



Australian Government

Department of Resources, Energy and Tourism

# Australia's Experience and its Impact on Coal Mine Methane Project Development

## Methane to Markets Partnership Expo

New Delhi, India

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# Issues to be covered

Australian coal industry

Australian climate change policies

Methane Emissions in Australia

Development of the Australian capabilities

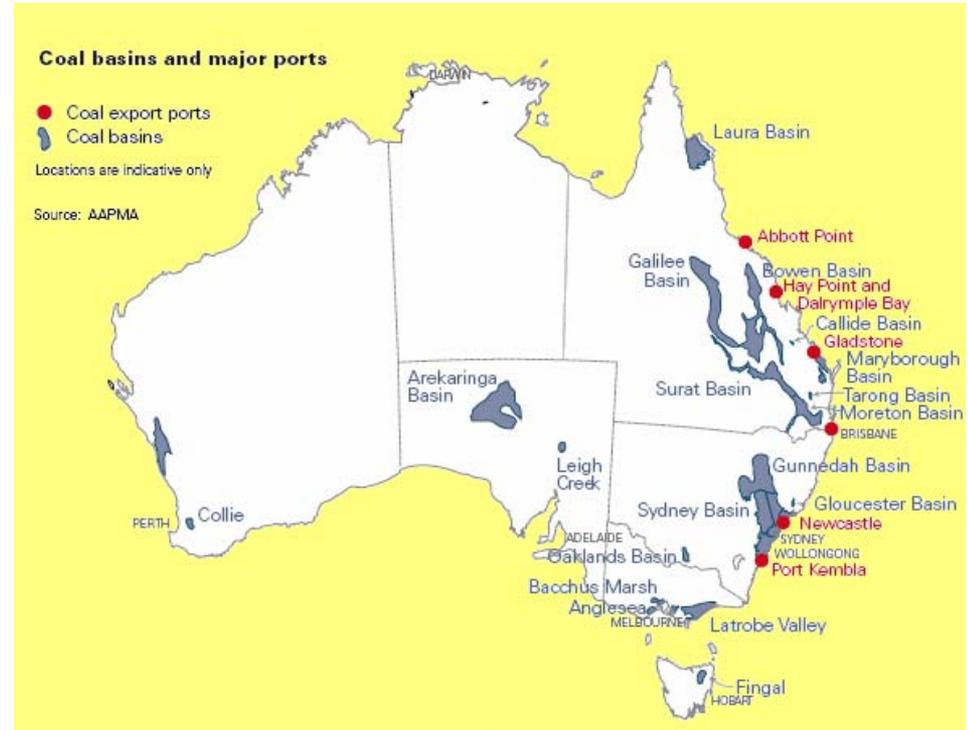
Government support and policy issues



# Australian Coal Industry

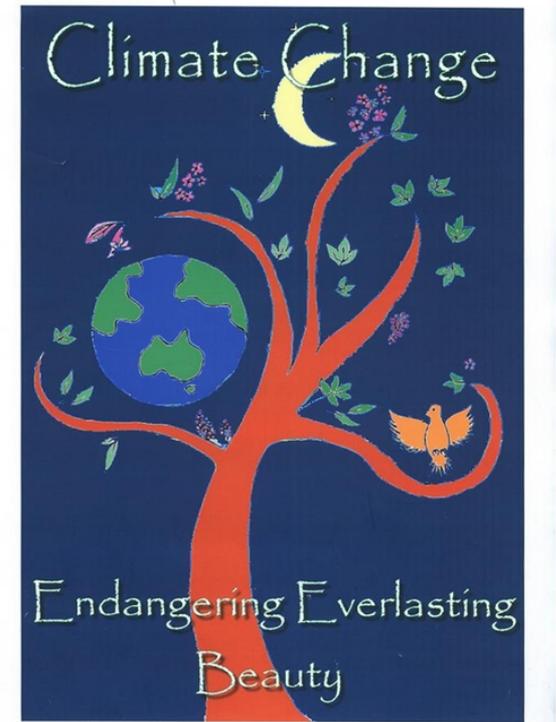
## Hard coal/ black coal

- World ranking – 4<sup>th</sup> producer, 1st exporter
- 30% of world trade
- Production 336 Mt
- Exports 262 Mt
- 112 mines of which
  - 70 open cut
  - 42 underground
- Domestic – 80% of electricity
- Export orientated
- Strong growth prospects
- World class environmental, occupational health and safety standards



# Climate Change Policy

- Kyoto Protocol: Australia ratified in 2007
- Greenhouse reduction commitments
  - 60% of 2000 levels by 2050
  - 5-25% of 2000 levels by 2020
  - Renewable energy target 20% by 2020
- Carbon Pollution Reduction Scheme (proposed)
  - Comprehensive climate change response strategy involving emissions trading regime





# Australia Greenhouse Gas Emissions

All greenhouse gas emissions, 2007	541 MT (CO <sub>2</sub> e)
• Of which - Total methane emissions	115 Mt
• Of which - Energy sector methane emissions	33.3 Mt
• Of which - Coal sector methane emissions	26.8 Mt

## **Trends in coal sector methane emissions**

- Coal sector methane emissions in 1990 were 16.2 Mt (CO<sub>2</sub>e)
- 65% increase in emissions between 1990 and 2007
- 99.5% increase in coal mine production
- Emissions per 1000 tonne of coal produced decreased by 16.5% from 67 tonnes to 56 tonnes (CO<sub>2</sub>e)
- Improvements due to less gassy mines, technologies to recover, use or flare methane



# Waste Coal Mine Gas in Australia History

- Australian coal industry develops voluntary greenhouse response strategy following the UNFCCC in 1992
- Generic coal industry research program
- Breakthroughs support the development of coal seam gas industry to degasify coal seams ahead of future mining
- Early trials of different technologies for generating electricity from lean concentration drainage gases
- Reciprocating engines as trailed at Appin-Tower waste coal mine gas power station from 1996 support global deployment.





# Waste Coal Mine Gas in Australia History Ventilation Air Methane (VAM)

- Australia has undertaken world leading work on the development and trial of technologies to use ventilation air methane (VAM).
- Replacing ambient air in other combustion processes, eg rotary kiln generators
- Thermal Flow Reverse Reactors – eg Vocidiser, WestVamp is the world's first demonstration at an operating coal mine
- CSIRO catalytic enhanced oxidation (VAMCAT) – first trial in China supported by Australian Government

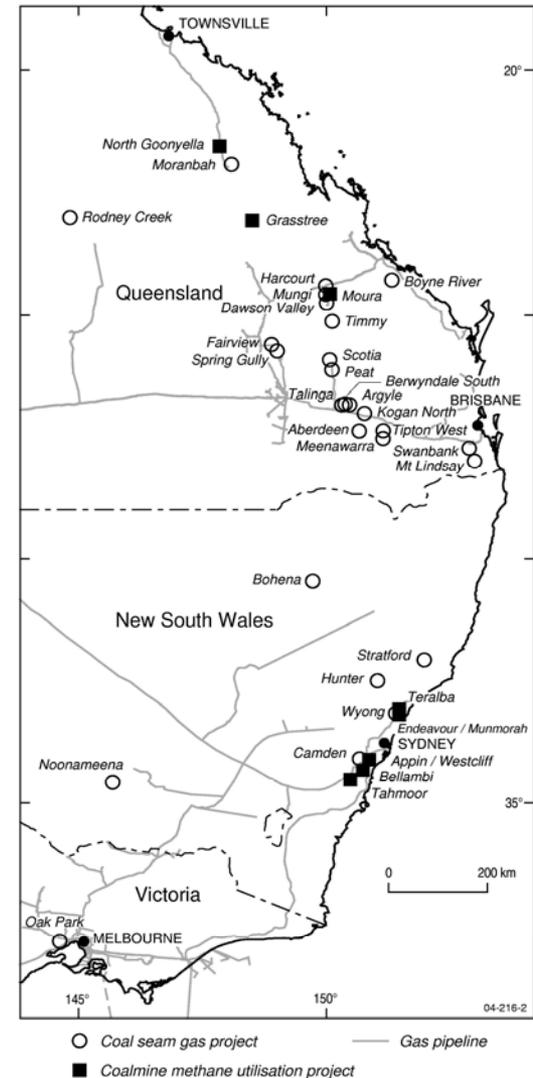


# Waste Coal Mine Gas Power in Australia

- Seven grid connected WCMG power stations using drainage gases with a combined capacity of 215 MW abates 6.5 mtpa of CO<sub>2</sub>e

Appin Tower	97 MW
German Creek	32 MW
Mooranbah North	45 MW
Oaky Ck	14 MW
Glennies Ck	10 MW
Teralba	10 MW
Tahmoor	7 MW

- Based on expected growth in the industry there is the potential to at least double generating capacity over the next decade
- WestVamp (not grid connected) 6 MW





# Government Support

- Prior to 2000 - minimal direct Government involvement in trials and demonstrations
- To help meet Kyoto commitments a range of measures were introduced to accelerate deployment
- Greenhouse Gas Abatement Program (GGAP) provided grants for waste coal mine power stations
- State based schemes provide additional incentives to encourage a shift in energy use towards natural gas
  - Operators of waste coal mine gas (WCMG) power stations rely on these incentives to cover additional costs.





# Carbon Pollution Reductions Scheme (CPRS)

- Fugitive emissions from coal mines will require emission permits under the proposed CPRS
  - Proposed transitional arrangements for coal include:
    - Coal Mining Transitional Assistance Fund - \$1.23 billion to provide free permits to the most gassy coal mines
    - \$270m Coal Sector Abatement Fund to provide grant funding for abatement projects, particularly for power generation.
  - Legislation to implement the CPRS is currently before Parliament.
  - **Over time the CPRS will induce the further development and uptake of technologies to abate fugitive methane emissions.**
    - However, existing WCMG plants will no longer have access to incentives under State based programs.
    - Renewable energy credits have been extended to cover electricity supplied from existing WCMG plants.
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# Concluding Comments

- Australia is world leader in the development and demonstration of technology to make effective use of fugitive methane emissions.
- But we still face major challenges in deploying this technology.
- Will the CPRS induce the further development of waste coal power stations?

## Power Generation v Flaring

- Same emissions profile/ carbon penalty for coal industry
- Power station - \$25 -20 million plus
- Flaring – less than \$5 million
- Return on electricity sales needs to cover the additional investment costs and risks.
- Generation costs relatively high – may not be able to pass on the full cost of emission credits in market power prices
- Flaring - national benefits less through the loss of a major energy resource; reduced greenhouse benefits by not displacing more greenhouse intensive power.

