

CCS Current Global Status

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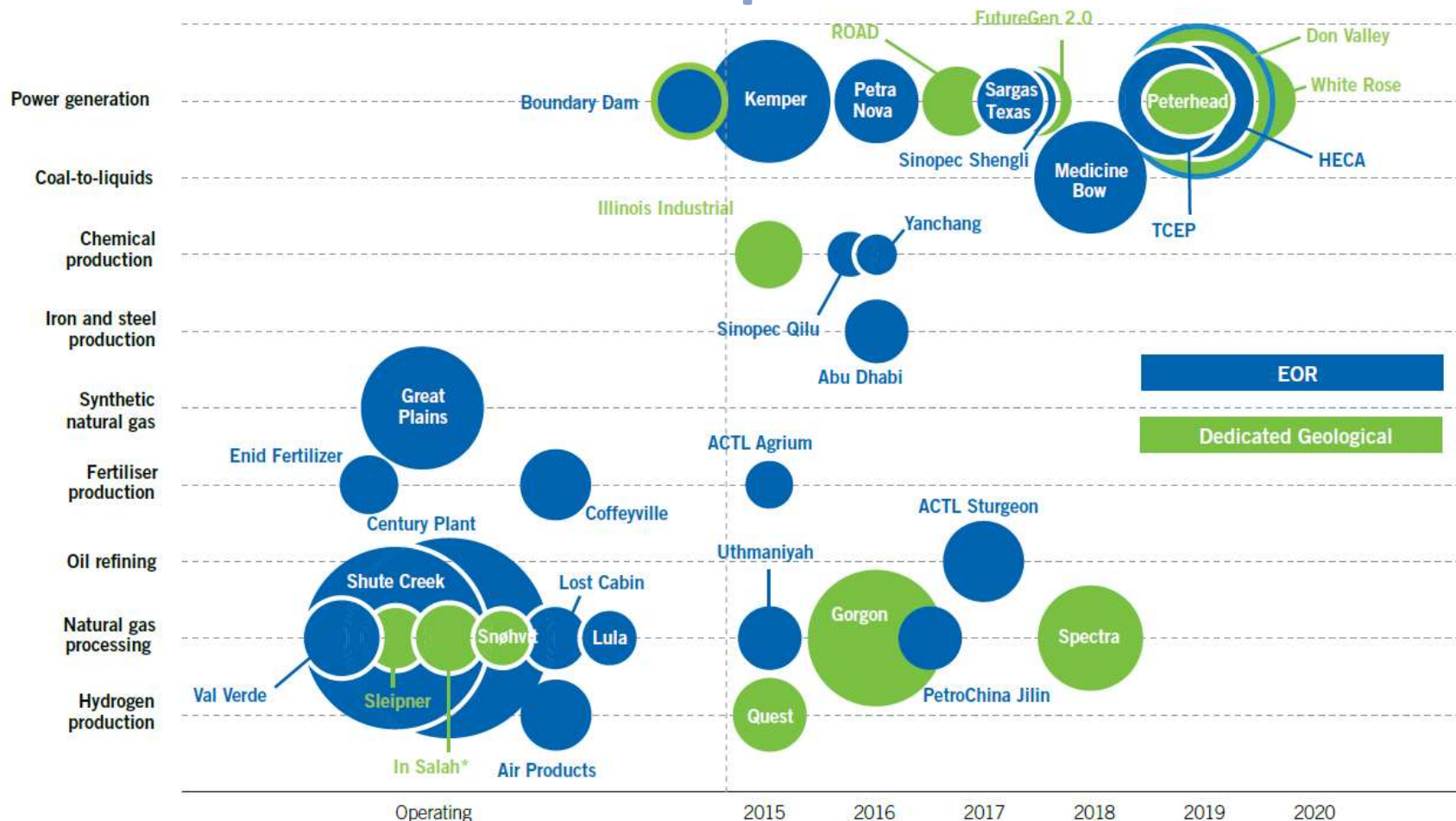
CCS Session at ICEF2015

Tokyo, Japan

October 8th 2015



Around a dozen projects are at earlier stages of development



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

Source: GCCSI 2014

* Injection currently suspended

Important CCS Projects - Power Sector



Boundary Dam 3, Canada



- Refit of existing coal fired unit
- Operational for 1 year
- CanSolv amine based PCC technology
- 110MWe
- 95% capture
- CO₂ sold for EOR

NRG Parish, USA



- Refit of existing coal fired unit
- Operational in late 2016
- MHI amine based PCC technology
- 250 MW slip stream
- 90% capture
- CO₂ sold for EOR

Important CCS Projects - Power Sector



- Kemper County Project, USA
 - Novel IGCC Technology
 - 524 MW lignite fired – new build
 - 65% of total emissions captured
 - Due on stream late 2016



SMR Based H2 Production CCS Projects



- Large scale demo projects
 - AP Port Arthur Project (USA)
 - Operational - ~1 million tpy CO₂ captured for EOR
 - Shell Quest Project (Canada)
 - Under construction - ~ 1 million tpy CO₂ captured and stored (on-shore) in saline aquifer
- Large scale pilot projects
 - Repsol (Spain)
 - Operational since 2002, 60k tpy CO₂ captured for sale as food grade CO₂
 - AL Port Jerome Project (France)
 - Under commissioning - ~100k tpy CO₂ captured for sale as food grade CO₂.
 - Japan CCS Tohokamai Project (Japan)
 - Under construction - ~200k tpy CO₂ captured and stored (off-shore) in saline aquifer

Bio Ethanol Based CCS Projects



Decatur CCS project

- 1 Mt CO₂ captured and stored in a deep saline aquifer
- Alstom amine based capture technology
- Now in non operational mode

Industrial CCS Project

- Includes initial CCS project
- Total of 3.6mT/y CO₂ captured
- CO₂ injected into a deep saline aquifer from June 2015
- Uses Amine based capture technology

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Key Developments Going Forward (2015 onwards-2016)



- Quest Project start up (October 2015)
- Kemper County IGCC project Start up – late 2015
- Gorgon project start up late 2015
- Announcement of UK Competition results (2016)
 - Peterhead – Gas fired power plant with CCS
 - White Rose – Oxy fired power plant
- FID on Road Project in Netherlands (2016)
- NRG Parish operational in late 2016

IEA ETP2015 – Tracking Energy Progress



- CCS not on track for 2DS
 - positive developments noted (Boundary Dam 3)
- **CCS deployment has begun in “sweet spots” where policies and strategic local and commercial interests align**
 - CO₂-EOR an enabler in some regions e.g. USA and Canada
- **“Learning-by-doing” is now also under way for CCS in power generation and some industry sectors.**
- Widespread deployment requires the cost gap be closed by determined, parallel action in technology development and market creation.
- Improving and using post-combustion technologies is of particular importance



Thank you

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