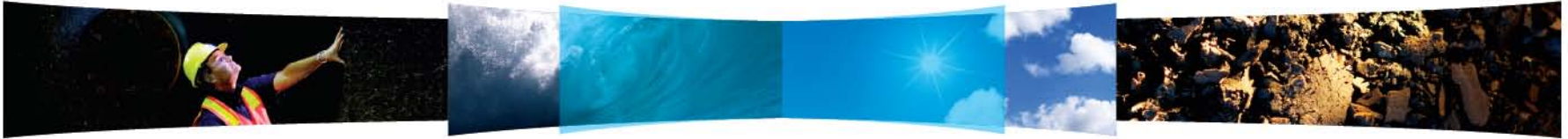


# Clean Coal Opportunities in Victoria, Australia

Minister Peter Batchelor  
Minister for Energy and Resources  
State Government of Victoria  
Australia

7 September 2009



# Why Victoria?

A prosperous state

Population: 5 million

State capital: Melbourne, 3.5 million

25 per cent of Australia's population

25 per cent of Australia's total GDP

Strong economy: GDP A\$45,000 per capita

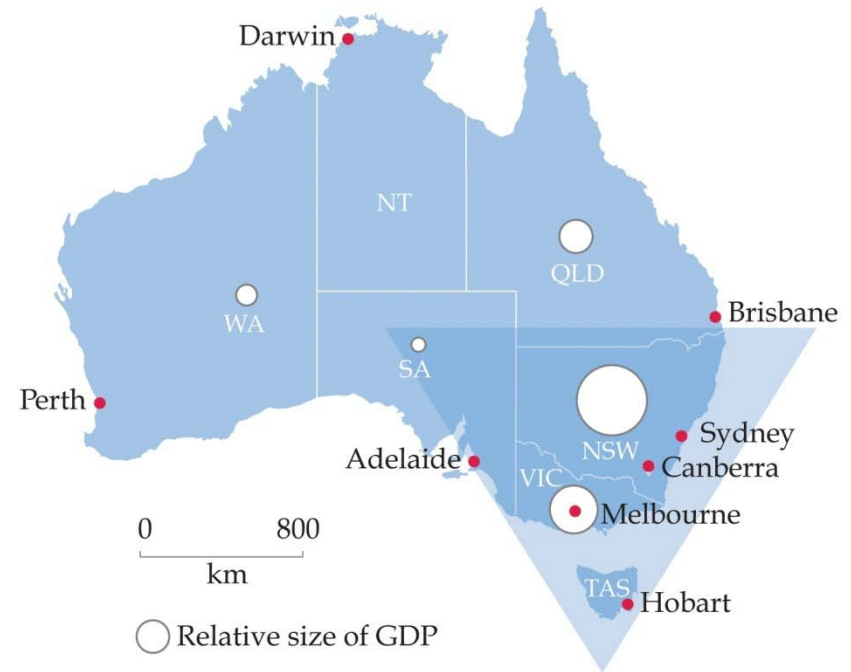
Hub for innovation and technology

Cross-sector collaboration fostered

A strategic link to Asia-Pacific

Excellent infrastructure and transport

Multicultural, multilingual workforce

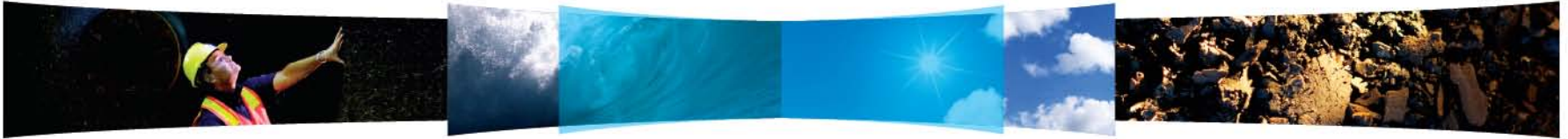




# Victoria - for Strategic Investment

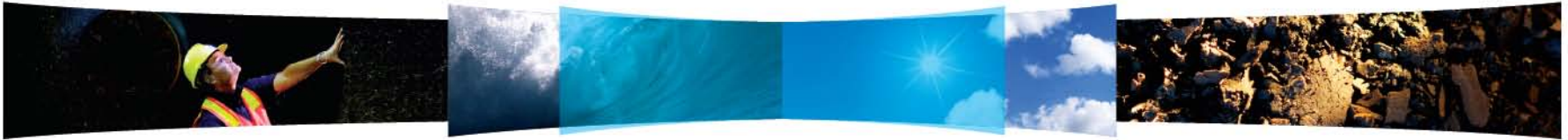
Victoria has all the facets of a strong, modern economy with a diverse range of manufacturing and service industries supported by an excellent education and R&D base





# Victoria's Relationship with Japan

Victorian Merchandise Exports to Japan	A\$1,763m	Victorian Merchandise Imports from Japan	A\$4,934m
Major Items		Major Items	
Aluminium	A\$446m	Passenger Motor Vehicles	A\$1,564m
Cheese & curd	A\$281m	Motor Vehicles for goods transportation	A\$425m
Wood Chips	A\$180m	Motor Vehicle Parts	A\$348
Bovine Meat	A\$160m	Civil engineering equipment	A\$143



# Major Investors - Japan



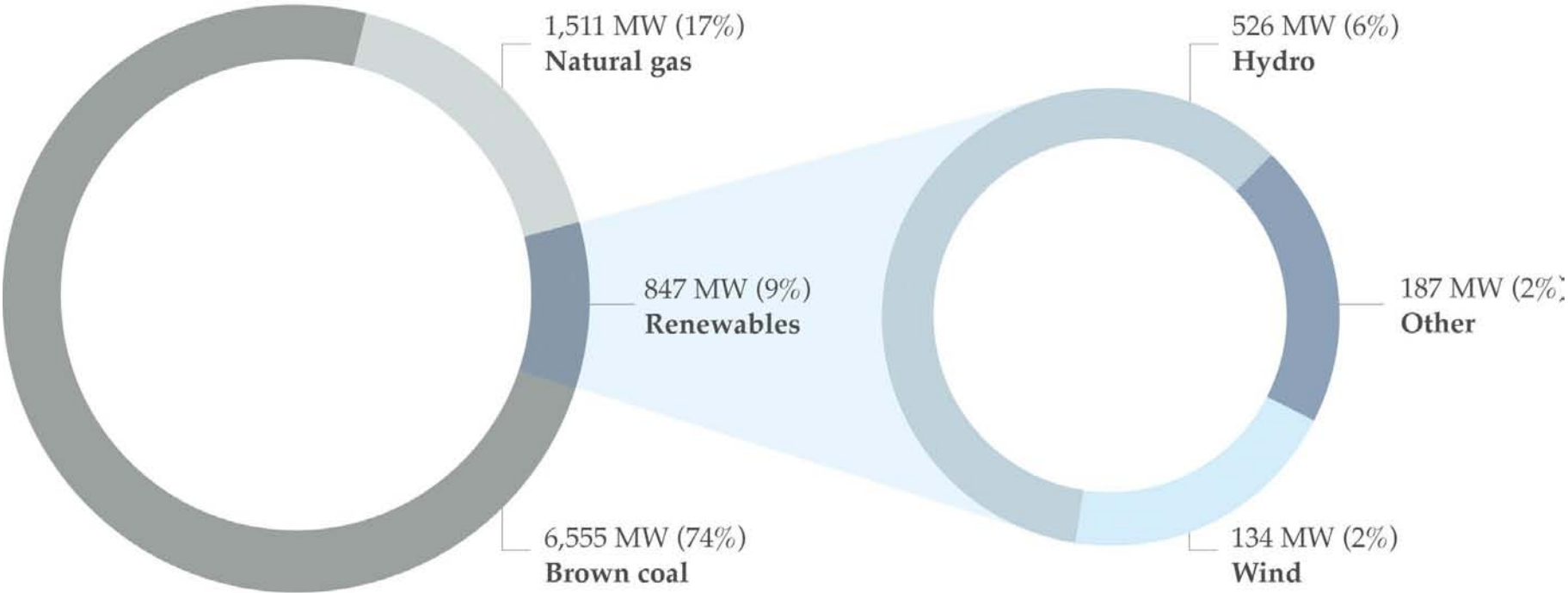
**KONICA MINOLTA**





# Victoria's Energy Mix

Electricity generation capacity (total 8,913 MW)





# Victoria's Energy Sector

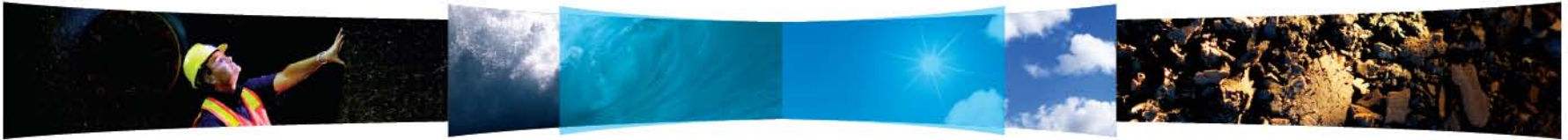
Victoria's privatised energy market (since 1996)

- Current installed electricity capacity is 8.913 MW
- Large international and national owners of generation and distribution assets

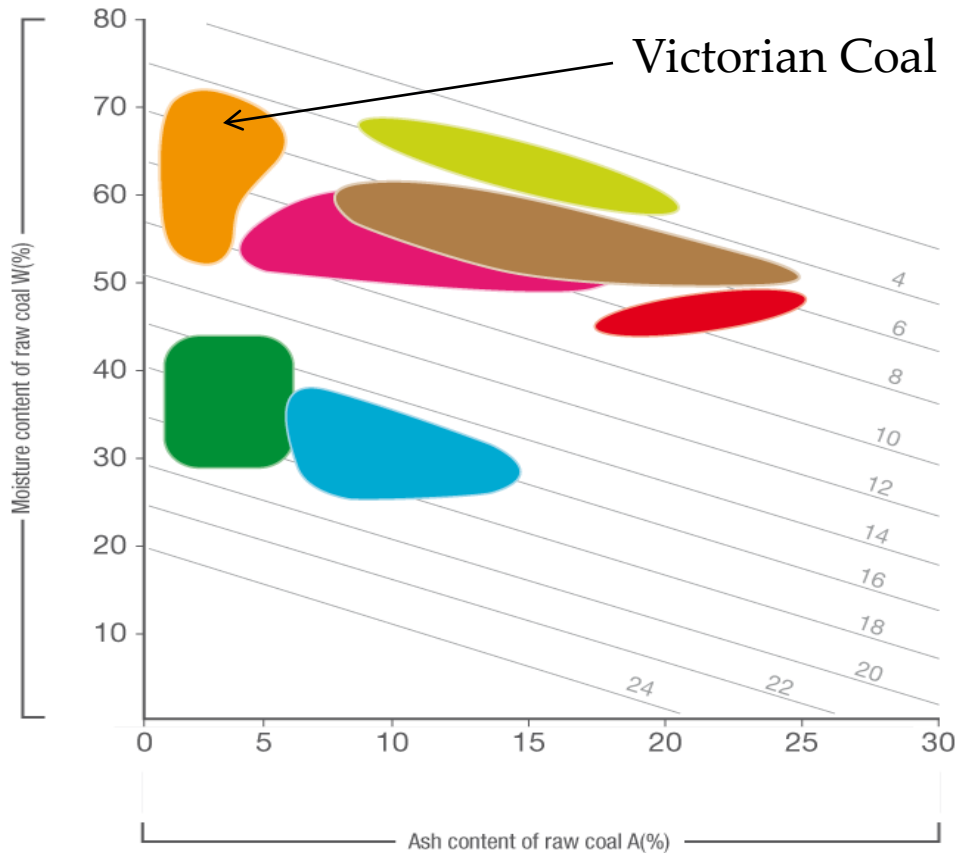
## Coal resources

- Brown coal is Victoria's primary energy source
- Capacity to supply Victoria for 500 years
- Latrobe Valley, 150km south-east of Melbourne





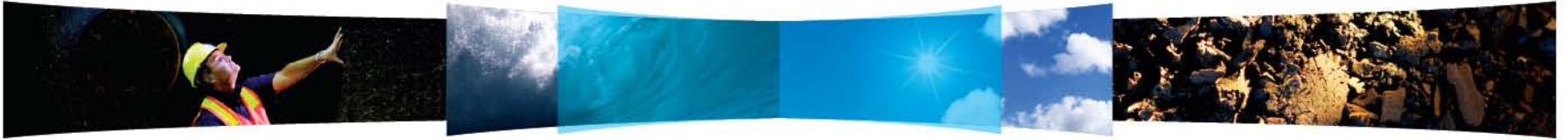
# Victoria's Brown Coal - a Comparison



## Key

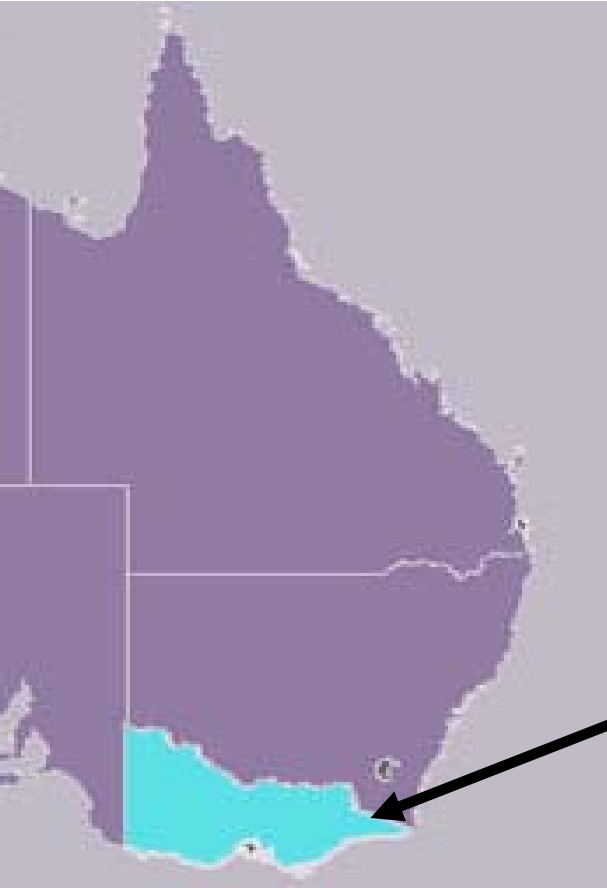
- Latrobe Valley
- Megalopolis Greece
- Ptolemais Greece
- Neurath D, Germany
- Puentes Spain
- Dakota Texas U.S.A.
- Indonesian Low Rank

Net Specific Energy = 2MJ / kg



## Thick seams of low cost Brown Coal at the surface

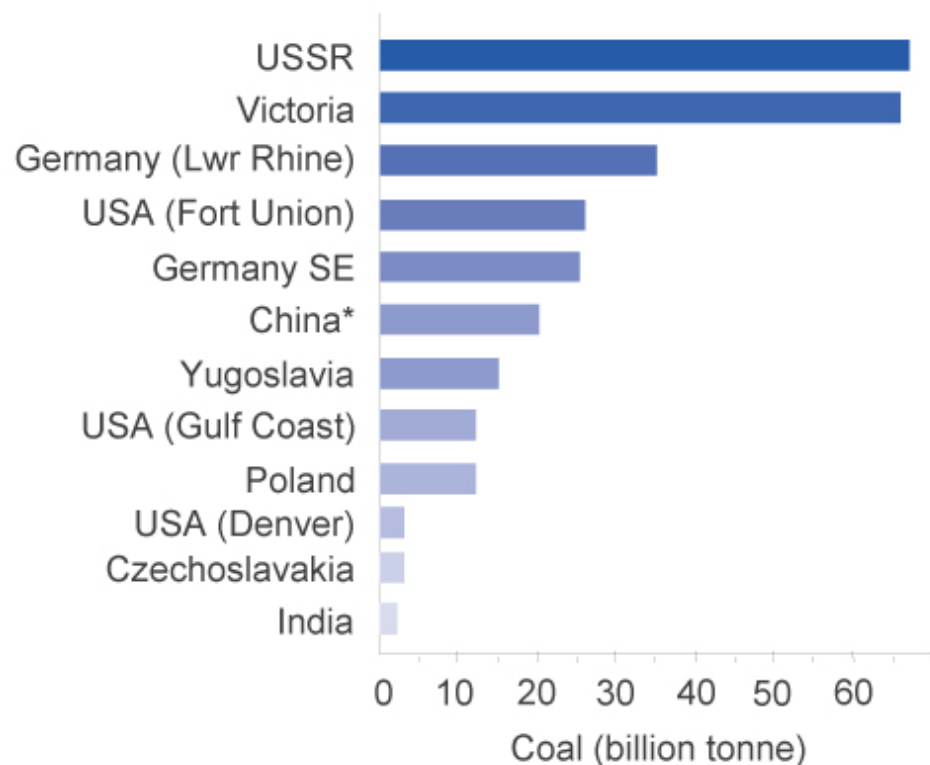
Victorian brown coal - one of the world's great energy resources  
More energy than Australia's NW Shelf gas reserves



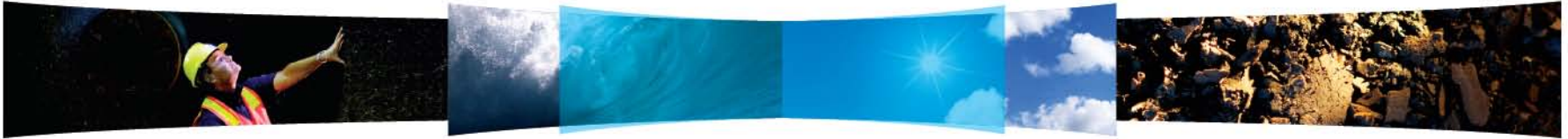


# Major World Brown Coal Resources

Major world brown coal resources



Economically winnable lignite and brown coal based on Durie (1991).  
\*Values for China are estimates.



# Energy and Sustainability - the Balance

## Sustainability

- Greenhouse gas emissions
- Coal
- Gas
- Water

## Economy

- GSP
- Jobs



## Energy supply

- Reliability
- Security
- Affordability

## Investment certainty

- Energy market reform
- Climate change policy



# Energy Greenhouse Policy Setting

## Carbon emission reduction targets

- Greenhouse gas emissions reduced by 60% by 2050
- Ratification of the Kyoto Protocol in 2007

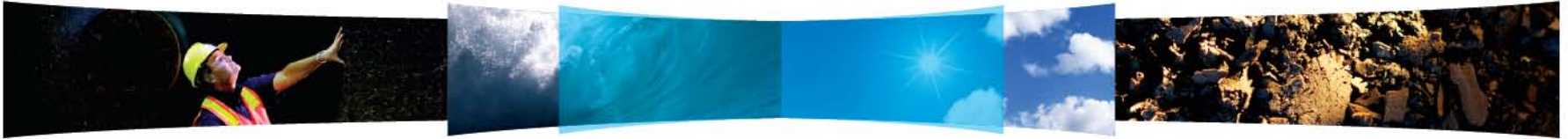
## Carbon Pollution Reduction Scheme

- To be introduced in Australia in 2011

## Victoria's Greenhouse Challenge for Energy

- Price on Carbon
- Energy Technology Innovation
  - Solving the "coal" problem
  - Developing renewable technologies
- Support for renewable energy
- Energy efficiency





# Victorian Government Financial Support

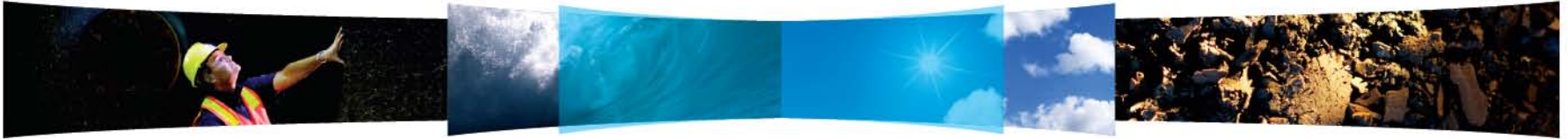
## Energy Technology Innovation Strategy 1 - ETIS1

- A\$180 million leveraged a further \$1.6 billion in private and public sector funding

### HRL Limited:

- A\$50 million from ETIS1
- 400 megawatt demonstration power station in the Latrobe Valley
- Integrated Drying, Gasification and Combined Cycle - IDGCC
- A\$100m further funding from the Federal Government
- A\$750 million total project value





# Victorian Government Financial Support

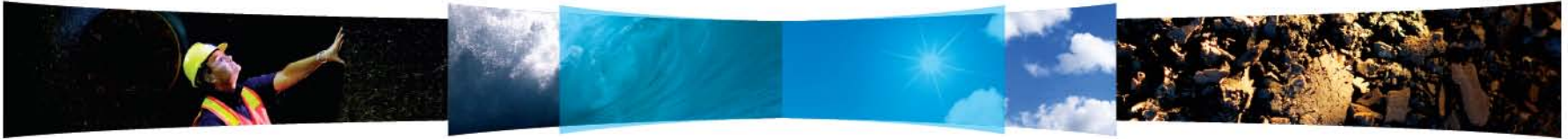
## Energy Technology Innovation Strategy 2 - ETIS 2

### Carbon Capture and Storage

- A\$110 million - over six years
- Large-scale, pre-commercial carbon capture & storage demonstration projects
- Either carbon capture, or storage, or both
- Large-scale - approximately 600kt pa to progress technology to industrial use

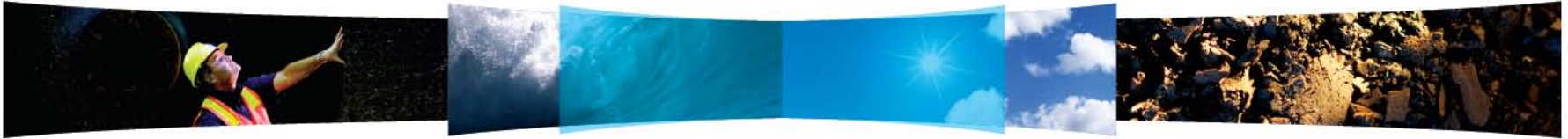
### Sustainable Energy

- A\$72 million - over six years
- Large-scale, pre-commercial sustainable energy demonstration projects



# Commonwealth CCS Flagship Program

- \$2.425 billion over 9 years
- Target to create 1000 MW of low emission fossil fuel generation
- Intention to build 2 to 4 projects
- Successful projects announced early 2010
- Construction commence 2012
- Commissioning 2015



## CO<sub>2</sub> - the Volumes

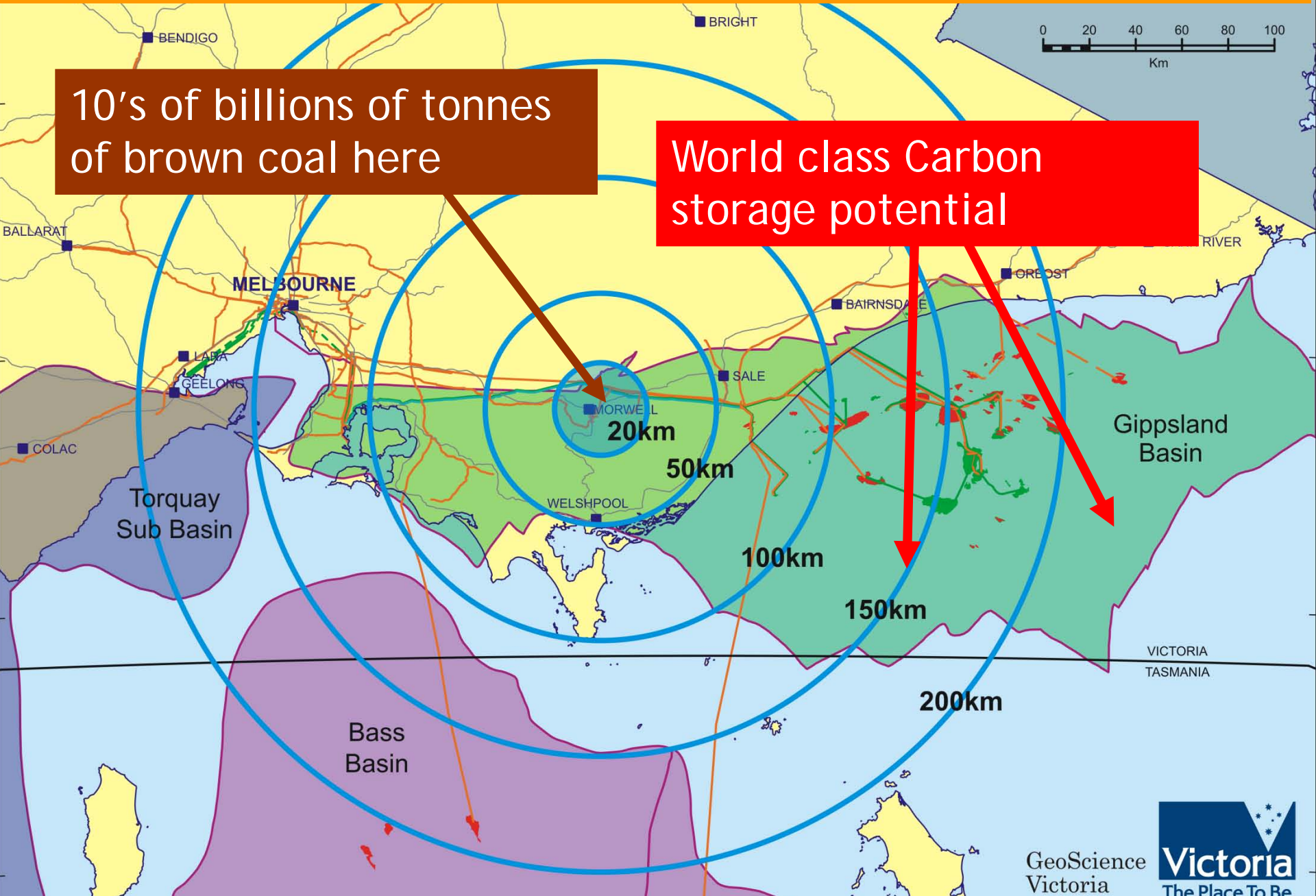
- Australia's annual emissions: 559 MT (10.5 TCF)
- Victoria's annual emissions: 122 MT (2.3 TCF)
- Potential capacity of depleted reservoirs in the Gippsland Basin: 2,000 MT (37.8 TCF)
- Potential capacity of deep saline aquifers in the Gippsland Basin: 33,300 MT (630 TCF or 275 years of Victorian emissions)

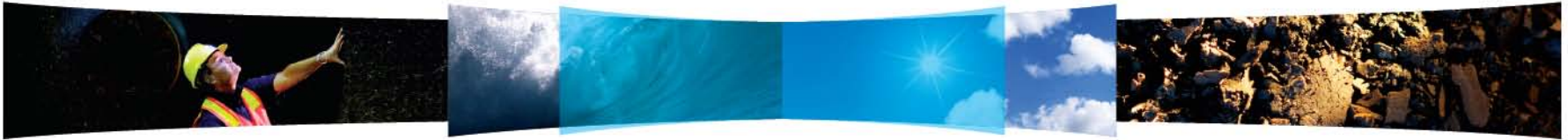
NOTE: TCF - Trillion Cubic Feet

# World class CCS location next to large coal resources

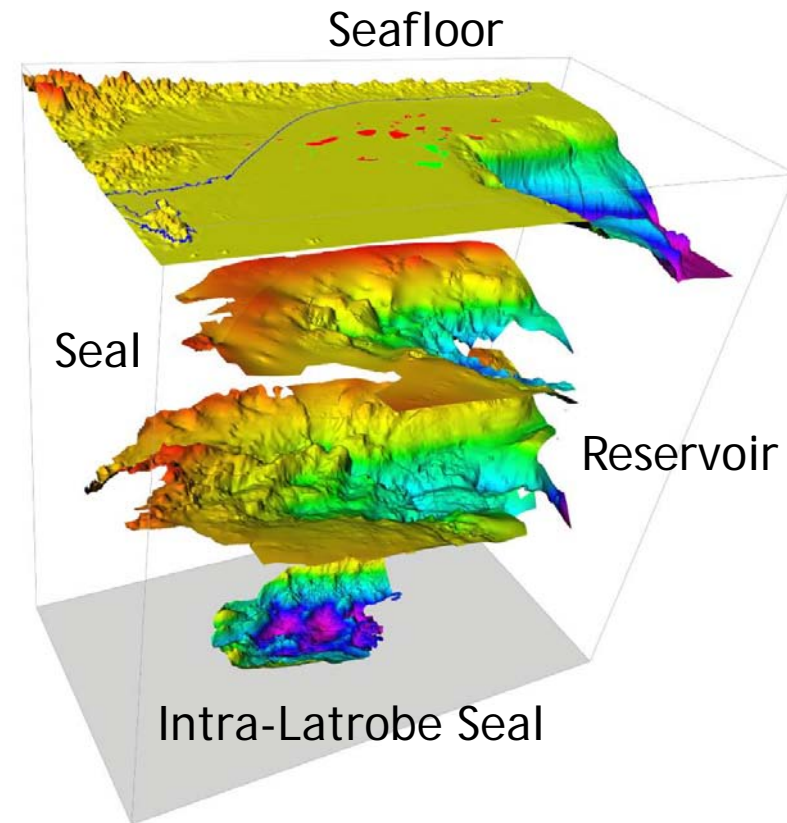
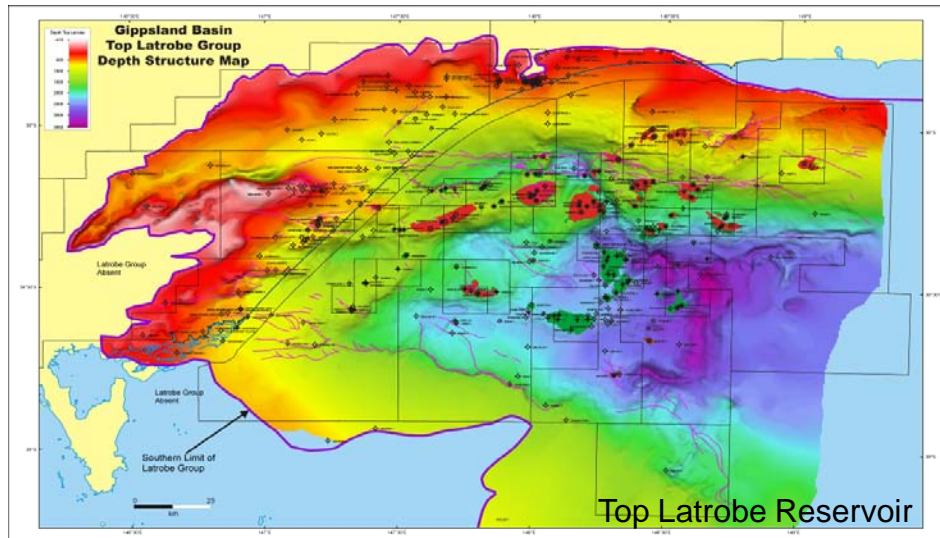
10's of billions of tonnes of brown coal here

World class Carbon storage potential

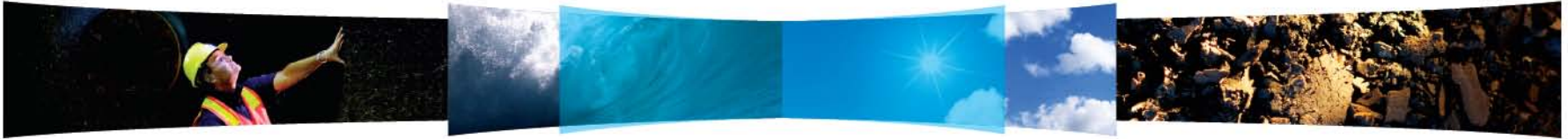




# Geological Framework and Databases



Build geological framework and databases of supporting geoscience information (porosity, permeability etc)



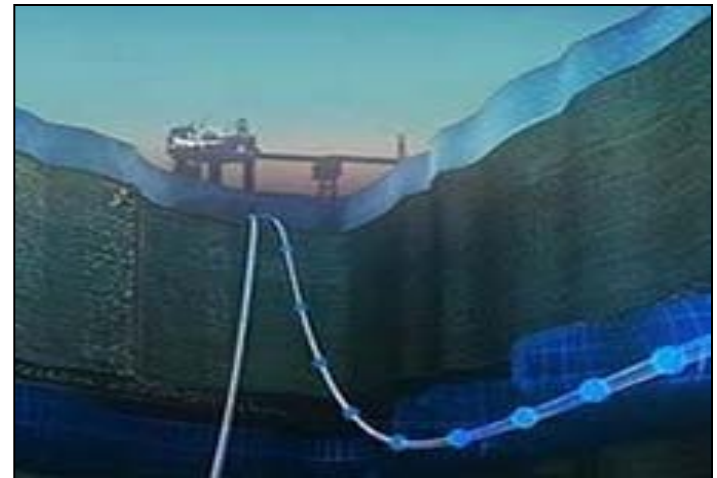
# Victoria's Regulatory Framework - CCS

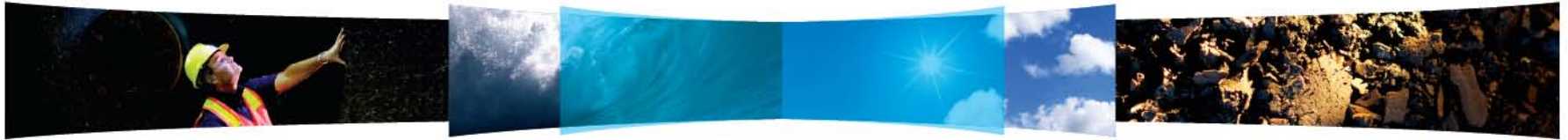
## 3 Elements:

Capture - 'industry' legislation (existing)

Transport - Pipelines Act (existing)

Storage - New legislation has been enacted

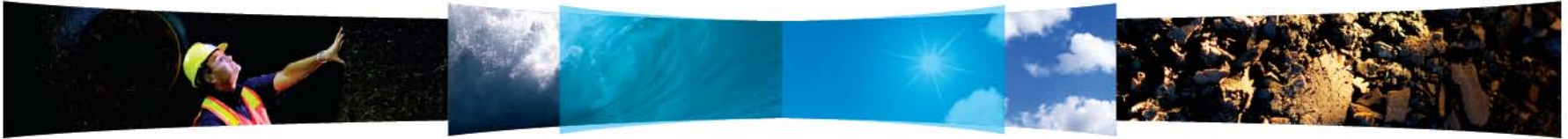




# Victoria's *Greenhouse Gas Geological Sequestration Act 2008*

## Key Elements of GGGS Act:

- Property rights and access regime established
- Competing rights and interests managed
- Behaviour of stored gas monitored
- Long-term liabilities managed
- Public health and environmental risks minimised
- Community interests recognised



# Victorian CCS Transition to Low Emission Coal

## The Victorian CCS Foundation Network concept:

- Common / Multi-user large scale infrastructure
- Cluster of CO<sub>2</sub> generating point sources - generators and new coal industries

146°30'E

147°E

147°30'E

148°E

# CONCEPT

## The Victorian CarbonNet

38°S

Melbourne

### Capture

Traralgon

Power-related capture

New coal-based industries (coal to liquids)

Maffra

Sale

Longford

Bairnsdale

Eastern Seaboard Pipeline (option)

Sydney

Lakes Entrance

Onshore storage site

Onshore storage site

Terminal

Offshore pipeline to other basins (Bass, Eastern Otway)

Injection sites

Offshore storage sites

38°S

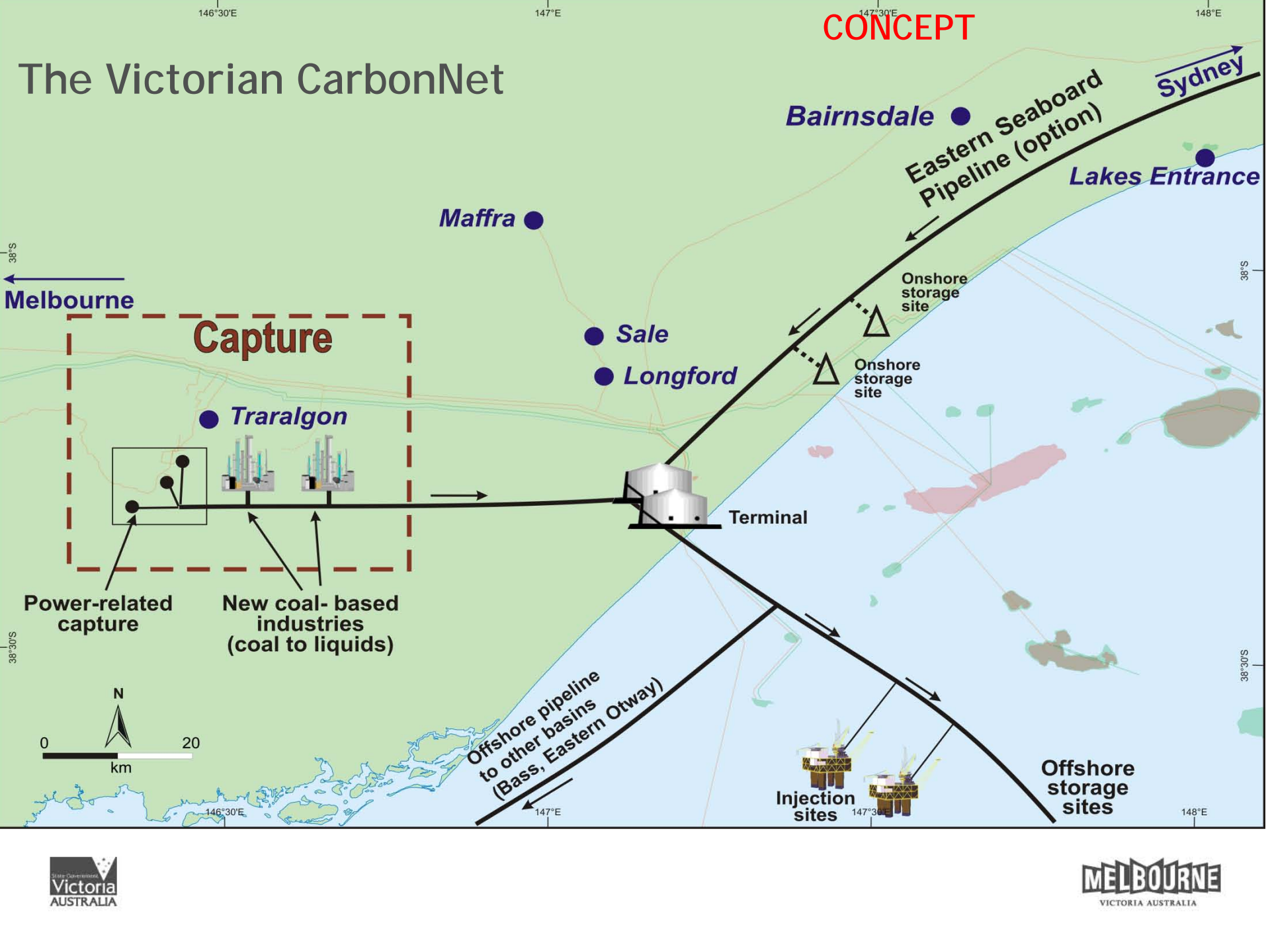
38°30'S

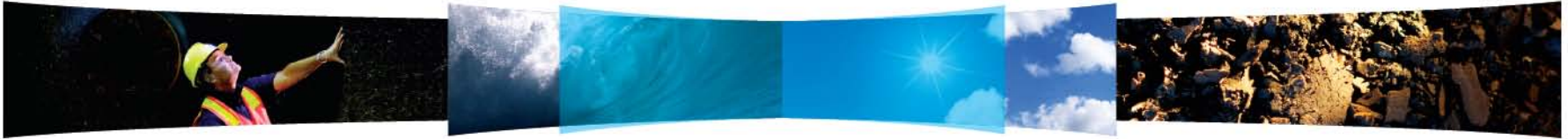
146°30'E

147°E

147°30'E

148°E

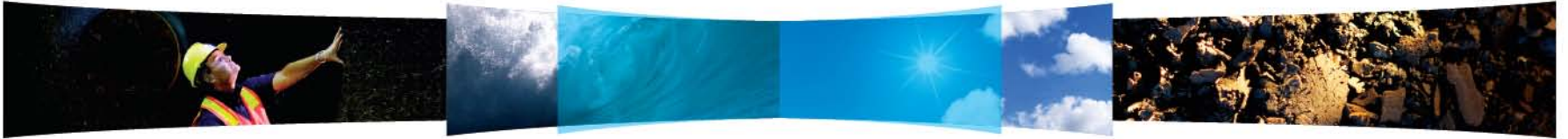




# Brown Coal Innovation Australia

- Recent announcement of \$A16 million over 4 years for the establishment of **Brown Coal Innovation Australia (BCIA)**
- BCIA will coordinate and fund brown coal R&D activities in Australia
- Work with and leverage funds from the Australian Government's **Australian National Low Emission Coal Research and Development (ANLECR&D)**

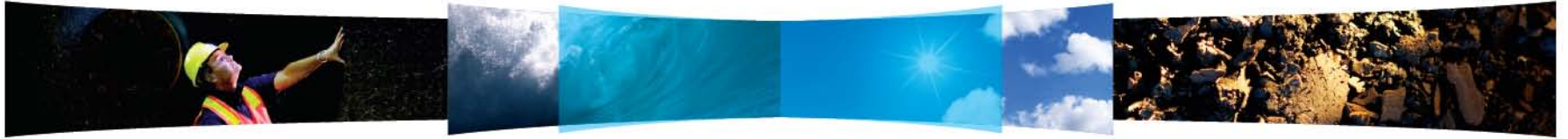




## Summary

- Initiatives and policy settings to secure future investment in Victorian Brown Coal
- An economically and environmentally successful transition to a cleaner energy future
- Work with coal trade partners such as Japan

# Thank You



# QUESTIONS?