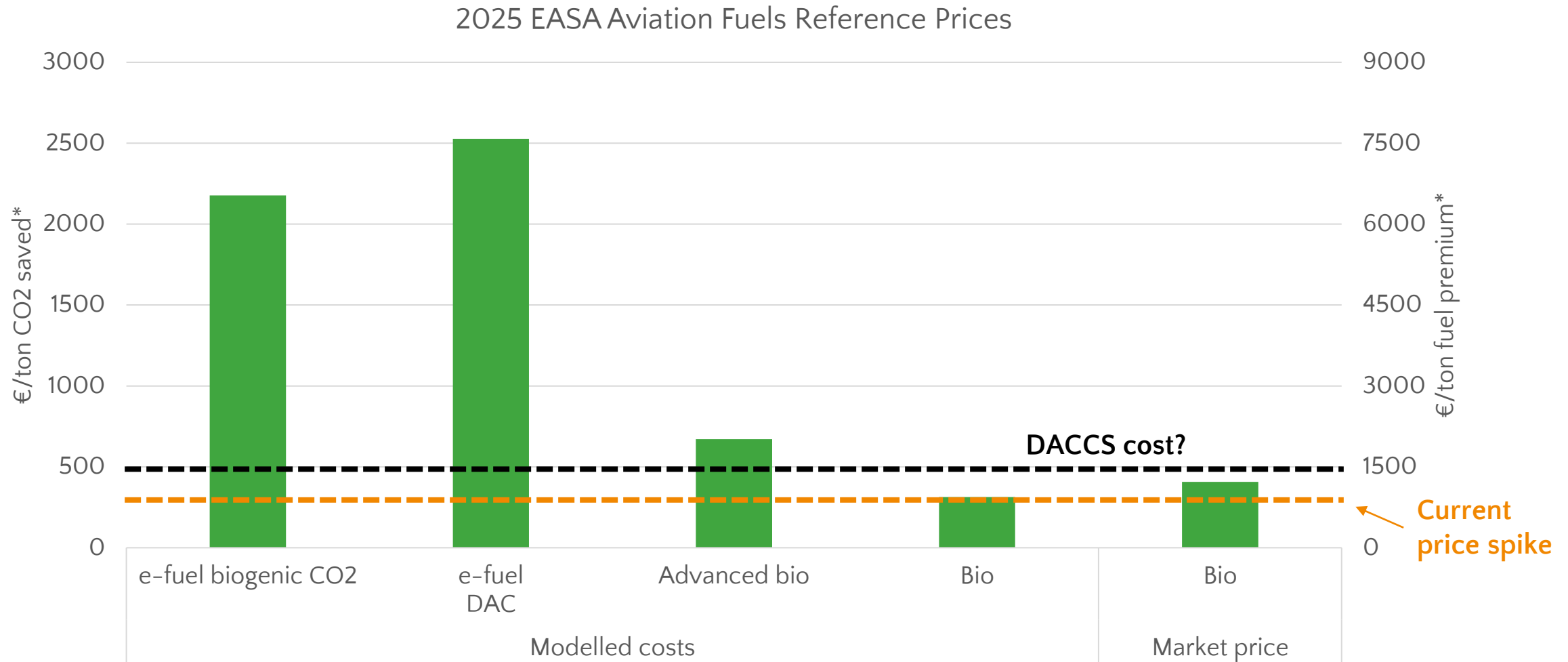
€/ton CO₂ used for
e-fuel or storage



Ratio of oil price and
cost of clean electricity
determine economics

CO₂ capture Storage Refining Oil extraction Clean power

Cost of alternative aviation fuels



* Compared to 2025 conventional fuel cost of 640 €/ton kerosene

How?

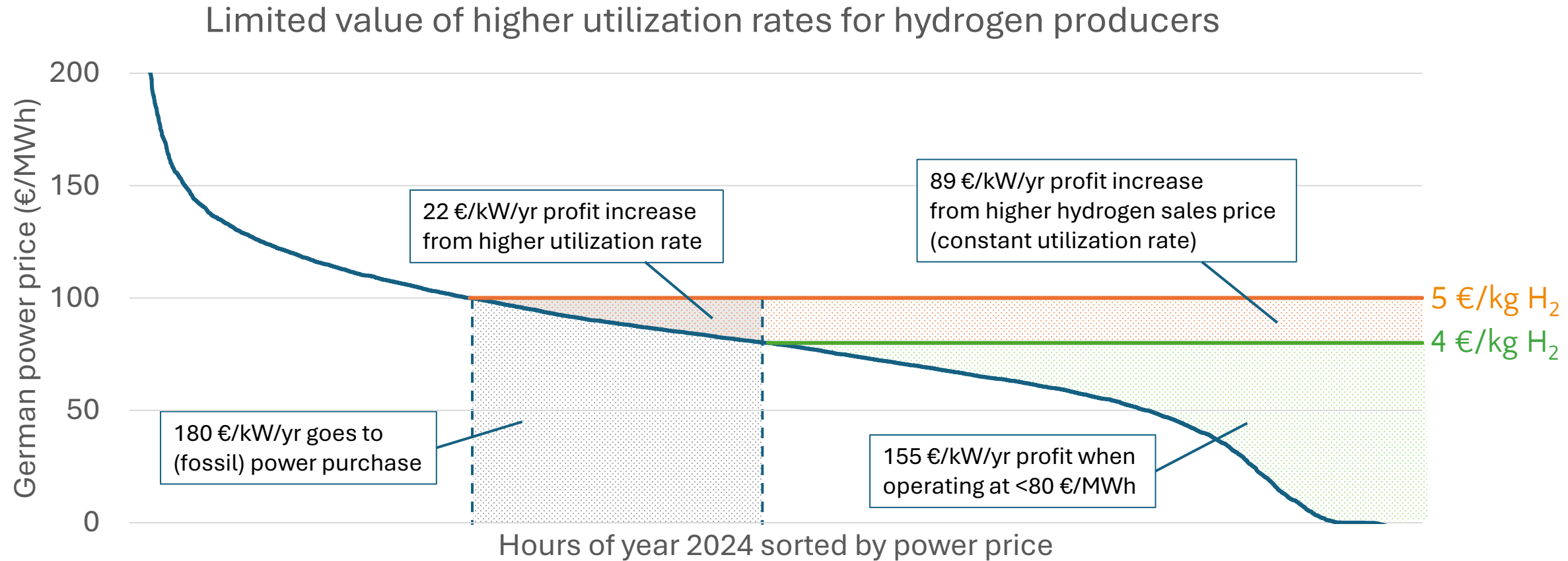
More CAPEX support for electrolyzers instead of OPEX or blending mandates

- High cost of electrolyzers yield high utilization rates if support is given as per kg H₂ or through blending mandates.
 - 7,000 €/ton e-kerosene
= 200 €/MWh power input
 - Gas power SRMC: 115 €/MWh
- Gas-to-power-to-X
 - 5x emissions compared to fossil jet fuel!
- More CAPEX support results in:
 - More capacity → More learning
 - More flexibility → More renewables



Power price criteria to ensure green H₂

- Support hydrogen producers not fossil energy



Focus on low hanging fruits

- e-SMR offers efficient reduction of natural gas demand and limits need for carbon storage with blue hydrogen
- Almost twice the climate benefit per kWh electricity.

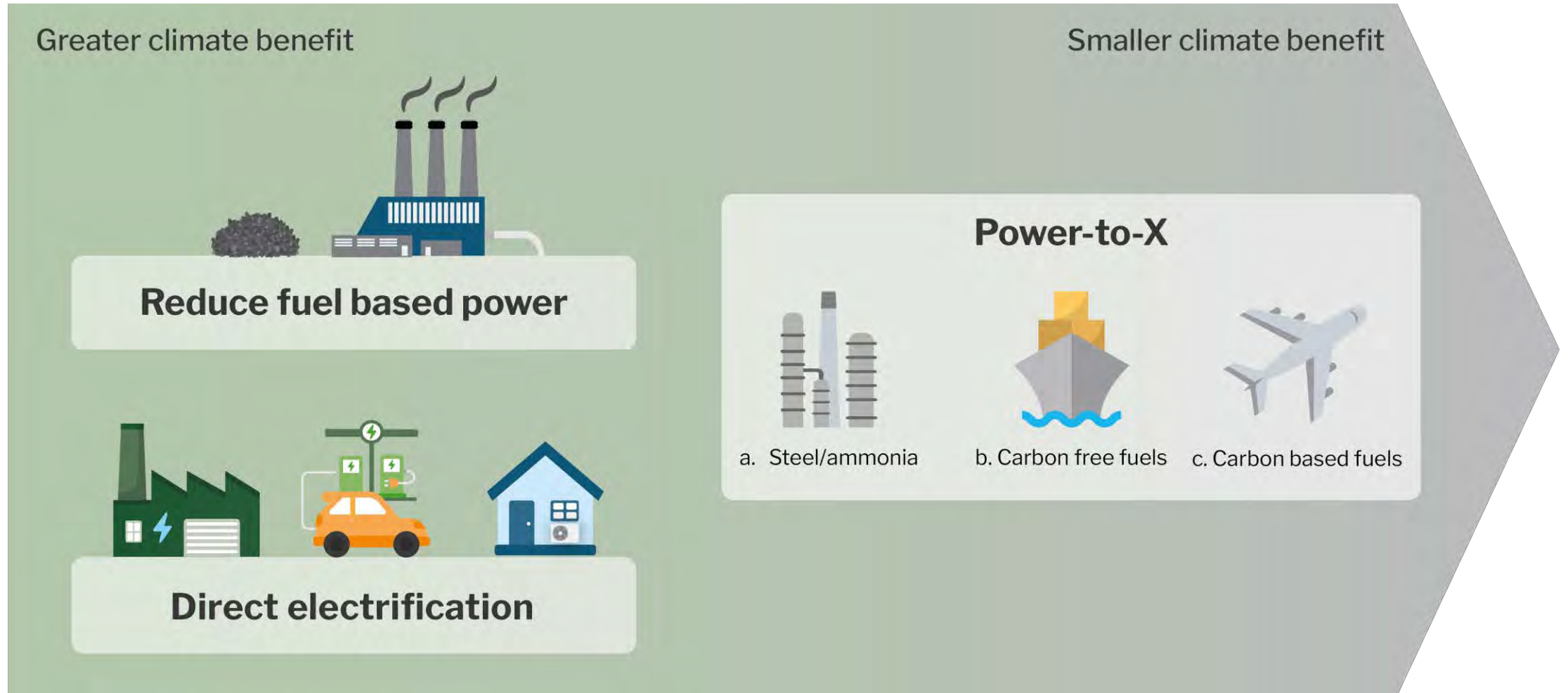
	Electricity kWh/kg _{H2}	Emission kgCO ₂ /kg _{H2}	Emission Reduction gCO ₂ /kWh
Fired SMR	–	10	–
SYPOX e-SMR	14	6	290
Electrolysis	52	0	190
Electrolysis (marginal)	38	6	160

≈2x

Source: SYPOX

When?

How to best use clean electricity



When should we get going?

- What technologies do we need to develop/scale now:
 - Electrolysis – limited run time (more CAPEX support)
 - Carbon capture – use it for storage until green hydrogen is abundant
- What could wait?
 - Combining CO₂ and H₂ into carbon fuels
 - Fischer-Tropsch synthesis is well known technology

Thank you!

kca@concito.dk

NEXT



Break

4.10 pm to 4.25 pm



NÆSTE OPLÆG

Klokken 16.25 til 16.45

Udfasning af gasfyr i Andel Energi

*Administrerende direktør
Marlene Holmgaard Fris
Andel Energi*

2026
Grønne
Gasdage

Andel Energi

Udfasning af gas

Grønne Gasdage 2026

andel energi

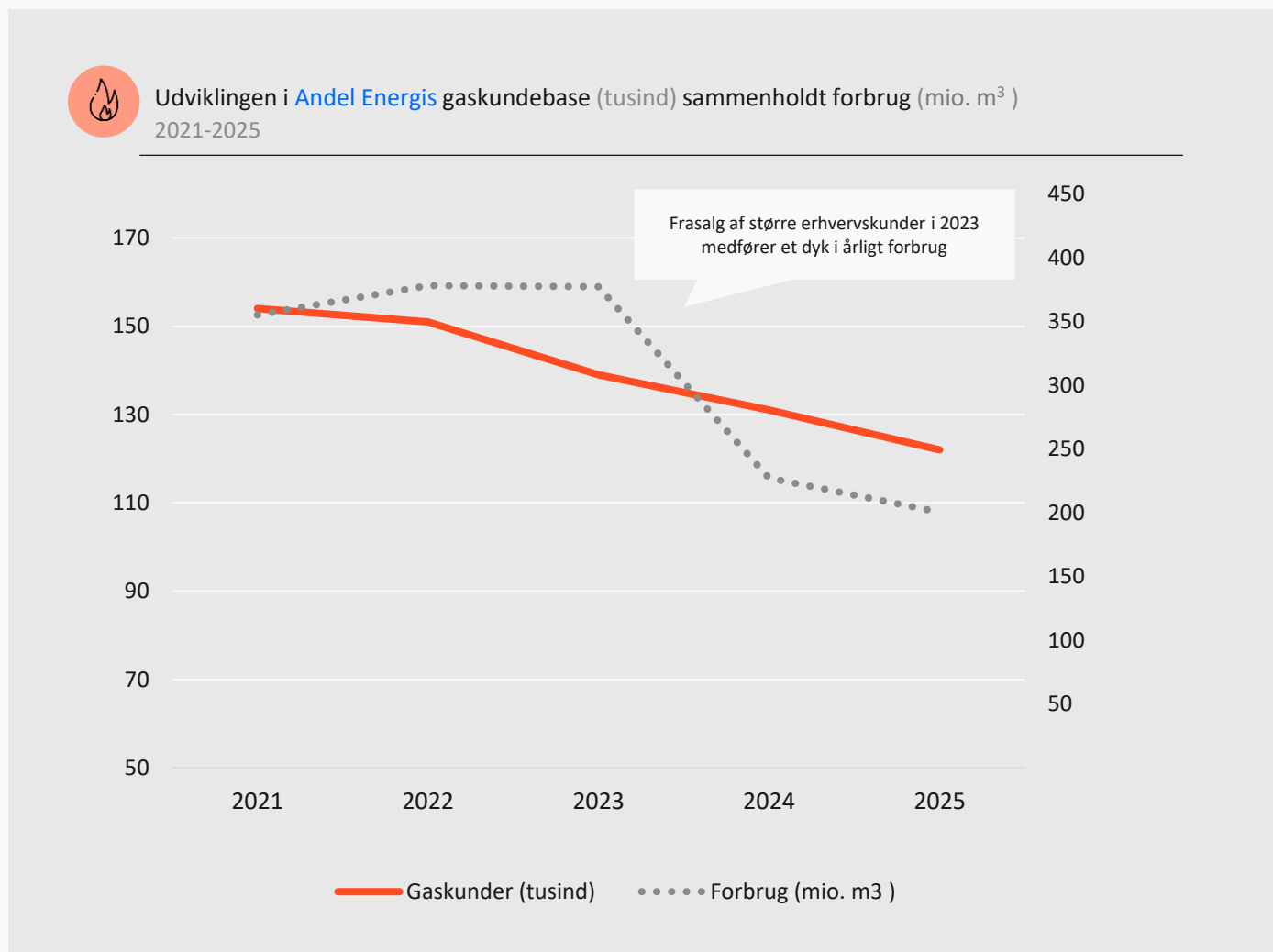




Andel Energi er Danmarks
største **energiselskab** med
+1 mio. privat-
og erhvervskunder.



Vi vil udfase gas til privat rumopvarmning



Vores ambitioner er et **løfte til vores andelshavere.**

Alle private gaskunder skal tilbydes et alternativ senest i 2029.

Vi oplever en **systematisk tilbagegang i vores gaskundebase siden 2021.**

Hvorfor udfase salg af gas til private kunder?

Vi har forpligtet os til at tage **lederskab** i den **grønne omstilling** af vores **energisystem** i Danmark.

01

Fuld fart på elektrificering

02

Biogas skal forbeholdes industrien

03

Udfasning af gasfyr er en investering, der betaler sig

04

Gasfyr sætter forbrugerne i klemme

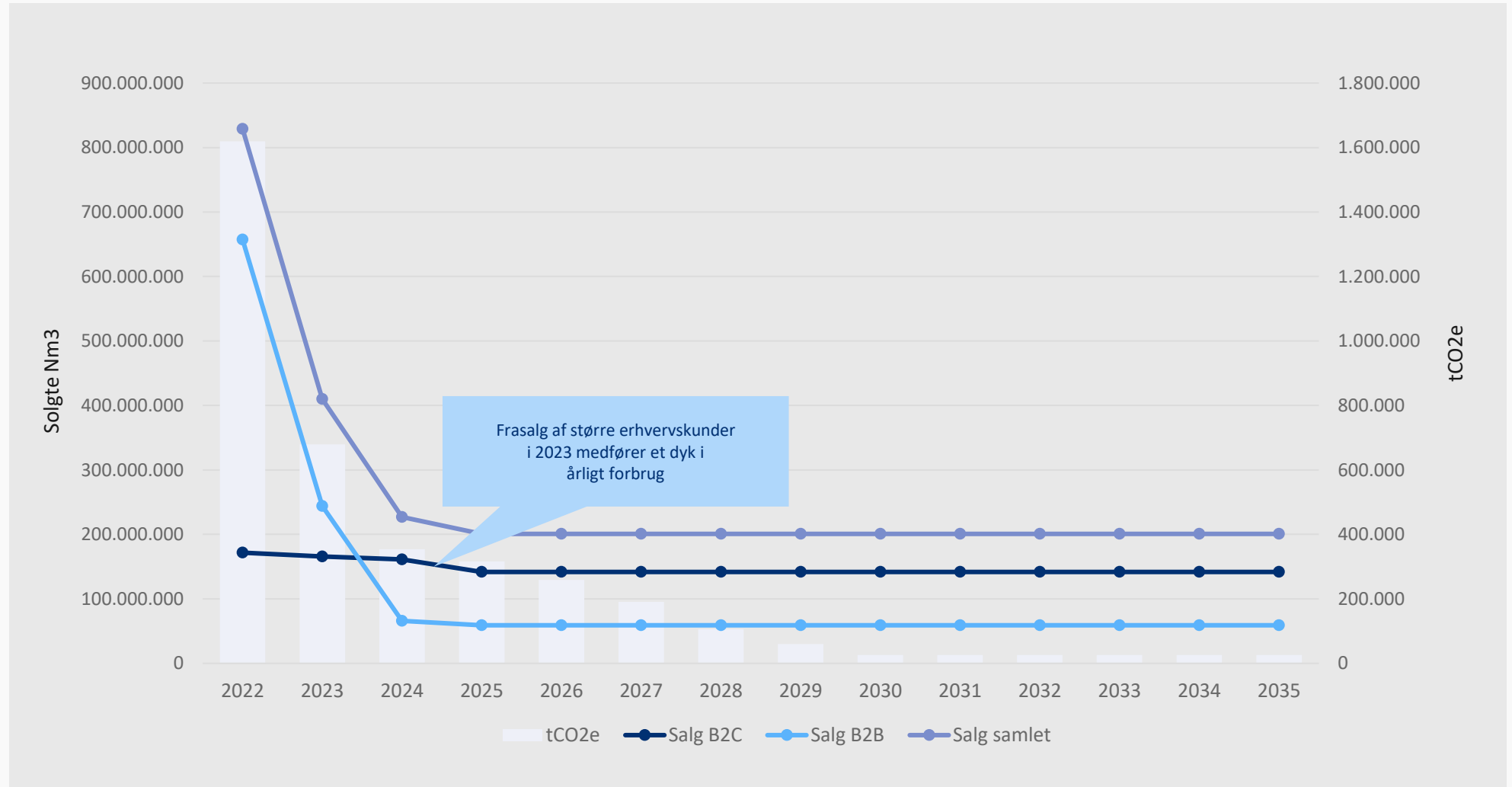


Med biogas falder udledninger

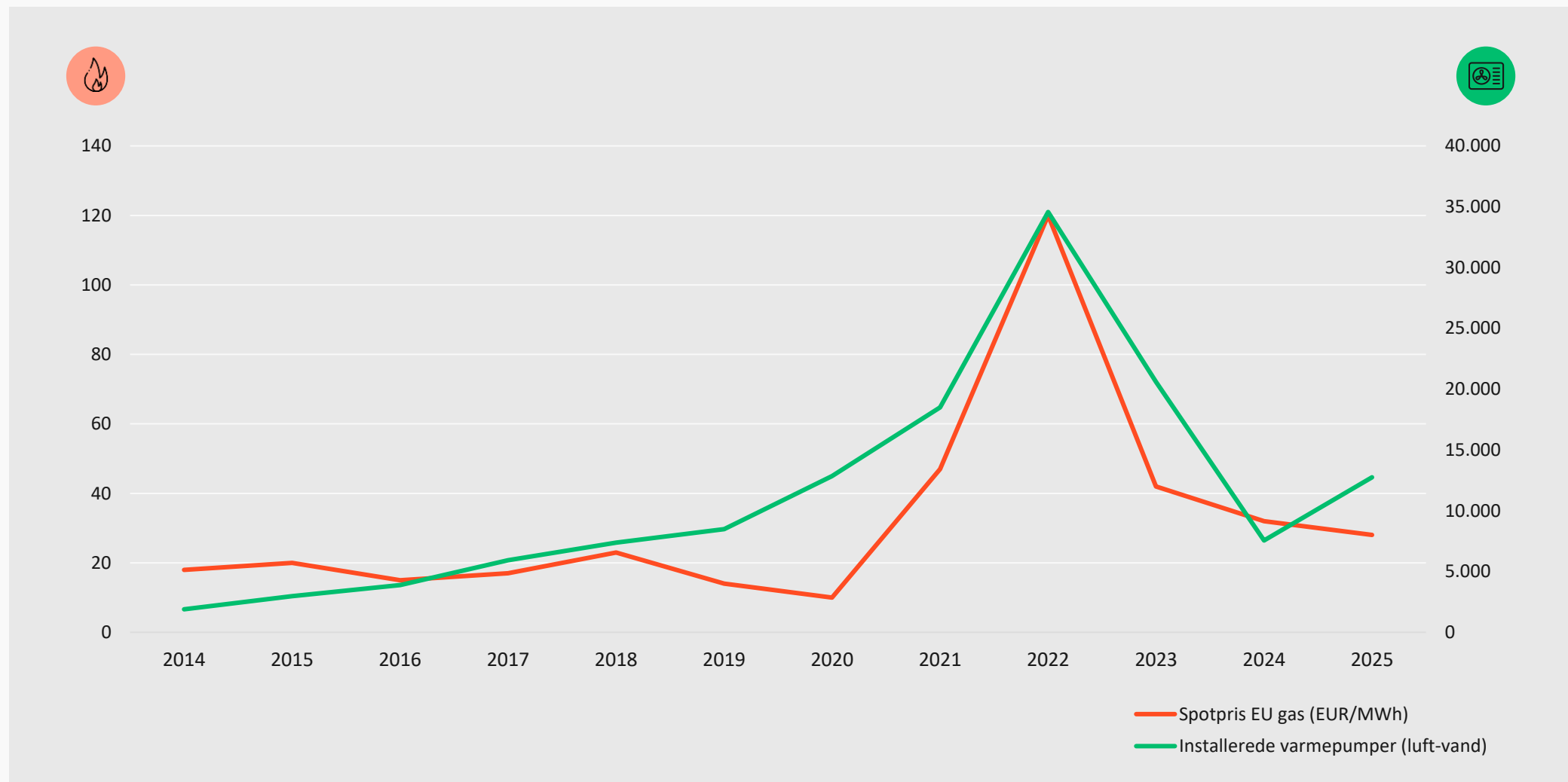
Emissionsfaktor	
År	kgCO ₂ e pr. Nm ³
2022	1,95
2023	1,66
2024	1,56
2025	1,58
2026	1,29
2027	0,95
2028	0,53
2029	0,30
2030	0,13
2031	0,13
2032	0,13
2033	0,13
2034	0,13
2035	0,13

Bekræftede

Fremskrevne



Når gassen er dyr, køber vi varmepumper



Vi vil gøre konvertering til varmepumper nemt og økonomisk overskueligt



Vi tilbyder **en samlet varmepumpe- løsning; rådgivning, installation og finansiering** med et fastforrentet og gebyrfrit lån over 10 år.



Gasservice er centralt for at møde gaskunderne, når de har behov for **vejledning om konvertering til varmepumpe.**

Forsyningsområder spiller en central rolle i vores konverteringsindsats

Fordelingen af de 259.000 private gasfyr ift. forsyningsområder



Husstande i områder med varmeplansforslag
(fjernvarme)

Antal

108.000



Husstande i eksisterende
fjernvarmeområder

Antal

99.000



Gasforsyning
(udenfor varmeplan)

Antal

52.000

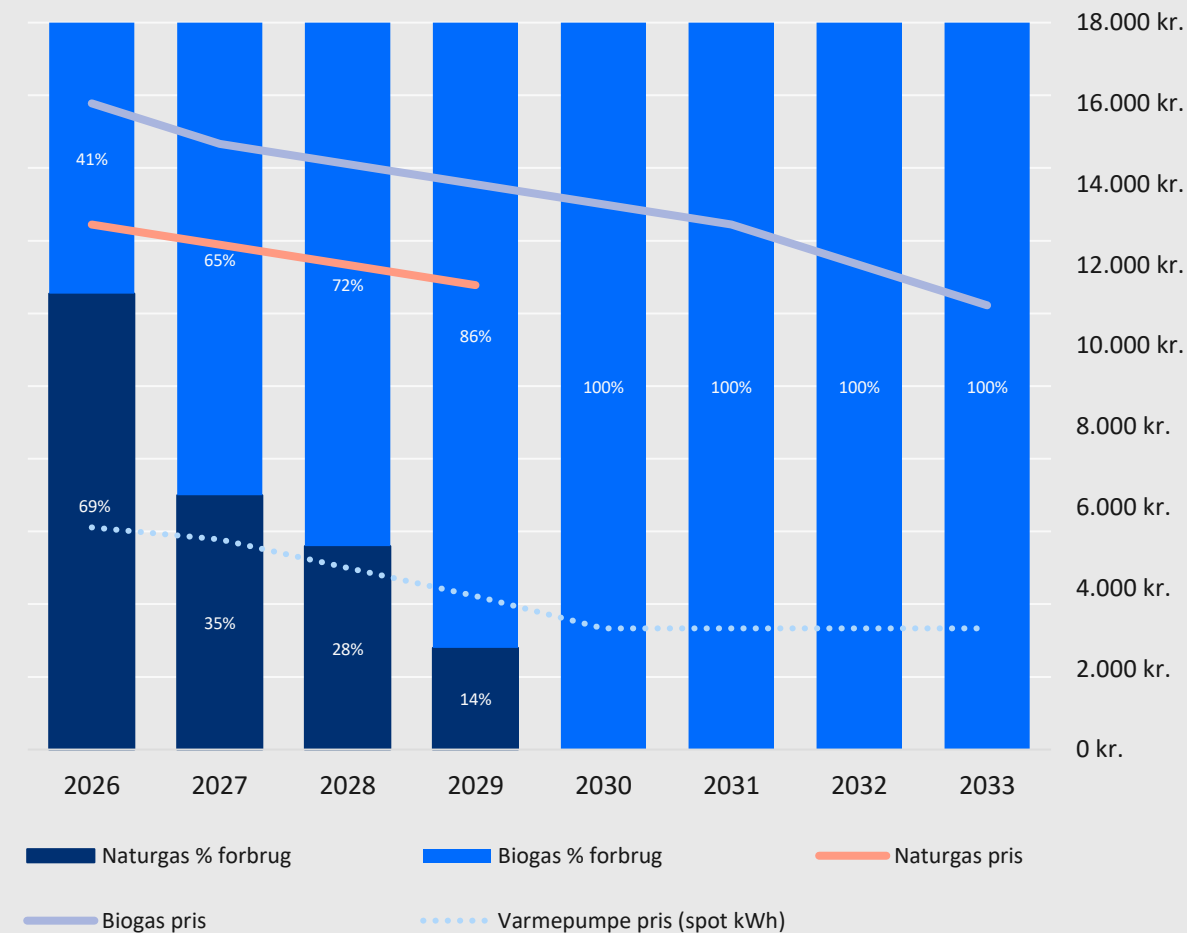
Vi forventer, at **30-40%** af vores nuværende gaskundebase vil **konvertere til en varmepumpe.**

Gasfyr sætter forbrugerne i klemme

I overgang til biogas forventer vi, at nogle **privatkunder** vil blive **udfordret af prisstigninger**.

Her vil **varmepumper** være et oplagt **alternativ**.

Fremskrivning: Fremskrivning af naturgas og biogas: forbrug og *pris
2026-2036



Udfasning er en gevinst for alle

Udfasning af gasfyr til privat opvarmning giver klare samfundsøkonomiske- og forsyningssikkerhedsgevinster

1. Det kræver, at den nye regering fastholder ambitionerne om at udfase gasfyr i 2035 og omsætter dem til konkret handling
2. Varmepumpepuljen skal øremærkes, så varmeomstillingen ikke får en social slagside



Tak for jeres tid!



6 maj kl 16:50

MAKEEN
ENERGY

Professional detection of gases
geopal®

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2026
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Gasdage**

MAKEEN

ENERGY

Professional detection of gases
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2026
Grønne
Gasdage

Næste aktivitet



Netværk og hygge

17.00

Middag

19.30

**2026
Grønne
Gasdage**

Slut første dag