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GLOBAL STATUS OF CCS

2015-2016: A WATERSHED YEAR FOR CCS?

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The Global CCS Institute



- 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, and
 - non-government organisations.
- Specialist expertise covers the CCS/CCUS chain.



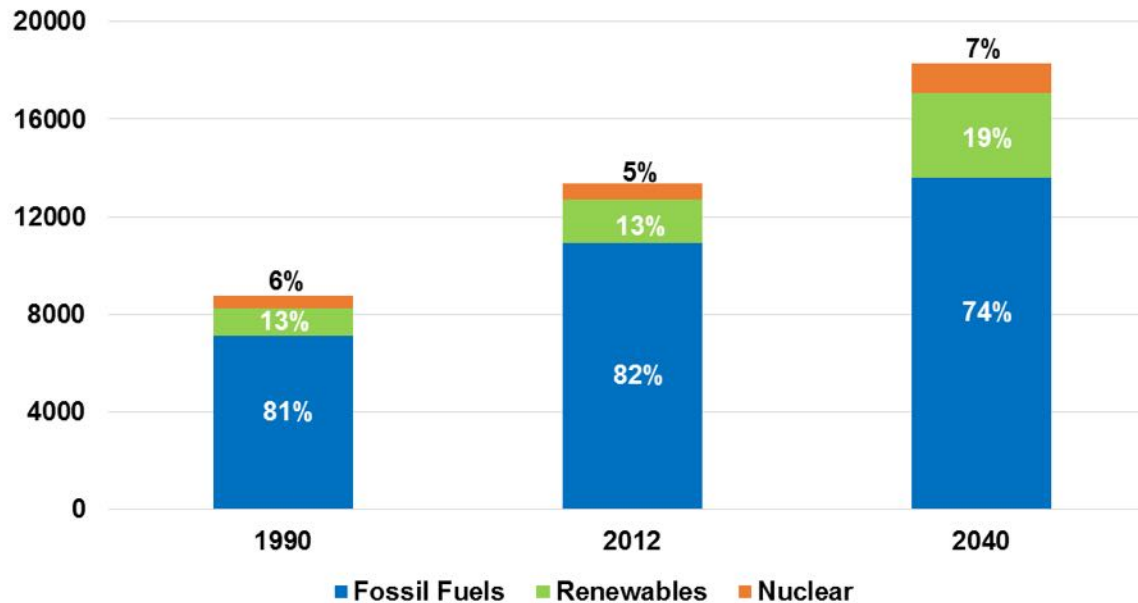
Agenda

- CCS is necessary
- CCS is real
- An EU perspective

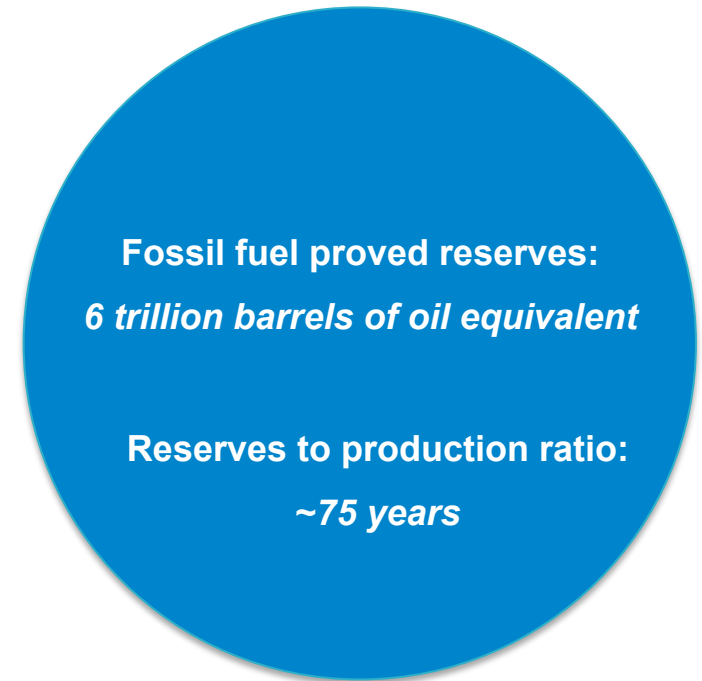


Fossil fuel demand growing and reserves robust

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



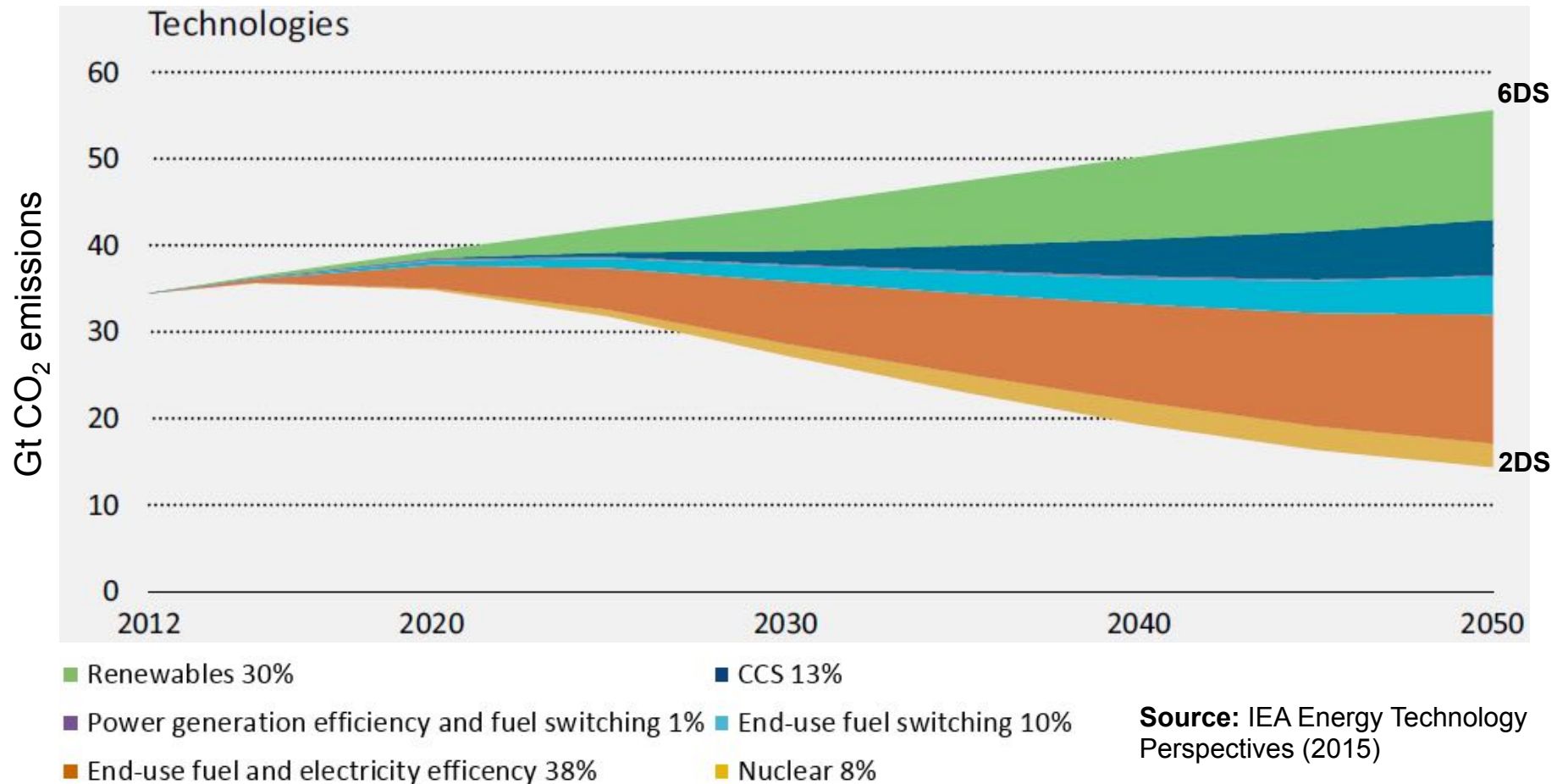
Source: IEA World Energy Outlook, 2014 (New policies scenario)



Source: BP Statistical Review of World Energy 2014



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







A transformation in how we generate and use energy is needed



Mitigation cost increases in scenarios with limited availability of technologies

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%  4/11 | 7%  8/11 | 6%  8/11 | 64%  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 is real

**Current operational
projects have around 27
Mtpa of CO₂ capture
capacity**





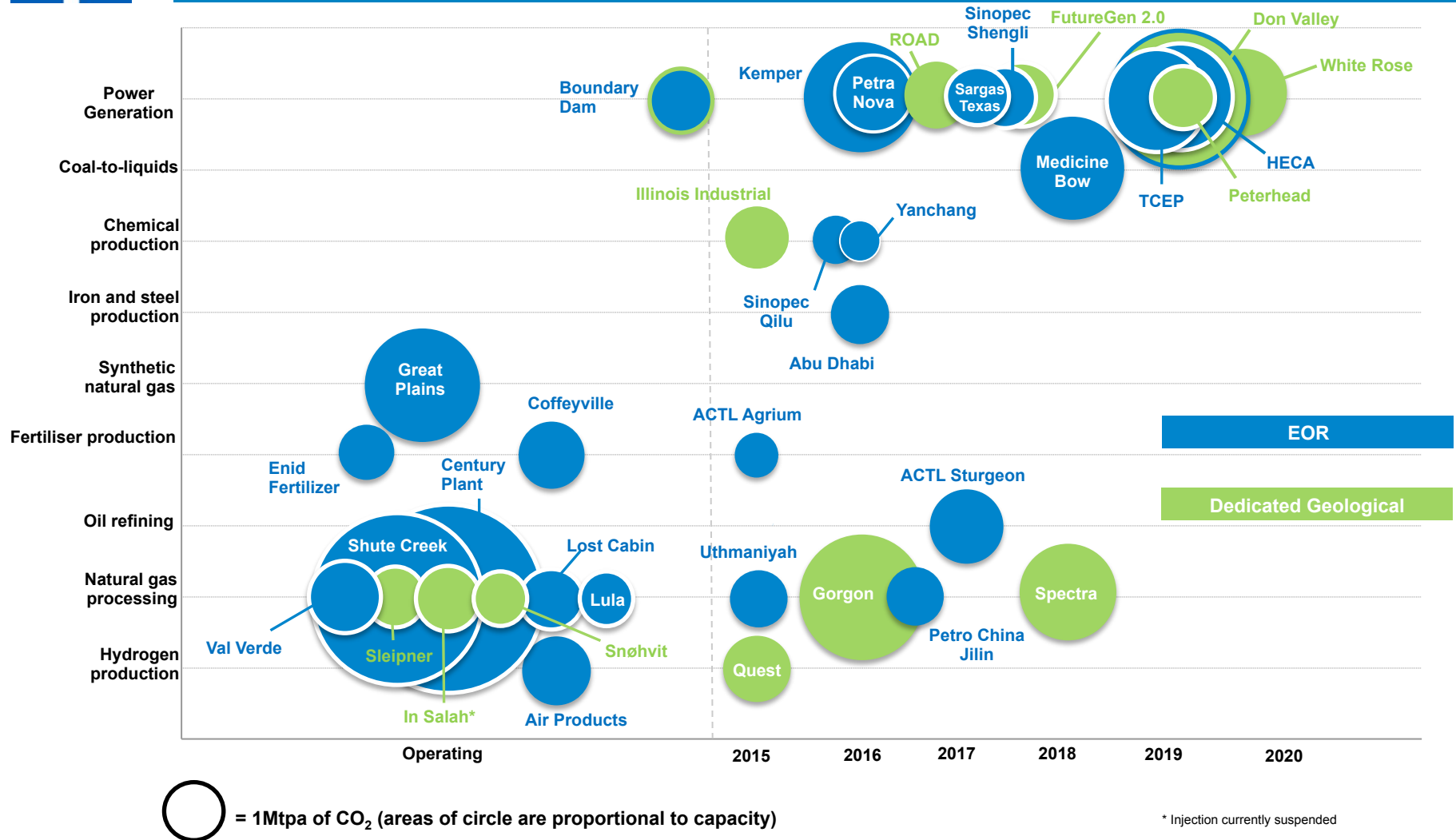
Large-scale CCS projects by region or country

| | Early planning | Advanced planning | Construction | Operation | Total |
|--------------------------|----------------|-------------------|--------------|-----------|-------|
| Americas | 5 | 6 | 6 | 10 | 27 |
| China | 7 | 4 | - | - | 11 |
| Europe | 3 | 4 | - | 2 | 9 |
| Gulf Cooperation Council | - | - | 2 | - | 2 |
| Rest of World | 4 | - | 1 | 1 | 6 |
| Total | 19 | 14 | 9 | 13 | 55 |

North America, China and UK (with 6) have the most projects



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



2014-2015 is a watershed period for CCS – it is a reality in the power sector and additional project approvals are anticipated



2015 -2016: A year of action

Operational
2015



Quest



ACTL Agrium

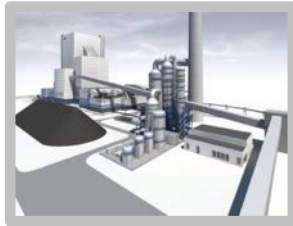


Decatur



Uthmaniyah

FID
2015



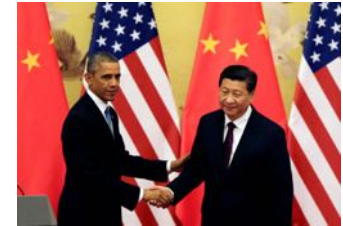
ROAD



White Rose



Peterhead



US China Projects

Operational
2016



Abu Dhabi CCS

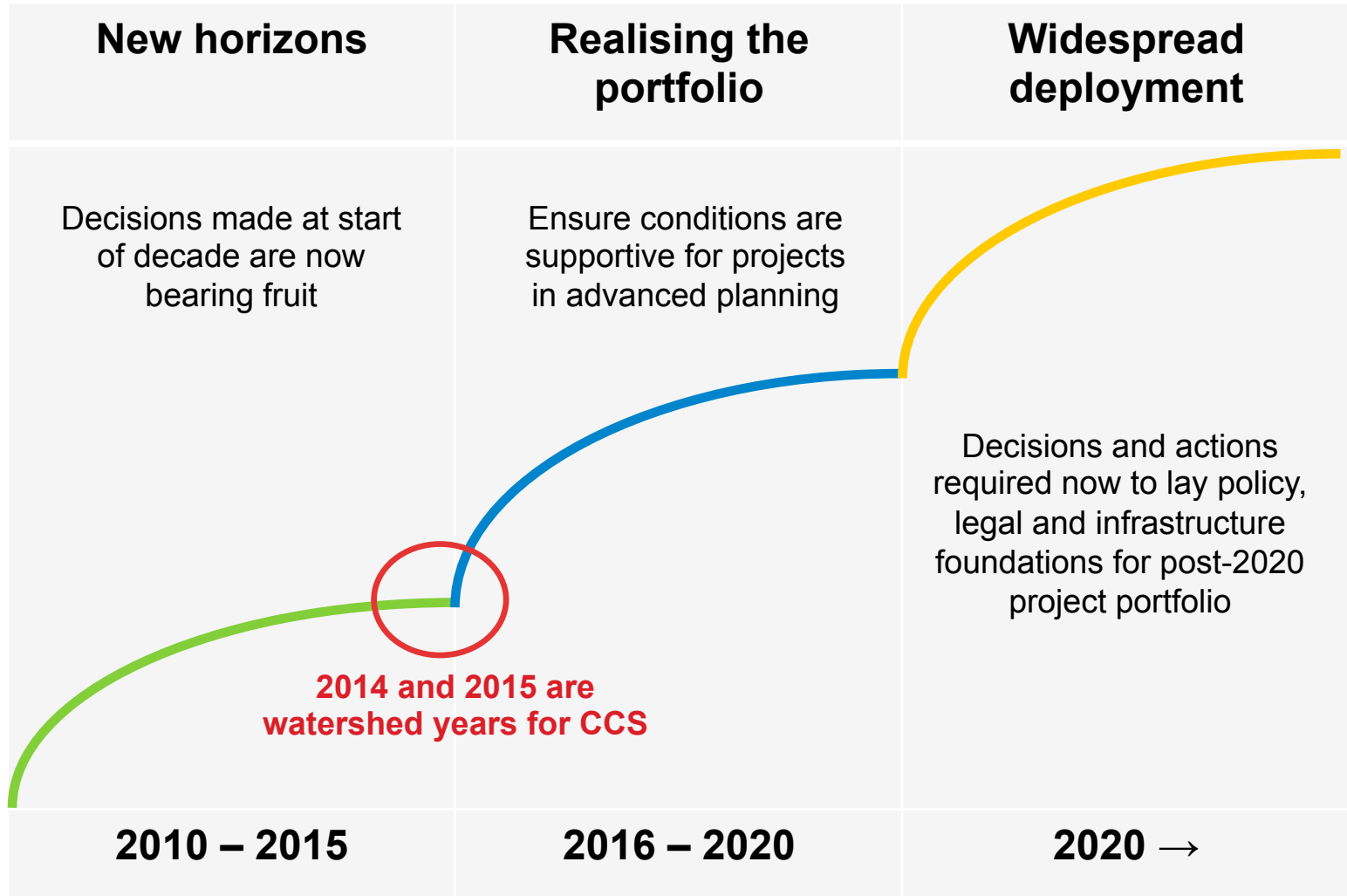


Kemper County

- COP 21
- IEA Ministerial
- CSLF Ministerial
- CEM Ministerial



A pathway to CCS deployment



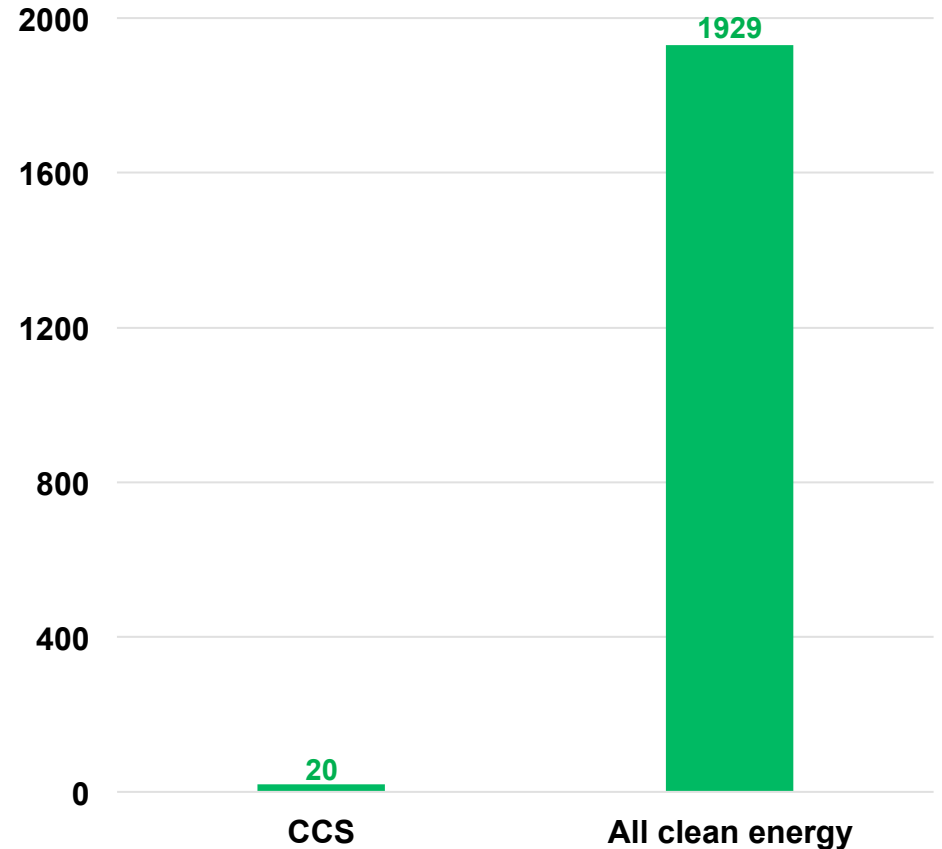


Strong policy drives investment

- 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.



ADVANCED CCS PROJECTS - EUROPE

Operate 12 in total

Advanced 14 in total

Early 19 in total



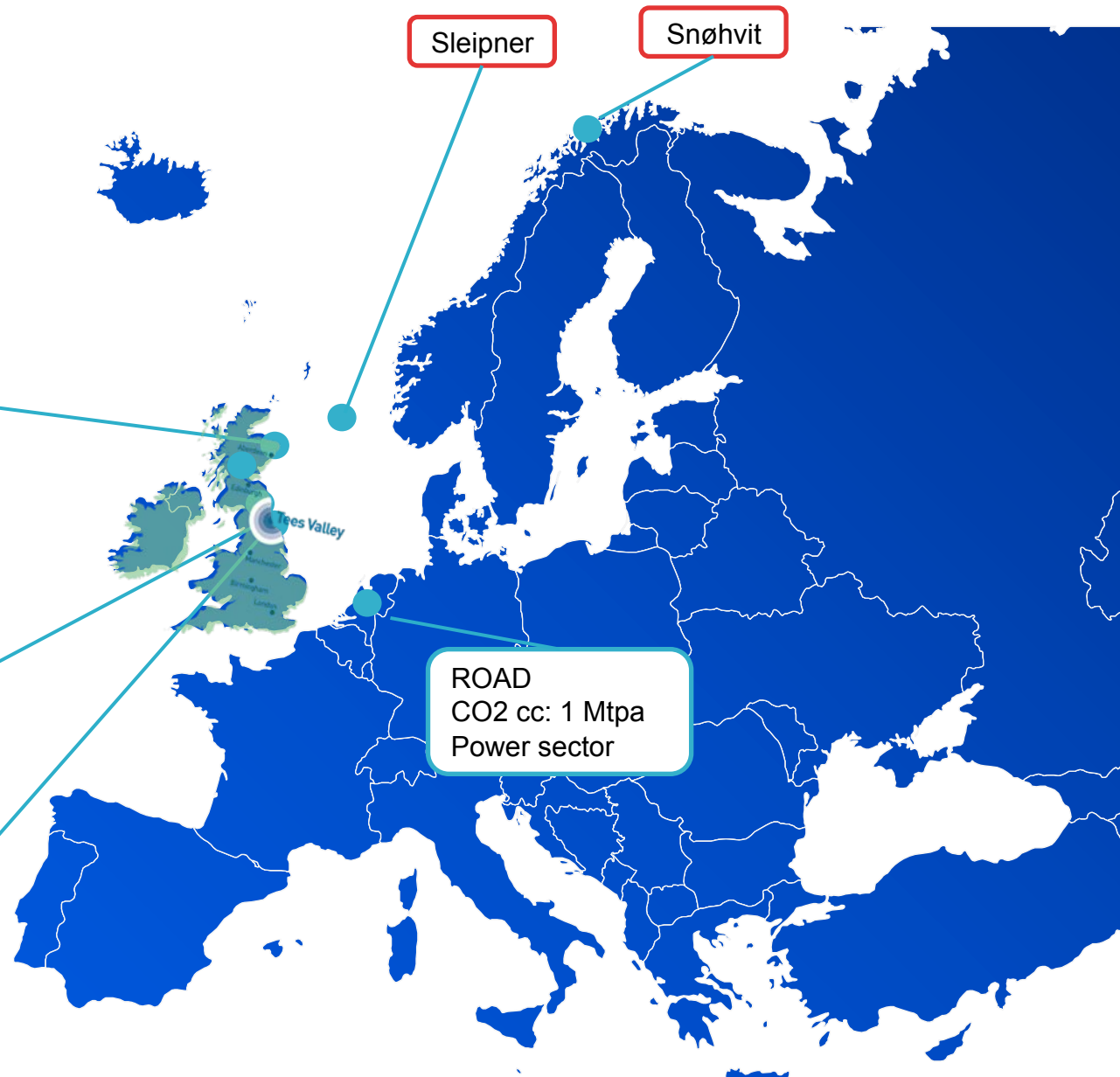
Peterhead
CO2 cc: 1 Mtpa
Power sector



White Rose
CO2 cc: 2 Mtpa
Power sector



Don Valley
CO2 cc: 1 Mtpa
Power sector



Sleipner

Snøhvit

Tees Valley

ROAD
CO2 cc: 1 Mtpa
Power sector



ADVANCED CCS PROJECTS – EUROPE

- **Progress in Europe** on CCS demonstration projects has been slow.
- In contrast with Europe, in **other parts of the world** projects in operation or construction phase and the pipeline has increased – led by North America (Boundary Dam, Kemper County, Petra Nova) 11 projects in China

Are there grounds for optimism?



EU CCS POLICY DEVELOPMENTS - AN OPPORTUNITY



- New Commission
- New Parliament
- UK support

- 2030 Framework
- Energy Union
- CCS Directive Review
- Innovation Fund (NER400)
- Initiatives in the EP
- UK CCS support and projects
- COP 21 Paris





WHAT NEEDS TO BE DONE

- The EC should
 - Engage with Member States on CCS through 2050 decarbonisation plans
 - Deliver ETS Reform, including creating a modernisation/innovation fund to fund CCS projects
 - Support the development of hubs, clusters, and Common User Infrastructure
 - Recognise Industrial and Part Chain CCS project in NER400
 - Ensure key European projects cross the finish line



IN SUMMARY....

- CCS is an essential mitigation technology
- 2015 is year of action globally, and represents a significant opportunity for CCS
- While EU progress has been slow, there is cause for optimism
 - We have supporters in the EC, EP and in the UK
 - The EU CCS Community is aligned
 - There are policy opportunities to promote delivery of CCS projects

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