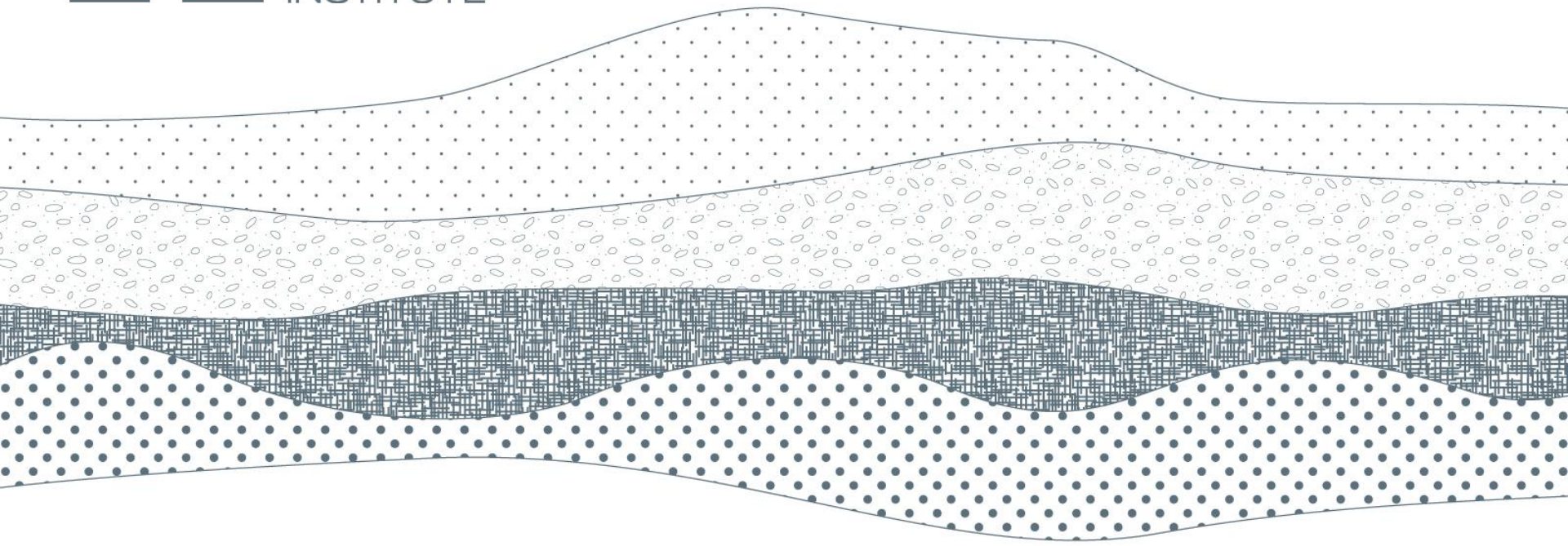


CCS PROJECT DEVELOPMENTS

Ian Havercroft, Senior Advisor – CCS Regulations

4th IEA International CCS Regulatory Network Meeting

The Global CCS Institute

The Institute works collaboratively to build and share the expertise necessary to ensure that CCS can make a significant impact towards reducing the world's greenhouse gas emissions.

FACT-BASED ADVOCACY:

- using facts to inform and influence domestic and international low carbon policies;
- supporting the commercialisation of CCS by advancing the understanding of appropriate funding and financing solutions and risk regimes; and
- increasing the awareness of the benefits of CCS and the role it plays within a portfolio of low carbon technologies.

ASSISTING PROJECTS:

- bridging knowledge gaps between demonstration efforts; and
- developing project specific solutions particularly amongst early movers.

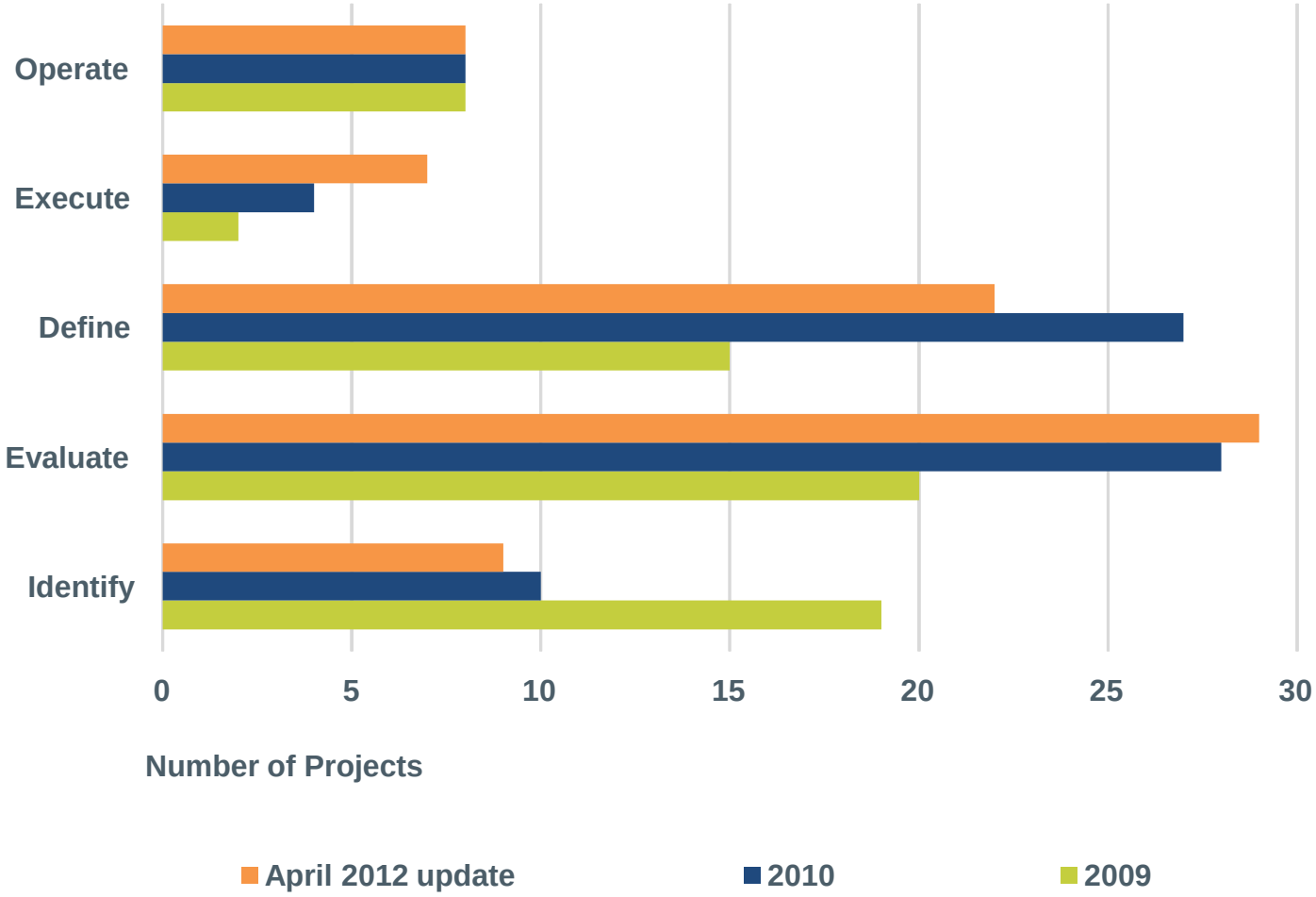
SHARING KNOWLEDGE:

- collecting information to create a central repository for CCS knowledge; and
- analysing and disseminating information to fill knowledge gaps and build capacity.

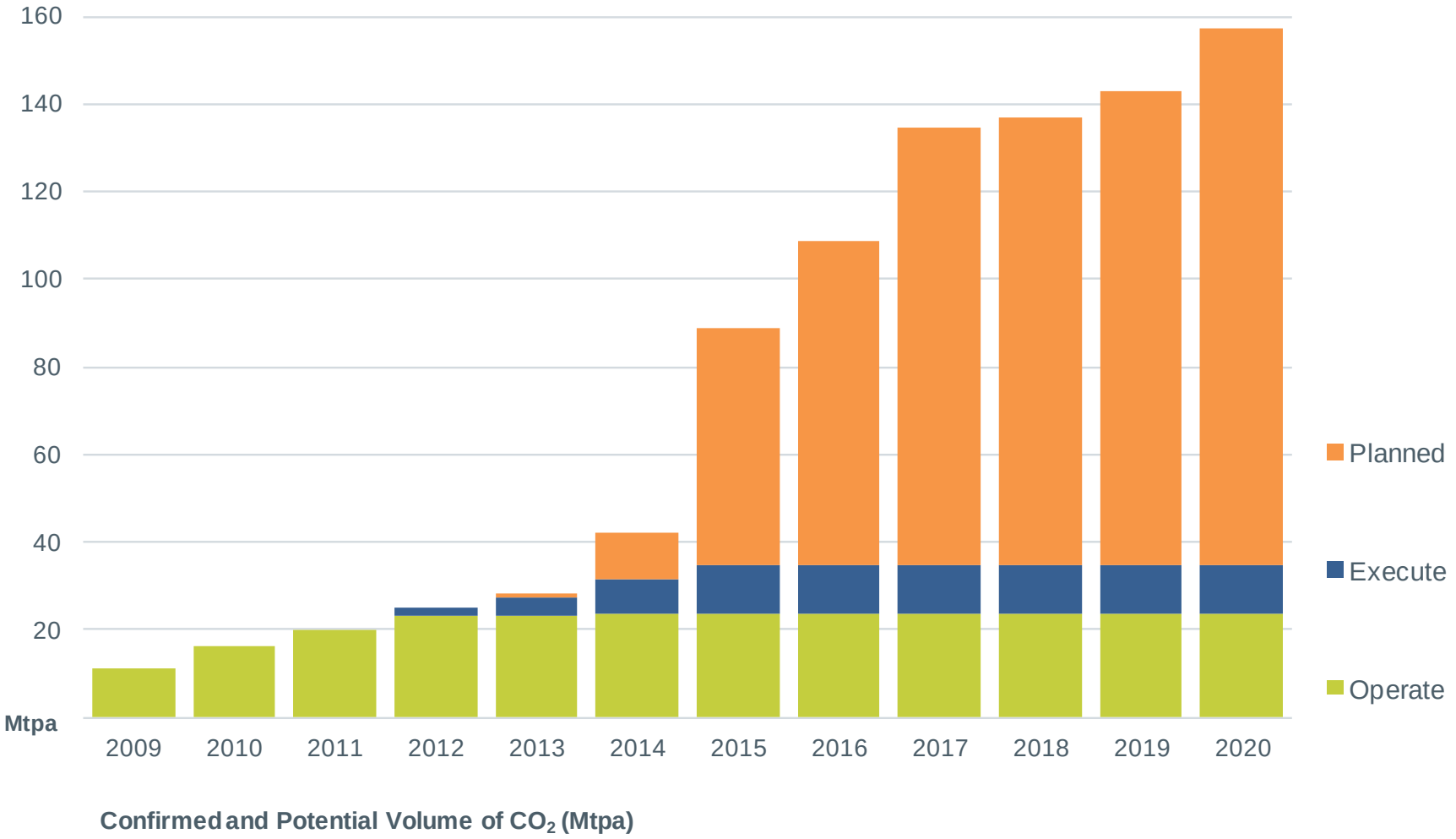
GLOBAL STATUS OF CCS

- Focus on Large Scale Integrated Projects
- 400kt/year or more CO_2 capture for industrial plants, 800kt+/year for electricity plants
- All aspects of CCS chain included

MEASURED PROGRESS OF LARGE-SCALE INTEGRATED PROJECTS SINCE 2009

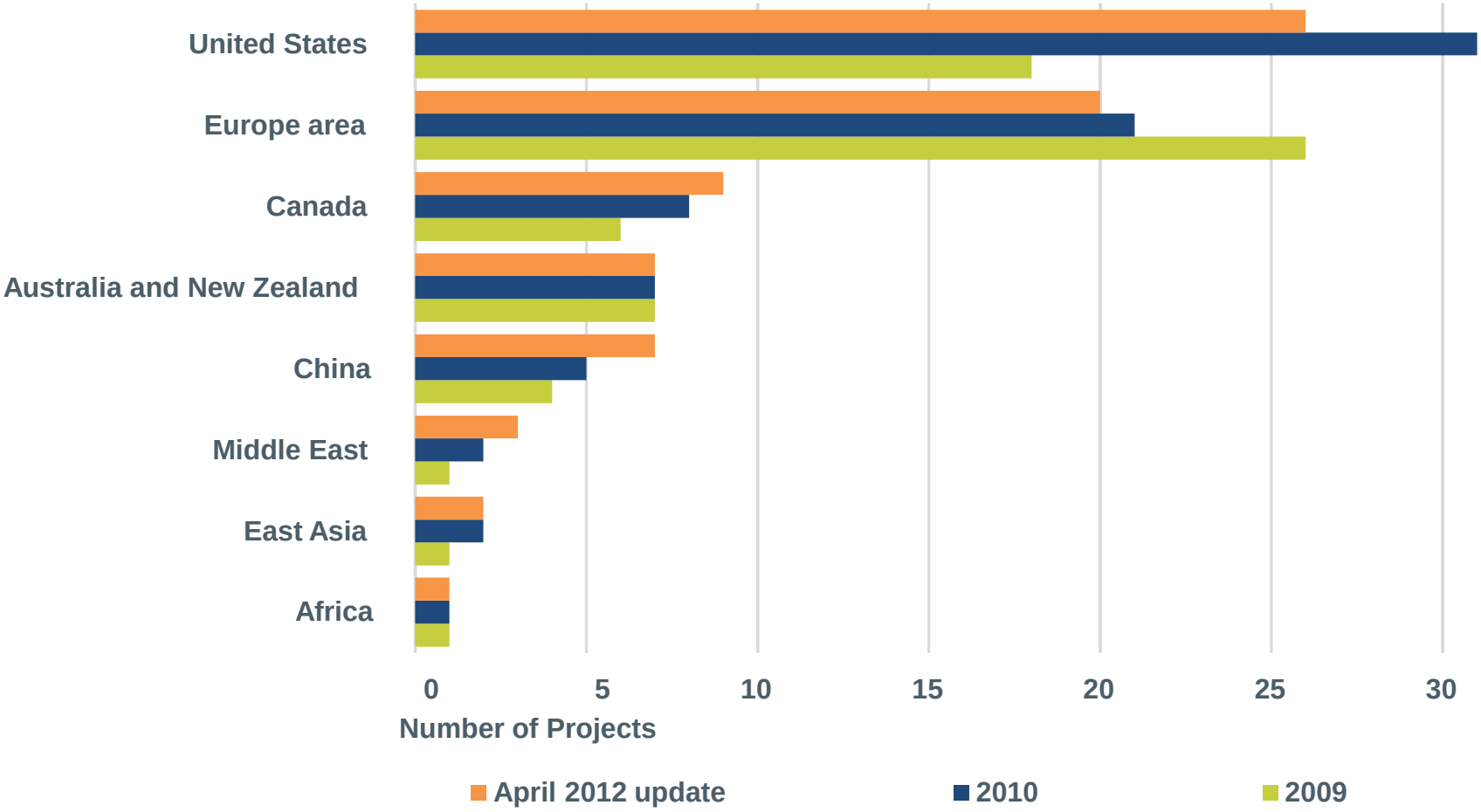


PROJECT DEPLOYMENT TIMEFRAMES INDICATE NEXT FEW YEARS CRUCIAL

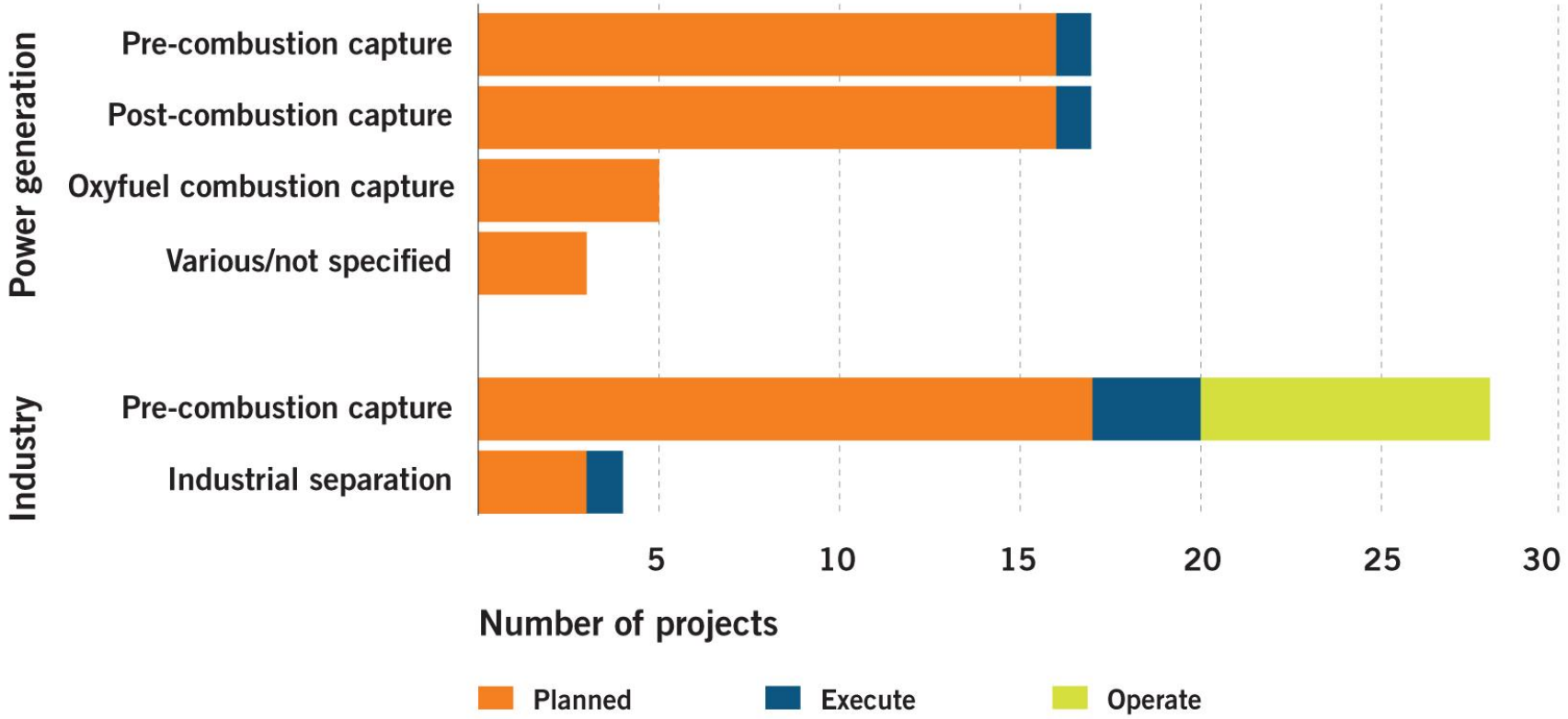


Confirmed and Potential Volume of CO_2 (Mtpa)

PROJECT NUMBERS CONCENTRATED IN THE UNITED STATES AND EUROPE



PROJECTS ARE SPREAD ACROSS TECHNOLOGIES



CONFIRMED PROJECTS

PROJECT NAME	LOCATION	CAPTURE TYPE	VOLUME CO_2 (Mtpa)	STORAGE TYPE	START DATE
In operation					
Shute Creek Gas Processing Facility	**United States**	**Pre-combustion (gas processing)**	**7**	**EOR**	**1986**
Sleipner CO_2 Injection	Norway	Pre-combustion (gas processing)	1 (+ 0.2 in construction)	Deep saline formation	1996
Val Verde Natural Gas Plants	**United States**	**Pre-combustion (gas processing)**	**1.3**	**EOR**	**1972**
Great Plains Synfuels Plant & Weyburn-Midale	**US/ Canada**	**Pre-combustion (synfuels)**	**3**	**EOR**	**2000**
Enid Fertilizer Plant	**United States**	**Pre-combustion (fertiliser)**	**0.7**	**EOR**	**1982**
In Salah CO_2 Storage	Algeria	Pre-combustion (gas processing)	1	Deep saline formation	2004
Snøhvit CO_2 Injection	Norway	Pre-combustion (gas processing)	0.7	Deep saline formation	2008
Century Plant	**United States**	**Pre-combustion (gas processing)**	**5 (+ 3.5 in construction)**	**EOR**	**2010**
In construction					
Lost Cabin Gas Plant	**United States**	**Pre-combustion (gas processing)**	**1**	**EOR**	**2012**
Air Products Steam Methane Reformer EOR Project	**United States**	**Pre-combustion (hydrogen production)**	**1**	**EOR**	**2012**
Illinois Industrial Carbon Capture and Sequestration (ICCS)	**United States**	**Industrial (ethanol production)**	**1**	**Deep saline formation**	**2013**
Boundary Dam with CCS Demonstration	**Canada**	**Post-combustion (power)**	**1**	**EOR**	**2014**
Agrium CO_2 Capture with ACTL	**Canada**	**Pre-combustion (fertiliser)**	**0.6**	**EOR**	**2014**
Kemper County IGCC Project	**United States**	**Pre-combustion (power)**	**3.5**	**EOR**	**2015**
Gorgon Carbon Dioxide Injection Project	Australia	Pre-combustion (gas processing)	3.4 - 4	Deep saline	2015

PROGRESS IS BEING MADE …

- CCS projects are operating today, in a number of industries and a number of countries
  - often when carbon capture is already part of the industrial process and where already well explored storage locations are available
  - and often based on EOR, which provides a value on CO_2
- More projects are entering construction and operation
- Two large scale power station CCS projects are now under construction, along with others in other industries.

… BUT A NUMBER OF CHALLENGES REMAIN

- Overall number of projects static and development behind targets
- High profile failures and cancellations, with many pointing to a lack of adequate policy support
- Continuing issues with public acceptance of CCS, despite proven nature of individual components
- Regulations in some countries pushing electricity generation to gas – without CCS

KEY MESSAGES

- CCS remains a key technology for GHG mitigation
- Momentum cannot afford to stall if long term GHG targets are to be met
- Planning and execution takes time; all elements of CCS projects must be carefully integrated
- Further policy action is vital
  - Projects need adequate policy support if they are to proceed and demonstrate the potential of the technology

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