Document 4

6TH ROUNDTABLE FOR STUDYING ENERGY SITUATIONS

ENERGY SECURITY FOR JAPAN – A ROLE FOR VICTORIA

Ministry of Economy, Trade and Industry (METI), Tokyo

Richard Bolt
Secretary, Department of Economic Development,
Jobs, Transport and Resources

Victorian State Government

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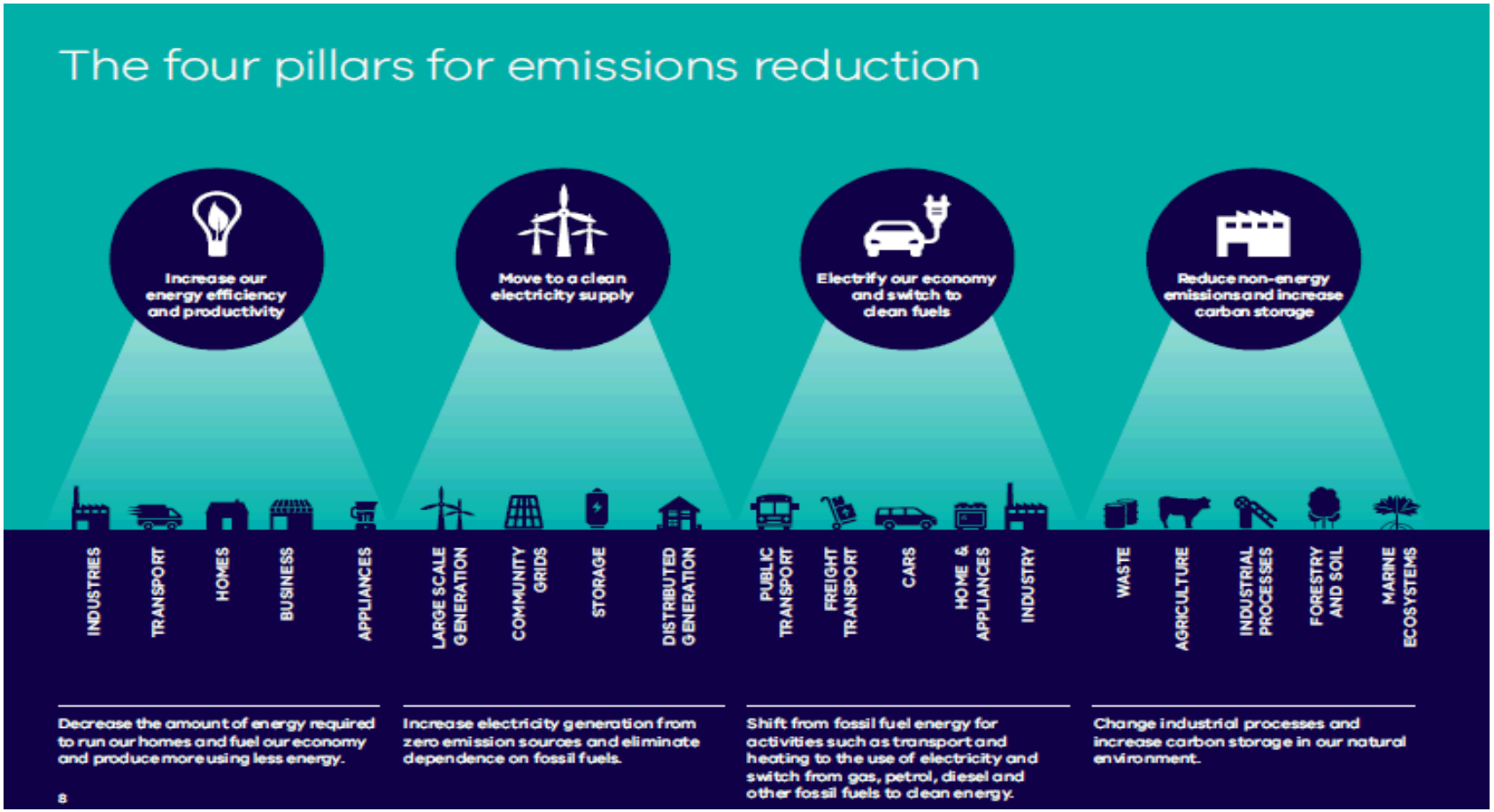
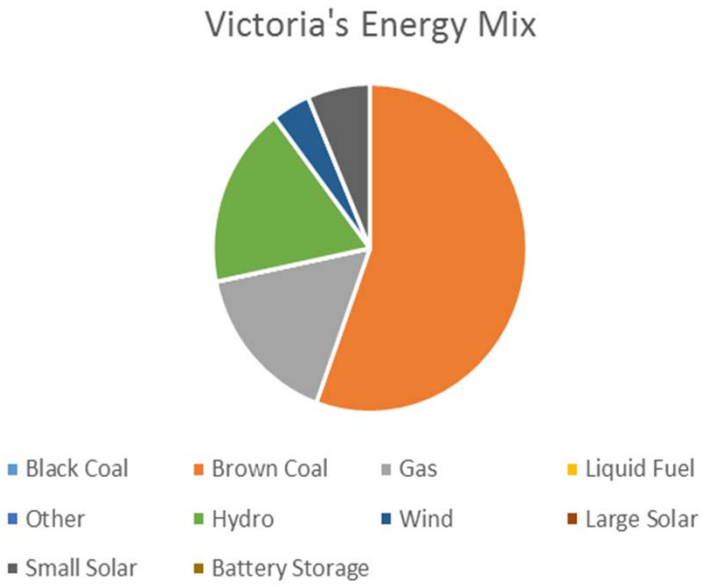
VICTORIAN GOVERNMENT
CLIMATE CHANGE COMMITMENT 2017



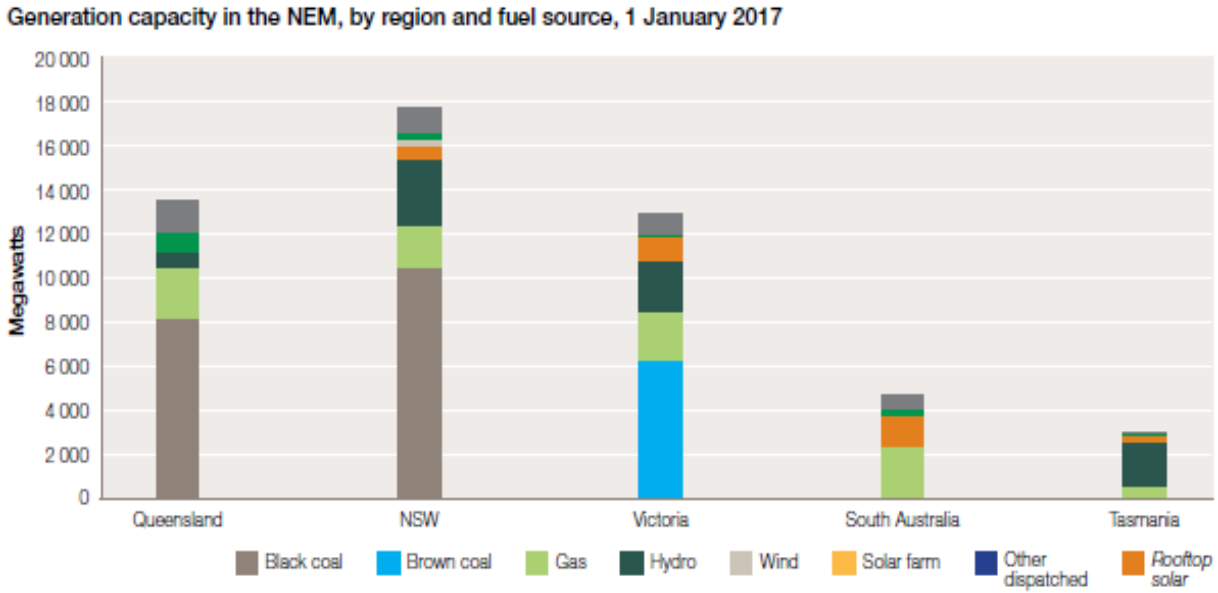
"CCS technology could support emissions reduction action across multiple pillars including from industrial processes such as gas processing, refineries and chemical manufacturing."

CAPACITY AND GENERATION BY FUEL SOURCE

- Brown coal's significant share of Victorian generation is decreasing
- First closure of large coal generator was 2017 (next forecast in 2020's)



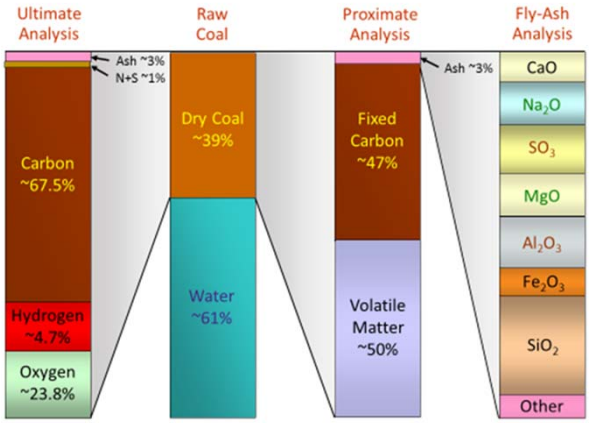
Source : http://reneweconomy.com.au/nem-watch/
accessed 6 February 2018



Note (figures 1.7 and 1.8): Rooftop solar generation is not traded through the NEM. Electricity generated from this source acts to reduce the demand for grid supplied electricity.

Sources (figures 1.7 and 1.8): AEMO; AER.

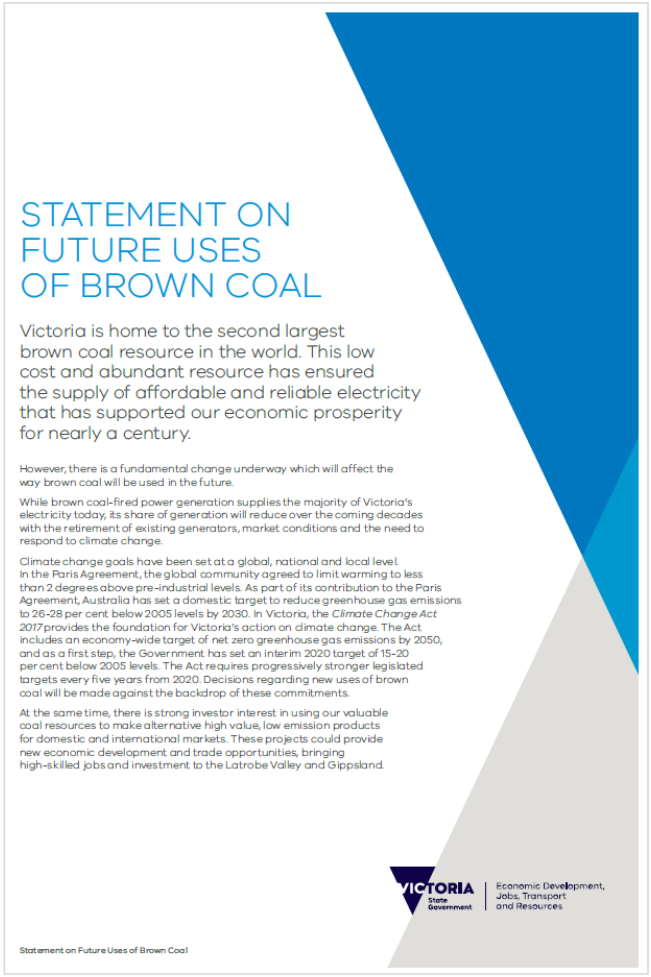
ABUNDANT BROWN COAL AND STORAGE RESOURCES



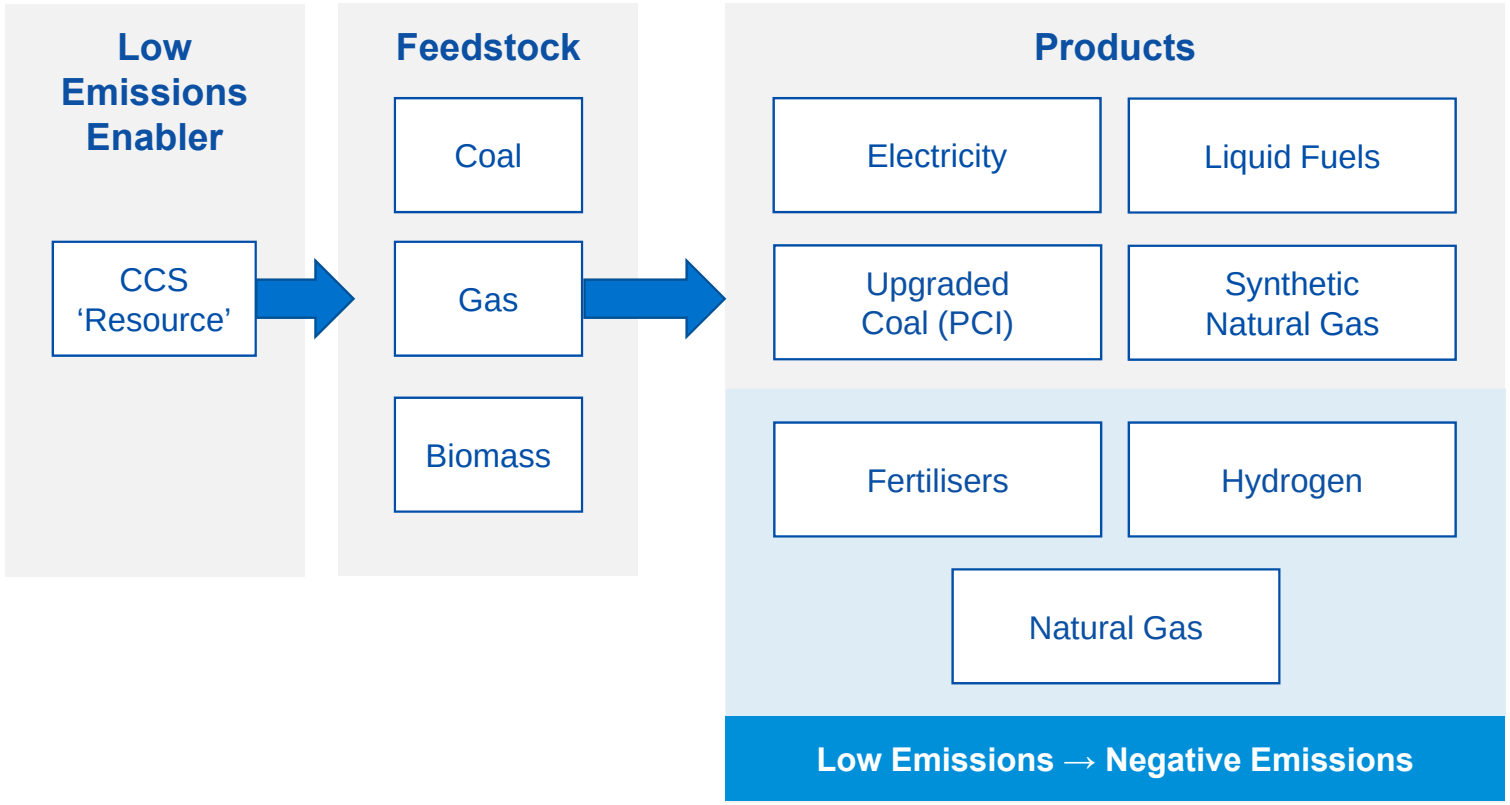
- 2nd largest resource in the world
- Low in impurities
- Reactive
- Close to world class CO_2 storage site

VICTORIAN GOVERNMENT – COAL POLICY STATEMENT JULY 2017

- Framework for approving new coal projects
  - Consistent with *Climate Change Act 2017* and net zero emissions by 2050
- Sets initial emissions intensity at 0.45 t CO_2e/MWh
- Acknowledges strong interest in low emission - high value products for domestic and international markets
  - Eg: hydrogen and fertilisers
- New projects must mitigate emissions with CCS or offsets
  - Commits to completing CarbonNet
- Independent Expert Advisory Panel will review project proposals for compliance and viability
- See http://earthresources.vic.gov.au/earth-resources/victorias-earth-resources/coal/policy-reviews/statement-on-future-uses-of-brown-coal



CCS: ENABLES LOW EMISSION USES OF BROWN COAL



RECOGNITION OF THE BENEFITS OF CCS

- Intergovernmental Panel on Climate Change (2015)
  - AR5 report re-emphasised the need for CCS to address climate change
  - 138% more expensive without CCS to meet COP21
- Global Carbon Capture and Storage Institute (2016)
  - 2016 Global status report: 21 large-scale projects operational by end 2017
  - call to policy makers to address barriers and accelerate deployment
- CSIRO (2015)
  - National Outlook to 2050: CCS important opportunity for Australia
- ClimateWorks (2014)
  - Pathways to Deep Decarbonisation in 2050: CCS and renewables important
- Commonwealth Energy White Paper (2015)
  - includes focus on CCS storage capacity
  - acknowledges opportunities for brown coal and hydrogen, with CCS

CCS IN AUSTRALIA

OTWAY DEMONSTRATION PROJECT (CO2CRC, Victoria)

- Established in 2008
- World's largest CCS demonstration (80,000 tonnes of CO_2 injected and stored)
- Comprehensive, internationally renowned, monitoring program that tests advanced technologies and techniques to reduce cost
- Community engagement from the outset

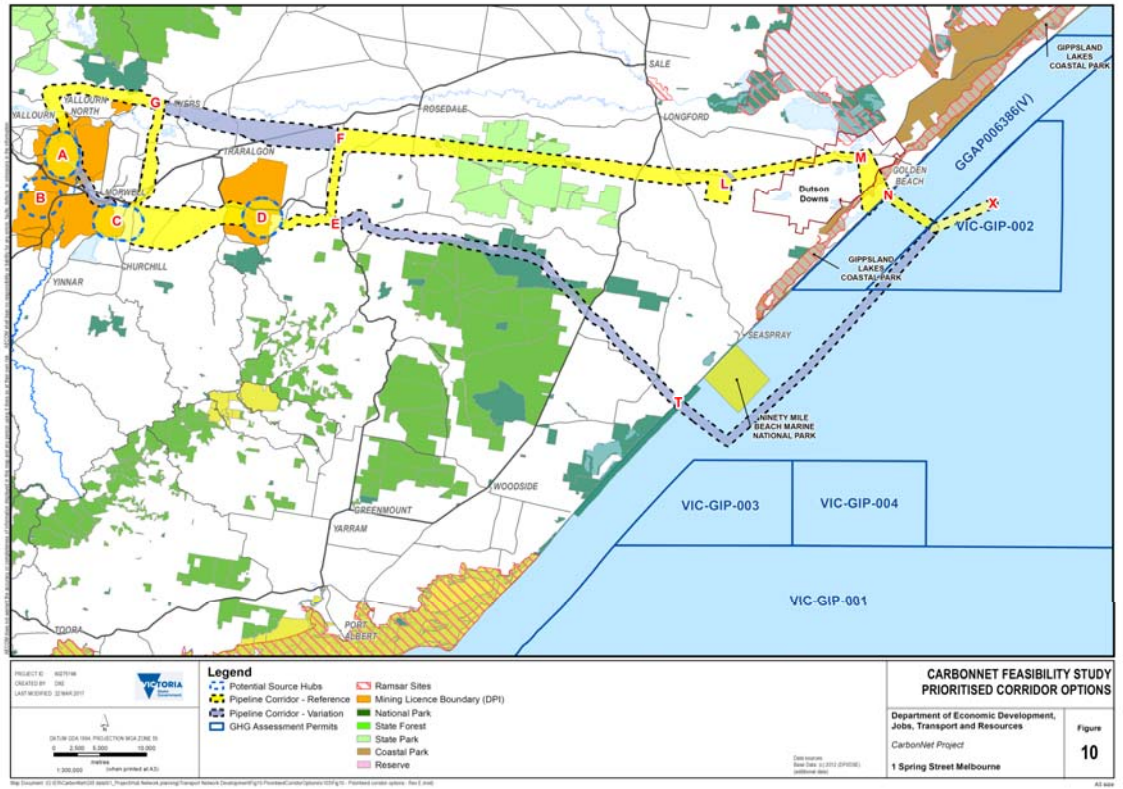
GORGON LNG PROJECT (WA)

- Currently being commissioned
- 3.4 - 4 million tonnes per year of CO_2 injected and stored in a deep saline formation
- World's largest dedicated geological storage

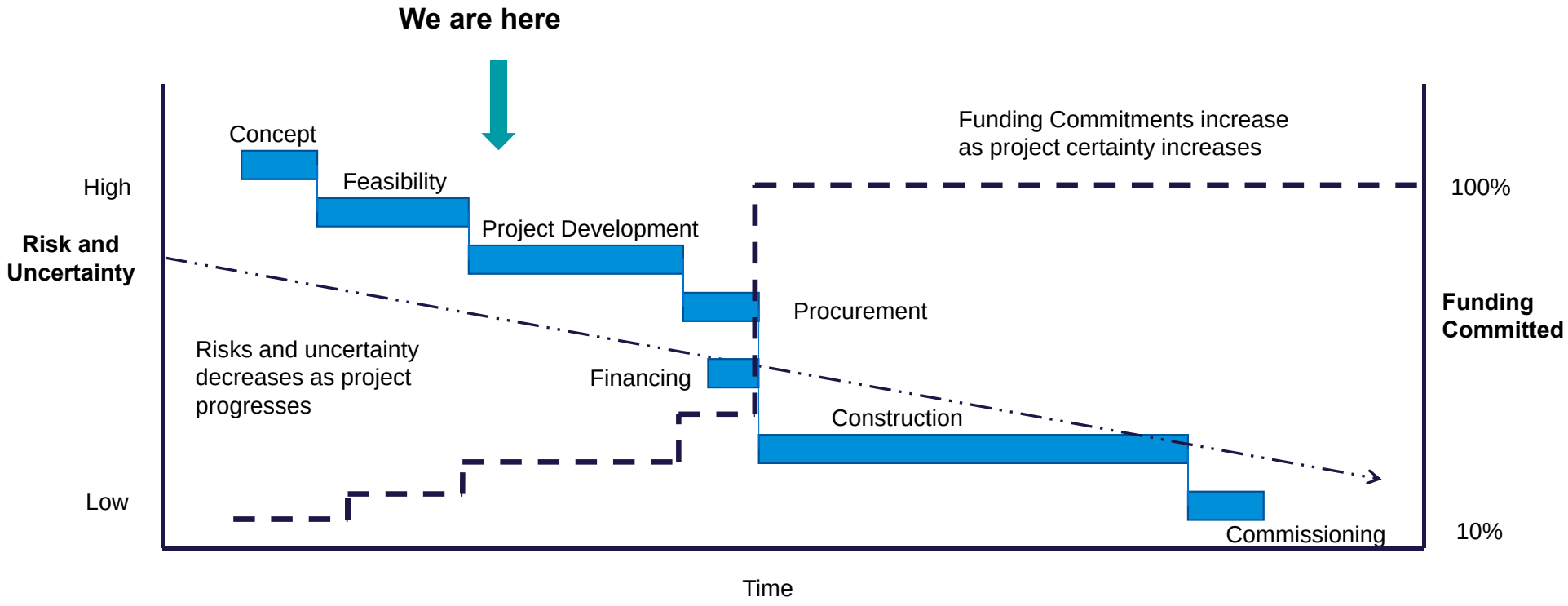
Source: CO2CRC

CARBONNET PROJECT

- Developing a large-scale, multi-user CCS network in Gippsland region
  - Near-shore injection for offshore storage
- Jointly funded by the Australian and Victorian Governments to 2020
  - $A150m for feasibility and development
- CarbonNet's Pelican storage site has 125 million tonnes at P90
- Significant research investment
- Knowledge sharing via Global Carbon Capture and Storage Institute
- Collaboration with industry to secure customers and investors



CARBONNET STATUS



COMMUNITY SUPPORT IS CRITICAL

Community Education

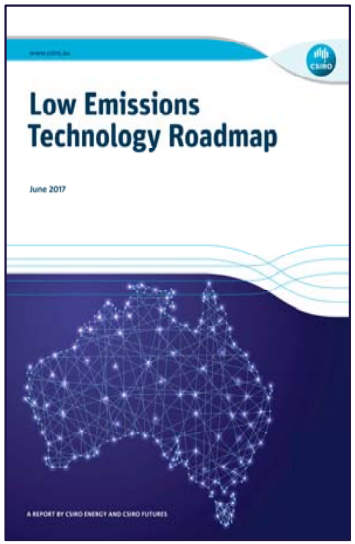
Improved understanding of new low emissions coal opportunities, including the role of CCS

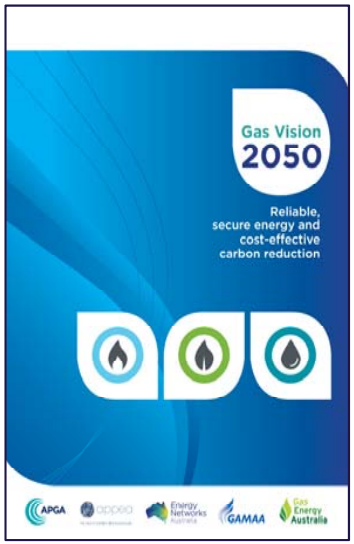
Access to information

Engagement – strategic and accessible factsheets, presentations and web content

HYDROGEN AS A DOMESTIC ENERGY SOURCE

Growing recognition in Australia of the future importance of hydrogen





POTENTIAL DOMESTIC USES

- Growth in renewable power will need gas-fired generation, batteries and pumped hydro to balance the grid
- As renewables share grows and emission caps tighten, hydrogen should become more important
  - A growing renewable surplus could become a large second source
- Hydrogen may also be a key source of industrial heat in place of fossil fuels
- There is a growing focus on reducing vehicle emissions
  - Hydrogen may become an important transport fuel, complementing battery-electric vehicles
- Hydrogen exports would provide Victoria and Australia with a key option for domestic energy security

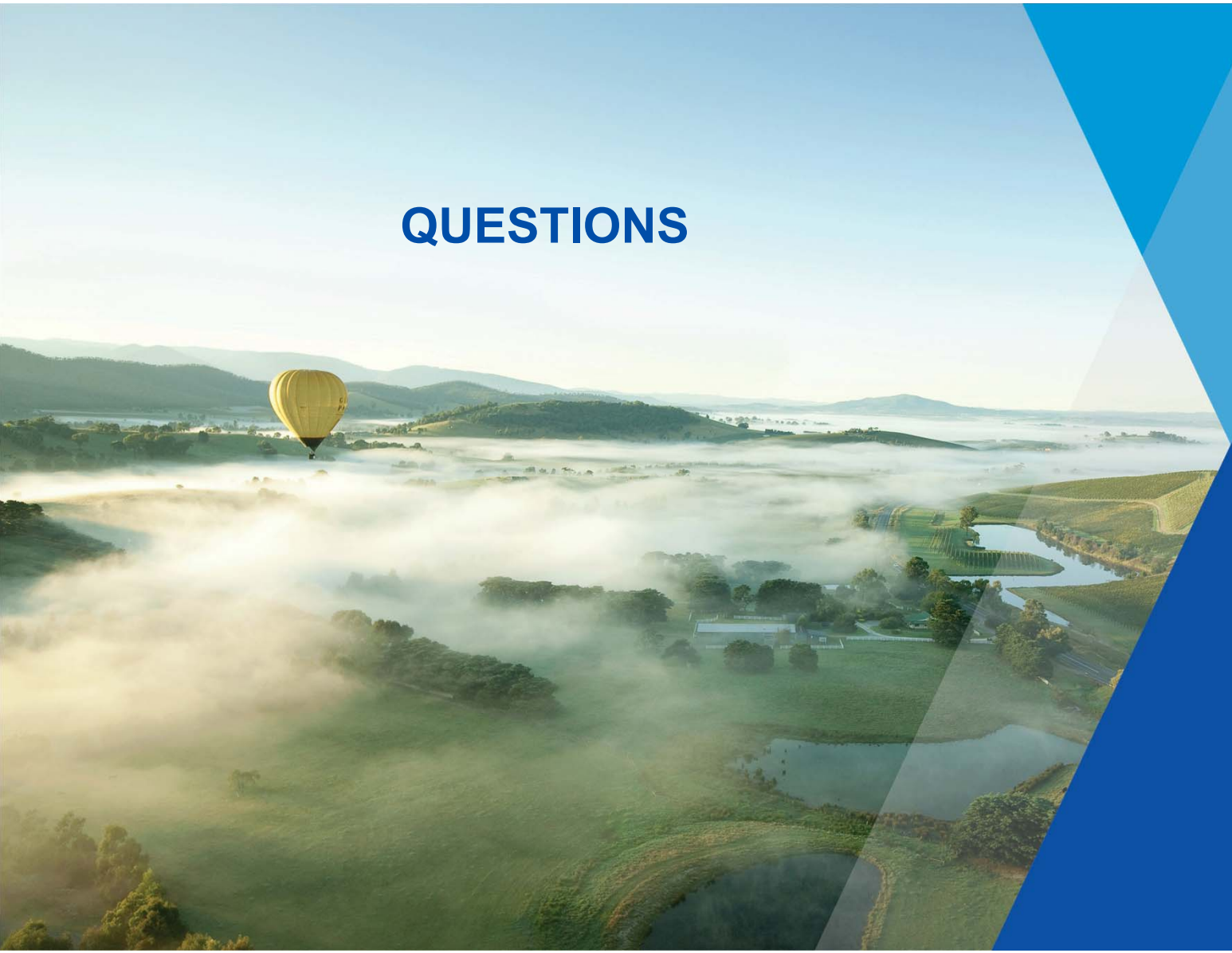
ELECTRIC AND HFC VEHICLES

- Electric vehicles are less than one per cent of light vehicles sales in Victoria, due to:
  - limited model choice (only two brands)
  - lack of charging infrastructure
  - perceived low vehicle range
  - high purchase price
- Battery electric vehicles projected to increase in the next decade, assuming:
  - costs equal conventional vehicle prices
  - more models are available
- Less clear when hydrogen fuel cell vehicles could enter the local market
  - may displace larger, long-distance vehicles (trucks, trains, buses)

SUMMARY

- The world has begun a major transformation to reduce carbon emissions while providing secure and affordable energy
- Victoria's brown coal resources will move from producing electricity with high emissions to other products with low emissions
- Victoria's large coal and carbon storage resources combined with Japanese technology could contribute to energy security in both countries
- The Hydrogen Energy Supply Chain project builds on a mature and trusting relationship

QUESTIONS



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