



GLOBAL
CCS
INSTITUTE



Global Status of CCS

CAGS Symposium, 26 June 2018

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Global CCS Institute



What is the GCCSI?

- International membership organisation.
- Offices in Washington DC, Brussels, Beijing and Tokyo. Headquarters in Melbourne.
- Opening a new office in London
- Our diverse international membership consists of:
 - governments,
 - global corporations,
 - small companies,
 - research bodies, and
 - NGOs.
- Specialist expertise covers the CCS/CCUS chain.
- Membership and consulting services



INSTITUTE
STRATEGY
2017 - 2022

[OUR VISION]

CCS is an integral part
of a low emission future

[OUR MISSION]

To accelerate the deployment and
commercial viability of CCS globally

[OUR STRATEGIC IMPERATIVES]

We're a Member led organisation
We're a sensible, but bold, risk taker
We're agile and we embrace change

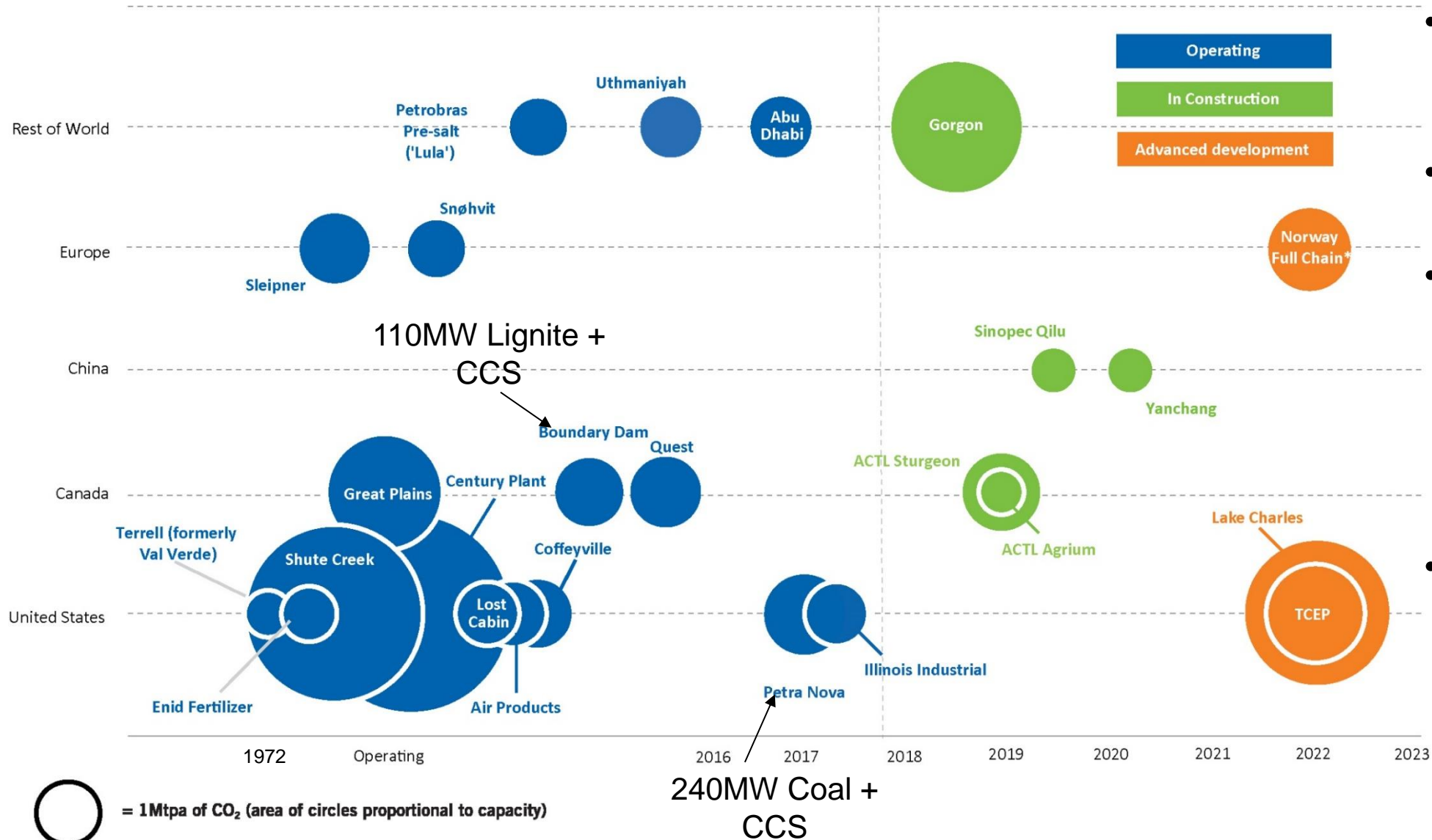
We're financially sustainable
We expand & leverage the CCS community
Our focus is on Valued & Impactful work

[OUR IDENTITY]


We're recognised and sought
out as the premier CCS body



CCS is a CO₂ mitigation technology with application in energy and industry



- 17 large scale facilities capturing ~30Mtpa CO₂
- 5 facilities in construction
- 22 large scale facilities expected to be in operation by 2018/19 capturing ~37Mtpa CO₂
- Another 85 smaller scale pilot and demonstration projects operating or completed

 = 1Mtpa of CO₂ (area of circles proportional to capacity)

Source: Global Carbon Capture and Storage Institute



Large-scale CCS facilities by region or country –2017

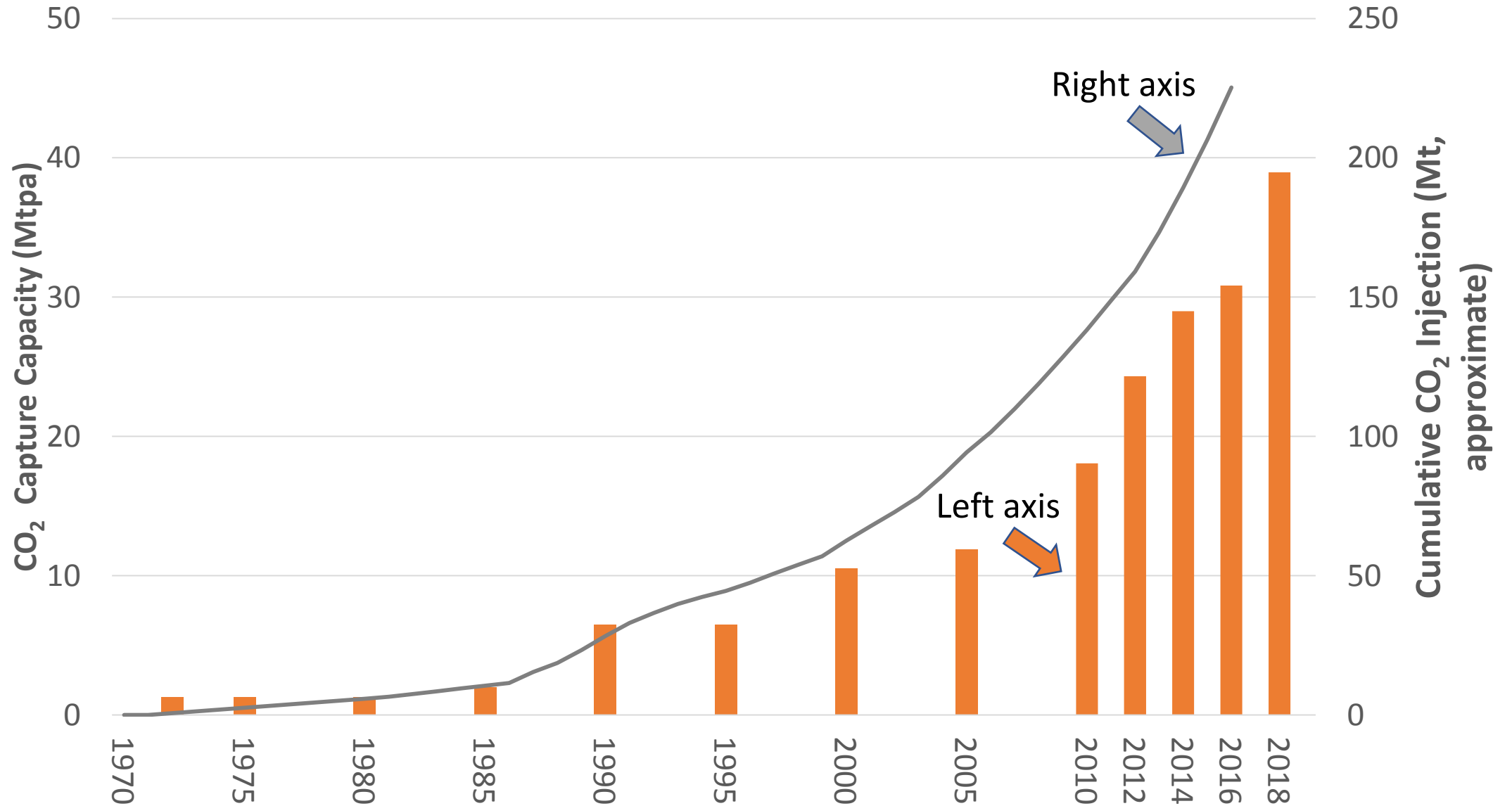
	Early development	Advanced development	Construction	Operating	Total
North America	-	2	2	12	16
China	6	-	2	-	8
Europe	2	1	-	2	5
Gulf Cooperation Council	-	-	-	2	2
Rest of World*	3	1	1	1	6
Total	11	4	5	17	37

** Includes facilities in Australia, Brazil and South Korea.*

North America dominates – 16 (of 21) facilities in operation or construction, China has most facilities in development, facility pipeline needs replenishment



Deployment of CCS continues...



Source: Global CCS Institute (November 2017)

Note: Data include large and key smaller scale facilities in operation and under construction



Pre-requisites for CCS deployment

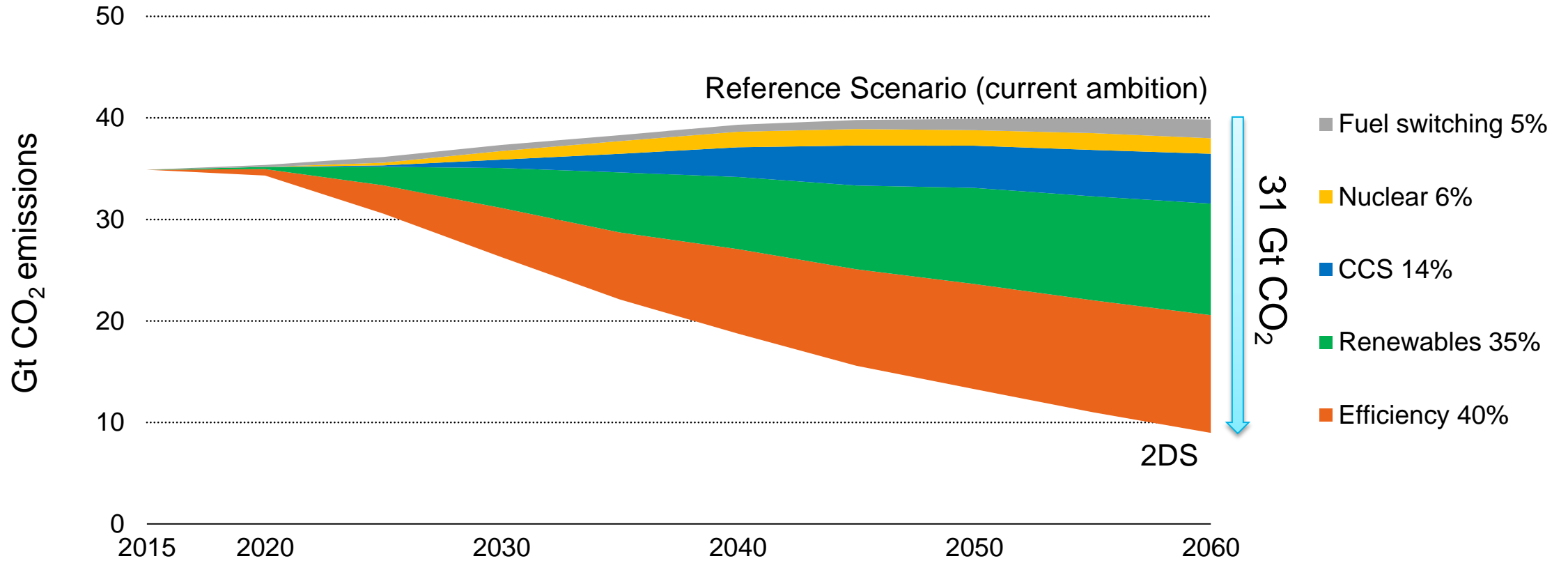


Pre-requisites for CCS deployment

1. Demand for CO₂ abatement services
2. Cost competitive technology
3. Effective regulation
4. Community acceptance of CCS
5. Access to geological storage reservoirs
6. Incentive to invest



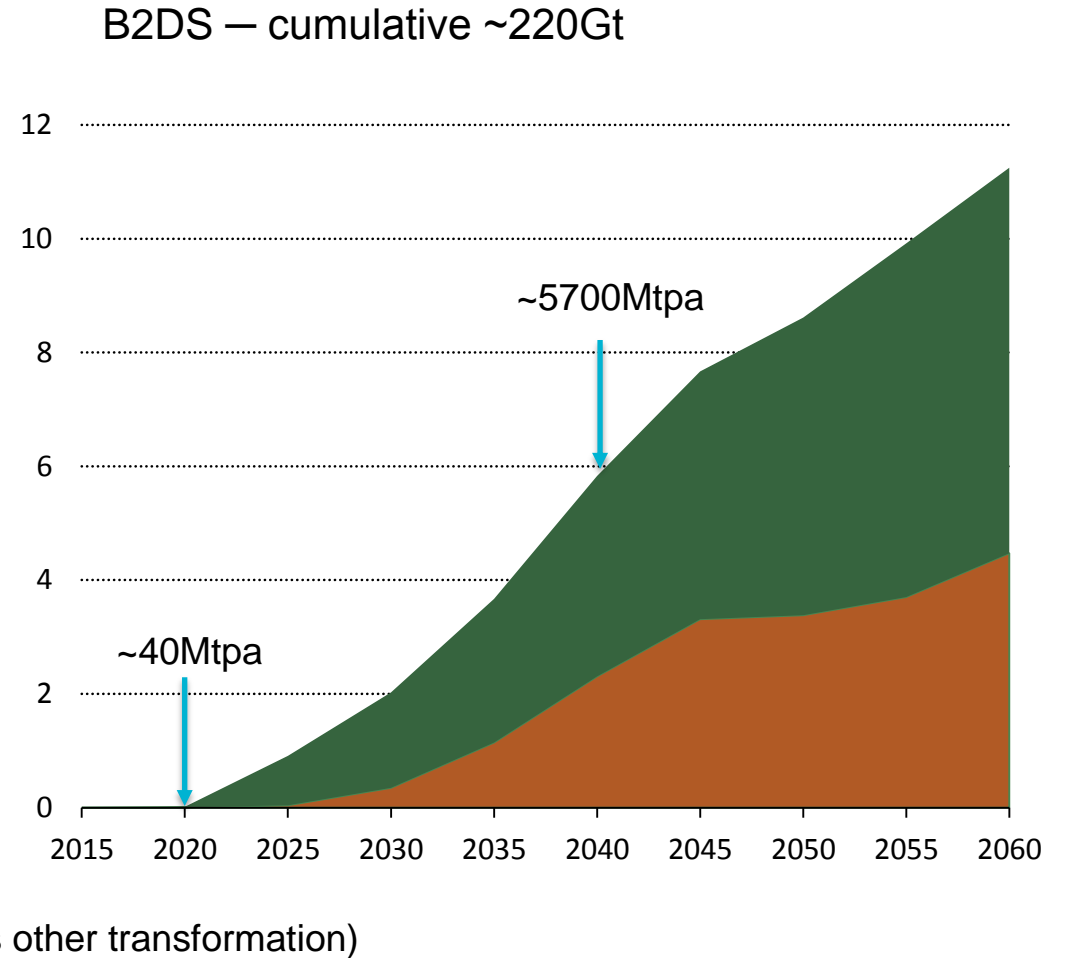
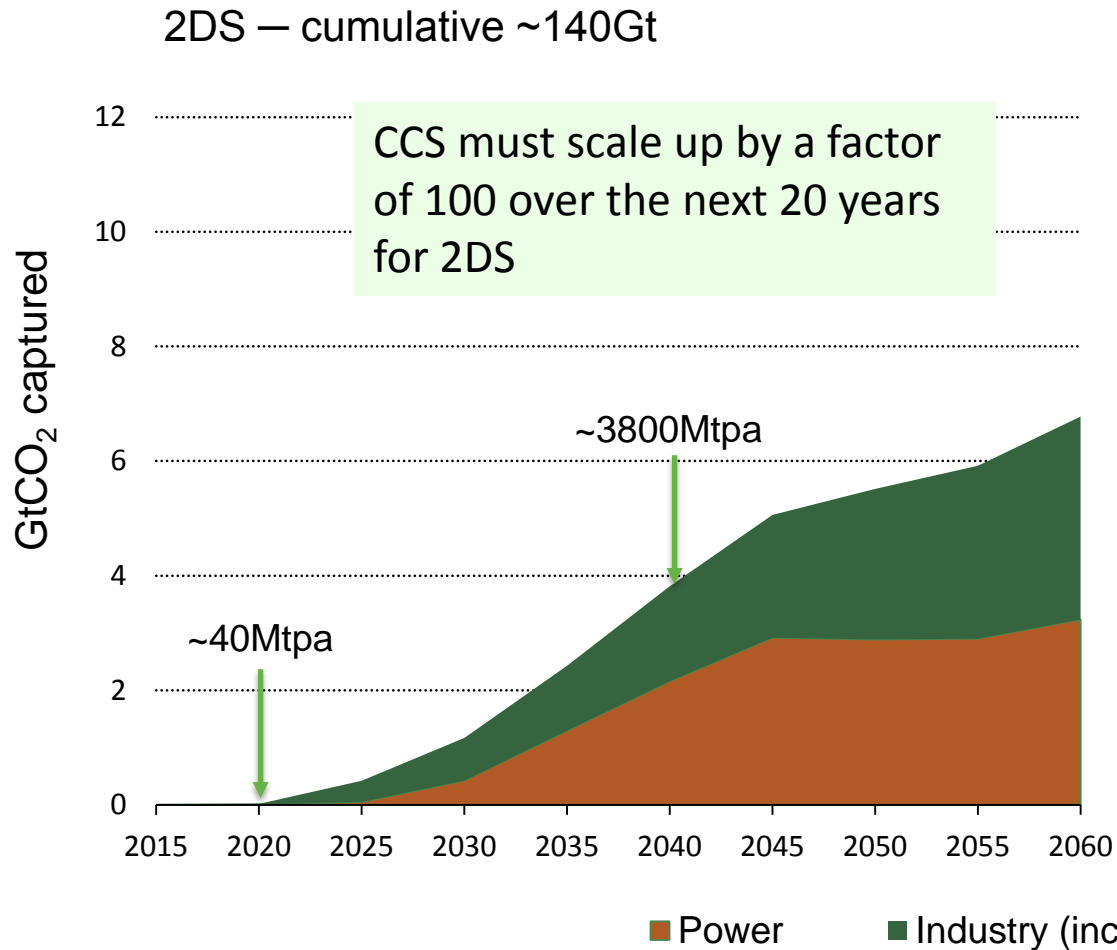
CCS is a vital element of a low-carbon energy future



A transformation in how we generate and use energy is needed



CCS deployment rates – 2DS and B2DS

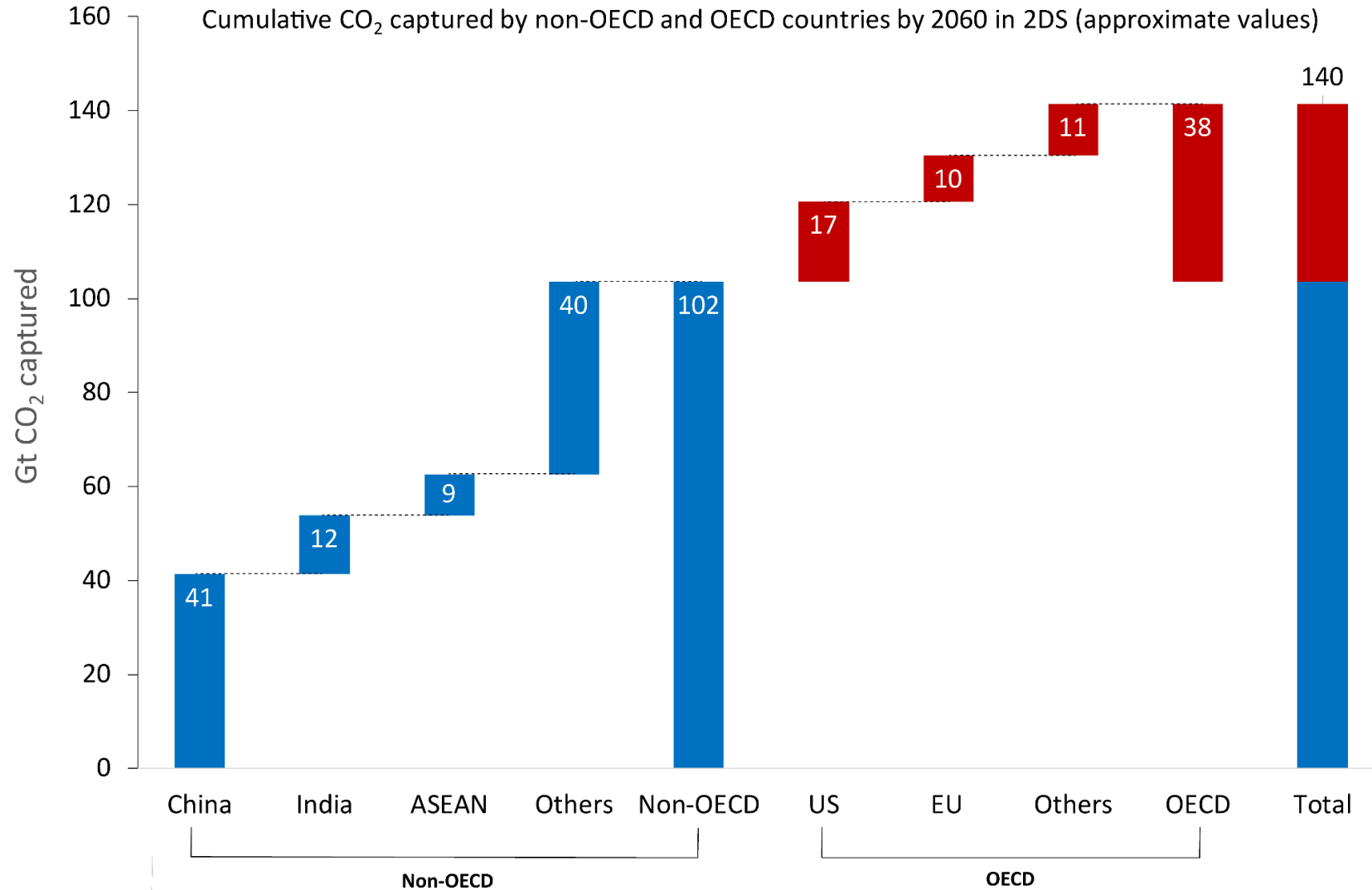


Note: B2DS refers to a *Beyond 2°C Scenario*, limiting average future temperature increases to 1.75°C

Source: International Energy Agency (2017), *Energy Technology Perspectives 2017*, OECD/IEA, Paris



Most CCS deployment is required in non-OECD countries

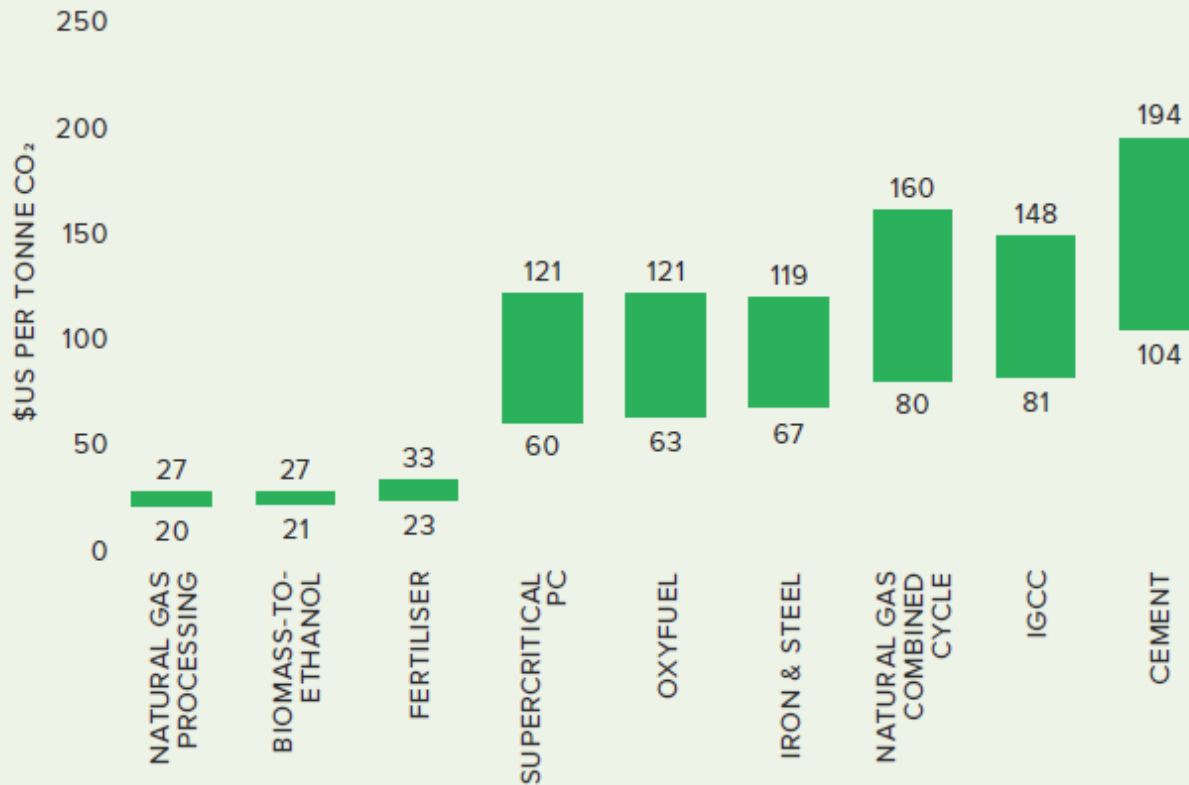


Source: data sourced from International Energy Agency (2017), Energy Technology Perspectives 2017, OECD/IEA, Paris



Current Estimate of the Cost of abatement using CCS

First-of-a-kind CCS costs in different industries



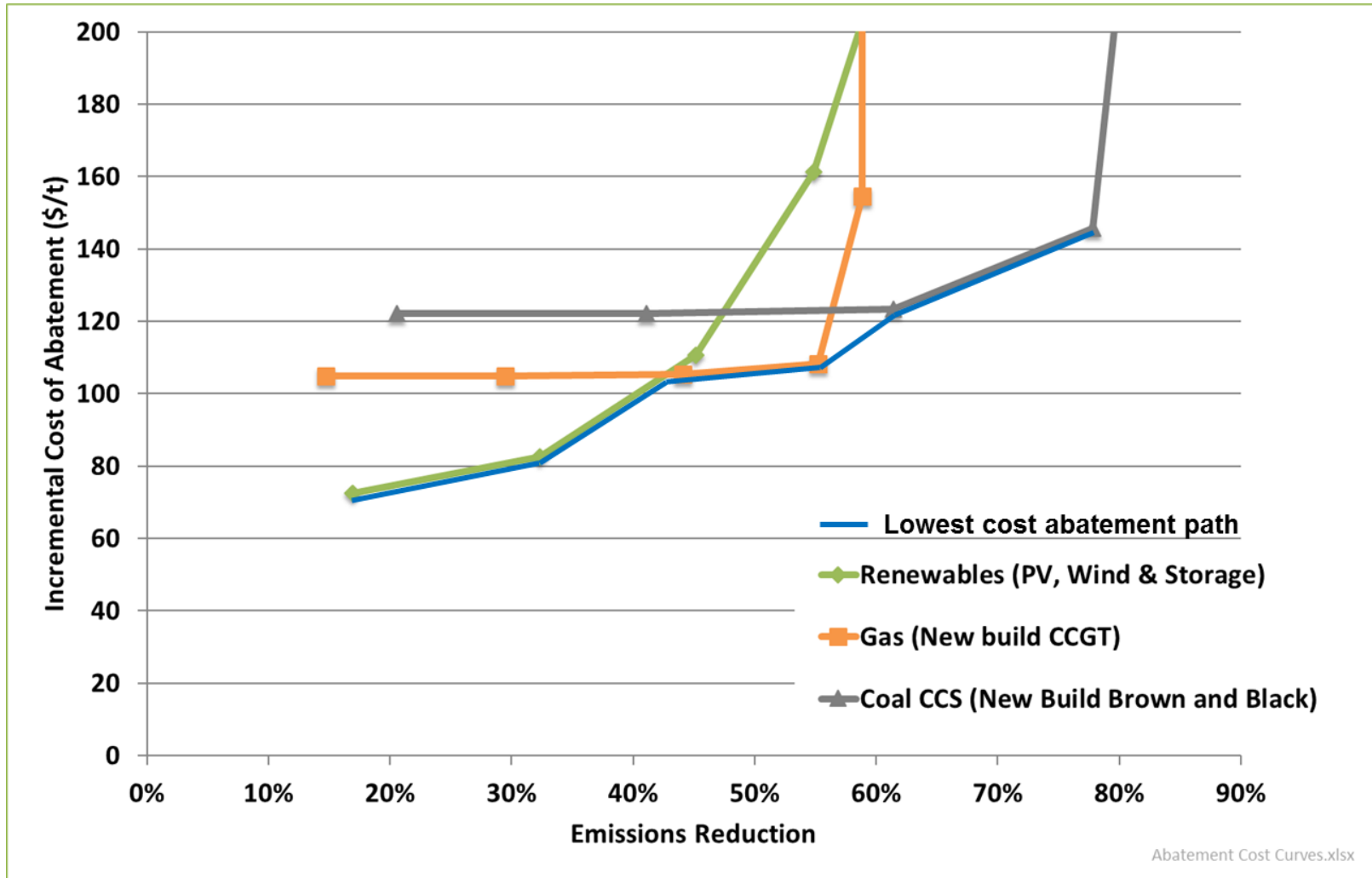
This figure shows the costs of implementing CCS technologies in the power sector and across a number of industrial processes, with costs defined as the cost per tonne of CO₂ avoided (in US\$).

Source: Global CCS Institute (November 2017)

The cost of CO₂ capture is a function of the concentration of CO₂ in the gas stream from which it is being separated. The higher the concentration of CO₂, the less work (and capital equipment) is required to separate it, and thus the lower the cost. Processes that produce gas streams with very high concentrations of CO₂ offer the lowest cost opportunities for CCS. Cost is also site specific due to variations in the cost of capital, labour, and other inputs.



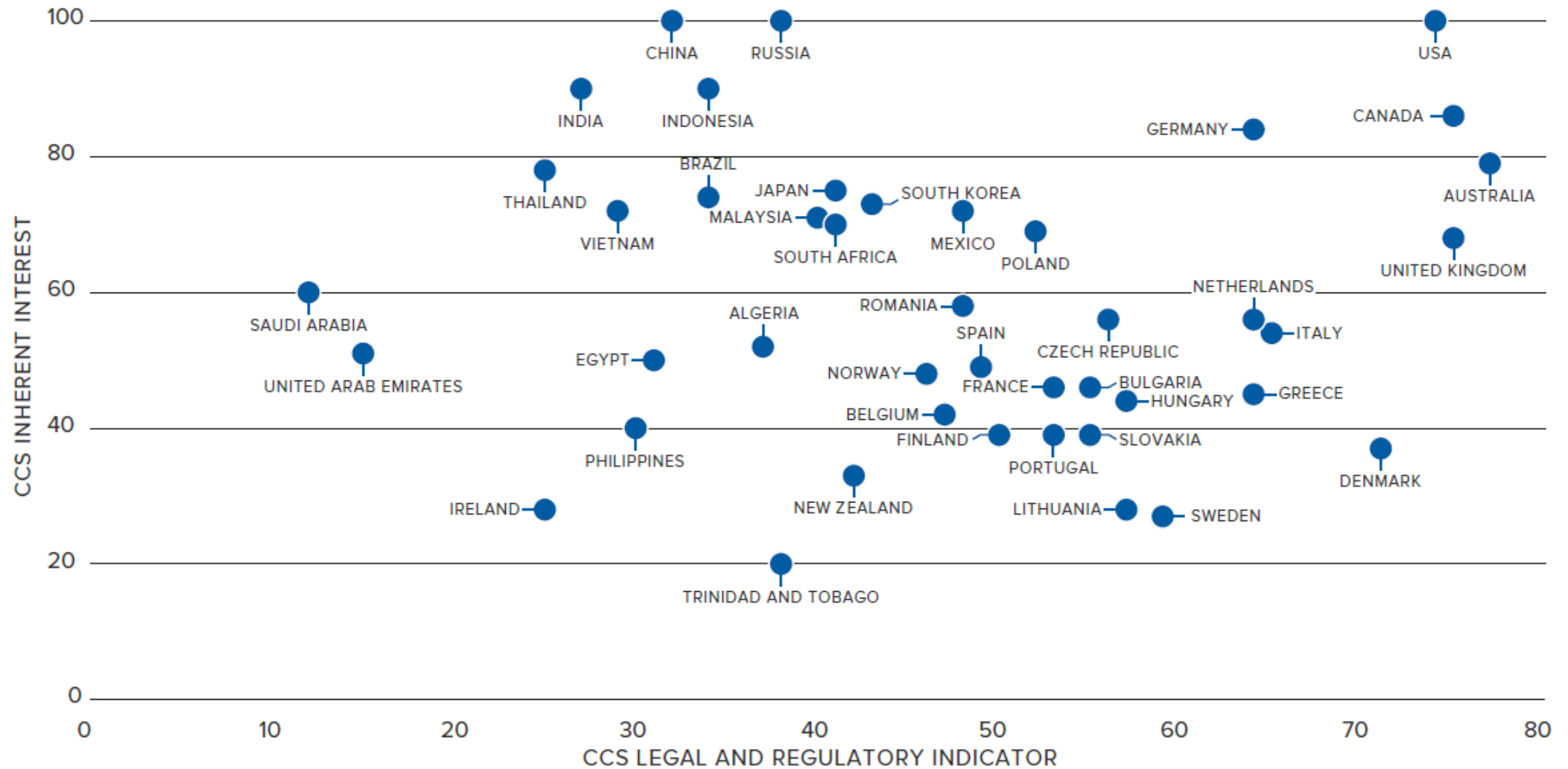
CCS is part of the lowest cost, low emissions electricity system.



Modelling of the Eastern Australian electricity grid demonstrates that CCS delivers the lowest cost abatement beyond around 55% emissions intensity reduction considering total system cost.



Global Status of Law and Regulation



The Legal and Regulatory Indicator is a relative measure of the maturity of national CCS-specific legislation.



Community acceptance of CCS is patchy



Photo: Japan CCS

← The Good

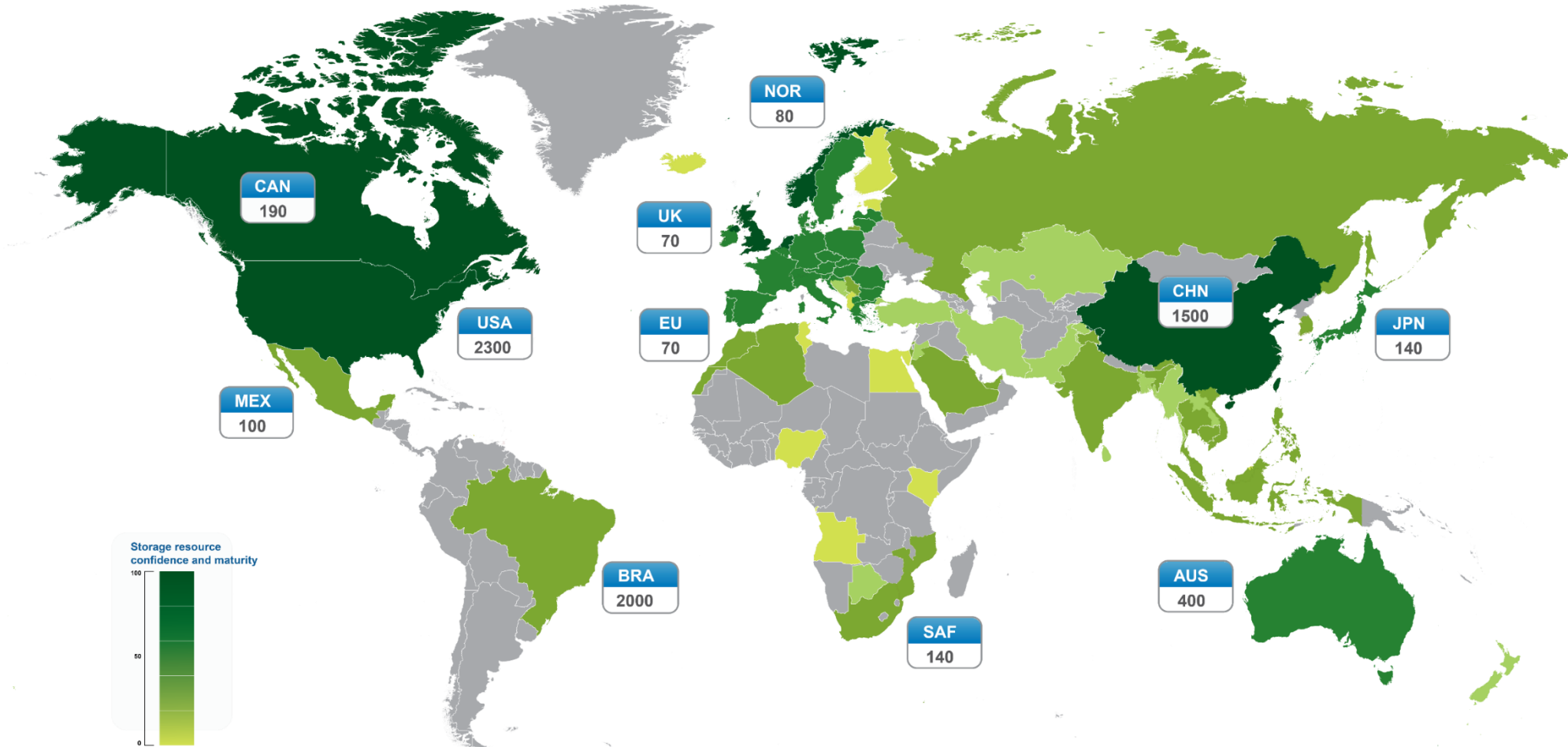
Photo: Alex Zapantis



The Bad →



There is ample global CO₂ storage capacity

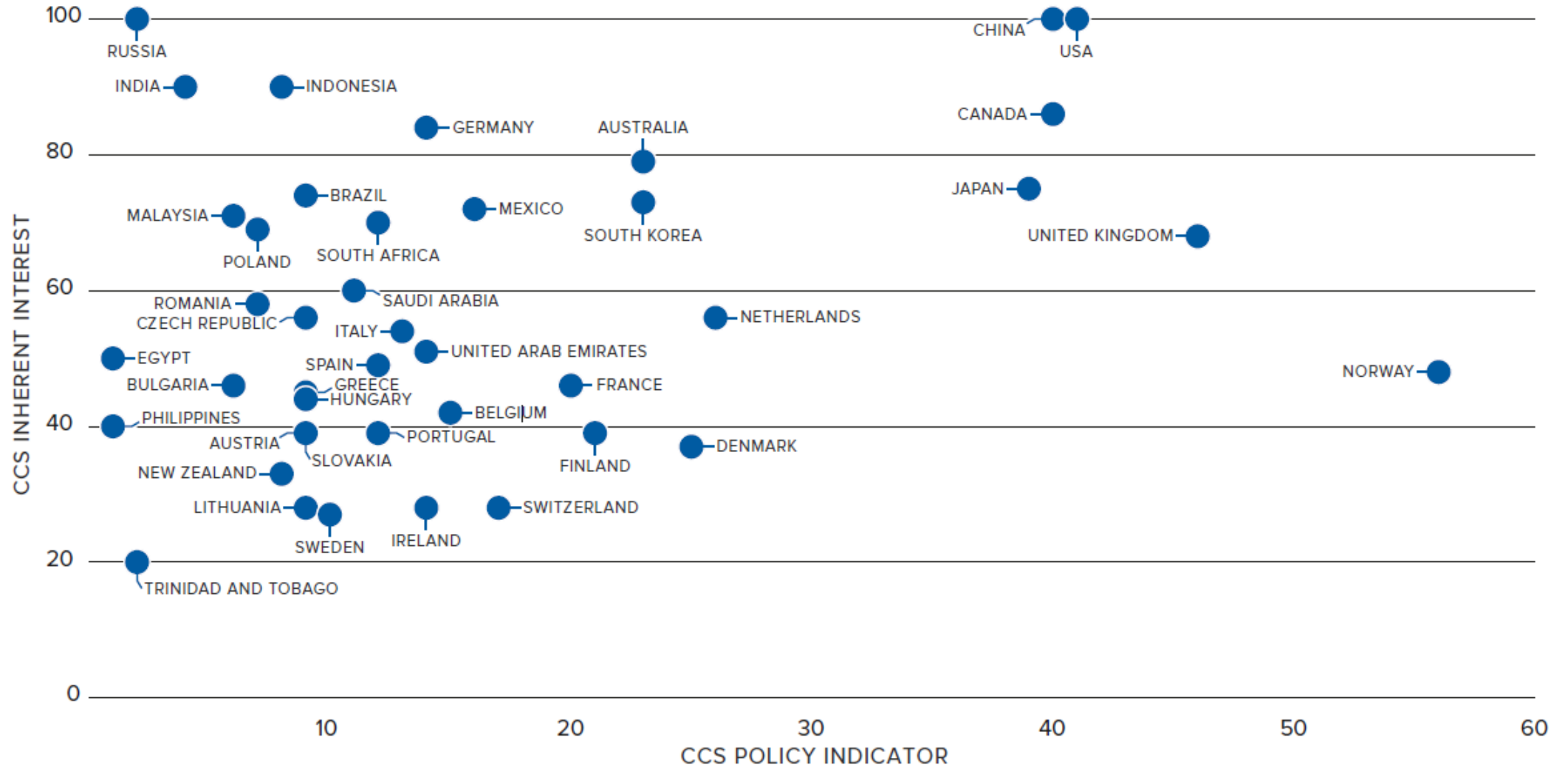


In IEA 2 Degrees Scenario, 140Gt of CO₂ is stored to 2060 – there is ample global storage capacity.

However there are less than 25 sites (excluding existing Enhanced Oil Recovery operations) globally where site characterization is well advanced.



Global Status of Policy



The Policy Indicator is a relative measure of extent to which national government policies incentivize investment in CCS.



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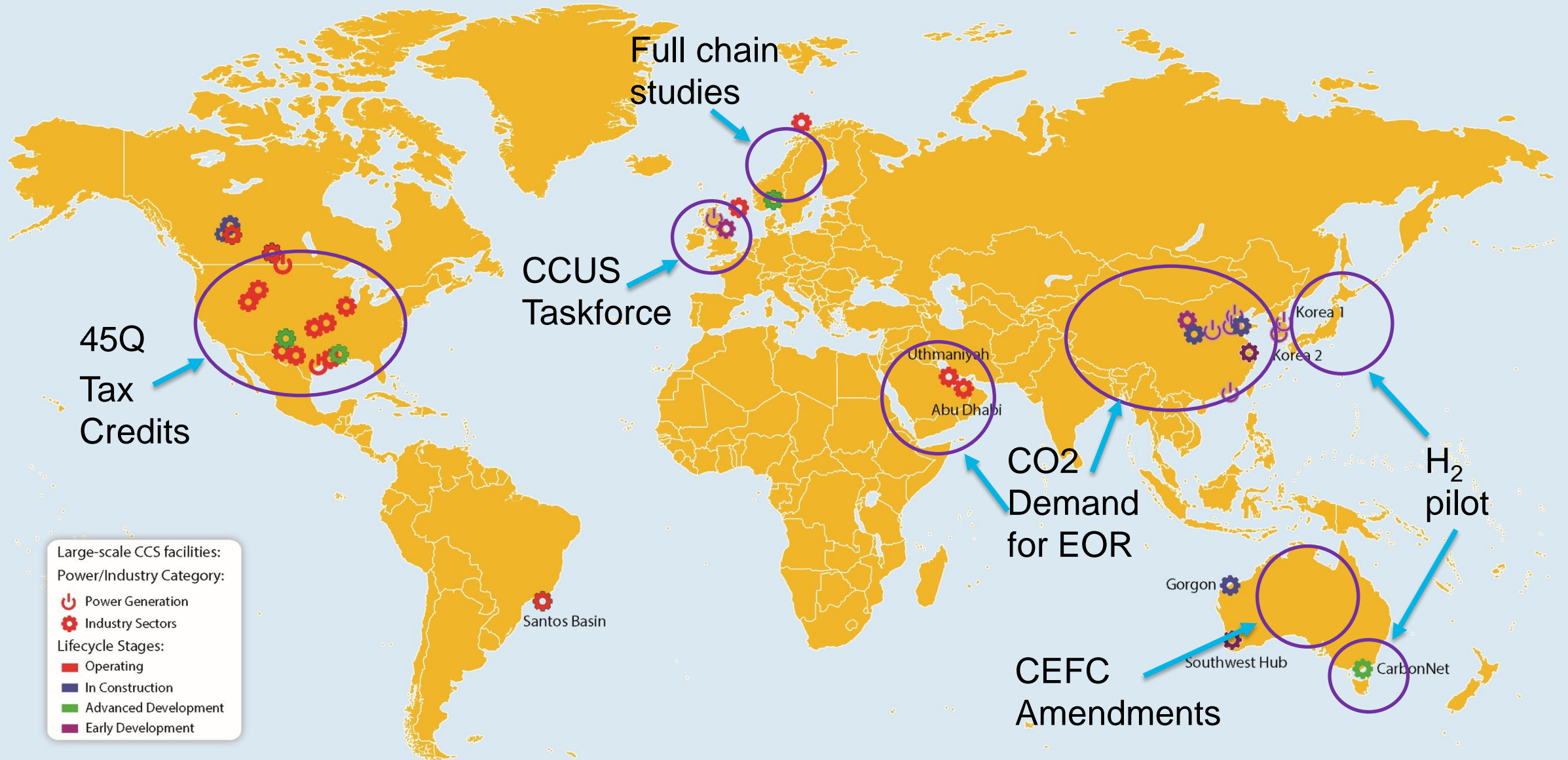


Pre-requisites for CCS deployment

- | | | |
|--|---|---|
| 1. Demand for CO ₂ abatement services | ✓ | ✓ |
| 2. Cost competitive technology | ✓ | |
| 3. Effective regulation | ✗ | ✓ |
| 4. Community acceptance of CCS | ✗ | ✓ |
| 5. Access to geological storage reservoirs | ✓ | |
| 6. Incentive to invest | ✗ | ✗ |



Recent uptick in activity...





Thank you!

Carbon capture and storage (CCS) is one of the last remaining clean mitigation technologies able to turn the tide on climate change.

The process of capturing CO₂ from fossil fuel industry and safely burying it deep below ground has been around since the Apollo 17 moon landing, but only now in 2017, 45 years later, is it truly touching down.

The world authority on CCS, the Global CCS Institute, is a member-led climate change organisation comprising governments, industry, think-tanks, research agencies and academic institutions.

Based in Melbourne (with offices in Brussels, Washington DC, Beijing and Tokyo) and led by geologists, economists, regulatory experts, educators and advocates, its mission is to accelerate the commercial deployment of CCS to address climate change and ensure energy security.

CCS science is proven through pre-eminent research and respected pedagogy including the Intergovernmental Panel on Climate Change and the International Energy Agency.

Their findings are resolute: Paris climate-change targets cannot be met without CCS.

The Global Status of CCS: 2017 is the Institute's flagship publication, a communication, a conversation and a discourse on "everything CCS".

It makes the compelling case for CCS as an imperative part of our climate change future – and the conduit to a new energy economy.

It looks at the 17 large-scale commercial facilities currently in global operation and the swathe of new plants coming onstream.

It debunks common myths and misconceptions about the technology.

And with commentary from a diverse group of leaders and luminaries – from the man who coined the phrase "global warming" in the 1970s, Professor Wallace Broecker, to former US Department of Energy Advisor, Dr Julio Friedmann, and celebrated British climate economist, Lord Nicholas Stern, as well as ambassadors, environmentalists and industry leaders – it concludes that the CO₂-quandary we face demands this revolutionary climate-game changer.

The Global Status of CCS: 2017 encourages you to "Join the underground" and embrace CCS as a tried and true technology that is integral to a "no" emission future.

THE GLOBAL STATUS OF CCS 2017

The Global Status of CCS: 2017

JOIN THE UNDERGROUND



The Institute's flagship publication can be found at

<http://www.globalccsinstitute.com/webform/global-status-ccs-2017>