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# Policy, Legal and Regulatory Framework for CCS in Australia

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Martin Squire

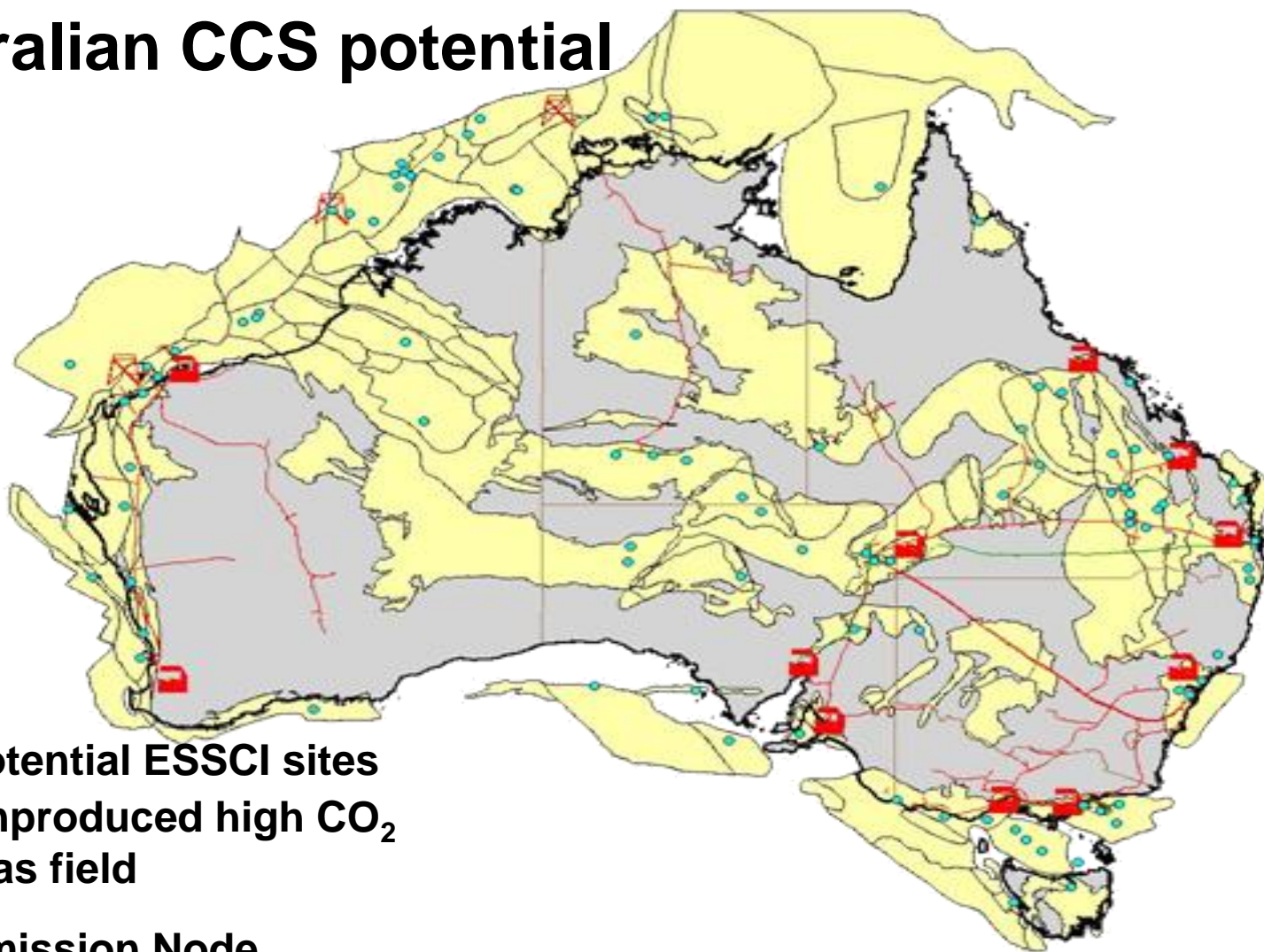
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# Australian CCS potential



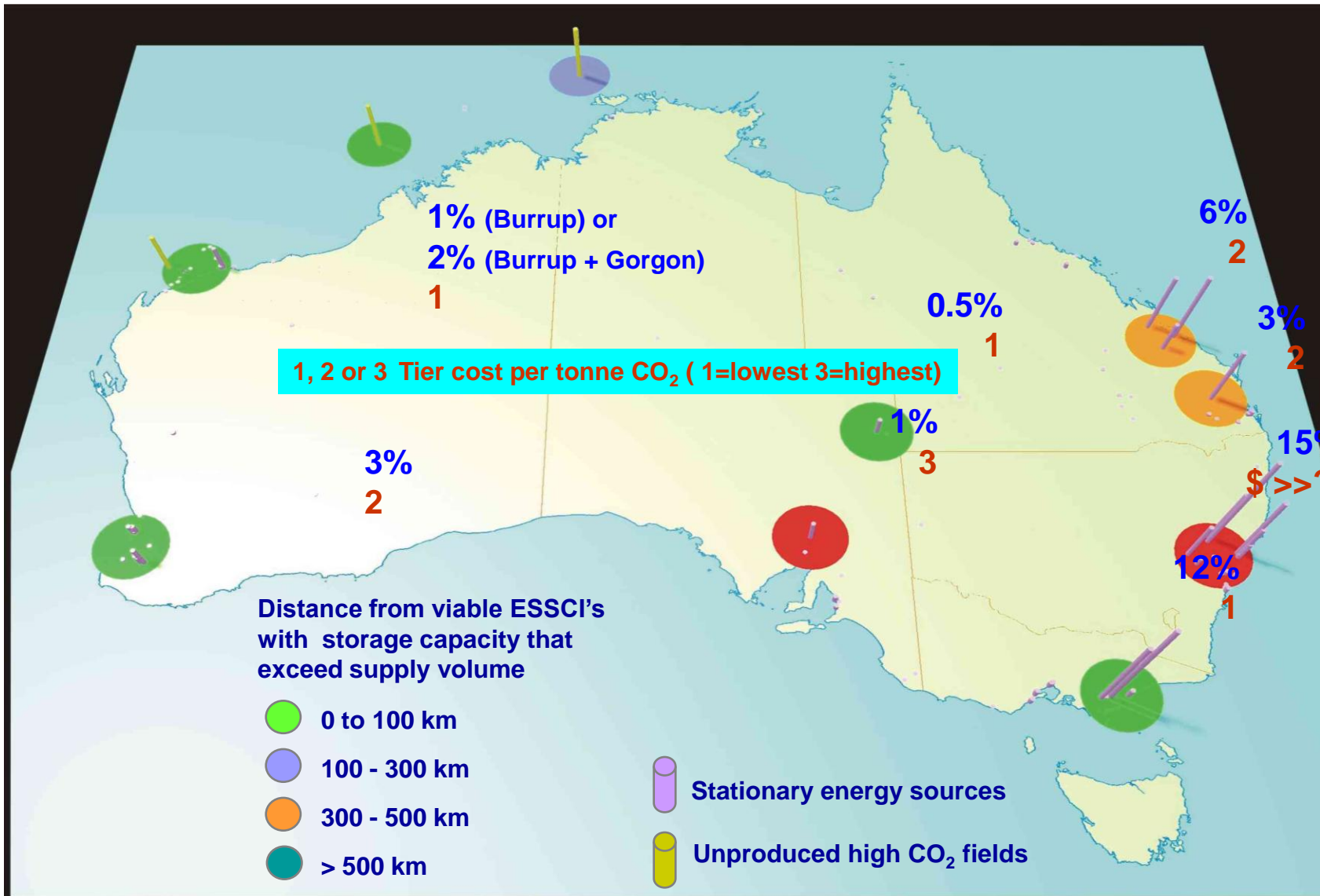
Potential ESSCI sites



Unproduced high CO<sub>2</sub> gas field



Emission Node





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# Key Australian Research Bodies

Geoscience Australia

Cooperative Research Centre for Greenhouse Technologies (CO2CRC)

Co-operative Research Centre for Coal in Sustainable Development (CCSD)

Centre for Low Emission Technology (cLET)

Commonwealth Scientific, Industrial and Research Organisation (CSIRO)



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# Australian Capture & Storage Projects

Name	Lead	Description	CO2 Source	Injection Rate	Start-up
Otway Project VIC	CO2CRC	Storage demonstrations project	Natural Gas / CO2 well	100 kt total	April 2008
Moomba CO2 Storage Project SA	Santos	Regional CO2 Storage Hub. Initial demonstration through EOR	Natural Gas	1mt total	2010
Gorgon LNG Project WA	Chevron	15mtpa Gas field development with CO2 Capture and Storage	Natural Gas	Up to 4mtpa	2012-2013
Callide Oxyfuel Project QLD	CS Energy Ltd	30MW Coal fired boiler Oxyfuel retrofitting Capture and CO2 Storage	Black coal	Up to 50 kt	2010-2011
ZeroGen Project QLD	Stanwell Corp.	100MW IGCC and CO2 Capture and Storage	Black Coal	Up to 400 ktpa	2011-2012
Kwinana (DF3) Project WA	BP	500MW IGCC and CO2 Capture and Storage	Black Coal	Up to 4 mtpa	2011-2014
Monash CTL Project VIC	Monash Energy	Coal to liquids CO2 Capture and Storage	Brown Coal	Up to 15 mtpa over 40 years	2015
Fairview Project QLD	GE Santos	100MW CSM post combustion capture and CO2 re-injection	Enhanced CSM	100 ktpa	2009-2010



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# Capture Trials with Possible Storage

Name	Lead	Description	CO2 Source	Injection Rate	Start-up
HRL Project VIC	HRL	400MW IDHCC Pilot Scale CO2 Capture	Brown Coal	Future potential storage	Post 2009
Hazelwood 2030 PCC Project VIC	International Power	200MW Boiler re-fit. 10- 20ktpa solvent based capture	Brown Coal	Future potential storage	Late 2008
Loy Yang PCC Project VIC	Loy Yang Power	5,000 tpa mobile PCC facility trials	Brown Coal	Future potential storage	2008-2009
Munmorah PCC Project NSW	Delta Electricity	5,000 tpa mobile PCC facility trials		Future potential storage	Mid 2008
FutureGas Project SA	Hybrid Energy	150-300MW Lignite CFB Combustion and Gasification CO2 Capture and Storage	Brown Coal	ytbd	2015
Collimbah Power Project WA	Aviva Corp.	2x200MW Oxyfuel with conversion for CO2 capture and storage	Black Coal	ytbd	2012



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# Otway Project - VIC

Description	CO <sub>2</sub> /CH <sub>4</sub> Extraction, Separation and CO <sub>2</sub> Storage Project
Location	Onshore Otway Basin near Curdie Vale SW Victoria
Participants	CO <sub>2</sub> CRC Pilot Project Lt - Member companies include: AngloCoal, BHP Billiton, BP, Chevron, Schlumberger, Rio Tinto Solid Energy, Woodside and Xstrata
Cost	\$40 Million
Capture	Extraction of CO <sub>2</sub> /CH <sub>4</sub> from an existing gas well, separation and transport to injection site
Storage	100,000 tonnes of CO <sub>2</sub> into a depleted gas field at a depth of 2km (Waarre reservoir)
Timeframes	Injection commenced early 2008, to be completed in 2009 with monitoring to 2010 as a minimum.
Comment	First demonstration of CO <sub>2</sub> injection at a pilot scale in Australia Significant monitoring and verification of stored CO <sub>2</sub>



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# Regulatory Guiding Principles for Greenhouse Gas (GHG) Storage

*In November 2005, MCMPR Ministers endorsed Regulatory Guiding Principles for GHG Capture and Geological Storage in Australia.*

- Consistent, transparent and flexible regulatory regime
- Provide investment certainty
- Ensure public confidence
- Promote, technology transfer, research and development



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# Proposed GHG Legislative Model

## Centralised model to be adopted

- Responsible Commonwealth Minister (RCM) has ultimate regulatory responsibility
- Use of the *Offshore Petroleum Act* as platform for GHG legislation

## Advantages of this model

- National consistency
- Issues of liability
- Small number of projects anticipated in early years



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# Offshore Petroleum Act Platform

## *Offshore Petroleum Act 2006 (OPA)*

- Primary legislation for regulating exploration for and recovery of petroleum within commonwealth offshore areas
- Commonwealth offshore areas extend from 3 nautical miles to the outer limit of the continental shelf

## *Amendments to the OPA chosen for CCS legislation*

- Technological similarities with petroleum activities
- Effectiveness over the past 40 years
- Potential for the overlapping or close proximity of petroleum and GHG activities
- Established regimes and processes can be used
  - Safety Management
  - Acreage release process
  - Regulations and guidelines



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# Acreage Release

- A similar process to that used for petroleum acreage release
  - Source sink matching, including storage capacity, proximity to source/s
  - Activities compatible with other resource usage (esp. petroleum)
  - Regional geological formations match need for migration control
- Release of areas for bidding after consultation with stakeholders (petroleum industry, environmental considerations, fishing, navigation, etc.)



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# Co-existence of Petroleum & GHG Injection and Storage activities

- Many attractive storage sites may be located in petroleum provinces
- Fundamental to any GHG acreage release will be potential overlap with petroleum activity
- International experience demonstrates GHG and petroleum activities are co-existing
- All the existing commercial GHG operations are within the “footprint” of oil and gas field production, with injection into deeper or shallower horizons, or down-dip of petroleum accumulation



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# Safe And Secure Storage

- Site selection is paramount
- Behaviour of the GHG stream in the ground must be understood
- Risks will have to be identified and, if necessary, actions to mitigate the risks will have to be undertaken
- Monitoring of the injected substance must enable the timely identification of any problems of potential problems
- Legislation will provide the regulator with broad powers to direct the GHG operator to undertake mitigation and remedial actions, if required.



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# Emerging Considerations

- Emissions Trading Scheme
- Common user infrastructure
- Potential scale
- Monitoring and verification knowledge gaps
- Skills shortages



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**THANK YOU**

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Industry House  
10 Binara Street  
Canberra City, ACT 2607, Australia  
Telephone +61 2 6213 6000