



Australian Government

DEPARTMENT OF RESOURCES, ENERGY AND TOURISM

Update on Australia's CCS Policy and engagement with China

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ENHANCING AUSTRALIA'S ECONOMIC PROSPERITY

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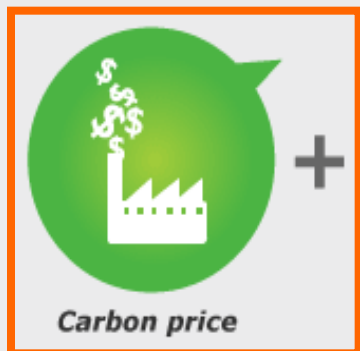
Policy drivers for CCS in Australia

Greenhouse gas reduction commitments

- By 2020: 5-25% below 2000 levels
- Proposed: 80% below 2000 levels by 2050

Clean Energy Future Plan

- Carbon price introduced 1 July 2012
- Fixed price of \$23 per tonne for the first 3 years
- Flexible price from 1 July 2015
- Linked to European Union emissions trading scheme
- Encourages investment in low-emissions technologies, including CCS



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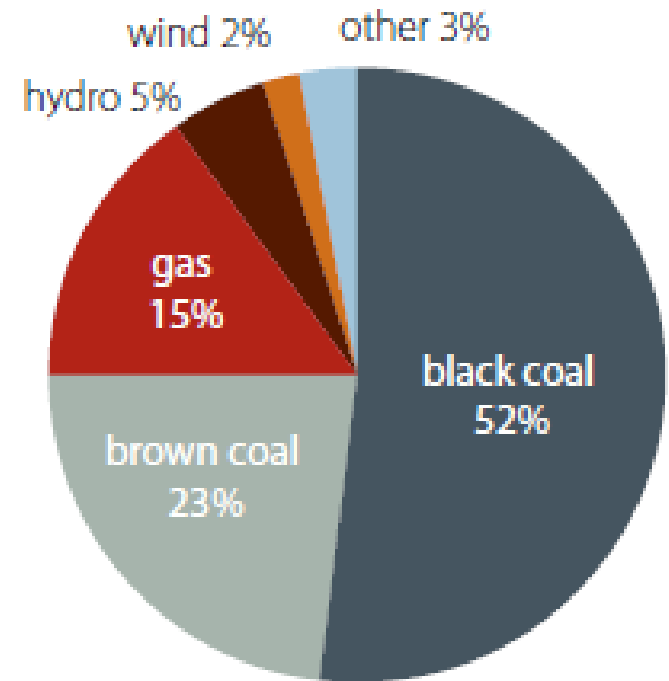
Importance of CCS for Australia

- Heavy reliance on fossil fuels
- World's largest net exporter of coal
- Several high-emitting industrial activities

For the year leading up to March 2012, coal-fired electricity generation accounted for around **155 million tonnes of CO₂**, which is roughly **30 per cent of Australia's man-made greenhouse gas emissions** in this period.

- CCS is currently the only technology able to significantly reduce emissions from the use of fossil fuels

Electricity generation by energy source, 2009-10:



Source: BREE 2012, Energy in Australia 2012.

Energy White Paper Priorities

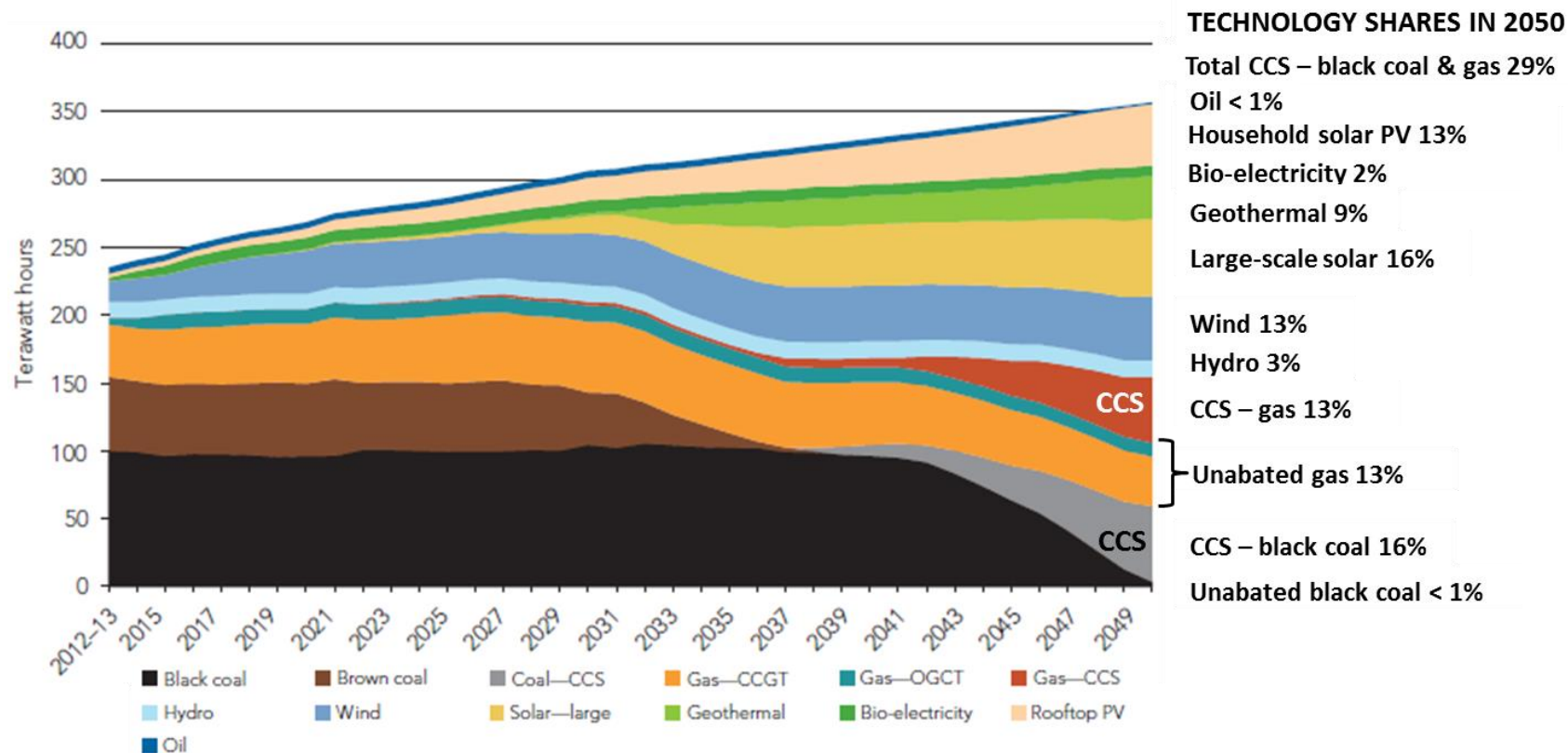
Developing better energy market outcomes for consumers

Accelerating our clean energy transformation

Developing Australia's critical energy resources – particularly
Australia's gas resources

Strengthening the resilience of Australia's energy policy
framework

Australian Energy Technology Share Projections

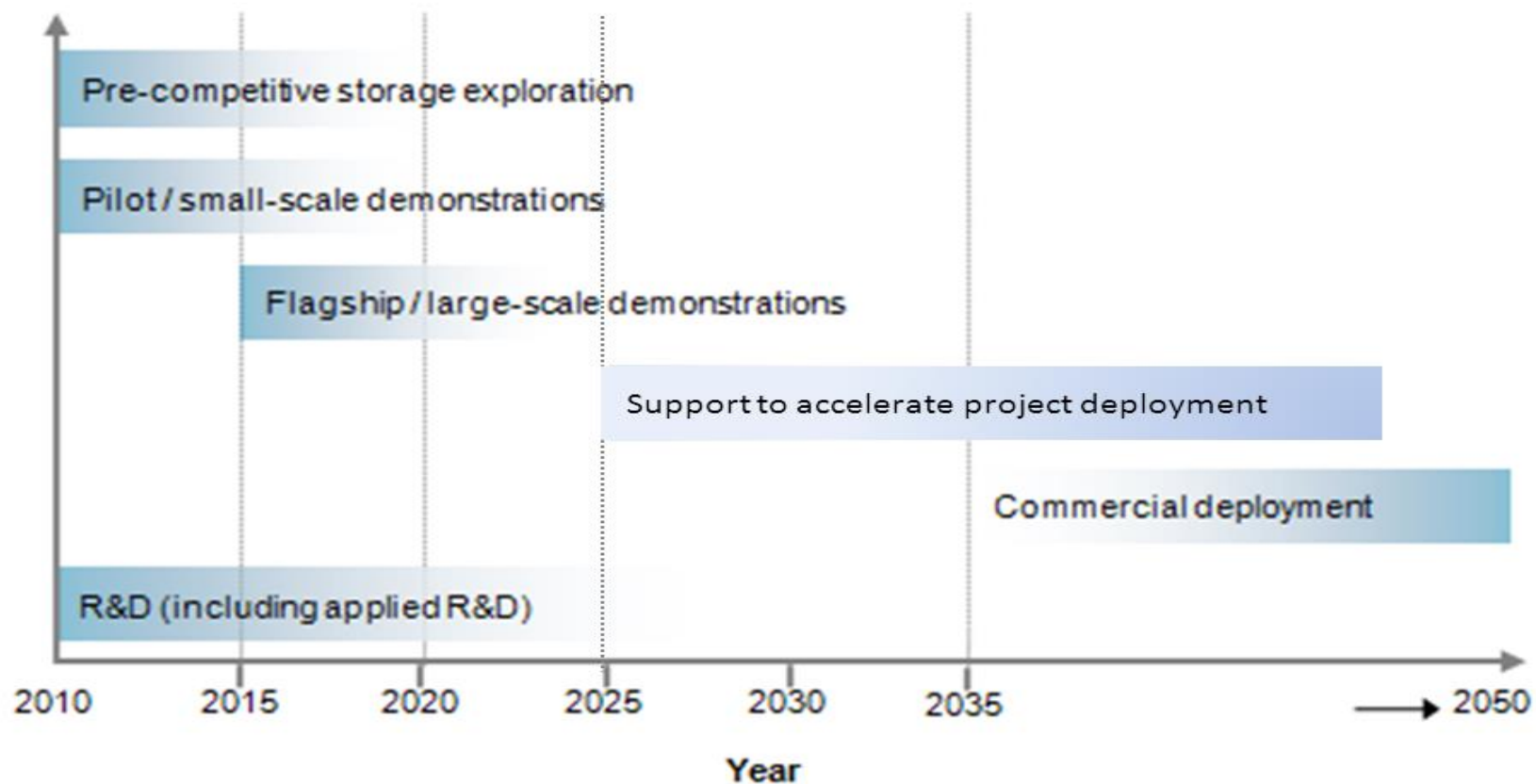


Source: BREE projections, cited in Commonwealth Government, *Energy White Paper*, Figure 3.8, p. 33.

White Paper - Clean Energy Recommendations

- Continued implementation of carbon pricing and the Renewable Energy Target
- Ongoing support for development and deployment of renewable and clean energy technologies through the Clean Energy Finance Corporation, ARENA, CCS Flagships and other clean energy programs
- Improve network planning and connection outcomes through timely response to the AEMC Transmission Frameworks Review
- Develop collaborations to build understanding of alignment of clean energy R&D to large-scale demonstration and commercialisation

Australian CCS Roadmap



Australia's CCS policies and programs

Major government programs are:

- CCS Flagships program (\$1.7 billion)
- National Low Emissions Coal Initiative (\$370 million)
- National CO2 Infrastructure Plan (\$61 million)
- Global CCS Institute (\$270 million)
- With additional support flowing from other programs

Legislation

Storage

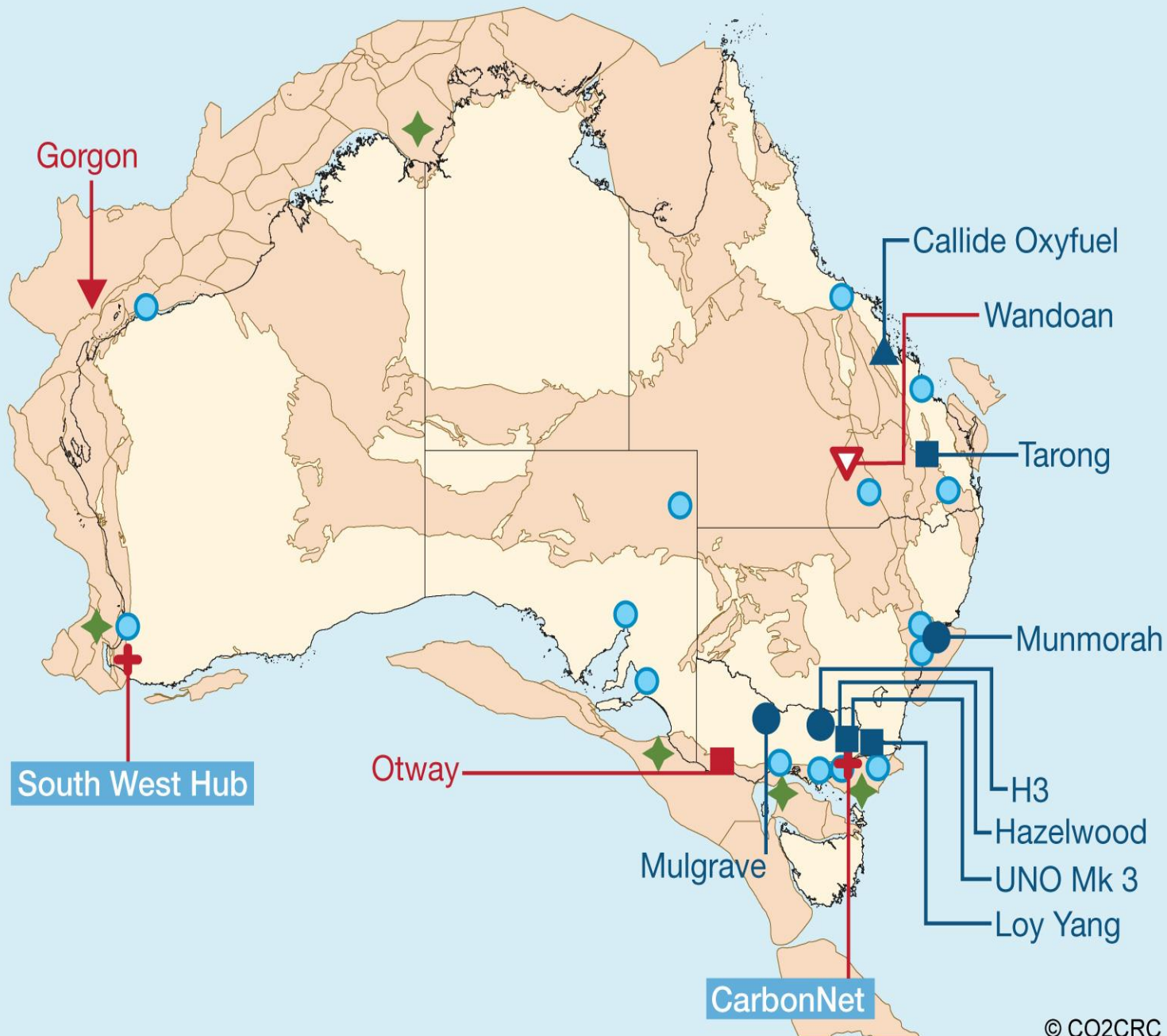
CCS Projects in Australia

CCS PROJECTS

- ▲ Capture - feasibility
- ▲ Capture - advanced
- Capture - operational
- Capture - completed
- ▽ Storage - feasibility
- ▽ Storage - advanced
- Storage - operational
- Storage - completed
- + Storage hub - feasibility
- Major emission nodes
- ◆ Offshore CCS permits
- Basins with potential for CO₂ storage

(Spatial data supplied by Geoscience Australia)

CCS Flagship project



Australia's international engagement on CCS

Australia is an active member of a range of international forums:

- Carbon Sequestration Leadership Forum (CSLF)
- CCUS Action Group – through the Clean Energy Ministerial (CEM)
- International Energy Agency (CCS Unit)
- Global CCS Institute
- Australia-China Joint Coordination Group on Clean Coal Technology



International
Energy Agency



GLOBAL
CCS
INSTITUTE



CLEAN ENERGY
MINISTERIAL

Accelerating the Transition to Clean Energy Technologies



Australia - China engagement on CCS

Australia - China Joint Coordination Group on Clean Coal Technologies (JCG)

- Established in 2008 and co-chaired by the Department (RET) and China's National Energy Administration (NEA)
- The 7th JCG meeting will be held in Australia later this year

Key Objectives:

- Work closely together as both countries develop and deploy low emissions coal technologies
- Develop a targeted suite of collaborative projects across the low emissions coal commercialisation curve
- Hold regular meetings to reinforce communication channels between government, industry and R&D organisations from Australia and China

Australia - China JCG

Key objectives are delivered through a range of funded projects.

Ongoing:

- Australia-China Post Combustion Capture (PCC) project (\$12 million)
- PCC Technology Advancement (PCC-3) project (\$2.4 million)
- Australia-China JCG Partnership Fund (\$1.1 million)
- CAGSII project (1.3 million)

Completed (December 2012):

- 6 laboratory scale R&D projects (\$3 million) including project example:
 - *Assessing the value of co-optimising ECBM recovery and CO2 storage*World first CO2 injection field trial in to multi-lateral horizontal well in coal seams. Over 460 tonnes of CO2 were injected into a multi-lateral horizontal well in Liulin, Shanxi, China.

Australia-China PCC Feasibility Study Project

Memorandum of Understanding (MoU)

- Between RET and the NEA;
- Initialed at 4th JCG in Shanghai 2010;
- Signed in December 2010;
- 600 MW (1 Mtpa) plant with PCC;
- Feasibility Study located in China;
- Up to \$12 million



Australia-China PCC Feasibility Study Project

Progress a 1 Mtpa PCC Plant with CCS.

Scoping Study undertaken by CSIRO and Huaneng CERI

- Provided advice on key considerations to progress the Project (March 2011)

Geoscience Australia Review of Scoping Study

- Considered sub-surface aspects and advised RET and NEA (June 2011)

Governance Structure agreed

- RET and NEA (JCG Co-chairs) plus CERI, CSIRO, CNPC HSE Research Institute & China University of Petroleum, Beijing, Geoscience Australia (steering committee and operations) (December 2012)
- A Project Manager will be contracted soon (August 2013)

Advancing PCC Technology in China Project (PCC-3)

Advance PCC technology in China.

- Project is led by CSIRO in partnership with Huaneng CERI
- Builds on previous collaborative work:
 - PCC engineering capability well established in China
 - Pilot plant designed and built
 - Process development facility established at CSIROs Energy Centre
 - Location for PCC demonstration project selected

What?

- Reducing the energy penalty and costs of PCC

How?

- New solvent formulations and PCC process modifications

JCG Partnership Fund

Create closer low-emission coal technology linkages with China.

- Managed by the Australian Academy of Technological Sciences and Engineering with support from Huaneng CERI
- Support for exchanges, workshops and symposia
- Round 1 funding contributed towards:
 - 4 Workshops
 - 5 Long Term Exchanges (up to 9 months)
 - 9 Short Term Exchanges (2 weeks)
- Recipients funded through Round 2 will be announced soon

CAGSII Project

Create closer linkages with China on the geological storage of CO₂

- Managed by Geoscience Australia in partnership with the Administrative Centre for China's Agenda 21, Ministry of Science and Technology
- Support for targeted research projects, exchanges, workshops and symposia
- The sharing of expertise is a critical aspect of the project



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Thank you

Energy White Paper 2012

www.energywhitepaper.ret.gov.au

Australian Energy Technology Assessment 2012

www.bree.gov.au/publications/aeta.html

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