



GLOBAL
CCS
INSTITUTE



Overcoming barriers to CCS Deployment

Silvia Vaghi, Principal Manager Policy Regulatory
UNECE, Group of Experts on Cleaner Electricity
Production from Fossil Fuels
Geneva, 18 November 2015



The Global CCS Institute

Our Vision for CCS:

CCS is an integral part of a low-carbon future

OUR MISSION

To accelerate the development, demonstration and deployment of CCS globally.

1

Fact-based, influential advice and advocacy

2

Authoritative knowledge sharing

- We are an international membership organisation.
- Offices in Washington DC, Brussels, Beijing and Tokyo. Headquarters in Melbourne.
- Our diverse international membership consists of:
 - Governments
 - Global corporations
 - Small companies
 - Research bodies
 - Non-government organisations.
- Specialist expertise covers the CCS/CCUS chain.



Key Messages from the Global CCS Institute

CCS is a vital component of a low-carbon future

**CCS is established and already reducing
emissions**

Strong policy support is required globally



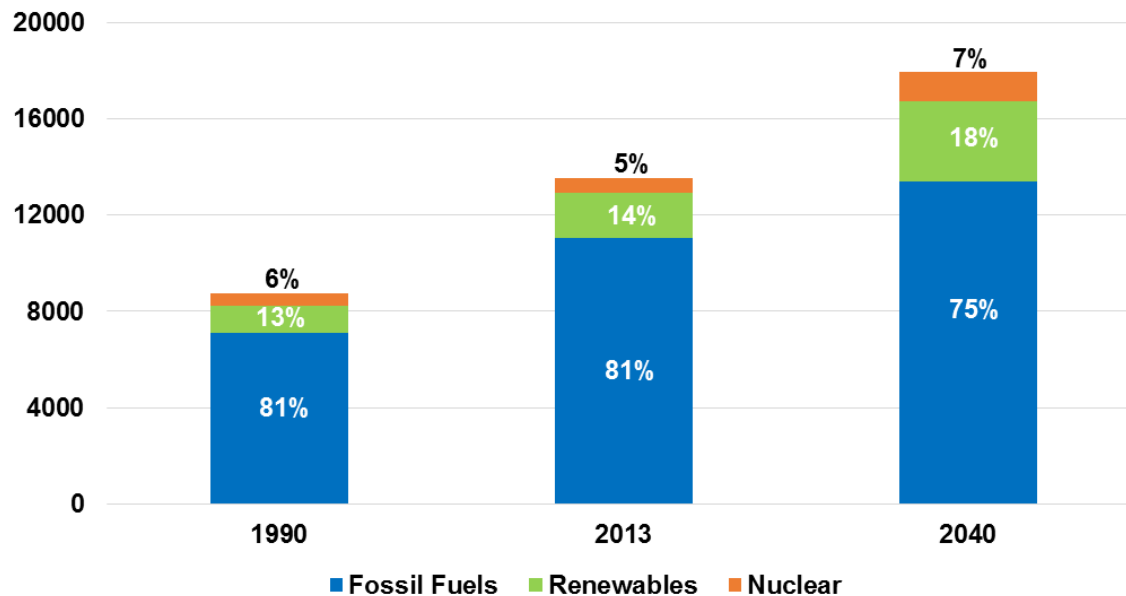
Key Message #1

**CCS is a vital component of a
low-carbon future**

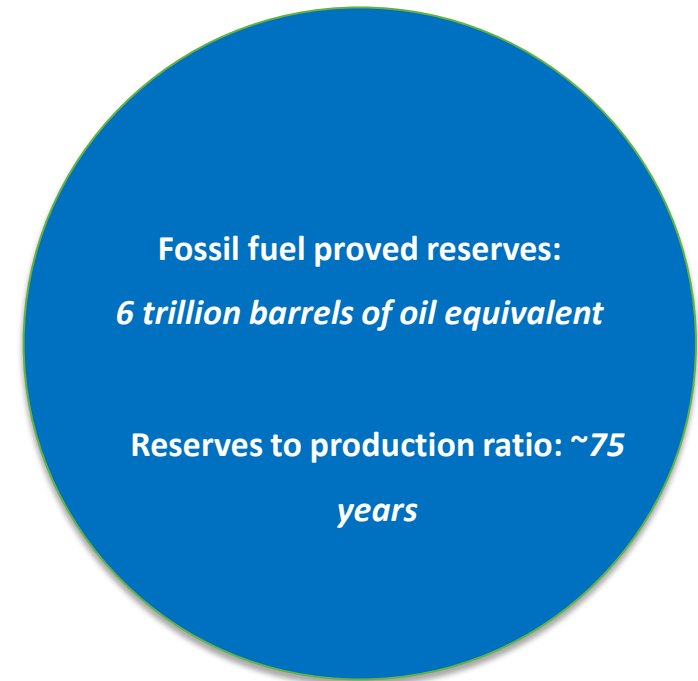


Fossil fuel demand growing and reserves robust

Primary energy demand by fuel source:
(million tonnes of oil equivalent)



Source: IEA World Energy Outlook, 2015 (New policies scenario)







Source: BP Statistical Review of World Energy 2015



Mitigation costs more than double in scenarios with limited availability of CCS

Percentage increase in total discounted mitigation costs (2015-2100) relative to default technology assumptions – median estimate

2100 concentrations (ppm CO ₂ eq)	no CCS	nuclear phase out	limited solar/wind	limited bioenergy
450	138% 	7% 	6% 	64% 
	4 / 11	8 / 11	8 / 11	8 / 11

Symbol legend – fraction of models successful in producing scenarios (numbers indicate number of successful models)



All models successful



Between 80 and 100% of models successful



Between 50 and 80% of models successful

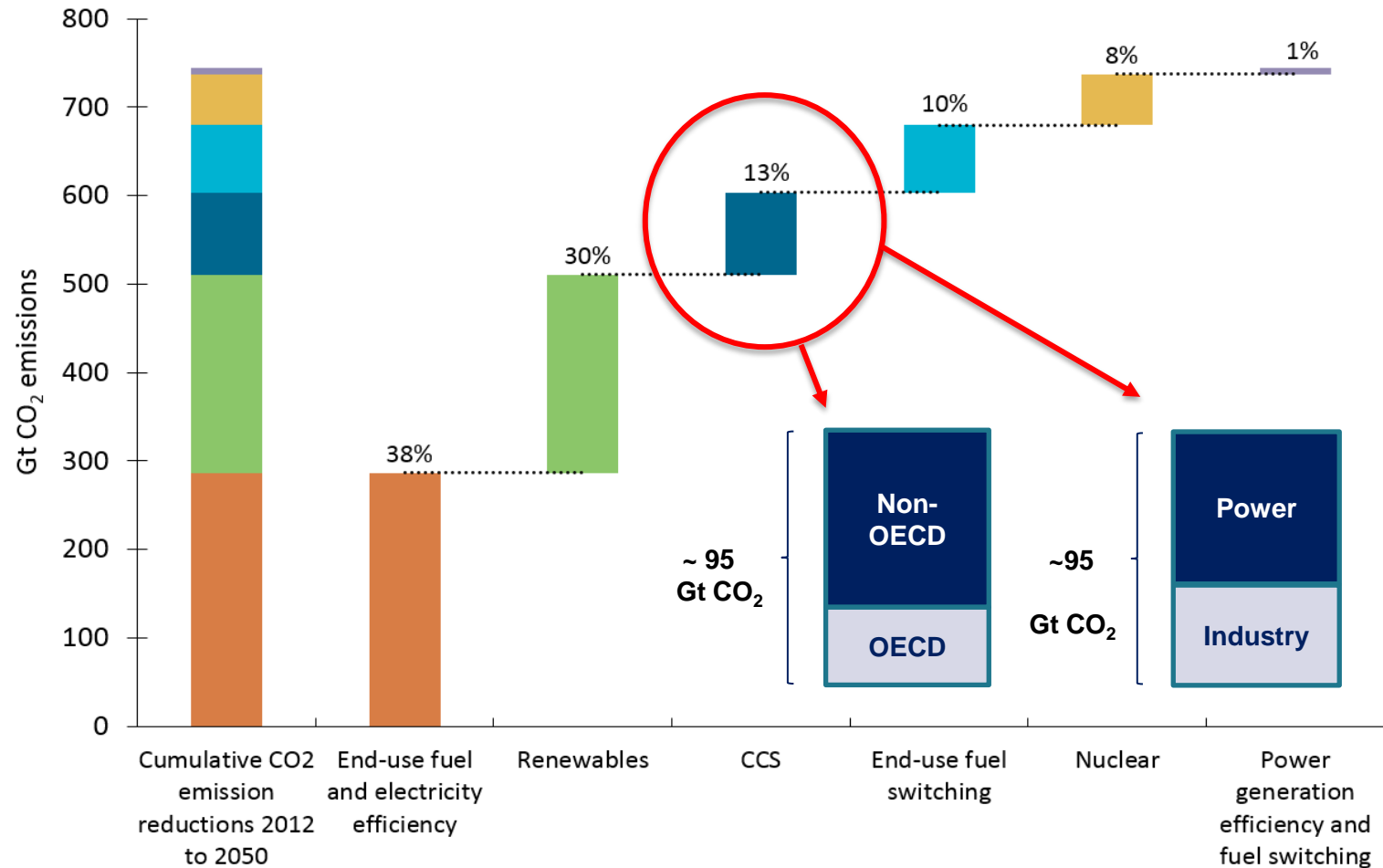


Less than 50% of models successful



CCS contributes 13% of cumulative reductions

Portfolio of low carbon technologies thought 2050 in a 2DS world compared to 'business as usual'



Source: IEA, *Energy Technology Perspectives* (2015).



When expectations collide

- 'Business as usual' is incompatible with climate change objectives
- 'Business as usual' leads to a rising average global temperature

“A 4°C world is so different from the current one that it comes with high uncertainty and new risks that threaten our ability to anticipate and plan for future adaptation needs.”

World Bank Group President Jim Yong Kim, November 2012

- Renewable technologies are not the sole answer to mitigating the rise
 - Decarbonising power without CCS could cost up to US\$2 trillion more than with CCS. In Europe, it will cost additional €1.2 trillion to reach the EU's CO₂ reduction target without CCS (CCS for Industry, ZEP 12 November 2015)
 - In industrial processes, which account for 25% of CO₂ emissions, there is no alternative to CCS to achieve deep emission cuts
- The longer the delay in climate change action, the greater the need for net negative emissions technologies like BECCS



Key Message #2

**CCS is established and already
reducing emissions**



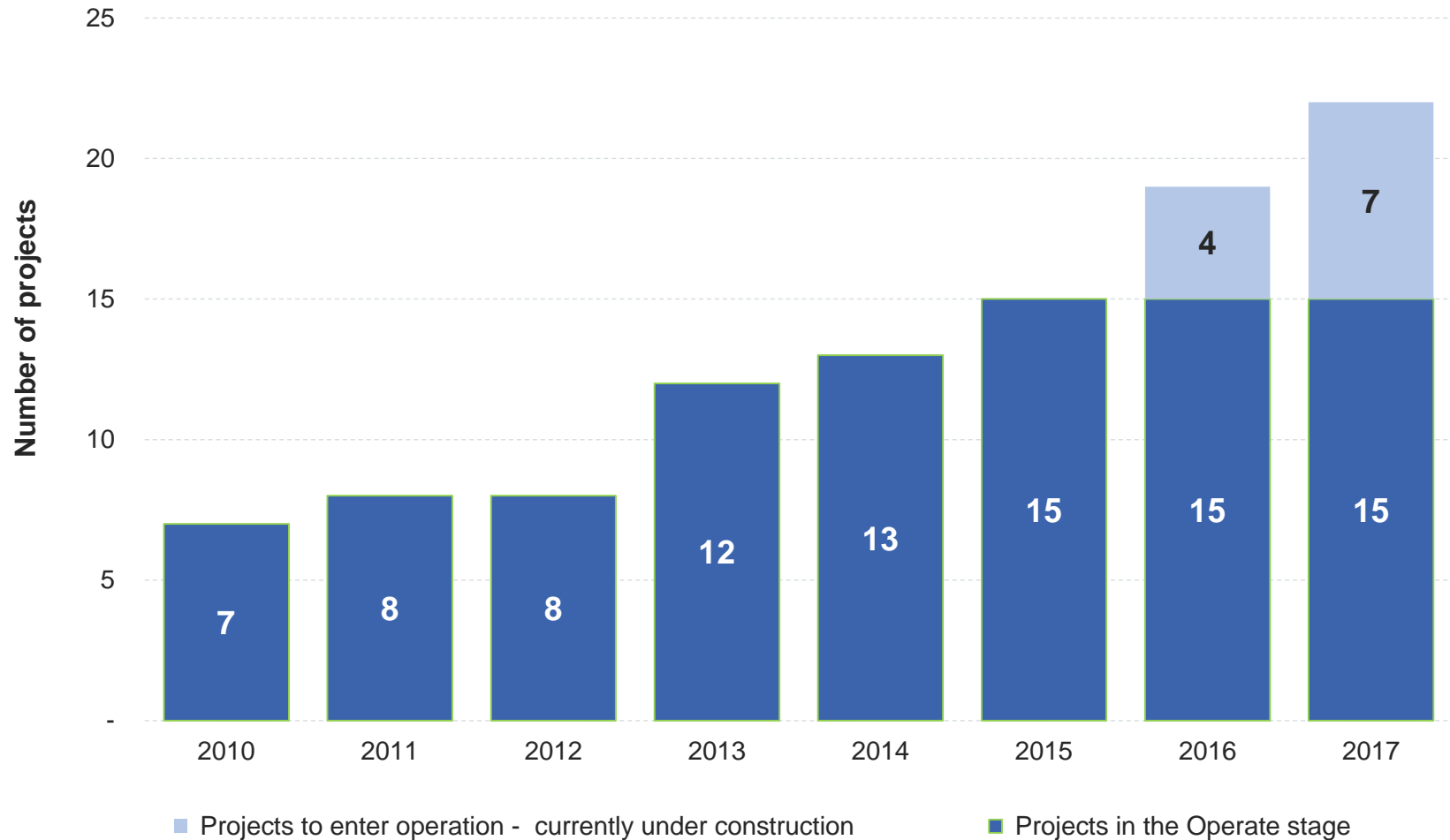
Large-scale CCS projects by region or country

	Early planning	Advanced planning	Construction	Operation	Total
Americas	1	3	5	11	20
China	5	4	-	-	9
Europe	2	4	-	2	8
Gulf Cooperation Council	-	-	1	1	2
Rest of World	4	-	1	1	6
Total	12	11	7	15	45

North America (with 13 in the US and 6 in Canada), China (with 9) and UK (with 5) have the most projects



Much to look forward to over the next 18 months





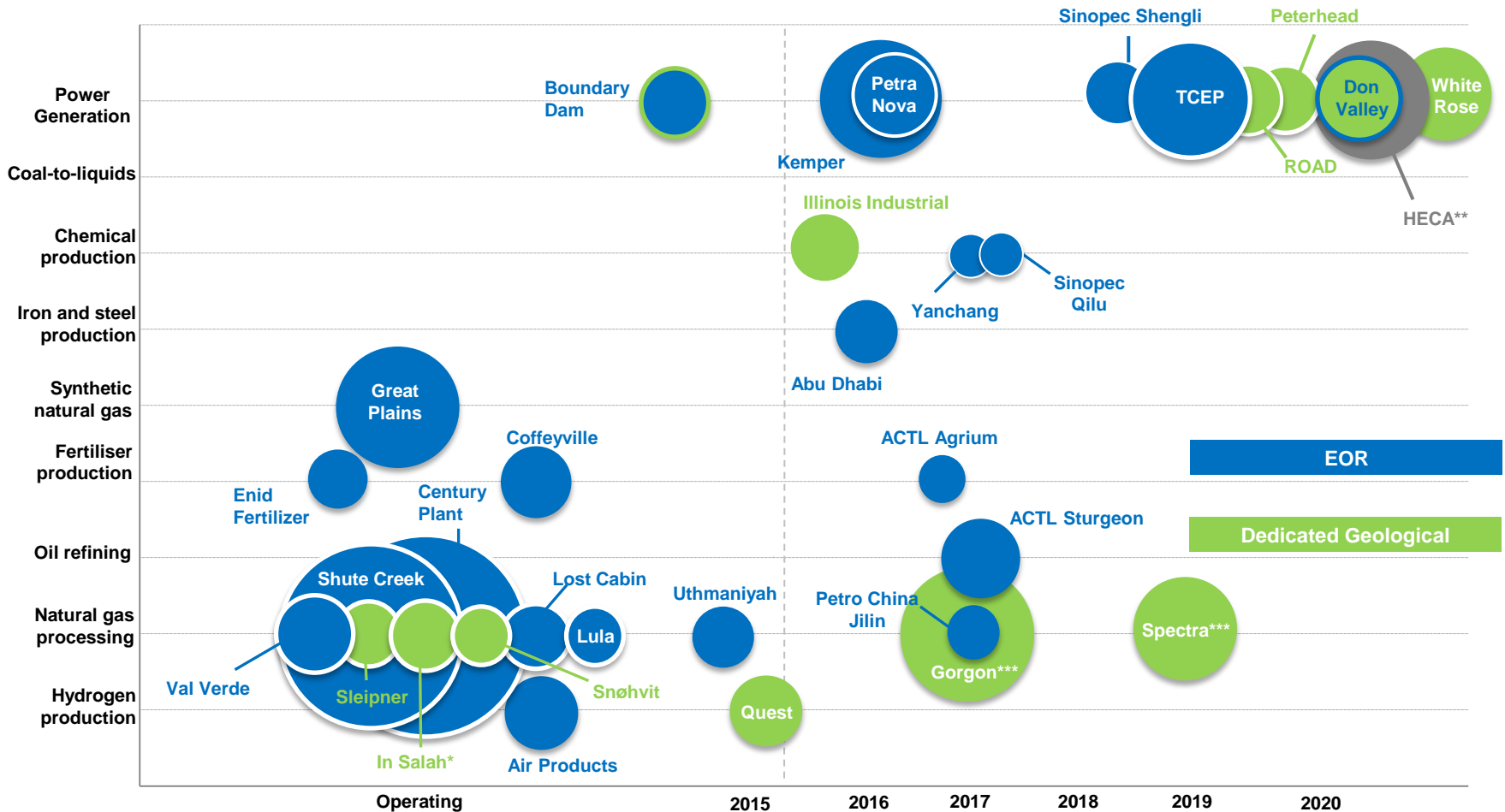
Large-scale projects expected to become operational by 2017



Source: *Global Status of CCS: 2015*, Global CCS Institute (2015)



Actual and expected operation dates for projects in operation, construction and advanced planning



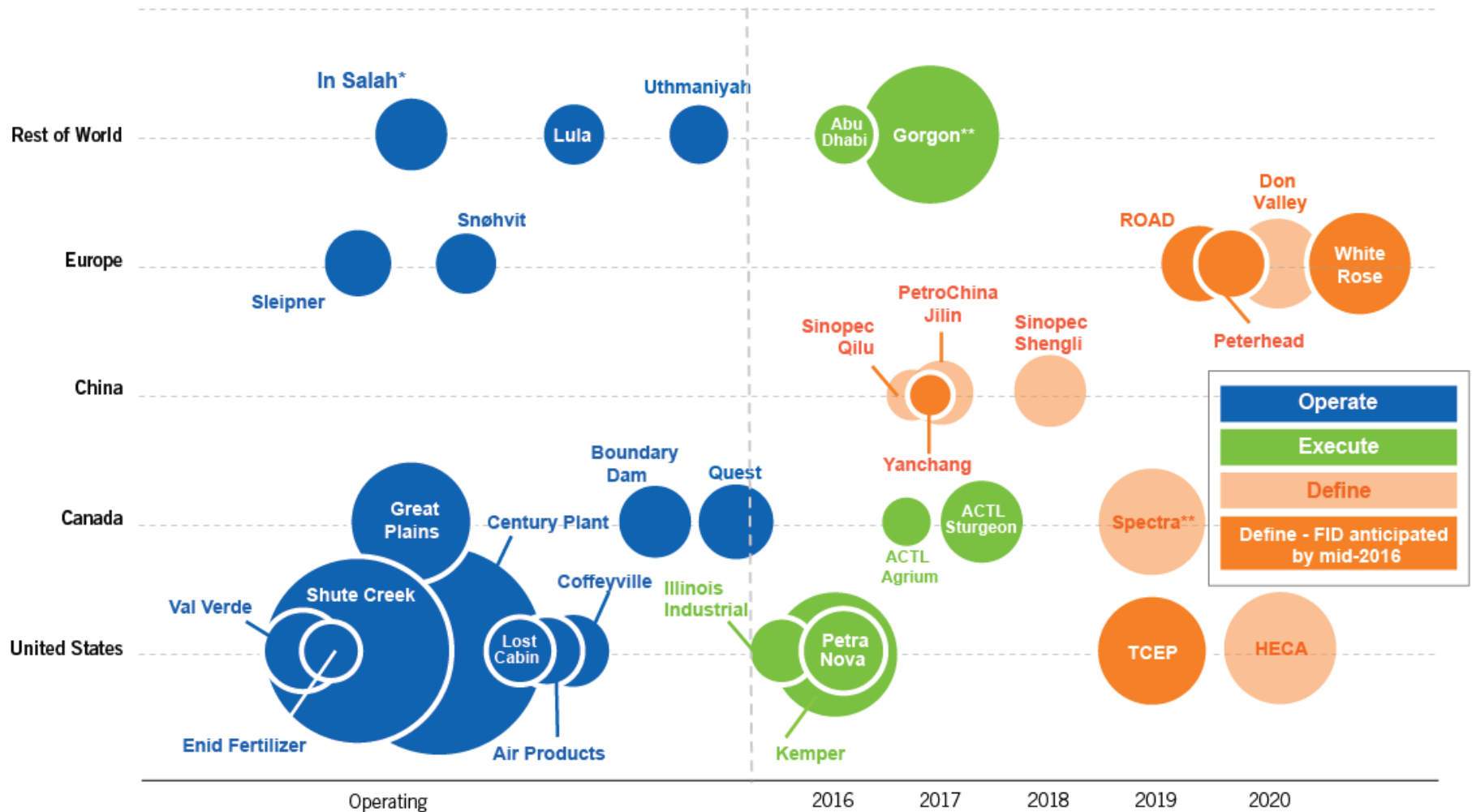
○ = 1Mtpa of CO₂ (areas of circle are proportional to capacity)

* Injection currently suspended ** Storage options under evaluation

*** Institute estimate



A global portfolio of operating CCS projects is emerging

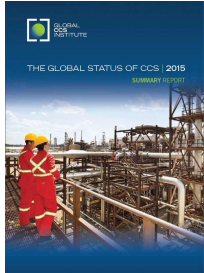


* Injection currently suspended

** Institute estimate of start date



A significant task within one generation



Global Status of CCS: 2015

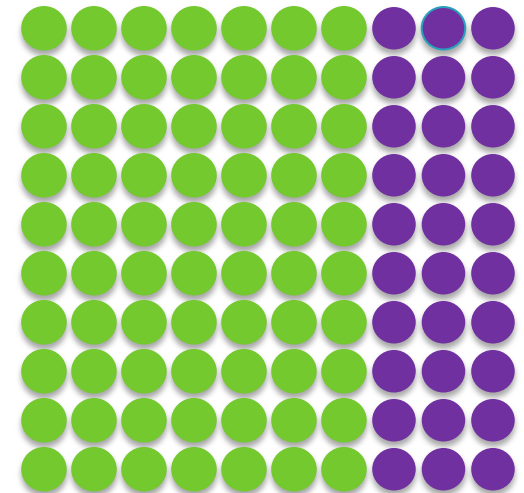
45 large-scale CCS projects -
combined capture capacity of
80 Mtpa*:

- 22 projects in operation or construction (**40 Mtpa**)
- 11 projects in advanced planning, five nearing FID (15 Mtpa)
- 12 projects in earlier stages of planning (25 Mtpa)

40 Mtpa



**4,000 Mtpa of CO₂
captured by CCS by 2040
(IEA 450 Scenario)****



● Non-OECD ● OECD

*Mtpa = million tonnes per annum

**Source: IEA, *Energy Technology Perspectives* (2015).



Key Message #3

Strong policy support is required globally

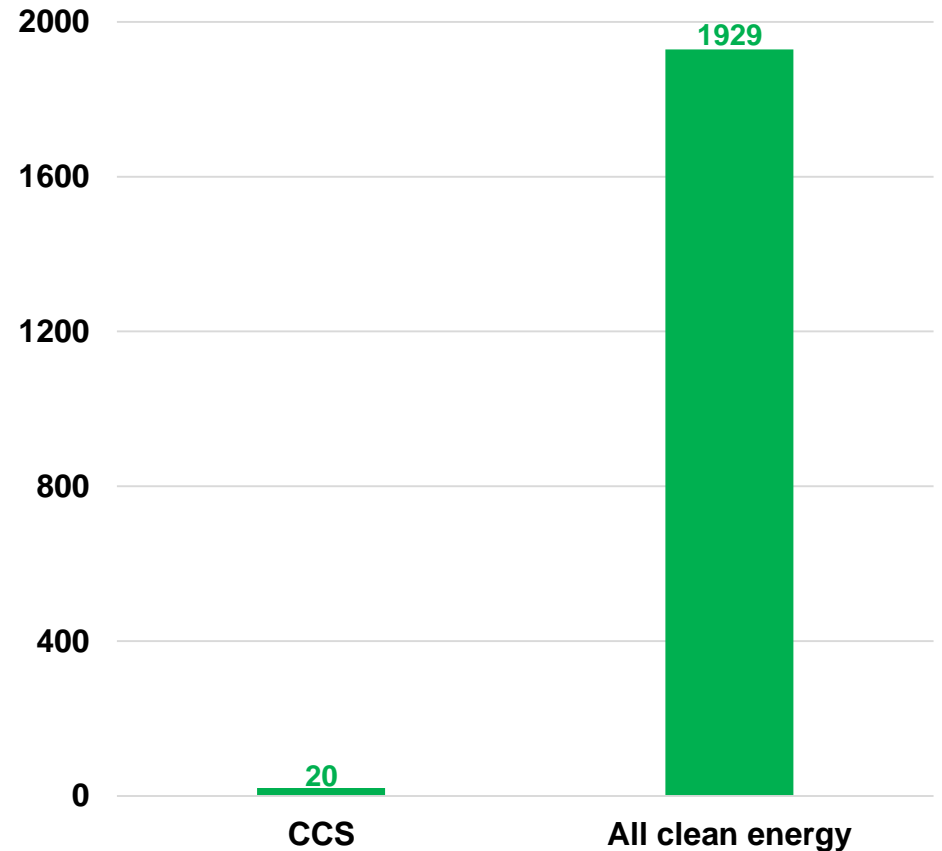


Strong policy drives investment

- Scale of renewables investment is instructive
- CCS has not enjoyed commensurate policy support
- EOR has provided impetus in North America
- Policy parity is essential
- How do we get CCS onto a similar curve?

Clean energy investment between 2004-2013

USD billion



Data source: Bloomberg New Energy Finance as shown in IEA presentation “*Carbon Capture and Storage: Perspectives from the International Energy Agency*”, presented at National CCS week in Australia, September 2014.

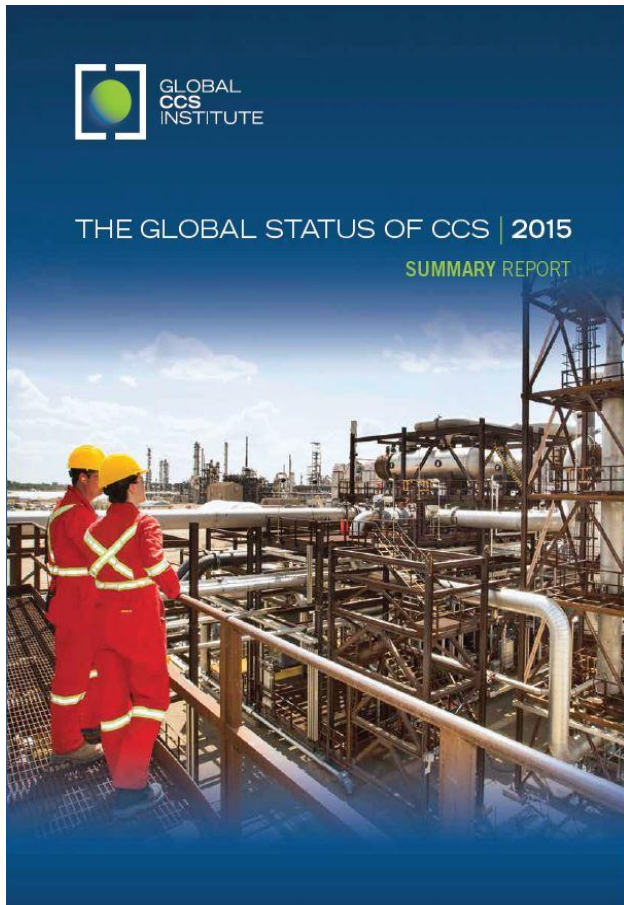


A plan for CCS – Actions to stimulate momentum

- Industry and government must move at least five advanced projects 'across the finish line' in 2016
- Strong policy action - Policy parity
- This includes:
 - Providing predictable and enduring policy arrangements
 - Implementing effective and cost-efficient CCS law and regulation
 - Incentivising early storage site identification and characterisation
 - Re-doubling R&D efforts to reduce costs and increase efficiency
 - Encourage efficient development of hub and cluster arrangements



The Global Status of CCS: 2015



The Institute's key publication

Access the Summary Report at:

www.globalccsinstitute.com/status2015

PLR recent analysis:

- The costs of CCS and other low-carbon technologies in the US: 2015 update
- Policy indicator: 2015 update
- Legal and regulatory indicator

<http://www.globalccsinstitute.com/publications>



GLOBAL
CCS
INSTITUTE

[**GLOBALCCSINSTITUTE.COM**](http://www.globalccsinstitute.com)