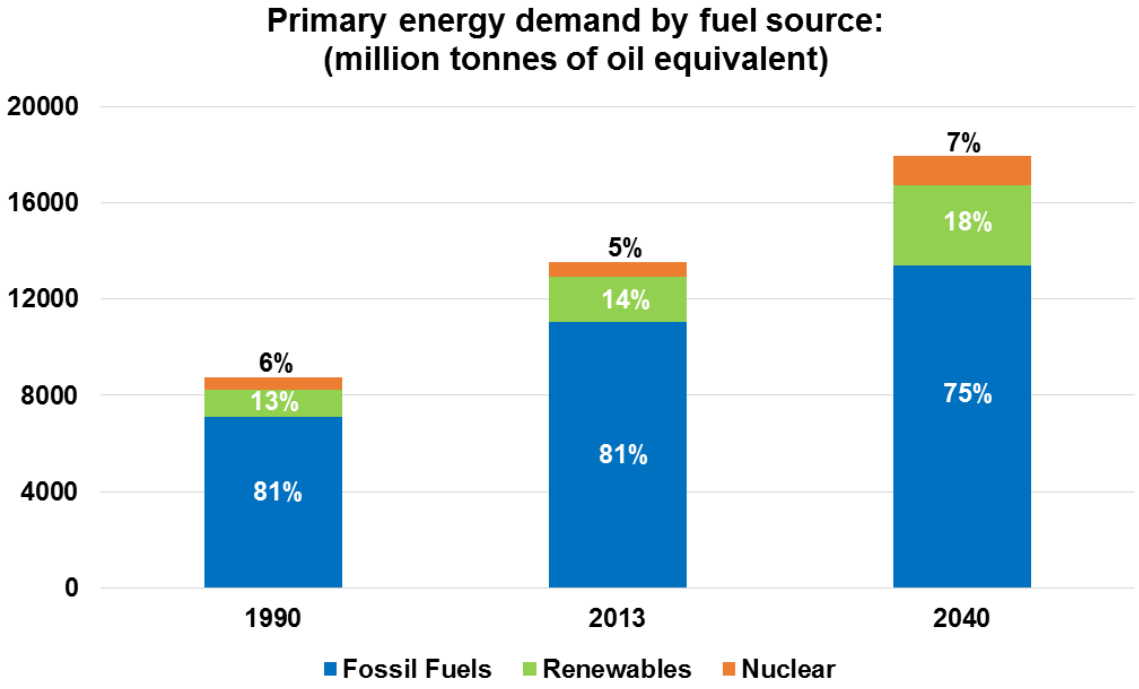
GLOBAL CCS INSTITUTE

GLOBAL STATUS OF CCS: 2016

Brad Page, CEO, Global CCS Institute

November 15, 2016

Fossil fuel demand growing and reserves robust



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

Fossil fuel proved reserves:

6 trillion barrels of oil equivalent

Reserves to production ratio:

~75 years

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_2eq)	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

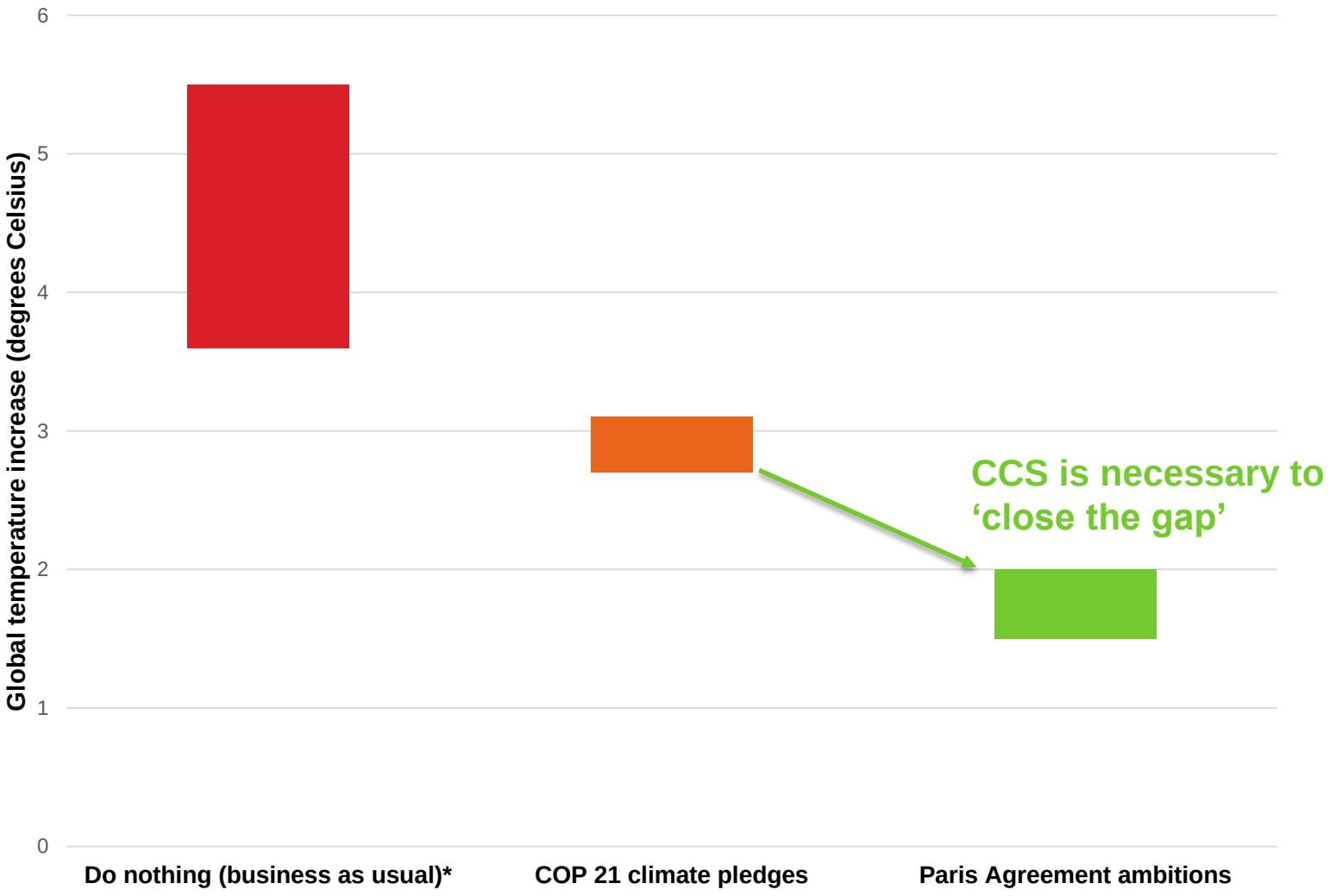

Between 80 and 100% of models successful


Between 50 and 80% of models successful


Less than 50% of models successful

Source: *IPCC Fifth Assessment Synthesis Report, Summary for Policymakers, November 2014.*

CCS is essential to meet Paris Agreement ambitions



*Absence of efforts to stabilise the atmospheric concentration of greenhouse gases.

Large-scale CCS facilities by region or country – November 2016

	Early planning	Advanced planning	Construction	Operation	Total
North America	1	1	5	10	17
China	5	3	-	-	8
Europe	2	1	-	2	5
Gulf Cooperation Council	-	-	-	2	2
Rest of World*	3	1	1	1	6
Total	11	6	6	15	38

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

North America dominates – three of the five facilities in construction soon to be operational, China has most facilities in planning, facility pipeline needs replenishment

15 large-scale facilities are operational; more to come

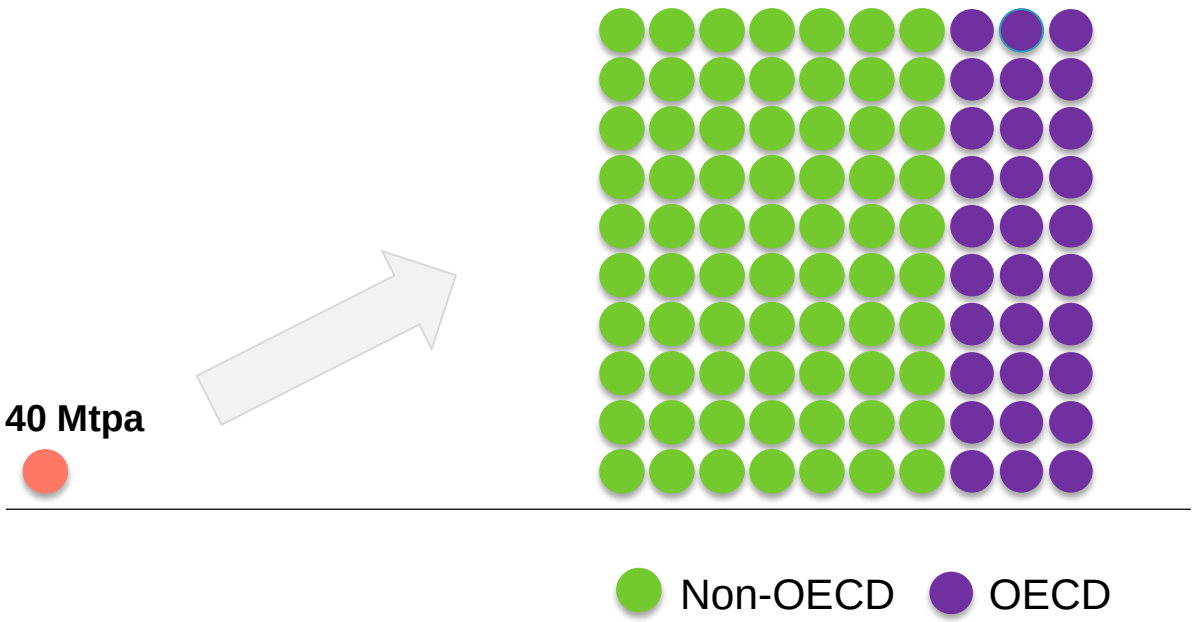
A significant task within one generation

Global Status of CCS November 2016

Almost 4,000 Mtpa of CO_2 captured and stored by 2040 (IEA 2DS Scenario)**

38 large-scale CCS facilities - combined CO_2 capture capacity of approximately 70 Mtpa*:

- 21 facilities in operation or construction (**40.3 Mtpa**)
- 6 facilities in advanced planning (8.4 Mtpa)
- 11 facilities in earlier stages of planning (21.1 Mtpa)

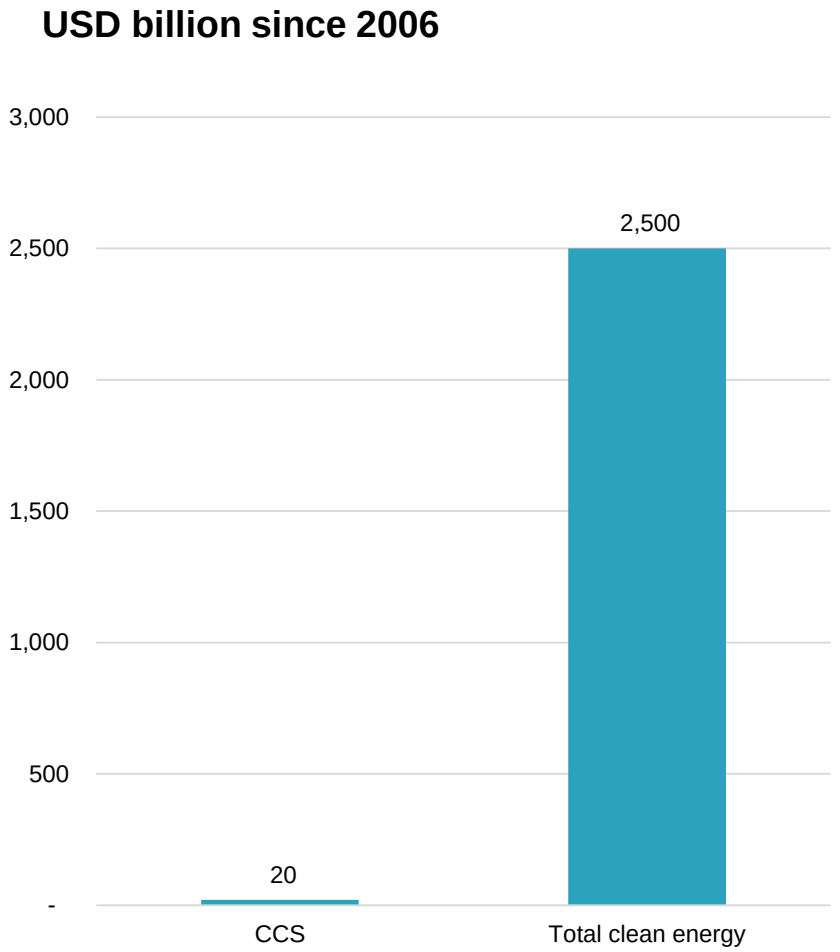


**Mtpa = million tonnes per annum*

***Source**: IEA, 2016. *Energy Technology Perspectives: Towards Sustainable Urban Energy Systems.* Paris. OECD/IEA.

Strong policy drives investment – CCS must be afforded 'policy parity'

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



Data source: **IEA 2015 "Tracking Clean Energy Progress". Bloomberg New Energy Finance "Clean Energy Investment By the Numbers – End of Year 2015" fact pack.**

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