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ebn State Energy Company of the Netherlands

TNO Geologische Dienst Nederland

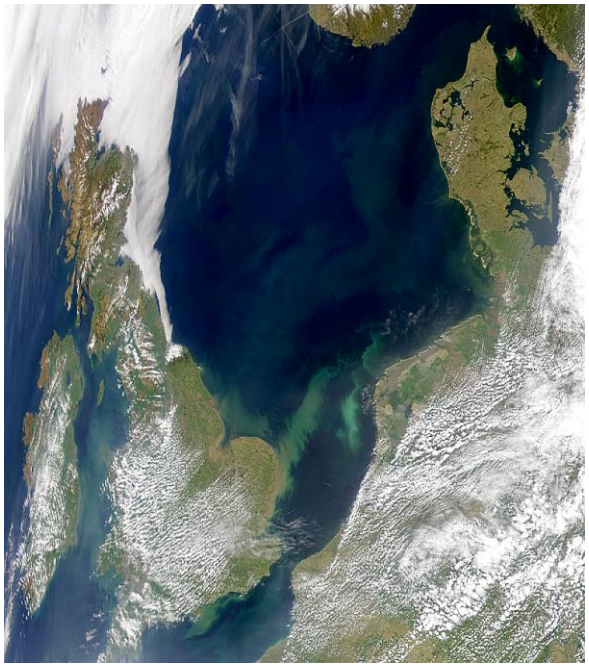
North Sea energy transition and policy – potential, incentives and blockers

Rory Dalman – TNO-GDN

A sustainable **gas system**

Scale and Scope

Our shared sea



Ref: NASA

Statement: Leveraging the North Sea's subsurface potential is key to achieving energy security and climate goals

Scope:
Focus on effective maturation of subsurface 'resources' as a result of policy

Resource potential is assumed known

Focus on the main use cases foreseen now; hydrocarbons and CO_2 storage.

Disclaimer; any views and expectations are my own and very much dependant on policy.

How did we end up with this North Sea territory?

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UK-Norway-Denmark-Netherlands not in dispute, however Germany was

1958 UN convention of the continental shelf: principle of equidistance decided

Germany was not part of this convention

Convex vs concave

Ref: Sovereign limits - [The North Sea Continental Shelf Cases | Sovereign Limits]

How did we end up with this North Sea territory?

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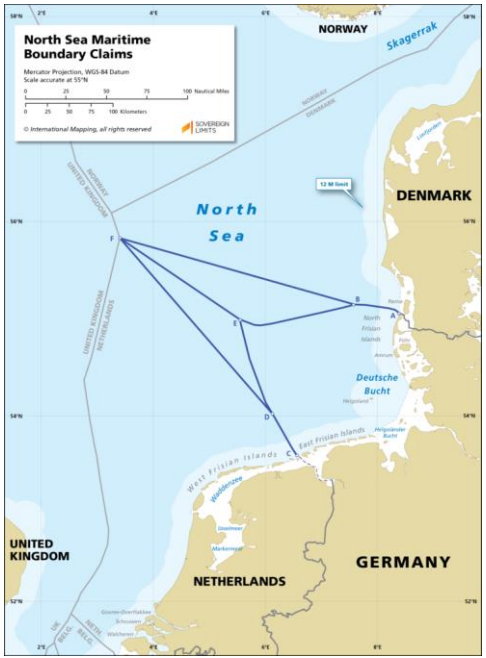

International Justice Court adjudicated and decided in 1969 (note the date!)

Time and number of signatories of the 1958 convention not significant enough -> take into account impact of "incidental coastal features"

Ref: Sovereign limits - [The North Sea Continental Shelf Cases | Sovereign Limits]

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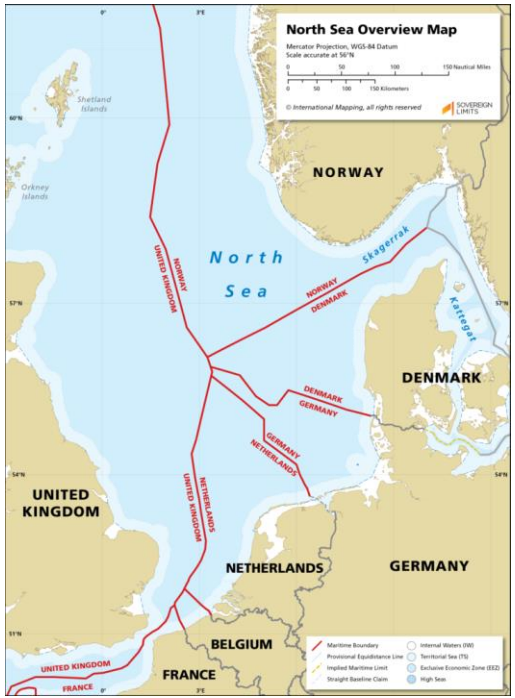
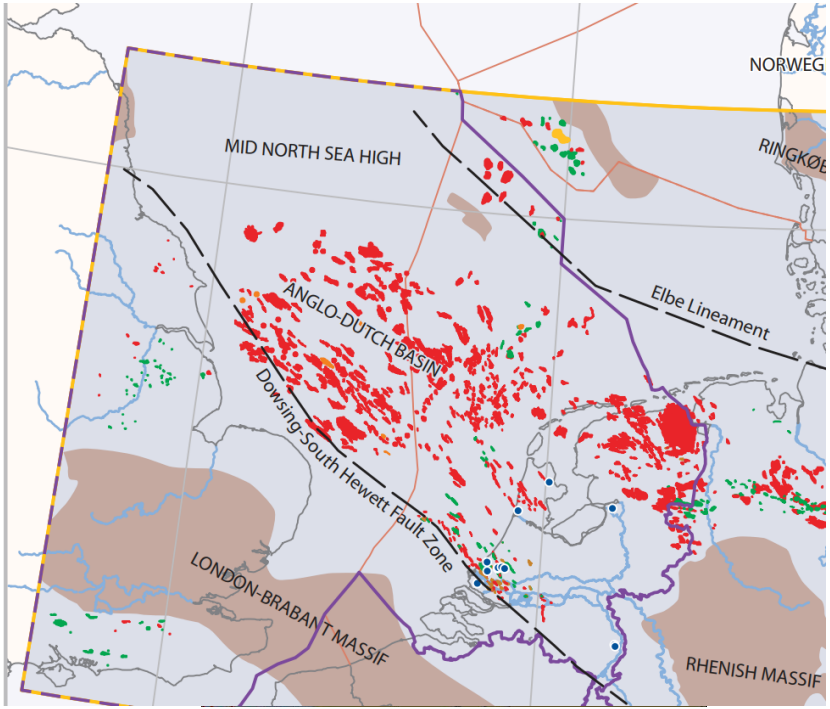


In 1971: agreement between Denmark and Germany and the Netherlands and Germany on the "Entenschnabel" extension

Ref: Sovereign limits - The North Sea Continental Shelf Cases | Sovereign Limits

How did we end up with this North Sea territory?

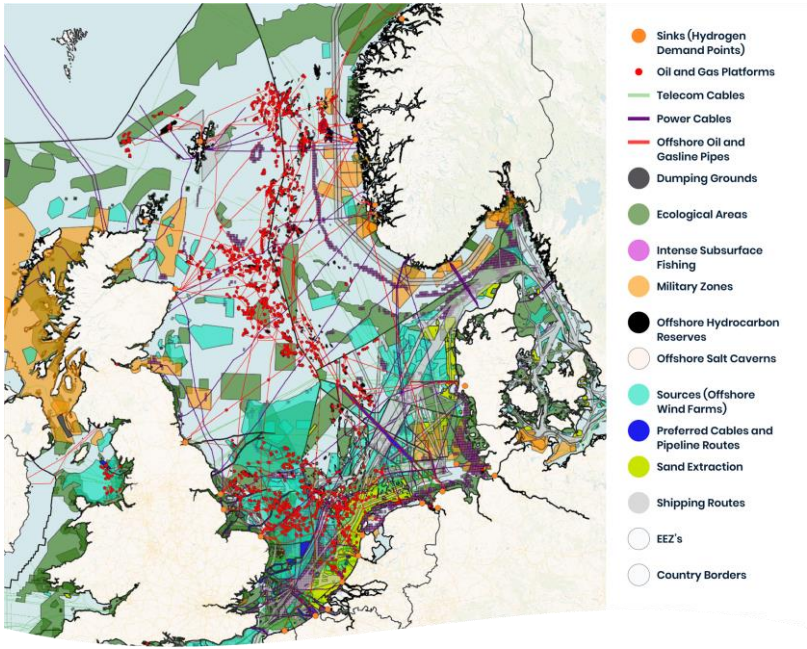


Ref: Doornenbal et al, 2022

In 1971: agreement between Denmark and Germany and the Netherlands and Germany on the "Entenschnabel" extension

Germany increased its area, without the geologically high potential area.

Fast forward 50 years:



It is busy!

Captain Obvious moment: we have many overlapping use cases and need to make choices.

Mayor of our North Sea: call for one North Sea Minister.

Ref: North Sea Energy atlas - [Project Atlas | North Sea Energy Atlas 2022 | Home]

Norwegian North Sea vs Netherlands North Sea

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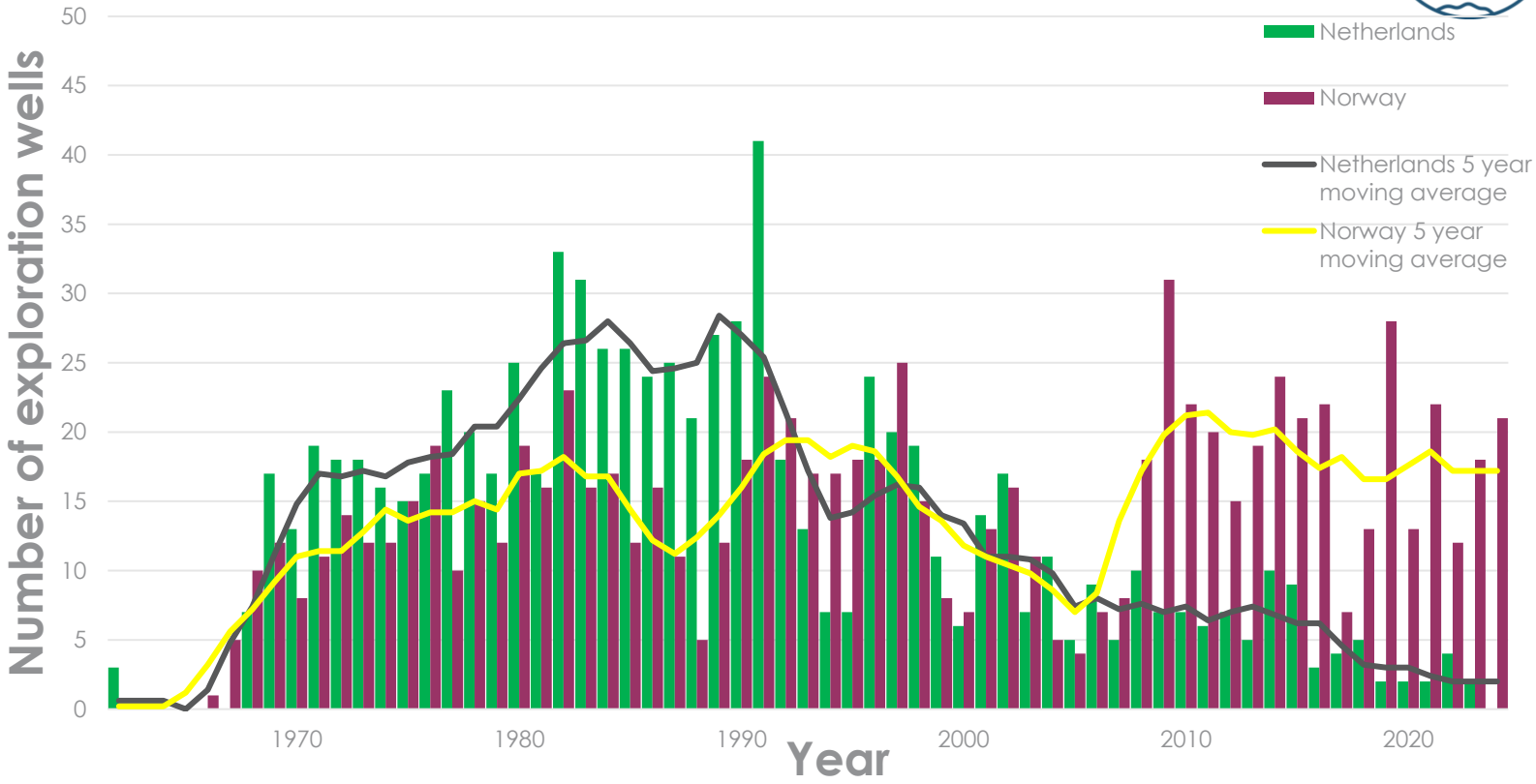

Ref: Modified after TNO 2025 R10395 - https://www.tweedekamer.nl/downloads/document?id=2025D08922

UK Southern North Sea vs Netherlands North Sea

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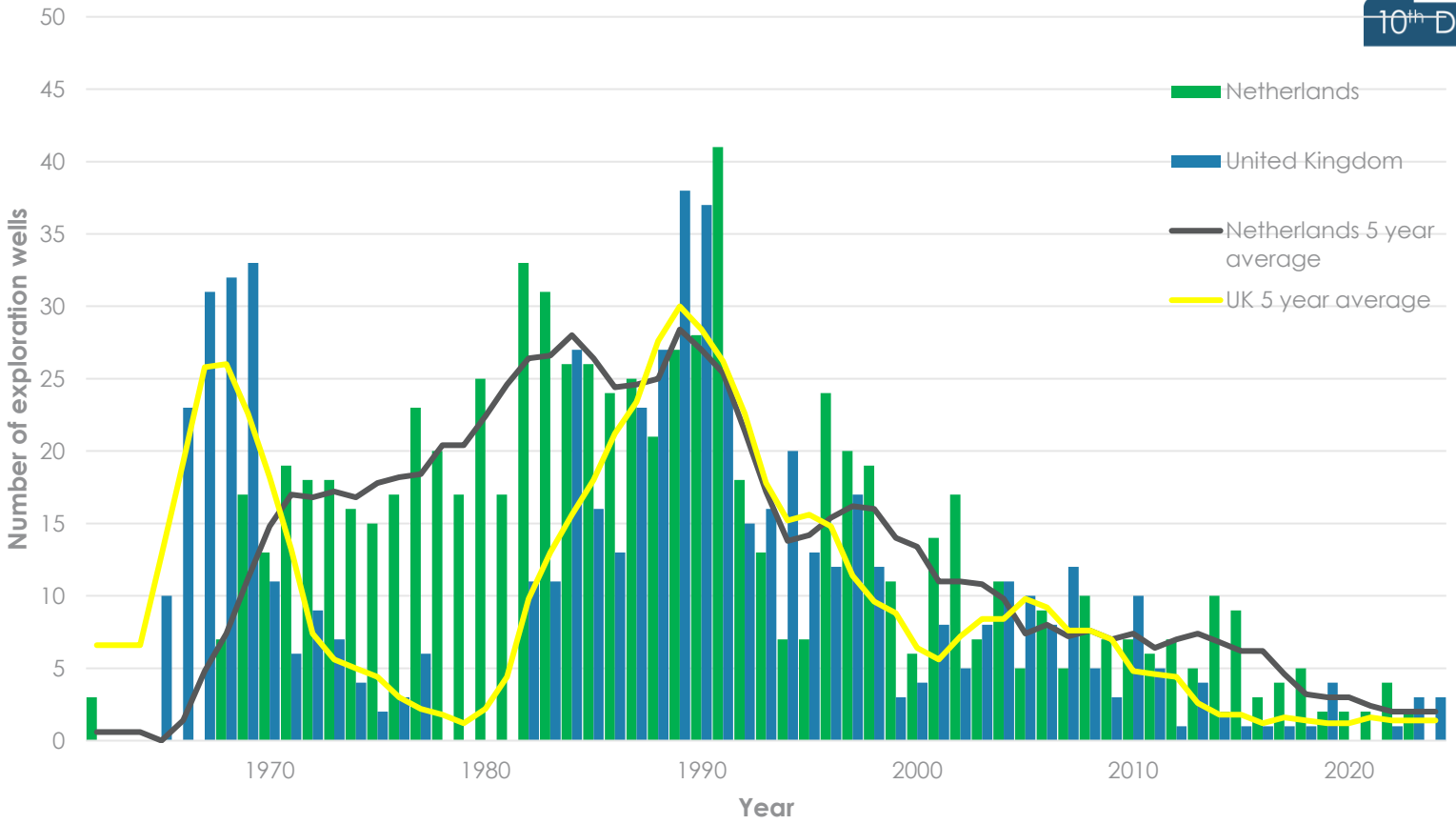

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UK Southern North Sea vs Netherlands North Sea

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No new North Sea oil wells for first time since 1960s

Labour's crackdown on oil and gas industry blamed for collapse of exploration in UK waters

Winning Noordzeegas stabiliseert na jaren van flinke daling, door nieuwe velden

Ref: Modified after TNO 2025 R10395 - https://www.tweedekamer.nl/downloads/document?id=2025D08922

Are we creaming? Yes we are.

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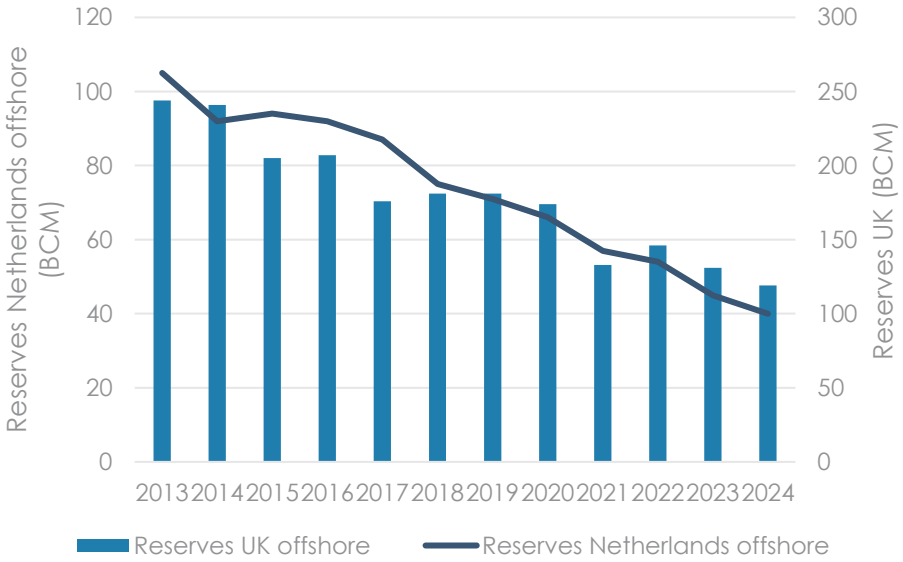
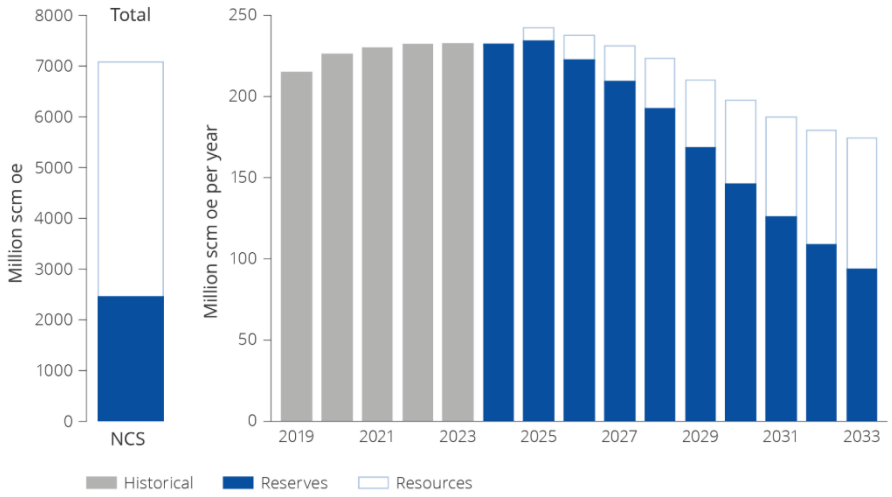
UK and NL showing the same trend

- Norway still going strong





Ref: Modified after TNO 2025 R10395 - https://www.tweedekamer.nl/downloads/document?id=2025D08922

Offshore Directorat: Remaining resources - The Norwegian Offshore DirectorateESOURCE REPORT 2022

A sustainable gas system

Are we creaming? Or are we not?

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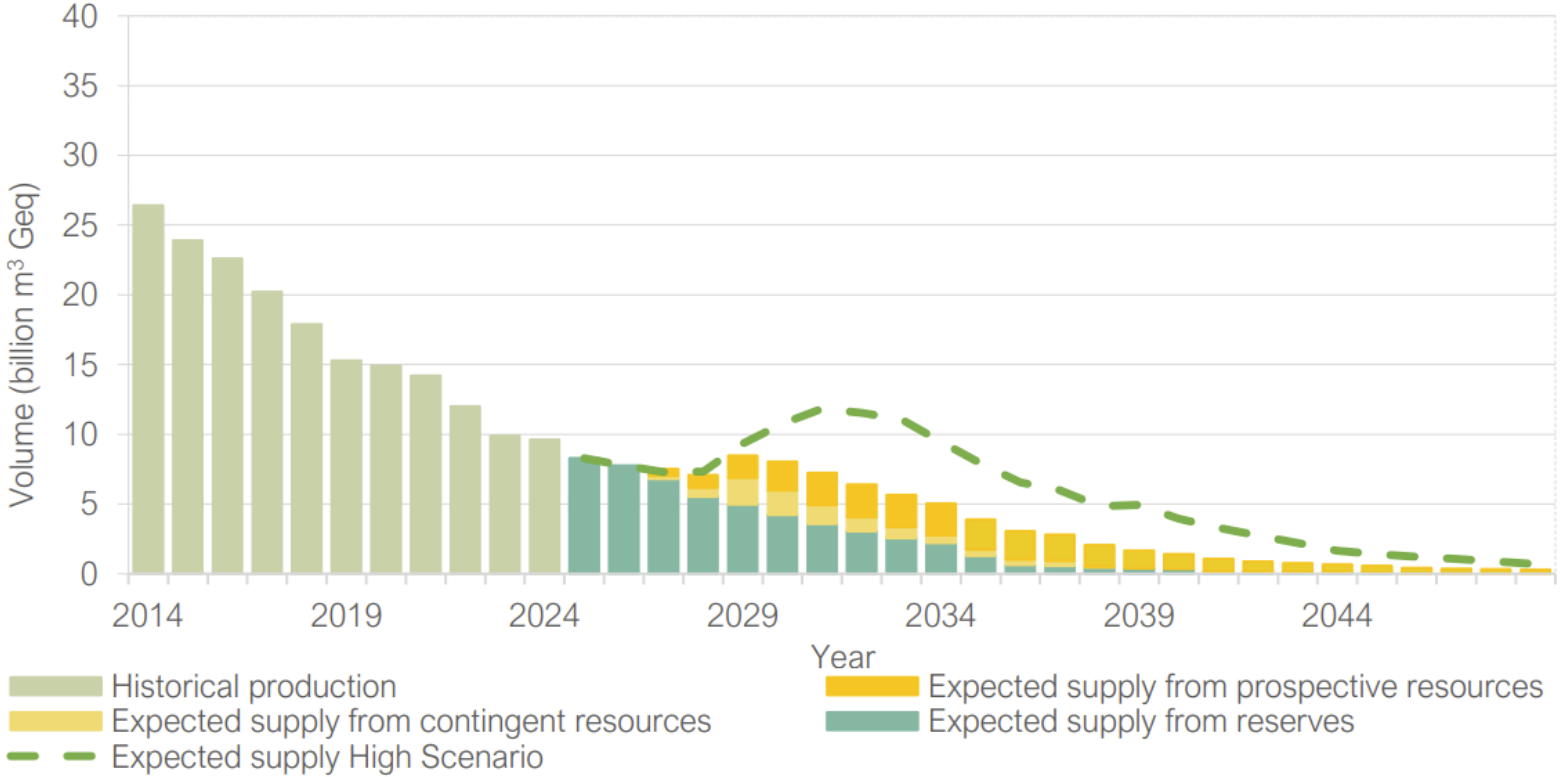

A sustainable **gas system**

Ref: Natural Resources and Geothermal Energy in NL 2024.pdf

CCS

National carbon management strategies and roadmaps for CCS or CDR development

"Where there is policy there are projects"

EU wide: NZIA obligation especially large for Netherlands and Romania.

- Germany: currently legal framework in preparation.
- Denmark: incentives in place, rapidly maturing
- UK: incentives in place, rapidly maturing
- Netherlands: incentives in place, rapidly maturing

- Norway: early incentives in place, frontrunner with first projects injecting as we speak and rapidly maturing

Source Global CCS institute

CCS key projects in Denmark, UK and the Netherlands

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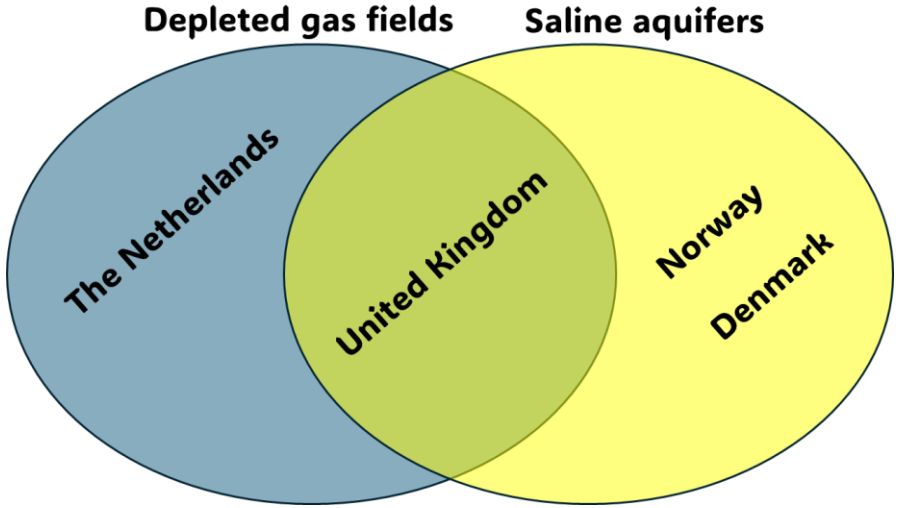
UK
Leman field - 1st injection test in a depleted gas field with 1 GT capacity.
1st operational project – Endurance - expected in 2028 (FID made end of 2024)

Denmark;
Greensand 1st injection tests in aquifer store (FID made end of 2024)
Greensand operational end of 2025/start 2026 (shipping so quicker to realize)

Netherlands:
Porthos P18-2/-4 injection expected (in gas phase) in Q3 2026
Aramis still challenging to meet the scale needed for FID



Policy goals for the North Sea - subsurface

Status and effect

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	Oil and gas E&P			CCS	
Country	Incentives	Investments		Incentives	Investments
UK				✓	✓
Denmark				✓	✓
Germany					
The Netherlands	✓	✓		✓	✓
Norway	✓ ✓	✓ ✓		✓ ✓	✓ ✓

Disclaimer: My own interpretation only! This is not an official evaluation.

Policy goals for the North Sea - subsurface

Status and effect

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Bonus policy for Germany, Denmark and the Netherlands: Net Zero Industry Act in 2024

				CCS	
Country				Incentives	Investments
UK				✓	✓
				✓	✓
The Netherlands	✓	✓		✓	✓
Norway	✓ ✓	✓ ✓		✓ ✓	✓ ✓

Disclaimer: My own interpretation only! This is not an official evaluation.

Final remarks

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- Norway frontrunner CO_2 storage and hydrocarbon production
- Netherlands worldwide first on injection CO_2 store in a depleted gas field. Investments in gas production is increasing
- Denmark just a bit earlier than NL (probably) for an operational (aquifer) CO_2 store
- UK slightly slower in CCS but has high potential projects to mature. Oil and gas in rapid decline

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