

CCS -

Carbon Capture and Storage eller CO₂-fangst og -lagring

- Hvad er CCS?
- CCS i Danmark og EU's rolle
- Hvad er status globalt?

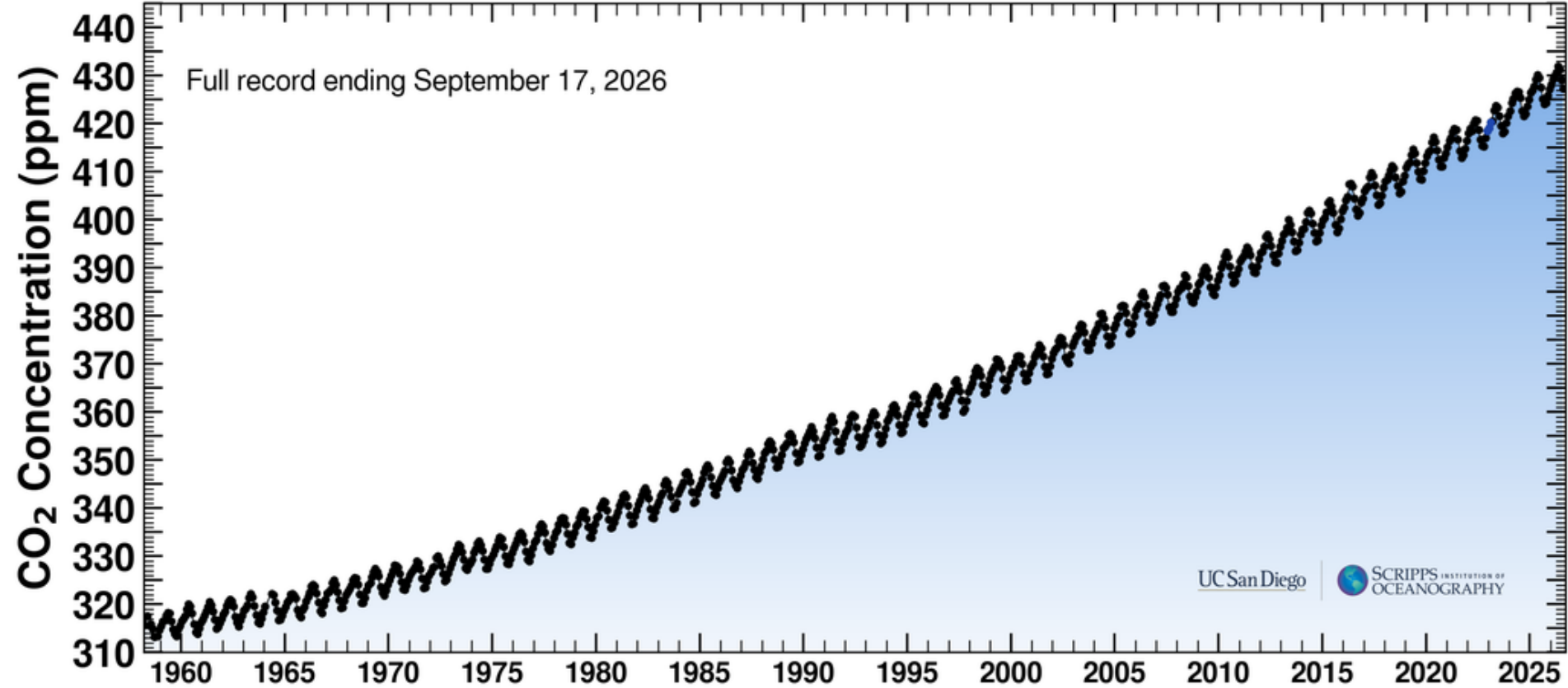
Jyderup, 19. september 2026

Palle Bendsen, NOAH



Rammen

Carbon dioxide concentration at Mauna Loa Observatory*



CO2-budget - fordi klimaet reagerer på den samlede udledning, år-for-år

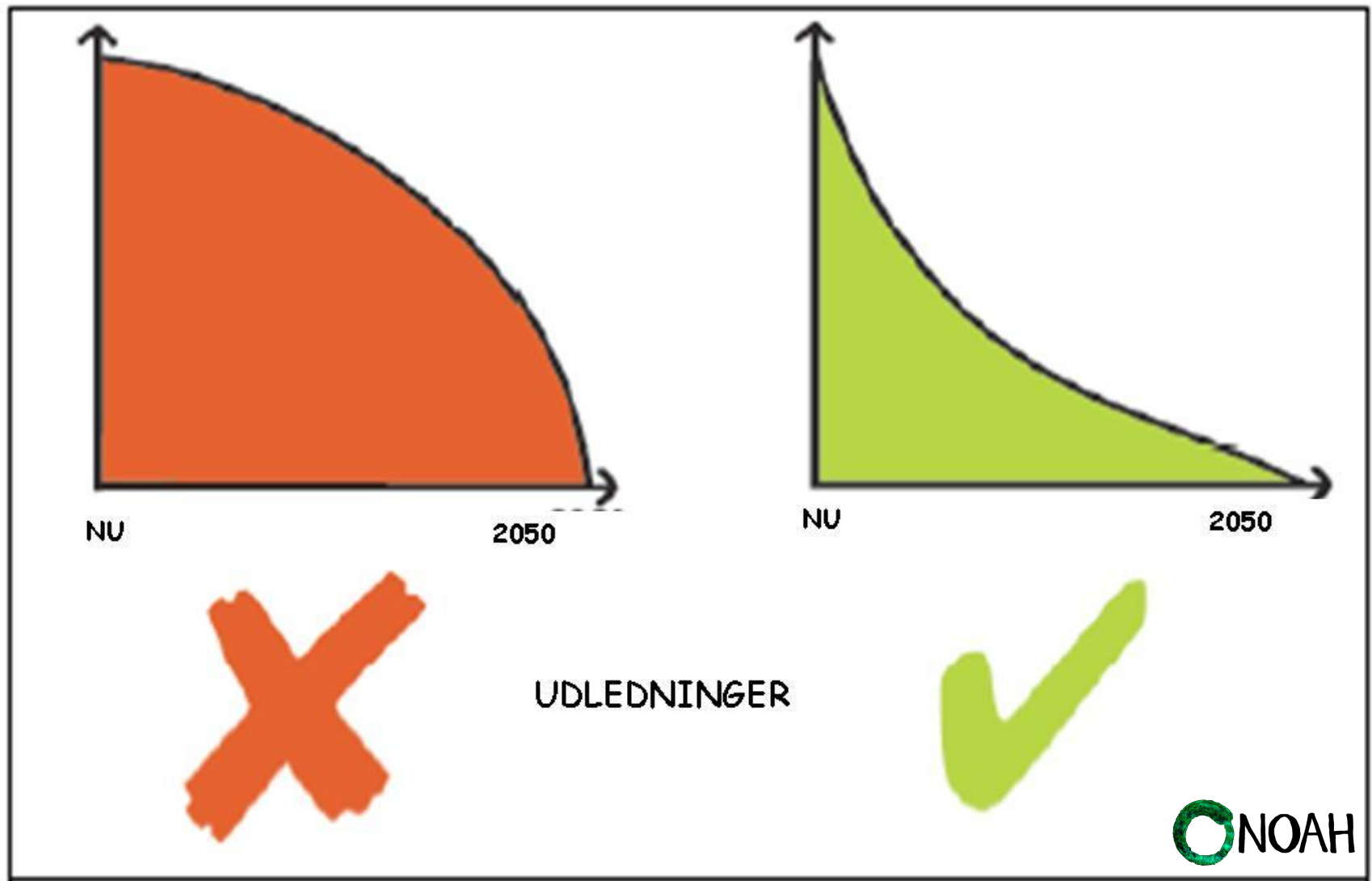
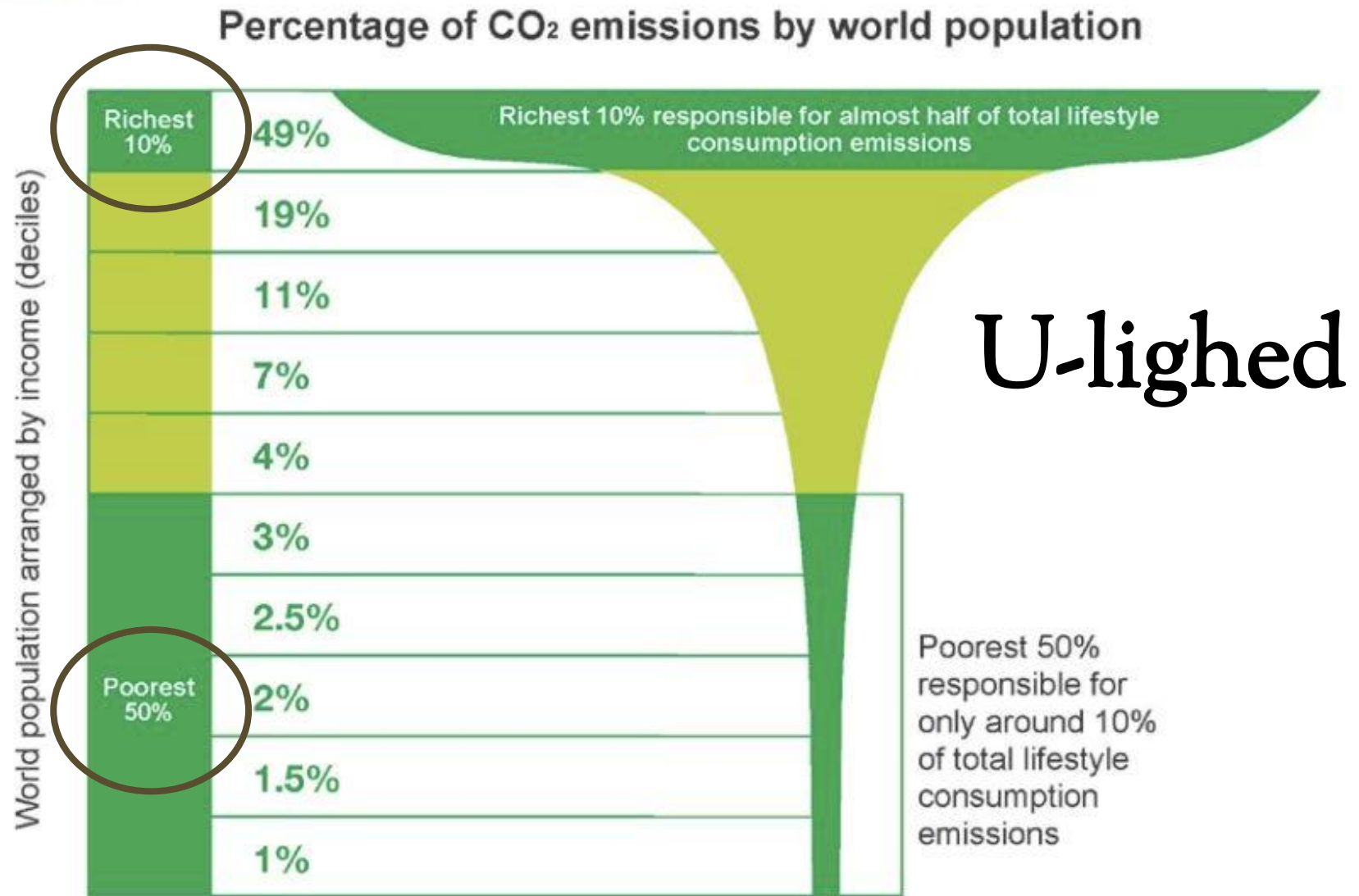


Figure 1: Global income deciles and associated lifestyle consumption emissions



Hvad er CCS?

Efter 1990: et klimaredskab?

I **NOAH** vil vi se på alle sider ...



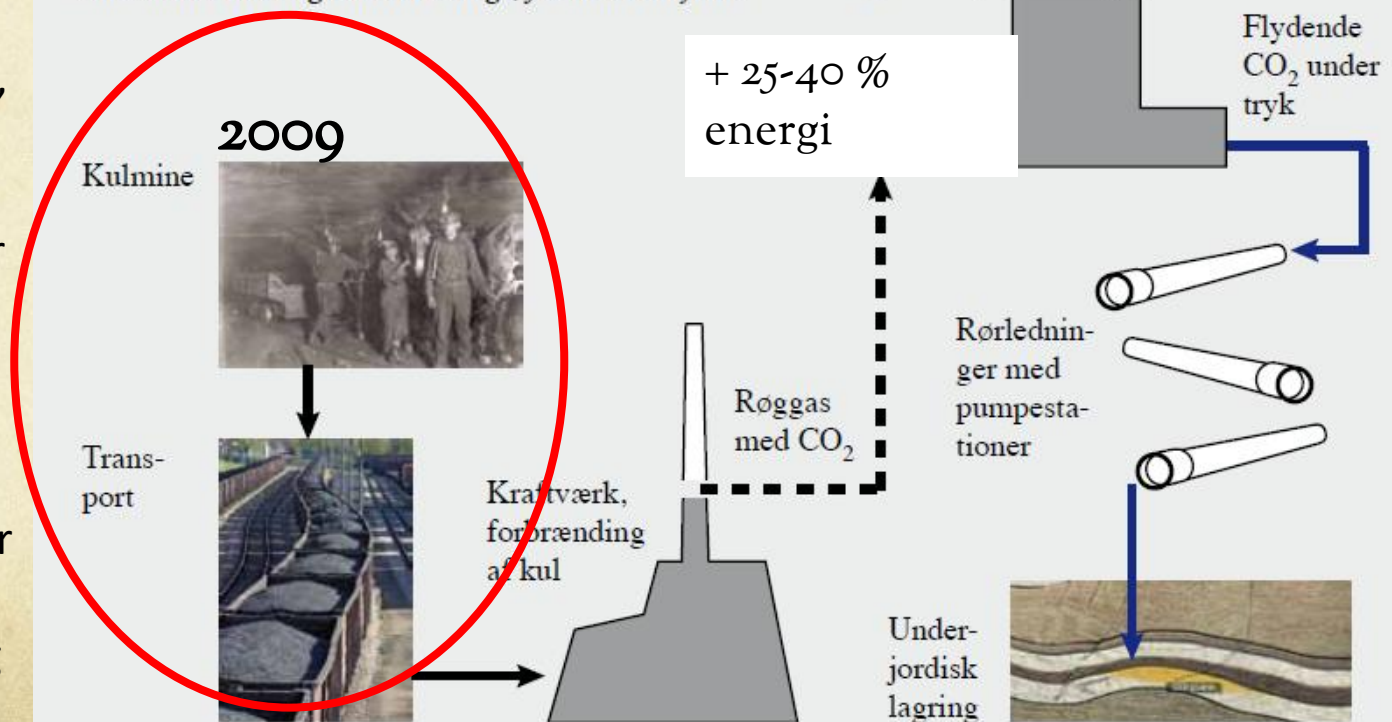
For **ingeniøren** er det et teknisk problem at fange CO₂

For **geologen** handler det om undergrunden, om lageret

For **industrien** handler det om at fortsætte deres profitable forretning

For **politikeren** handler det om at udsætte svære beslutninger og blive genvalgt

Illustrationen viser den metode, hvor man opsamler CO₂ efter forbrændingen (postcombustion). Den anses i øjeblikket for den mest interessante, fordi man regner med, at den kan anvendes på eksisterende kraftværker, som måske har nogle årtier tilbage, før de er udtjent.



Hvad er CCS?

Efter 1990: et klimaredskab?



I **NOAH** vil vi se på **alle sider** af fænomenet CCS.

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Klima:

Kan det nå at bidrage med noget?

Energi:

Er energibehovet ikke alt for stort?

Økonomi:

Er det alt for dyrt?

Finansiering:

Hvem skal betale? Forureneren eller det offentlige?

Og hvad går pengene fra?

Energiplaner:

Hvad gør det ved energiplanlægningen?

Sikkerhed:

Er det sikkert nok?

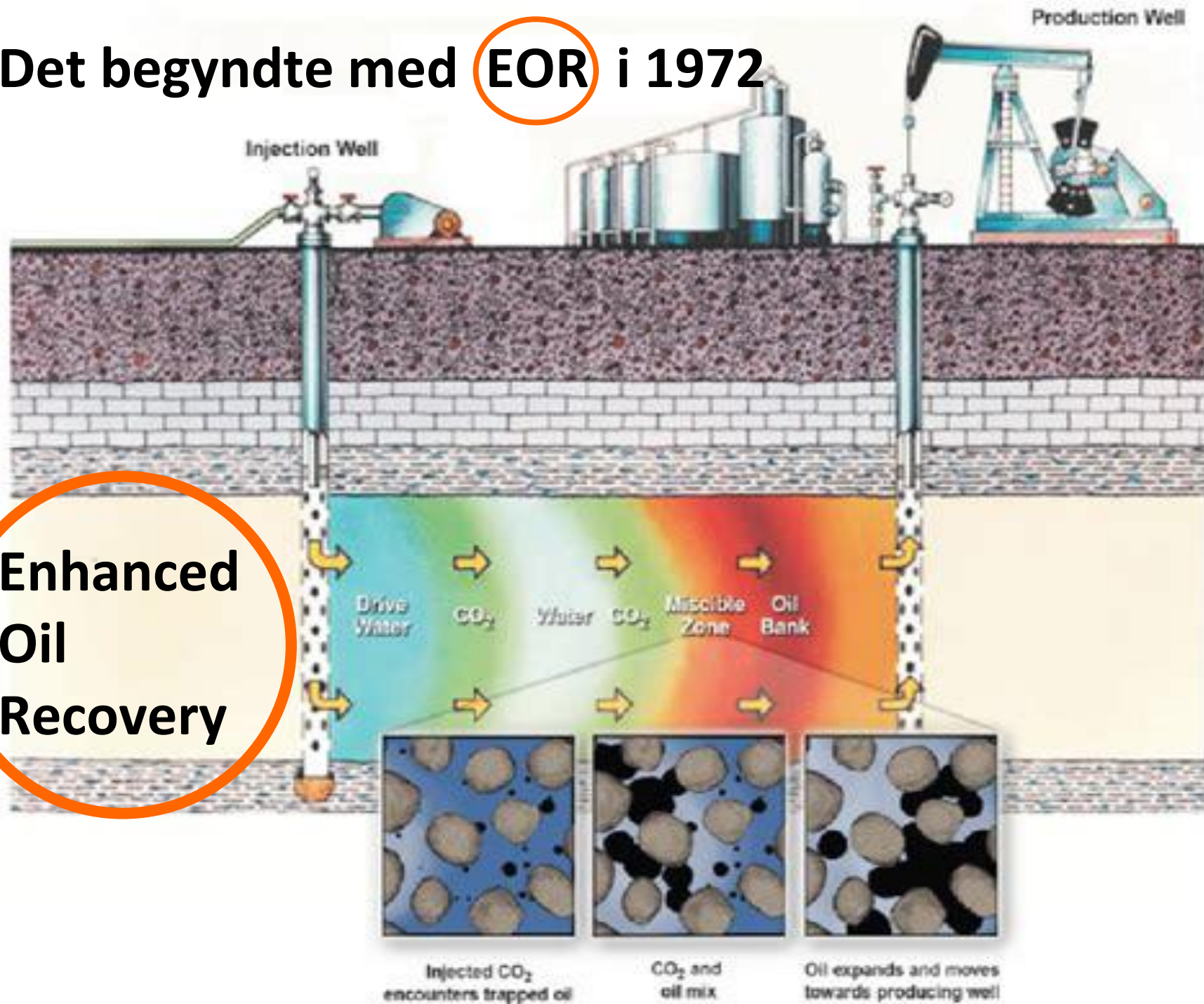
Lageransvar:

Hvor længe har operatøren ansvaret? Og hvad gør det ved de andre forhold, hvis lagere lækker?

Og hvad med CO₂-budgettet og det sociale, globale???

Det begyndte med **EOR** i 1972

**Enhanced
Oil
Recovery**



OVERSOLGT KLIMALØSNING til 70 % - målet???

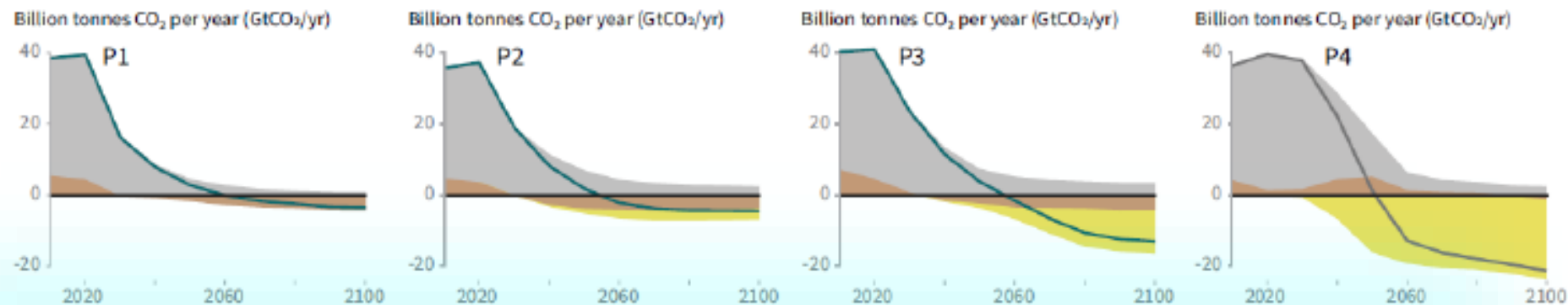
Principaftale mellem regeringen (Socialdemokratiet), Venstre, Dansk Folkeparti, Radikale Venstre, Socialistisk Folkeparti, Enhedslisten, Det Konservative Folkeparti, Liberal Alliance og Alternativet om

En køreplan for lagring af CO₂
Første del af en samlet CCS-strategi
30. juni 2021

”Aftalepartierne noterer sig, at **FN's klimapanel (IPCC)**, det internationale energiagentur (IEA) og Klimarådet fastslår, at CCS er et centralt virkemiddel for at afbøde klimaforandringerne. Kulstoffangst og lagring (Carbon Capture & Storage: CCS) er en velkendt teknologi, hvor CO₂ fanges fra røggasser eller **luften**, transporteres til og efterfølgende lagres i velegnede geologiske strukturer 1-2 km nede i undergrunden.”

CCS - i klimaforskningen

Figure 1: IPCC emissions pathways compatible with 1.5°C of warming



Source: [Summary for policymakers](#) of the IPCC Special Report on Global Warming of 1.5°C (2018).

FN's klimapanel, IPCC: Special rapport om CCS i 2005

GEUS

“I 2020 vurderede Geus, at Danmark kunne lagre mindst 12 milliarder tons* CO₂, en næsten ufattelig mængde sammenlignet med vores årlige udslip på cirka 40 millioner tons.

De 12 milliarder tons* er nævnt på første side i en bred politisk aftale fra 2023.

Den vil gøre Danmarks undergrund til lagerplads for CO₂ fra hele Europa. “

Politiken, 26. oktober 2025

I et nyt notat med “nye data har givet mere præcise estimater for specifikke områder” - nedskrev GEUS vurderingen til en fjerdedel, dvs. 3 GtCO₂

* faktisk 12-20 milliarder tons - (1 milliard tons kaldes også 1 Gigaton (Gt))

Klimahandling – I mål med fangst og lagring af CO₂

- Klima-, Energi- og Forsyningsministeriet August 2023

Regeringen foreslår derfor, at:

Der fortsat arbejdes for at fremme danske interesser i bl.a. EU's arbejde med rammerne for CCS-området samt **med negative udledninger i EU's kvotesystem**, jf. En køreplan for fangst, transport og lagring af CO₂ (Anden del af en samlet CCS-strategi) af december 2021.

Der fortsat arbejdes for CCS-strategiens målsætning om at indgå **flere samarbejdsaftaler med ligesindede lande**. Særligt prioriteres arbejdet med Tyskland, Norge, Holland, Sverige, Polen og Frankrig for at understøtte udviklingen af CCS i Danmark og resten af Europa.

Der iværksættes en strategisk indsats for at **understøtte hjemtagningen af EU-støtte** til bl.a. CCS-projekter, jf. Finansloven for 2023.

Der tages dansk stilling til **grænseoverskridende rørtransport og sammenkobling af regionale transportnet**, når Europa Kommissionen fremlægger sine konklusioner på området – forventeligt i 2024.

Udspillet skal samtidigt understøtte ambitionen om, at **Danmark skal blive en europæisk hub for CO₂ lagring**. Det vil sikre, at danske lagringsressourcer kan understøtte omkringliggende landes klimaambitioner.

CCS i EU

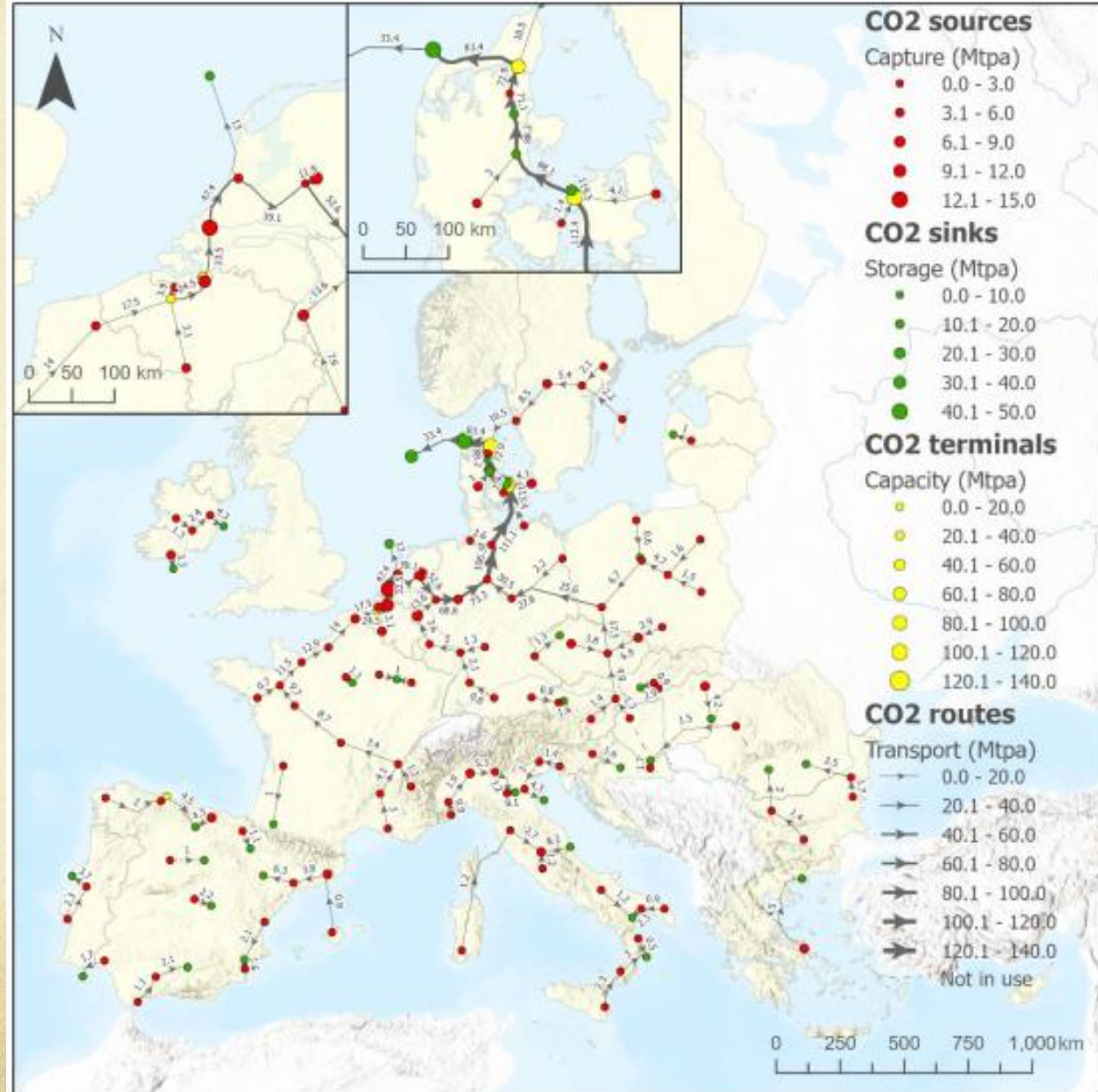
EU har været med til at understøtte forskning, og man har lavet et **CCS-Direktiv** tilbage i 2008, som banede vejen for lovgivning i alle medlemsstaterne. Herhjemme ved en ændring af **Undergrundsloven**.

EU har besluttet, at man samlet set skal reducere udledningerne af CO₂ inden for EU med
55 % i 2030,
90 % i 2040,
100 % i 2050 (klimaneutralitet)

Klimaneutralitet betyder, at de tilbageværende drivhusgasudledninger skal ophæves af mindst lige så store optag af drivhusgasser primært CO₂, f.eks. i skove og andre naturområder - eller BECCS eller DACCS

Mulig CO₂-infrastruktur i 2040 (set fra EU)

19.000 km
rørledninger



IEA
CCUS
database
2026
med 1110
CCS-
projekter

86 er i drift

79	Kemper county CCUS (MS)	241	United States	3	3		Power and heat	Power (coal)	EOR		https://www/https/
80	in Salah	415	Algeria	0,5	0,5		Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
81	Green Plains Advantage Nebraska - Central City biorefinery (NE)	178	United States	0,3 - 0,33	0,332	0,332	Fuel transformation	Bioethanol	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
82	Green Plains Advantage Nebraska - Wood River biorefinery (NE)	183	United States	0,31 - 0,35	0,346	0,346	Fuel transformation	Bioethanol	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
83	Green Plains Advantage Nebraska - York biorefinery (NE)	184	United States	0,13 - 0,14	0,143	0,143	Fuel transformation	Bioethanol	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
84	Illinois Industrial Carbon Capture and Storage (IL)	223	United States	1	0,5 - 1,1	0,5	Fuel transformation	Bioethanol	Dedicated storage	ADM Decatur Campus CO2 Storage	https://www/https/
85	Midwest AgriEnergy Blue Flint ethanol (ND)	277	United States		0,2	0,2	Fuel transformation	Bioethanol	Dedicated storage		https://www/https/
86	Gevo Net Zero North (ND) (formerly Red Trail Energy BECCS)	350	United States		0,18	0,18	Fuel transformation	Bioethanol	Dedicated storage		https://www/https/
87	ADM Columbus West Mill (NE)	627	United States		0,238	0,238	Fuel transformation	Bioethanol	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
88	Madrid Ethanol plant (NE)	1410	United States		0,286	0,286	Fuel transformation	Bioethanol	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
89	HeidelbergMaterials Brevik	201	Norway	0,4	0,4	0,044	Industry	Cement	Dedicated storage	Northern Lights	https://www/https/
90	Eastern Wyoming Sequestration Hub (WY) (Juniper 1-1)	133	United States	1,5	1,5		CO2 T&S	CO2 storage	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
91	Meadowbrook Carbon Storage Hub (MCSH) (ALB) Initial start-up	273	Canada	0,002	0,002		CO2 T&S	CO2 T&S	Dedicated storage	Meadowbrook Carbon Storage Hub	https://www/https/
92	Northern Lights Phase 1	295	Norway	1	1,5	1,5	CO2 T&S	CO2 T&S	Dedicated storage	Northern Lights	https://www/https/
93	Trailblazer CO2 pipeline (NE)(WY)	769	United States	10 - 16	10		CO2 T&S	CO2 transport	Dedicated storage	Trailblazer CO2 pipeline (NE-WY)	https://www/https/
94	Clmeworks Orca	434	Iceland	0,004	0,004	0,004	DAC	Direct Air Capture	Dedicated storage		https://www/https/
95	Clmeworks Mammoth Project phase 1	441	Iceland	1	0,006	0,006	DAC	Direct Air Capture	Dedicated storage		https://www/https/
96	Deep Sky Alpha phase 1 (AB)	952	Canada	0,002	0,002	0,002	DAC	Direct Air Capture	Dedicated storage		https://www/https/
97	Origen DAC Demonstration (EERC) (ND)	1337	United States	0,001	0,001	0,001	DAC	Direct Air Capture	Dedicated storage	Meadowbrook Carbon Storage Hub	https://www/https/
98	Moringa Phase 1	1423	Dman-United Arab Emirates	1	0,001	0,001	DAC	Direct Air Capture	Dedicated storage		https://www/https/
99	Quest CCS (ALB)	347	Canada	1	1		Fuel transformation	Hydrogen or ammonia	Dedicated storage		https://www/https/
100	Gorgon CCS	173	Australia	3,4 - 4	1,6		Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
101	Qatar LNG	344	Qatar	1,23 - 2,2	2,2		Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
102	Moolamba Carbon Capture and Storage	358	Australia	1	1,7	1,7	Fuel transformation	Natural gas processing/LNG	Dedicated storage	Moolamba CCS storage hub	https://www/https/
103	Sleipner	374	Norway	1	1	1	Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
104	Snohvit CO2 capture and storage	0,75	Norway	0,7	0,7		Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
105	Pifoo's Dark Horse Trading Facility and storage	1311	United States	0,18 - 0,19	0,19		Fuel transformation	Natural gas processing/LNG	Dedicated storage		https://www/https/
106	Enping 15-1 offshore CCS (Hong Kong)	95	People's Republic of China	0,3	0,3		Fuel transformation	Oil and gas extraction	Dedicated storage		https://www/https/
107	Campo Viejo Gas Processing Plant	1308	United States	0,12 - 0,19	0,12		Fuel transformation	Oil and gas extraction	Dedicated storage		https://www/https/
108	Arklow CO2 Compression Facility (KS)	35	United States	0,19 - 0,31	0,31		Fuel transformation	Bioethanol	EOR		https://www/https/
109	Bonanza BioEnergy CCUS EOR (KS)	53	United States	0,1 - 0,16	0,16		Fuel transformation	Bioethanol	EOR	Bonanza Storage (KS)	https://www/https/
110	Karamay Dunhua methanol plant (Xinjiang)	238	People's Republic of China	0,1	0,1		Industry	Chemicals	EOR		https://www/https/
111	Guanghui Energy CCUS Integration project Phase 1 (Xinjiang)	642	People's Republic of China	0,1	0,1		Industry	Chemicals	EOR		https://www/https/
112	Xinjiang Dunhua Wuziwan Industrial Park CO2 Capture Project	1299	People's Republic of China	0,15	0,15		Industry	Chemicals	EOR		https://www/https/
113	Xinjiang Guoen Chemical CO2 CCU Phase 1 (Xinjiang)	1309	People's Republic of China	1	0,1	0,1	Industry	Chemicals	EOR		https://www/https/
114	Enhance Clive Sequestration Facility (ALB)	94	Canada	1,5	1,5		CO2 T&S	CO2 storage	EOR	Alberta Carbon Trunk Line (ACTL)	https://www/https/
115	Weyburn-Midale storage (SK)	659	Canada	3	3		CO2 T&S	CO2 storage	EOR		https://www/https/
116	CO2 EOR Project Croatia - Zutica South	725	Croatia				CO2 T&S	CO2 storage	EOR		https://www/https/
117	Alberta Carbon Trunk Line (ACTL) (ALB)	25	Canada	14,6	14,6		CO2 T&S	CO2 transport	EOR	Alberta Carbon Trunk Line (ACTL)	https://www/https/
118	Great Plains Synfuels Plant (ND) Weyburn-Midale (SK)	176	United States-Canada	1	3	3	Fuel transformation	Coal-to-gas	EOR	Weyburn storage unit	https://www/https/
119	Sinopec Nanjing Chemical Industries CCUS Cooperation Project (J)	369	People's Republic of China	0,2	0,2		Fuel transformation	Coal-to-gas	EOR	Jiangsu oilfield	https://www/https/
120	Yulin Coal Chemical CCUS (Shaanxi) Phase 1	411	People's Republic of China	1	0,3	0,3	Fuel transformation	Coal-to-liquids	EOR	Yanchang oilfield	https://www/https/
121	Jilong Petrochemical CCUS (Nanjing refinery) (Jiangsu) phase 1	643	People's Republic of China	1	0,1	0,1	Fuel transformation	Coal-to-liquids	EOR	Jiangsu oilfield	https://www/https/
122	CEIC-CNPC CCUS-EOR demonstration (Ningxia) Phase 1	813	People's Republic of China	1	0,4	0,4	Fuel transformation	Coal-to-liquids	EOR		https://www/https/
123	Bantam DAC (OK)	1307	United States	0,01 - 0,01	0,005		DAC	Direct Air Capture	EOR	Oklahoma Carbon Hub	https://www/https/
124	Coffeyville fertilizer plant (KS)	105	United States	0,7 - 0,9	0,9		Industry	Fertiliser	EOR		https://www/https/
125	Erid fertilizer (OK)	144	United States	0,68	0,68		Industry	Fertiliser	EOR		https://www/https/
126	PCS Nitrogen-Gelsmar plant (LA)	305	United States	0,2 - 0,3	0,3		Industry	Fertiliser	EOR		https://www/https/
127	Sinopec Qilu Petrochemical Shengli (Shandong)	370	People's Republic of China	0,7 - 1	1		Industry	Fertiliser	EOR	Shengli oilfield	https://www/https/
128	Nutrien Redwater Fertilizer (ALB) phase 1	407	Canada	1	0,3	0,3	Industry	Fertiliser	EOR	Alberta Carbon Trunk Line (ACTL)/Enhance Clive Soq	https://www/https/
129	Emirates Steel Industries	4	United Arab Emirates	0,8	0,8		Industry	Iron and steel	EOR		https://www/https/
130	Century plant (TX)	80	United States	4,32 - 5	4,32		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
131	Changfeng Gas plant /Jilin Oil Field CO2-EOR Full-scale (Jilin)	83	People's Republic of China	0,43 - 0,6	0,6		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
132	Core Energy CO2-EOR South Chester plant (MI)	106	United States	0,35	0,35		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
133	Largave Shute Creek Gas Processing Plant 2010 expansion (WY)	251	United States	2	3,5	3,5	Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
134	Largave Shute Creek Gas Processing Plant original (WY)	252	United States	1	3,5	3,5	Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
135	Leit Cabin Gas Plant (WY)	267	United States	0,9	0,9		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
136	Petrobras Santos Basin pre-salt oilfield CCS (ES)	310	Brazil	1	3 - 14,2	14,2	Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
137	Terrill Natural Gas Processing Plant (former Val Verde) (TX)	389	United States	0,4 - 0,5	0,5		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
138	MOI Szank field CO2 EOR	669	Hungary	0,16	0,16		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
139	New Generation Gas Gathering (NG3)	1312	United States	1,2	1,2		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
140	Barnett Zero CCS (TX) (Bridgeport plant)	1384	United States	0,18 - 0,21	0,183		Fuel transformation	Natural gas processing/LNG	EOR		https://www/https/
141	Enping 15-1 offshore CCS (Hong Kong) (well extension)	1414	People's Republic of China		0,1	0,1	Fuel transformation	Oil and gas extraction	EOR		https://www/https/
142	Boundary Dam CCS (SASK)	59	Canada	1	1		Power and heat	Power (coal)	EOR		https://www/https/
143	Petra Nova Carbon Capture (TX)	309	United States	1,4	1,4		Power and heat	Power (coal)	EOR		https://www/https/
144	Xinjiang Jinlong Shewu Thermal Power Plant (Xinjiang)	1415	People's Republic of China	0,2	0,2		Power and heat	Power (coal)	EOR		https://www/https/
145	NWR Sturgeon Refinery (ALB)	293	Canada	1,3	1,3		Fuel transformation	Refining	EOR	Alberta Carbon Trunk Line (ACTL)/Enhance Clive Soq	https://www/https/
146	Valero Port Arthur Refinery (TX)	323	United States	0,9	0,9		Fuel transformation	Refining	EOR		https://www/https/
147	CF Industries blue ammonia Donaldsonville (LA)	458	United States	2	2		Industry	Fertiliser	EOR and storage	Use carbon capture and storage (T)	https://www/https/
148	Jinjiang Chemical CCUS Project (Xinjiang)	1298	People's Republic of China	0,1	0,1		Industry	Fertiliser	EOR and storage		https://www/https/
149	China Energy Taizhou power (Jiangsu)	85	People's Republic of China	0,5	0,5		Power and heat	Power (coal)	Mixed		https://www/https/
150	China Energy Guohua Jinjie Power (Shaanxi)	86	People's Republic of China	0,15	0,15		Power and heat	Power (coal)	Mixed		https://www/https/
151	Uthmaniyah CO2-EOR demonstration	395	Saudi Arabia	0,8	0,8		Fuel transformation	Natural gas processing/LNG	Mixed		https://www/https/
152	Huaneng Shanghai Shidongkou Second Power Plant (Shanghai)	1472	People's Republic of China	0,12	0,12		Power and heat	Power (coal)	Mixed		https://www/https/
153	Baotou Steel (Baogang Group) (Inner Mongolia) phase 1	1053	People's Republic of China	1	0,5	0,5	Industry	Iron and steel	Unknown/unspecified		https://www/https/
154	Carbon Dioxide Full Oxygen Combustion Enrichment and Purification	1208	People's Republic of China		0,2	0,2	Industry	Cement	Unknown/unspecified		https://www/https/
155	Arcelor LanzaTech Carbulyst (Steelanol) Ghent	34	Belgium	0,125	0,125		Industry	Iron and steel	Use		https://www/https/
156	Horizon Oil Sands (ALB)	209	Canada	0,4	0,4		Fuel transformation	Refining	Use		https://www/https/
157	Sailboat Green Methanol plant Shengong petrochemical (Jiangsu)	233	People's Republic of China	0,15 - 0,16	0,16		Industry	Chemicals	Use		https://www/https/
158	Shell Netherlands Pernis Refineries (SK)	365	Netherlands	0,75	0,75		Fuel transformation	Refining	Use		https://www/https/
159	Twence Hengelo facility (Boendershoek)	394	Netherlands	0,1	0,1		Power and heat	Power and heat (waste)	Use		https://www/https/
160	Huaneng Longdong Energy base/Zhengrong coal power plant (G)	593	People's Republic of China		1,5	1,5	Power and heat	Power (coal)	Use		https://www/https/
161	Tracy DAC facility	985	United States	0,001	0,001		DAC	Direct Air Capture	Use		https://www/https/
162	United States Clear Lake HyCO Plant (TX)	1043	United States	0,18	0,18		Industry	Chemicals	Use		https://www/https/
163	CCAP	1096	Netherlands	0,5	0,5		CO2 T&S	CO2 transport	Use		https://www/https/
164	Mikawa Power Plant BECCS Fukushima Prefecture	279	Japan	0,18	0,18	0,18	Power and heat	Power (bioenergy)	Use and storage		https://www/https/
165	Beihai cement CCUS project (Beijing)	591	People's Republic of China	0,1	0,1		Industry	Cement	Use low impact		https://www/https/
166	Global thermostat headquarters plant (CO)	437	United States	0,001	0,001		DAC	Direct Air Capture	Vented		https://www/https/
167	8Rivers H2 (RRH2) (WY)	3	United States				Fuel transformation	Hydrogen or ammonia	Dedicated storage		https://www/https/

IEA-CCUS-database 2026

86 anlæg er i drift. De opsamler **95 MtCO₂**

= **0,24%** af de globale CO₂-udledninger

40 anlæg med **EOR** som formål opsamler **64 MtCO₂**

= **0,16%** af de globale CO₂-udledninger

27 Anlæg til **dedikeret lagring** opsamler **24 MtCO₂**

= **0,06 %** af de globale CO₂-udledninger!



NOAH-kilder

- Om CCS: <https://ccs-info.org> (2009-14) & <https://noah.dk/ccs>
- Klima: <https://www.global-klima.org>
- NOAH: <https://noah.dk>

Andre kilder

- Miljøforeningen Havnsø-Føllenslev: <https://miljohf.dk/>
- The Institute for Energy Economics and Financial Analysis (IEEFA): <https://ieefa.org/>