Submission
No 328

INQUIRY INTO COAL SEAM GAS

Name: Mr John Shewan

Organisation: Wybong Action Group

Date received: 9/09/2011


WAG
Wybong Action Group
Singleton Healthy Environment Group
Camberwell PAC Sept 2011
Hunter Communities Network
Broke Conference
NO GAS
Save Bunnan Inc
Merriwa Healthy Environment Group
Bylong Valley Protection Alliance
Upper Hunter Shire Coal & Coal Seam Gas Forum Sept 2011

Acknowledgement Of Country

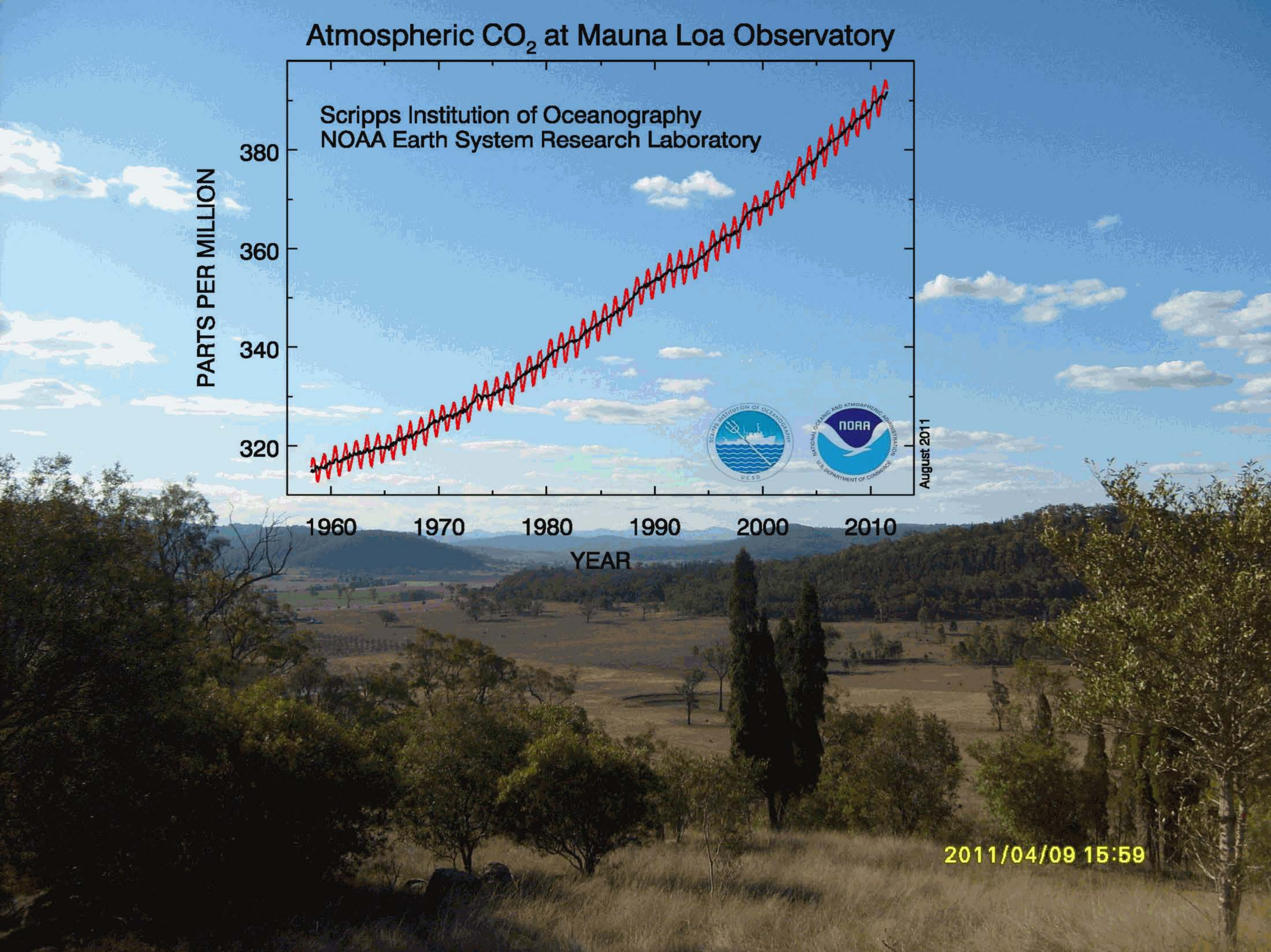
Today we stand in footsteps millennia old.

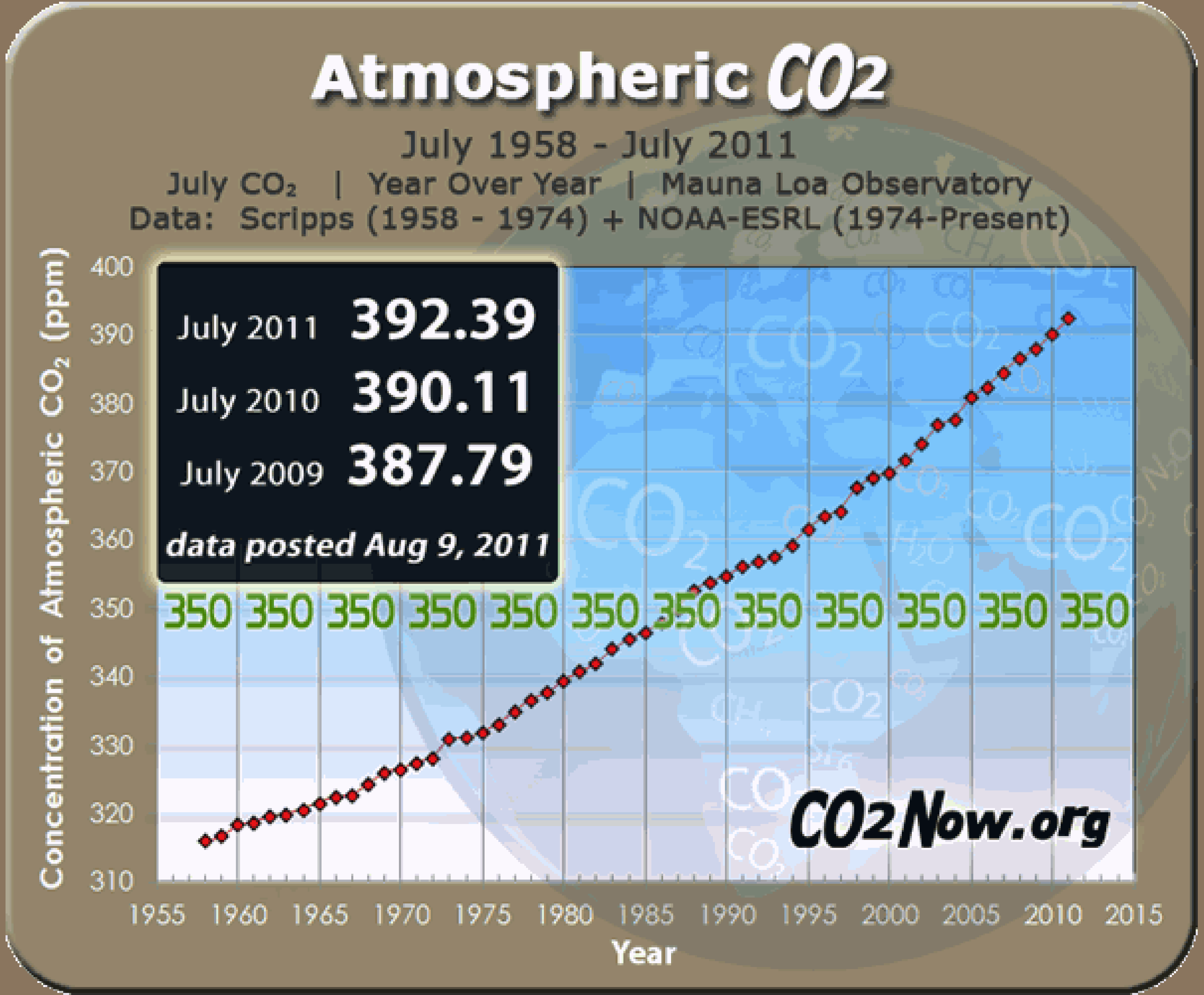
May we acknowledge the traditional owners whose cultures and customs have nurtured, and continue to nurture, this land, since men and women awoke from the great dream.

We honour the presence of these ancestors who reside in the imagination of this land and whose irrepressible spirituality flows through all creation.

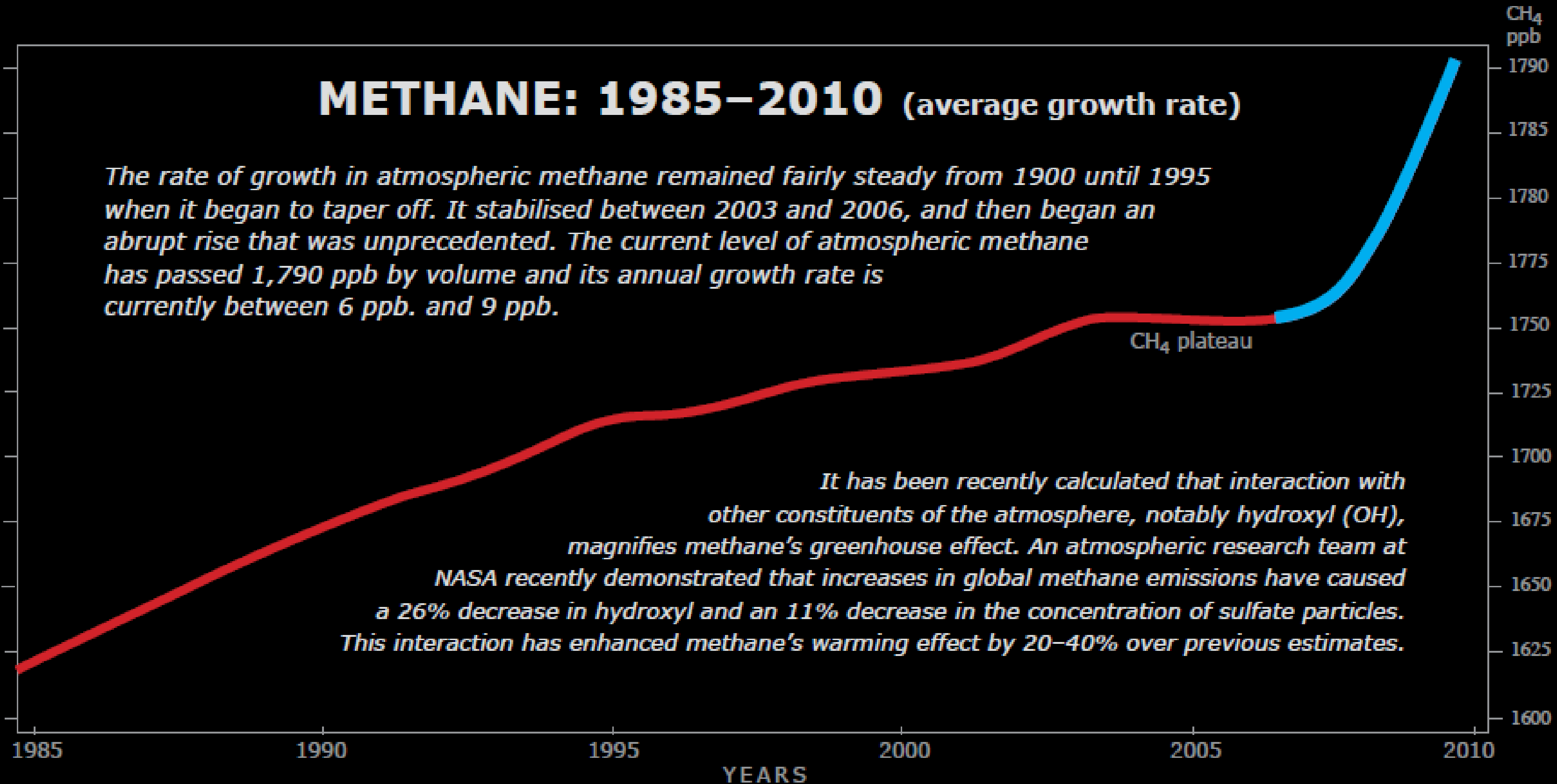
Jonathan Hill is an Aboriginal poet living in New South Wales

1. Coal Seam Gas Extraction


Atmospheric CO_2 at Mauna Loa Observatory
Scripps Institution of Oceanography
NOAA Earth System Research Laboratory
PARTS PER MILLION
380
360
340
320
1960
1970
1980
1990
2000
2010
YEAR
NOAA
August 2011
2011/04/09 15:59



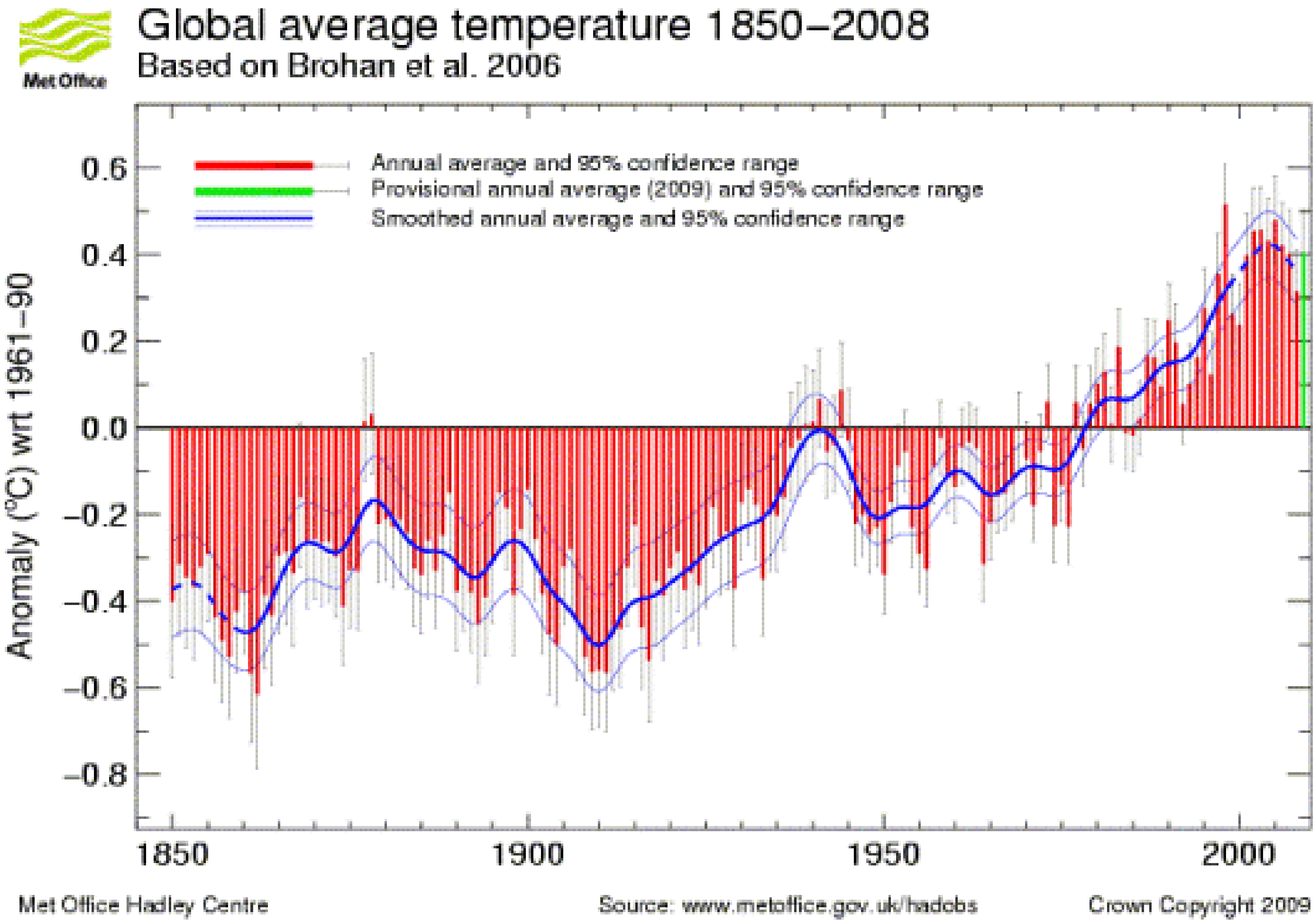
Atmospheric CO2
July 1958 - July 2011
July CO₂ | Year Over Year | Mauna Loa Observatory
Data: Scripps (1958 - 1974) + NOAA-ESRL (1974-Present)
July 2011 392.39
July 2010 390.11
July 2009 387.79
data posted Aug 9, 2011
350 350 350 350 350 350 350 350 350 350 350 350
Concentration of Atmospheric CO₂ (ppm)
400
390
380
370
360
350
340
330
320
310
1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015
Year
CO2Now.org



Methane is a far more powerful greenhouse gas than carbon dioxide (CO2).
A molecule of methane has a global warming potential that is about 23 times that of a CO2 molecule.
If coal seam methane were vented to the air, this would be a worse greenhouse outcome than collecting the gas and using it for combustion

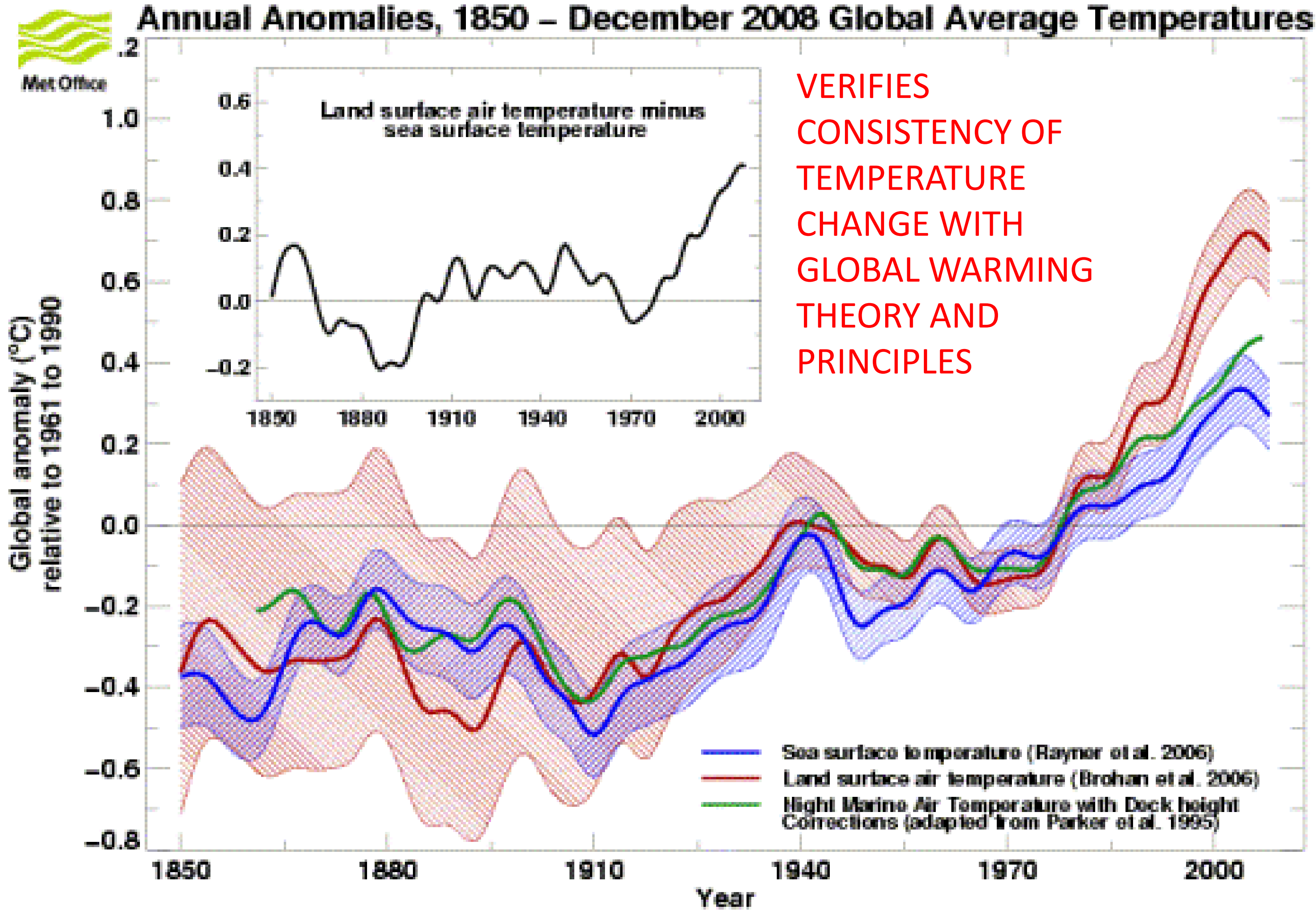
- from “The development of Australia’s coal seam gas resources “ by Michael Roarty Science

1 Drew T. Shindell, Greg Faluvegi, Dorothy M. Koch, Gavin A. Schmidt, Nadine Unger, and Susanne E. Bauer *Science* 30 October 2009 326: 716-718 [DOI: 10.1126/science.1174760]



Source: Met Office Hadley Centre for Climate Change © British Crown Copyright 2005, the Met Office

VERIFIES CONSISTENCY OF TEMPERATURE CHANGE WITH GLOBAL WARMING THEORY AND PRINCIPLES



Source: Met Office Hadley Centre for Climate Change © British Crown Copyright 2005, the Met Office

Genuine Denial or Criminal Negligence?

Global warming since the 1970s has been more rapid over land than over the oceans, as would be expected from an increasing human-caused greenhouse effect.

The amount of warming observed varies considerably from place to place, because natural variability of climate can add to human-caused warming in some places, or subtract from it in others. Local factors (such as cooling from aerosols of emitted fine particles in the atmosphere) may also come into play.

That the earth's surface has experienced a recent warming is also supported by the widespread recession of mountain glaciers over the last few decades, and by measurements made at different depths in boreholes in sediments and ice layers that carry signatures of the climate at the time they were laid down, which can be used to estimate the historical rise in temperature.

Source: Climate change in Australia—observed changes and projections, CSIRO, October 2007.

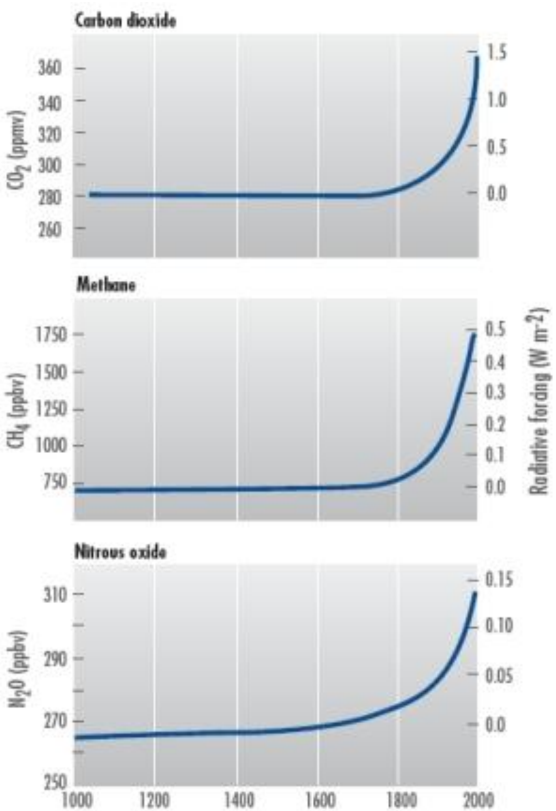
Gas	Chemical formula	Lifetime (years)	100-year Global Warming Potential
Carbon dioxide	CO_2	50-200	1
Methane	CH_4	12	25
Nitrous oxide	N_2O	114	298
Chlorofluorocarbons	CFCs	45 – 1700	4750 – 14,400
Hydrochloro-fluorocarbons	HCFCs	1.3 – 17.9	77 – 2310
Hydrofluorocarbons	HFCs	1.4 – 270	437 – 12,000
Sulphur hexafluoride	SF_6	3200	22,800
Perfluorocarbons	PFCs	740 – 50,000	7390 – 17,700
Hydrofluoroethers	HFEs	0.77 – 136	59 – 14,900

Source: Intergovernmental Panel on Climate Change, Working Group I Contribution to the Fourth Assessment Report, *Climate change 2007—the physical science basis*, Chapter 2 Changes in atmospheric constituents and in radiative forcing, Table 2.14, pp. 212–13.

Trends in the main greenhouse gas concentrations in the atmosphere in the last 1000 years

Source: Bureau of Meteorology, The greenhouse effect and climate change, Bureau of Meteorology, 2003,

http://www.bom.gov.au/info/GreenhouseEffectAndClimateChange.pdf



Main Greenhouse Gases Contributions

Gas	Principal anthropogenic sources	Lifetime	Proportional contribution to the enhanced greenhouse effect
Carbon dioxide (CO2)	Fossil fuel burning, biomass burning, gas flaring, cement production, land use and land use change	50–200 years	56 %
Methane (CH4)	Disturbance of wetlands, rice paddies, ruminant livestock, venting from natural gas wells, biomass burning and decomposition, coal mining, rubbish tips	12 years	16 %
Nitrous oxide (N2O)	Fossil fuel combustion, fertiliser production, biomass burning	114 years	5 %
Halocarbons (combined)	Industrial production, consumer goods (aerosol can propellants, refrigerants, foam-blowing agents, solvents, fire retardants)	2 to 50,000 years (e.g. CFC-11 is 45 years, CF4 is 50,000 years)	11 %
Tropospheric ozone (O3)	Emissions of precursors (carbon monoxide, nitrogen oxides, volatile organic compounds) from fossil fuel combustion and biomass burning	Short-lived	12 %

Sources: Intergovernmental Panel on Climate Change, Working Group I Contribution to the Fourth Assessment Report, *Climate Change 2007: The Physical Science Basis*, Chapter 2, Changes in atmospheric constituents and in radiative forcing, Table 2.12, p. 204; Bureau of Meteorology, *The greenhouse effect and climate change*, 2003, Table 2, p. 18.

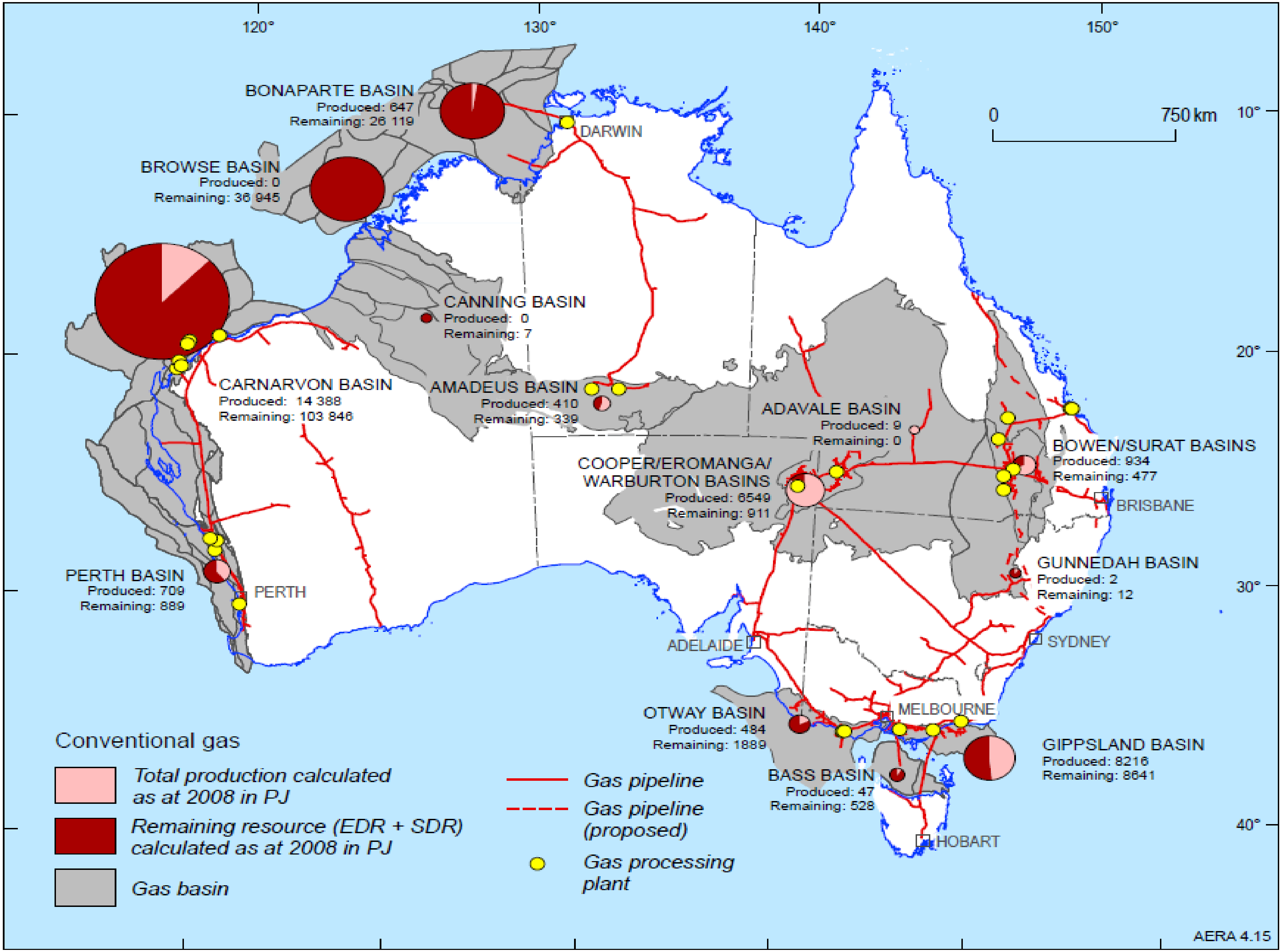


Figure 4.15 Australia's conventional gas resources, proven gas basins and gas infrastructure

Characteristics of natural gas

Conventional natural gas occurs in underground porous sedimentary rock reservoirs generally juxtaposed in the pore spaces with oil. Natural gas that occurs in reservoirs with little to no oil is called non-associated gas.

Naturally occurring gas is composed of the less complex hydrocarbons mainly methane (CH_4) with some ethane (C_2H_6). Depending on the source of the gas it may contain minor quantities of propane (C_3H_8), butane (C_4H_{10}) and pentane (C_5H_{12}). Other constituents may or may not be present, such as the more complex hydrocarbons, in addition to nitrogen (N_2), carbon dioxide (CO_2) and hydrogen sulphide (H_2S). Pure methane gas is colourless, odourless and lighter than air. Impurities such as hydrogen sulphide can give natural gas an odour.

Liquid hydrocarbons or natural gas liquids—as distinct from natural gas—comprise ethane, propane, butane and pentane. Liquefied petroleum gas (LPG) comprises both propane and butane, and ethane is widely used as a petrochemical feedstock. Natural gas with a low concentration of liquid hydrocarbons it is known as a 'dry' gas, and that with a high concentration is known as a 'wet' gas. A 'lean' gas falls between the two. A 'sour' gas contains more than one part per million hydrogen sulphide and is characterised by a foul or rotten egg smell. Australian natural gas is generally 'sweet' due to its low hydrogen sulphide content.

http://www.aph.gov.au/library/pubs/rp/2007-08/08rp25.htm#_Toc192411139

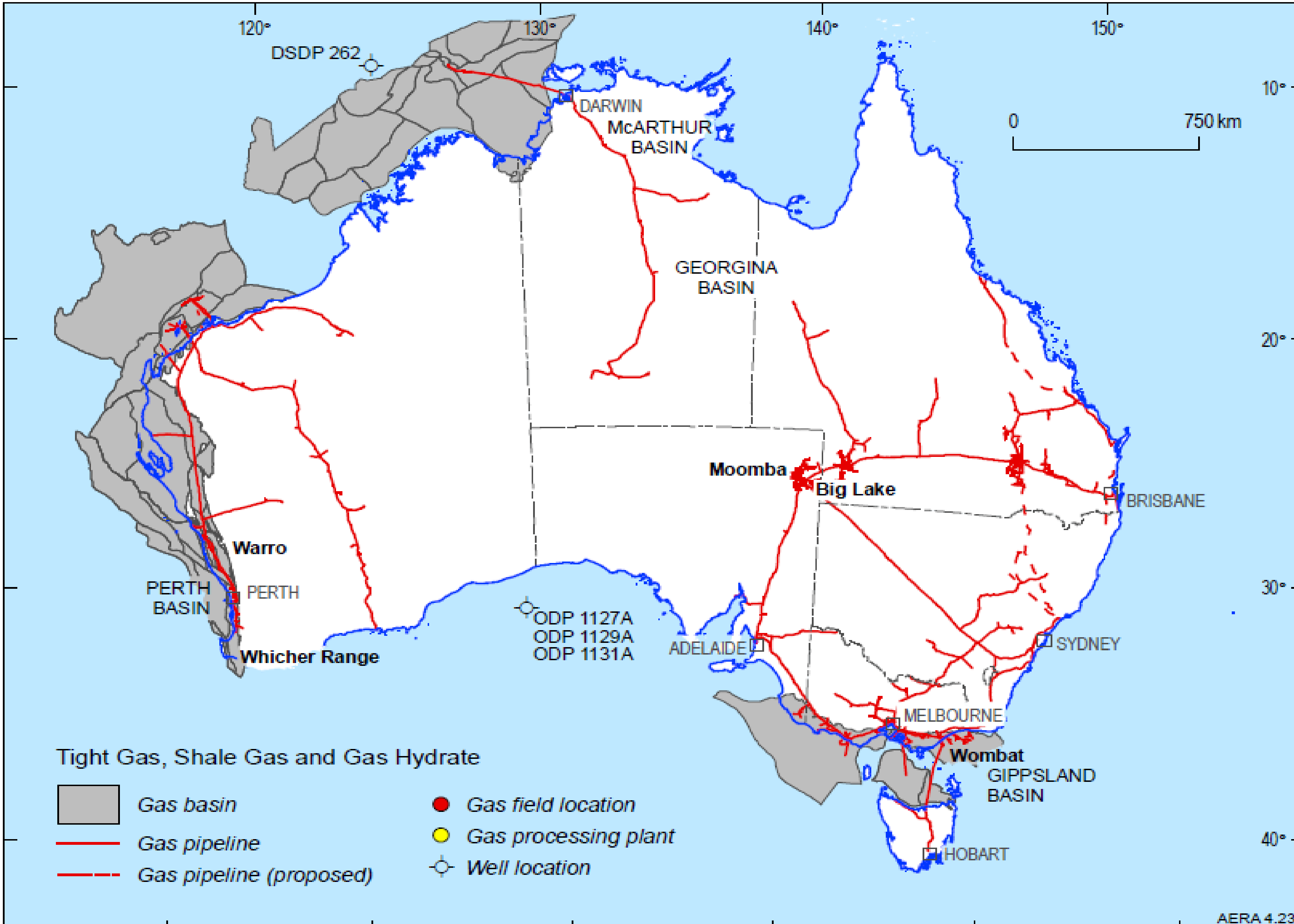


Figure 4.23 Tight gas, shale gas and gas hydrate resource locations and gas infrastructure

Source: Geoscience Australia

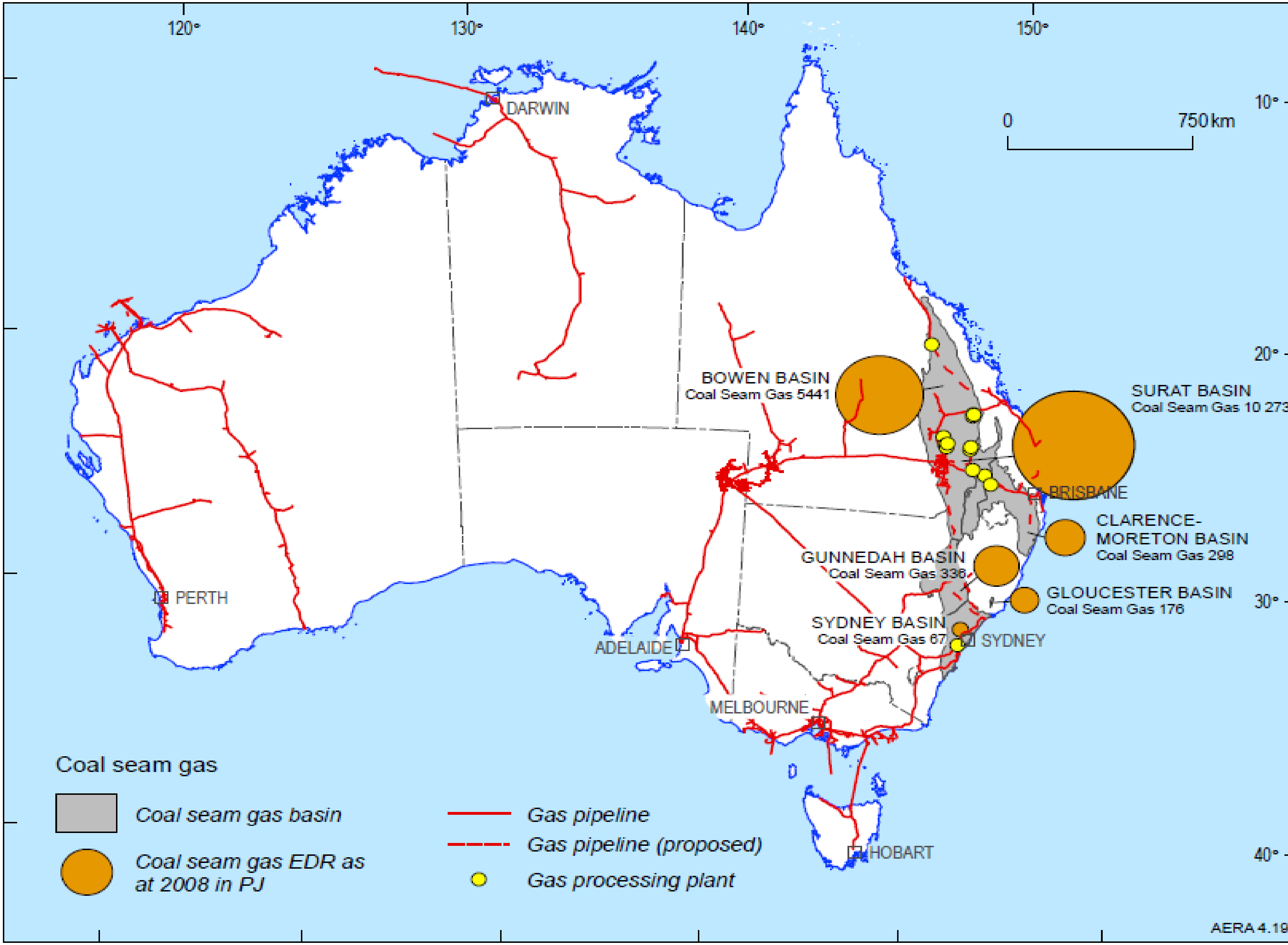
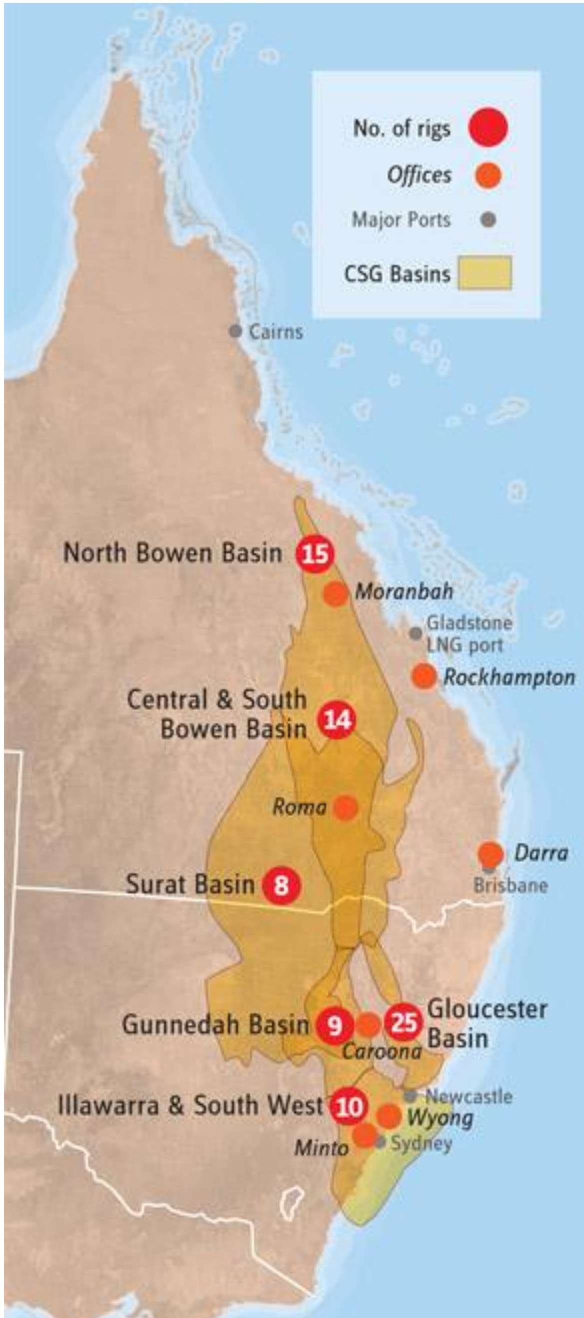
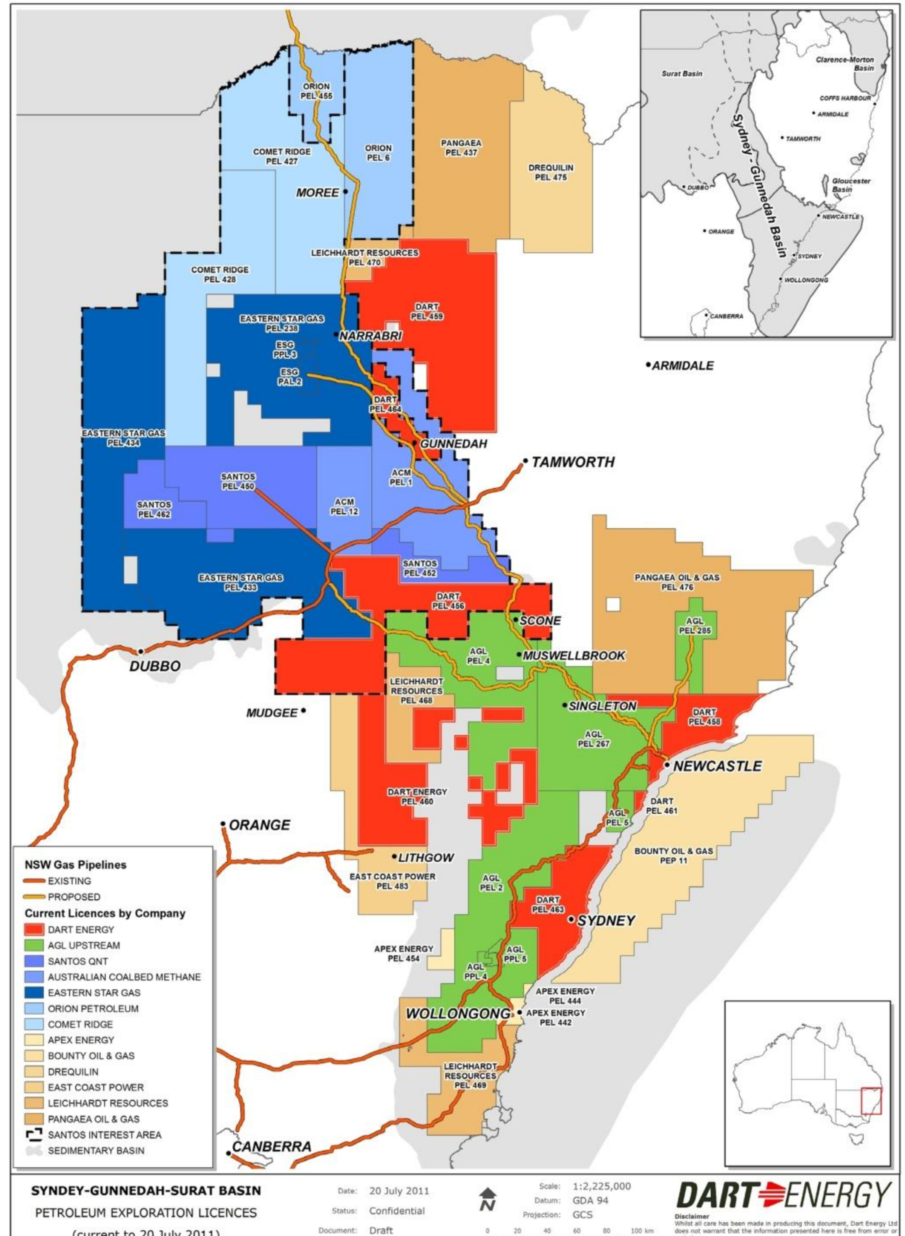
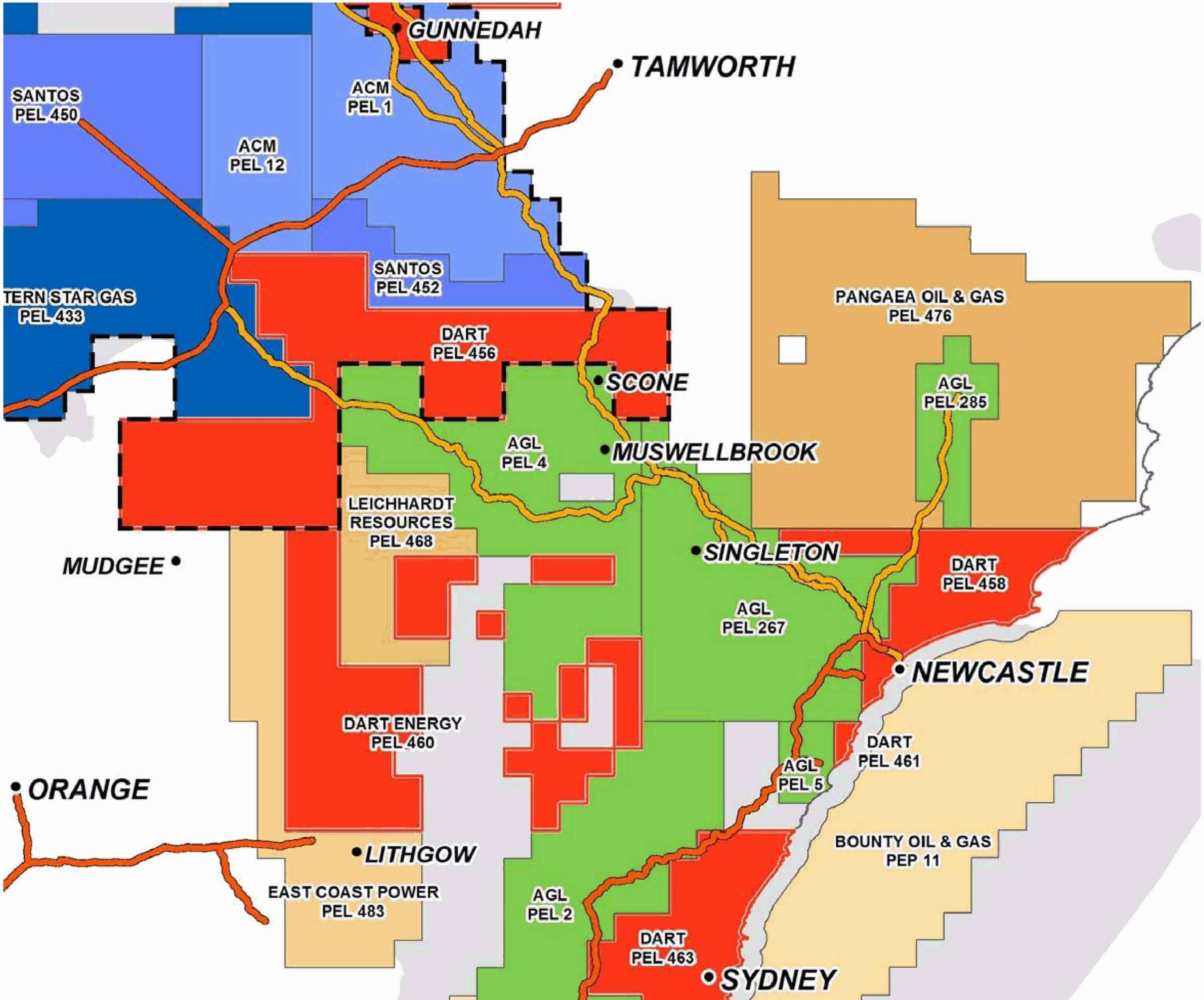


Figure 4.19 Location of Australia's coal seam gas reserves and gas infrastructure

Source: Geoscience Australia


No. of rigs
Offices
Major Ports
CSG Basins
Cairns
North Bowen Basin 15
Moranbah
Gladstone LNG port
Rockhampton
Central & South Bowen Basin 14
Roma
Darra
Brisbane
Surat Basin 8
Gunnedah Basin 9
25 Gloucester Basin
Caroona
Newcastle
Illawarra & South West 10
Wyong
Minto
Sydney


ORION PEL 455
COMET RIDGE PEL 427
ORION PEL 6
PANGAEA PEL 437
DREQUILIN PEL 475
MOREE
LEICHHARDT RESOURCES PEL 470
COMET RIDGE PEL 428
DART PEL 459
EASTERN STAR GAS PEL 238
NARRABRI
ESG PPL 3
ESG PAL 2
DART PEL 464
EASTERN STAR GAS PEL 434
GUNNEDAH
TAMWORTH
ARMIDALE
SANTOS PEL 450
ACM PEL 1
SANTOS PEL 462
ACM PEL 12
SANTOS PEL 452
EASTERN STAR GAS PEL 433
DART PEL 456
PANGAEA OIL & GAS PEL 476
SCONE
AGL PEL 285
AGL PEL 4
MUSWELLBROOK
DUBBO
LEICHHARDT RESOURCES PEL 468
SINGLETON
DART PEL 458
MUDGEE
AGL PEL 267
NEWCASTLE
DART ENERGY PEL 460
DART PEL 461
AGL PEL 5
ORANGE
BOUNTY OIL & GAS PEP 11
LITHGOW
EAST COAST POWER PEL 483
AGL PEL 2
DART PEL 463
SYDNEY
APEX ENERGY PEL 454
AGL PPL 5
AGL PPL 4
APEX ENERGY PEL 444
WOLLONGONG
APEX ENERGY PEL 442
LEICHHARDT RESOURCES PEL 469
CANBERRA
Surat Basin
Clarence-Morton Basin
COFFS HARBOUR
Sydney - Gunnedah Basin
Gloucester Basin
NSW Gas Pipelines
EXISTING
PROPOSED
Current Licences by Company
DART ENERGY
AGL UPSTREAM
SANTOS QNT
AUSTRALIAN COALBED METHANE
EASTERN STAR GAS
ORION PETROLEUM
COMET RIDGE
APEX ENERGY
BOUNTY OIL & GAS
DREQUILIN
EAST COAST POWER
LEICHHARDT RESOURCES
PANGAEA OIL & GAS
SANTOS INTEREST AREA
SEDIMENTARY BASIN
SYNDEY-GUNNEDAH-SURAT BASIN
PETROLEUM EXPLORATION LICENCES
(current to 20 July 2011)
Date: 20 July 2011
Status: Confidential
Document: Draft
N
Scale: 1:2,225,000
Datum: GDA 94
Projection: GCS
0 20 40 60 80 100 km
DART ENERGY


GUNNEDAH
TAMWORTH
SANTOS
PEL 450
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ACM
PEL 12
SANTOS
PEL 452
TERN STAR GAS
PEL 433
DART
PEL 456
SCONE
PANGAEA OIL & GAS
PEL 476
AGL
PEL 285
AGL
PEL 4
MUSWELLBROOK
LEICHHARDT
RESOURCES
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SINGLETON
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NEWCASTLE
DART ENERGY
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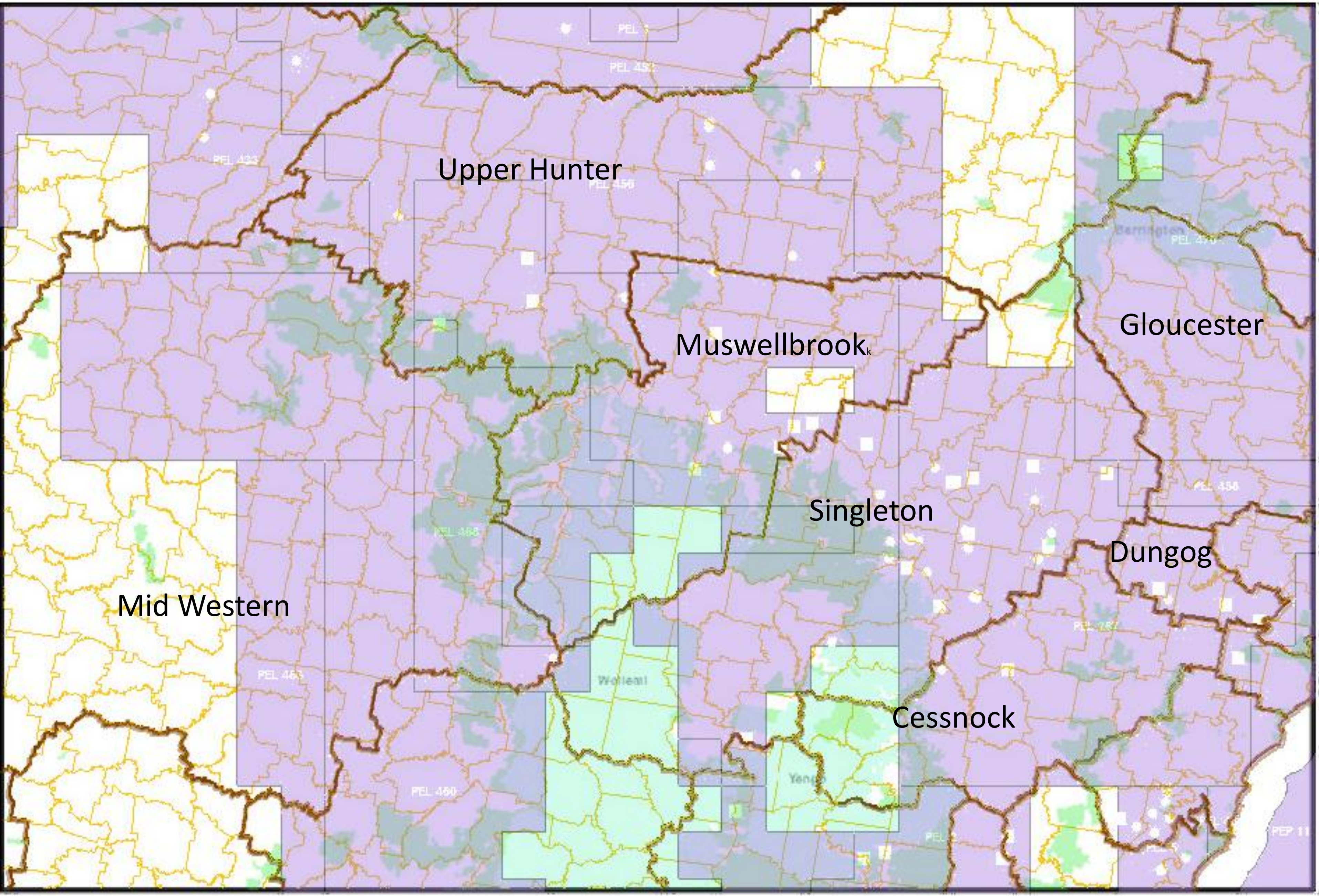
ORANGE
BOUNTY OIL & GAS
PEP 11
LITHGOW
EAST COAST POWER
PEL 483
AGL
PEL 2
DART
PEL 463
SYDNEY

Petroleum titles in the Upper Hunter (purple)



Methane formation in Australian Coal Seams

•Geochemical data for gases and coal indicate extensive microbial activity, especially in coal seams shallower than about 600 m.

•Such microbial activity has contributed to considerable volumes of methane presently stored in the shallow coals of these basins. The two main pathways of biogenic methane generation in coal are the carbon dioxide (CO_2-reduction) and acetate dependant (aceticlastic-reaction) methanogenesis by archaea.

•Carbon and deuterium isotope data indicate that CO_2 reduction is the main pathway of secondary biogenic methane generation in the eastern Australian coal seams.

•Sweet spots for CBM production are likely to be mainly confined to [shallow] permeable coal seams where microbial activity has enhanced the methane saturation levels of the coals

Significance of microbial activity in Australian coal bed methane reservoirs Mohinudeen Faiz, Phil Hendry Bulletin of Canadian Petroleum Geology (2006) Volume: 54, Issue: 3, Pages: 261-272

Methane formation in Australian Coal Seams

•The methane and carbon dioxide embedded within a coal seam is generally not the gas that was produced during the initial decay of the vegetation that formed the coal. Some of the gas is produced by heat and pressure during the natural process of coalification, but,

• most gas is the biogenic waste that is discharged by the coal-eating bacteria that infest the seam whenever water is present.

•There are coal seams in Australia that are up to two thirds water by volume (67%) and barely warrant the label 'solid fuel'. (The lower section of Wybong Creek derives water independently of flow and scientific investigation suggests lower Wybong Creek flows derive substantially from the outcropping of the coal seam aquifers – HCRCMA Dec 2010)

•Where the water content is high, the methane content is similarly high due to the density of methane-generating bacteria that thrive in such wet, carbon-rich, oxygen free habitats.

•If the water in these seams is extracted by pumping, or the coal is exposed to air during mining, it releases most of the methane that clings to its interstitial surfaces and the gas migrates easily along the seam. Such permeable seams discharge large quantities of methane until most of the coal bed dries out. (Dried seams > spontaneous combustion)

•Deeper coal seams tend to contain more methane than shallow ones on a tonne for tonne basis, since some of the methane that is embedded in and around shallow seams tends to leak out over geological time.

<u>Comparison of Extraction > Conventional Natural Gas / Coal Seam (Unconventional) Gas</u>

•Generally, CSG can be produced using similar technologies to those used for the development of conventional gas.

•Compared with the conventional gas, CSG projects can generally be developed at a lower capital cost because the reserves are typically located at a shallow depth and hence require smaller drilling rigs.

•The production of CSG can also be increased incrementally given the shallow production wells.

•Although hundreds of wells are needed to produce a field as opposed to a few dozen at most in a giant conventional gas field, they are hundreds of metres rather than kilometres deep, and take a few days as opposed to weeks to drill

Geoscience Australia and ABARE, 2010, Australian Energy Resource Assessment, Canberra

•The extraction of CSG necessarily involves the taking of groundwater.

The rise of the girly gas, An overview of the environmental management of coal seam gas activities, in Queensland Norton Rose Australia October 21 2010

Coal seam gas – how does it work?

•Coal seam gas is usually methane in composition and is typically attached to the coal along its natural fractures and cleats.

•Gas is released when pressure on the coal seam is reduced, usually after water is removed from the seam.

•Because of natural fractures called cleats, coal has a large internal surface area and is therefore capable of holding larger volumes of gas than conventional sandstone reservoirs.

•The amount of gas present in a coal seam depends on the depth of the seam, the thickness and the extent to which the fracture system is interconnected.

•When water is released from coal, the pressure is reduced, and gas flows through the cleats.

•When a well is first drilled into a coal seam, gas does not normally flow to the surface.

•Water is pumped from the well and gas flows subsequently. As water production declines, gas production increases.

•Production from a well must be continuous. If production is halted, water will re-enter the seam and dewatering must begin again.

Coal Seam Gas in Australia: Exploring, Producing, Supplying The Australian Pipeliner — July 2005

Australian Methods of Coal Seam Gas Extraction

In general, Australian Permian coal seams are relatively high in gas content at shallow depths. The coals tend to be generally low in permeability and under saturated with respect to gas. Permeability decreases with depth and gas content increases - however the gradient is site specific. Three principal methods of extracting gas from coal are :

- Vertical wells with hydraulic fracturing
- Medium Radius Drilling (MRD) methods
- Tight Radius Drilling (TRD) methods

Vertical wells with stimulation are best suited to relatively deep coals with high gas contents (probably greater than 500m depth).

MRD is best applied at depths less than 500m where coal seam continuity is relatively assured.

TRD has a niche position in coals from 300-700m depths, with multiple target seams – and where coal seam continuity is less of an issue.

The decision as to which technique is most likely to be successful is largely driven by geological factors, in particular the environment of deposition (EOD) of the target prospect.

Where pressure in the annulus of a borehole is higher than the pore pressure of the surrounding formation in a permeable zone, drilling fluids will migrate into the formation – This is generally known as an "overbalanced" condition. The amount of fluid migrating into formation is therefore a function of the pressure imbalance and the permeability of the formation. The migrating fluid entrains a certain amount of solids that can contribute to a localised permeability reduction in the zone surrounding the well. Where chemical additives are used, these too can be transported into the formation further contributing to potential formation damage (Purl et al, 1991).

Maximising Coal Seam Methane Extraction through Advanced Drilling Technology, Scott Thomson, Andrew Lukas, Duncan MacDonald

Developed in 1949 by Halliburton, by year 2000, hydraulic fracturing was used in 90 to 95 percent of all oil and gas wells.

There are two main concerns about fracking.

"One is the actual fluid and what the chemical make up is and how much that might impact the [associated] water.“

"There is a risk that when you induce a fracture, rather than it be contained within the coal zone it might extend into an aquifer above. If that's the case, there's a concern that the methane gas could leak into the overlying aquifer."

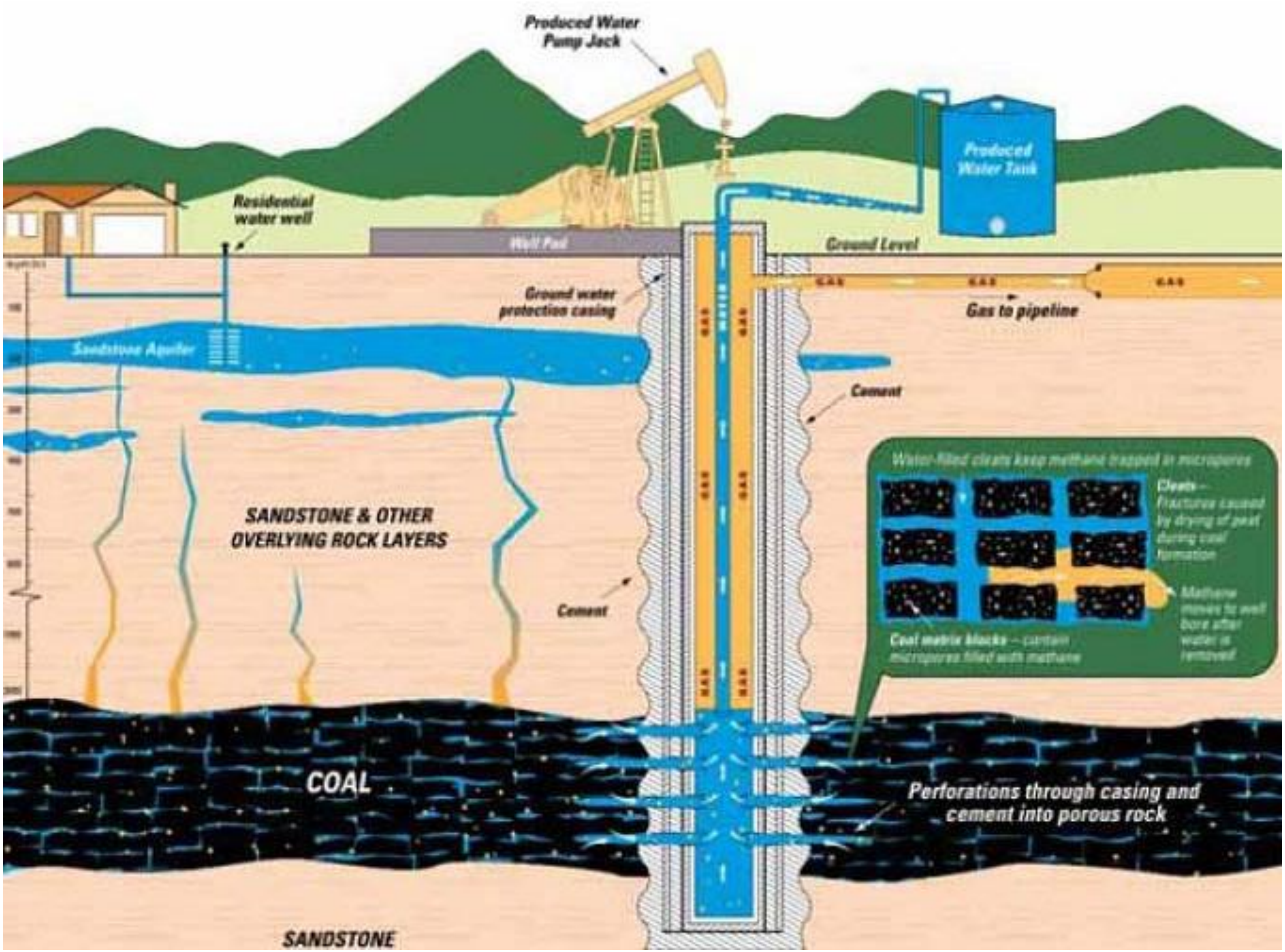
Dr Jim Underschultz, CSIRO

“To give you an idea of the quantities of fracking fluids involved, in one QLD proposed coal seam gas operation it was reported that 18,500kg of additives were to be used in each well during the fracturing process and that up to 40% (i.e. 7,500kg or 7.5 tonnes) of the fracking fluids would remain in the formations. ”

National Toxics Metwork 2011

“Natural gas obtained by the controversial technique of hydraulic fracturing may contribute significantly to greenhouse gas emissions and so should not be considered as a cleaner alternative to coal or oil.”

Robert Howarth (2010) Preliminary Assessment of the Greenhouse Gas Emissions from Natural Gas obtained by Hydraulic Fracturing,



Typical Coalbed Methane Well. Source: Ecos Consulting

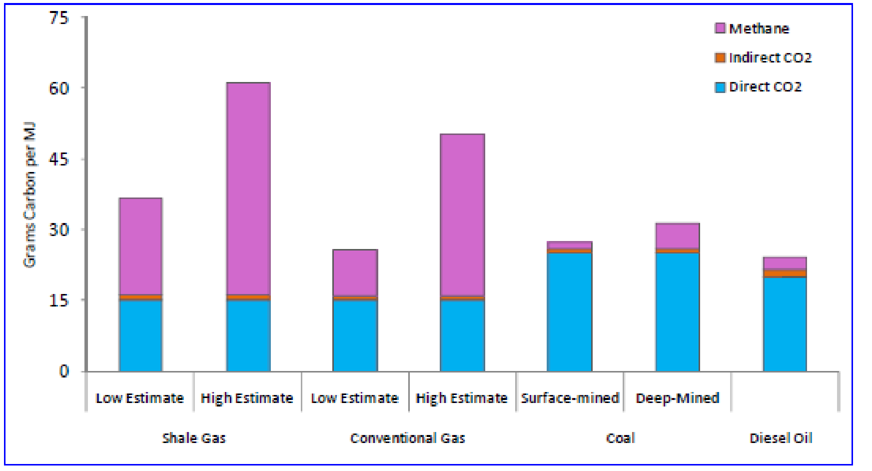
The footprint for shale gas is greater than that for conventional gas or oil when viewed on any time horizon, but particularly so over 20 years.

Compared to coal, the footprint of shale gas is at least 20% greater and perhaps more than twice as great on the 20-year horizon and is comparable when compared over 100 years

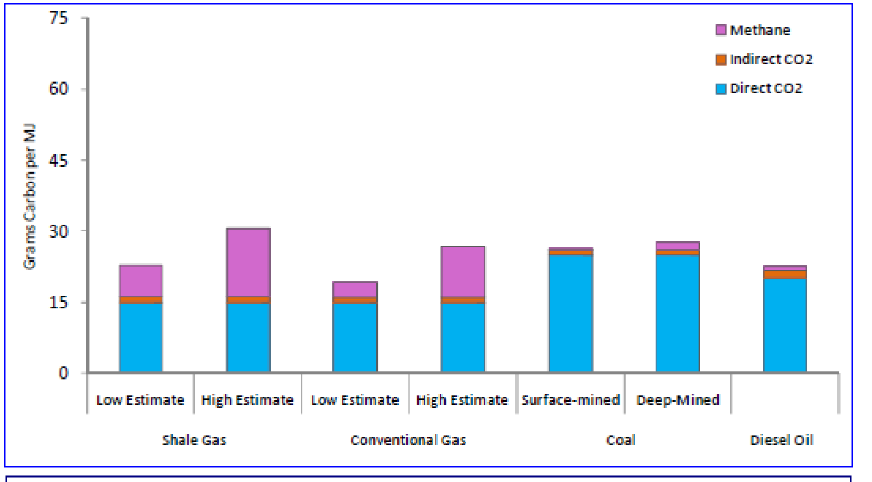
Methane and the greenhouse-gas footprint of natural gas from shale formations, A letter Robert W. Howarth, Renee Santoro, Anthony Ingraffea

Lifecycle GHG Emissions from Shale Gas compared to coal, 2011 Post Carbon Institute James Hughes

A. 20-year time frame



B. 100-year time frame



Top panel is 20-year time frame, and bottom panel is 100-year time frame. Estimates include direct emissions of CO_2 during combustion (blue bars), indirect emissions of CO_2 necessary to develop and use the energy source (red bars), and fugitive emissions of methane, converted to equivalent value of CO2 for global warming potential (pink bars).

Each well has an area of disturbance of 1 ha during construction. Each megalitre of CSG water brings up approximately 5 – 8 tonnes of salt that was previously stored safely underground.

Submission to Senate Standing Committee on Rural Affairs & Transport Management of the Murray-Darling Basin - Impact of Mining Coal Seam Gas 28 July 2011 OzEnvironmental P/L

Routes of Water Contamination - Fracking

Fracking well casings can leak and equipment failures can cause blowouts. Fracking wastewater can spill from storage pits. In 2008, a wastewater pit in Colorado leaked 1.6 million gallons of fluid, which migrated into the Colorado River.157

When injected into the ground, the fracking fluids can contaminate underground water sources.158

Groundwater contamination could be permanent because it happens slowly and can easily go undetected; cleanup can be expensive and is sometimes impossible.159

157 Lustgarten, Abrahm. "How the West's energy boom could threaten drinking water for 1 in 12 Americans." *ProPublica*. December 21, 2008.
158 New York State Department of Environmental Conservation Division of Mineral Resources. "Draft Supplemental Generic Environmental Impact Statement on the Oil Gas and Solution Mining Regulatory Program; Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeatbility Gas Reservoirs." September 2009
159 U.S. EPA. Office of Water, Office of Ground-Water Protection. "Citizen's Guide to Ground-Water Protection." April 1990

Leaks and Blowouts

The high-pressure injection of fracking fluids can cause leaks in well casings and blowouts of well equipment, where the underground pressure overpowers the drilling rig. Leaky well casings at shallow depths can allow fracking fluids to leach into groundwater.160

A National Academy of Sciences study found that average methane concentrations in shallow drinking water wells in active gas areas were 17 times higher than those in non-active areas, possibly due to leaky gas-well casings.161

The massive pressure and multiple fracks used during a gas well's lifetime increases the likelihood that well casings will fail and pollute aquifers.162 In 2010, a malfunctioning "blowout preventer" at a Pennsylvania gas well failed to prevent a 75-foot tall geyser of gas and drilling fluid that spilled 35,000 gallons on the ground before it was contained.163 (A faulty blowout preventer also contributed to the BP Gulf oil spill of April 2010.164)

In January 2011, 21,000 gallons of fracking fluid and flowback water spewed from a Tioga County well when a valve was erroneously left open, releasing hazardous chloride, sodium, barium and strontium, as well as hydrochloric acid used in the fracking fluid.165 Two months after a fire in the company's fracking liquid storage tanks injured three people, a Chesapeake Energy well spurted thousands of gallons of fracking fluid in Bradford County due to a cracked well casing.166 Local families were forced to evacuate their homes.167 Pennsylvania had cited Chesapeake Energy 284 times for violations and taken 58 enforcement actions since 2008.168

160 House Energy and Commerce Committee Minority Staff Report (April 2011) 161 Osborn et al. (2011) at 2, 4.
162 Northrup (August 2010) at 1; Northrup, James. Otsego 2000. "Potential leaks from high pressure hydro-fracking of shale." September 8, 2010 at 3.
163 Maykuth, Andrew. "Pa. suspends gas drilling at Marcellus rupture site." *The Philadelphia Inquirer*. June 7, 2010.
164 *Ibid*.
165 Aaron, Jeffrey. "Anatomy of a well blowout." *Elmira (New York) Star-Gazette*.March 13, 2011.
166 McAllister, Edward. "Pennsylvania natgas well has blowout during fracking." *Reuters*. April 21, 2011; "Crews stop flow of drilling fluid from Marcellus Shale well in Pa." *Associated Press.* April 22, 2011.
167 McAllister (2011).
168 Legere, Laura. "After blowout, most evacuated families return to their homes in Bradford County." *Scranton Times Tribune.* April 21, 2011

Aquifer Migration

Fracking fluids and gases can leak into aquifers through well shafts or rock faults. High-pressure horizontal fracking disturbs natural underground rock formations and can have unintended consequences, even after the drilling is complete.

Horizontal wells are more likely than vertical wells to encounter pre-existing cracks in the rock formation where the gas can migrate and enter aquifers.169 A 2011 Duke University study demonstrated that groundwater near fracking operations has higher methane concentrations.170 If methane can migrate, it is likely that other chemicals can as well.171

Underground gas well leaks can contaminate nearby water sources if the cracks in the shale caused by fracking overlap with natural faults and fractures in the rocks.172 Through these fracture and fault networks, toxic chemicals from the fracking fluids, the gas itself, or naturally occurring radioactive chemicals and salts can migrate into nearby aquifers that provide drinking water.173

These natural faults and geological fractures are common in places like New York state.174 For example, New York City's water supply is drawn from a region with prevalent geologic faults. The city opposed fracking near its pristine watershed, since the impact of fracking on these geological structures has not been studied sufficiently.175 A New York hydrogeologist observed that the interconnection of natural faults and fractures would make fracking dangerous even if the fluids were not toxic because it could allow underground saline or radioactive fluids to mix with freshwater sources.176

169 Northrup (August 2010).
170 Osborn et al. (2011)
171 Lustgarten, Abrahm. "Why gas leaks matter in the hydraulic fracturing debate." *ProPublica*. August 2, 2010.
172 Lawitts, Steven. New York City Department of Environmental Protection. (Letter). Re: Draft Supplemental Generic Environmental Impact Statement on the Oil, Gas and Solution Mining Regulatory Program (dated 9/30/2009). Submitted to NYSDEC Bureau of Oil & Gas Regulation. December 22, 2009.
173 Rubin, Paul. Hydroquest. Comments on the Scope of EPA's Proposed Study of Hydraulic Fracturing. August 10, 2010.
174 New York State Department of Environmental Conservation (2009)
175 Lawitts (2009)
176 Rubin (2010)

Fracking Wastewater Pollutes Waterways

Although some fracking fluid remains in the well, about 30 to 70 percent of the injected fluids are discharged as wastewater.

177 For example, in 2009, Pennsylvania's oil and gas wells produced 9 million gallons of wastewater a day; by 2011, the wells were expected to create 19 million gallons.178 The waste can be so toxic and concentrated that it is very difficult to dispose of safely.

One method to get rid of fracking waste is to inject it in disposal wells in rock formations underground.179 This method is common for most shale plays except the Marcellus Shale because Appalachian geology is unsuitable for underground injection.180 Only a few injection wells exist in Pennsylvania.181 Drillers near population centers can send fracking waste to local wastewater treatment plants, which treat and dilute the wastewater and release it into surface waters.182

Standard wastewater treatment cannot handle the chlorides, total dissolved solids, organic chemicals, bromide and fracking fluid chemicals.183 The water also contains substances, including possibly radioactive elements, picked up during its journey underground.184 A 2011 *New York Times* investigative report found that nearly three-quarters of the more than 240 Pennsylvania and West Virginia studied gas wells produced wastewater with high levels of radiation, including at least 116 wells with levels that were hundreds of times the EPA's drinking water standard, and at least 15 wells with levels thousands of times the standard.185

According to ProPublica, no Pennsylvania wastewater treatment plant was expected to be able to remove total dissolved solids from the water until 2013.186 In Pennsylvania, at least half of the waste went to public sewage plants between 2008 and 2009.187

177 Groundwater Protection Council and ALL Consulting (2009)
178 Sapein, Joaquin. "With natural gas drilling boom, Pennsylvania faces an onslaught of wastewater." *ProPublica*. October 3, 2009.
179 Groundwater Protection Council and ALL Consulting (2009)
180 U.S. EPA (February 2011) at 40; Levy, Marc. "Pa. asks natural gas drillers to stop taking wastewater to 15 treatment plants for discharge." *Associated Press.* April
19, 2011.
181 Levy (2011).
182 U.S. EPA (February 2011)
183 Volz (2011) at 1, 2, 5 to 7; Clayton (2010); U.S. EPA (February 2011)
184 Groundwater Protection Council and ALL Consulting (2009)
185 Urbina (February 2011).
186 Sapein (2009).
187 Urbina (February 2011).

Fracking Wastewater Pollutes Waterways (cont'd)

A 2011 *Associated Press* report found that Pennsylvania could not account for the disposal method of 1.28 million barrels of its wastewater (one-fifth of the annual total) due to faulty reporting.188 In August 2010, despite industry backlash, Pennsylvania strengthened its fracking wastewater regulations, but treatment plants that had already accepted fracking waste were allowed to continue to do so under the same treatment standards.189 As of April 2011, 15 of those 27 plants were still accepting fracking wastewater.190 Pennsylvania does not require all sewage plants to test for radioactivity; regulators and industry officials discount the risk of radioactivity in the waste.191 After the *New York Times* study was released, the EPA urged Pennsylvania to require community water systems near plants that treat Marcellus Shale wastewater to test for radiation and reevaluate discharge permits of wastewater treatment plants that dispose of fracking waste.192 The Center for Healthy Environments and Communities (CHEC) at the University of Pittsburgh tested the wastewater of a treatment facility in Indiana County, Pennsylvania, and found barium at rates 14 times the EPA drinking water standard, strontium at 746 times the standard, benzene at twice the standard and total dissolved solids at 373 times the standard.193 Much of this fracking wastewater ends up in rivers after its incomplete treatment. These discharges have already been a major problem. The Monongahela River in Pennsylvania might be one of the most endangered rivers in the country, partially due to the large portions of pollution from Marcellus Shale fracking waste.194 Even after 2010 rules reduced fracking pollution, the Pennsylvania Department of Environmental Protection estimated that gas wastewater was causing 5 to 10 percent of the pollution in the river.195 Pennsylvania's rivers have higher levels of bromides, which react with treatment plant chlorine disinfectants to create potentially cancer-causing chemicals called trihalomethanes.196 Wastewater facilities have not been able to treat or remove trihalomethanes.197 Drillers have tried to mitigate this problem by recycling wastewater. Almost two-thirds (66 percent) of fracking waste was recycled in the six months before March 2011, up from 20 percent the previous year.198 However, reusing water does not make it go away; it still needs to be disposed of eventually. 199 Some wells sell the waste to nearby communities that use it for dust suppression or road de-icing, where it can run off into surface water.200

188 Caruso (2011).
189 Levy (2011).
190 *Ibid*.
191 Urbina (February 2011).
192 Garvin, Shawn. [Letter] Submitted to Michael Krancer, Acting Secretary of Pennsylvania Department of Environmental Protection. March 7, 2011.
193 Volz (2011).
194 Puko, Tim. "Silty, salty Monongahela River at risk from pollutants." *Pittsburgh Tribune-Review.* August 24, 2010.
195 *Ibid*.
196 Levy (2011).
197 Caruso (2011).
198 Urbina, Ian. "Wastewater recycling no cure-all in gas process." *The New York Times.* March 1, 2011.
199 *Ibid*.
200 *Ibid*.

Economic Costs Exceed Short-term benefits and amount to an Improper Consideration

The shale gas rush is not just a danger to public health, but also to local economies. While industry promotes job creation and local investment, proponents typically do not account for the long-term economic damage and the significant erosion of communities' quality of life that can outweigh any benefits.201 Many economic benefits may be a mirage — distant energy companies typically do not buy from local businesses and out-of-town roughnecks fill short-term jobs. New wells bring fleets of trucks that crowd and damage rural roads and carry potentially hazardous wastewater. Cacophonous drilling rigs operate 24 hours a day, 7 days a week.202 Scenic vistas are replaced with a landscape of gas wells, which lowers property values and harms tourism and recreation industries like hunting and fishing. In Wise County, Texas, properties with gas wells have lost 75 percent of their value.203 Natural gas rigs not only devalue the property where they are located, but also the value of neighboring properties.204 Every energy boom comes with a bust. Most economic gains are short-lived — employment, construction, housing demand and even royalty payments are large at first, but diminish quickly after the initial investment.205 Locals do not always fill drilling jobs. In Pennsylvania, 70 percent of drill rig workers are from out of state.206 In New York state, the top gas-producing counties have lower household incomes and higher levels of poverty than nearby non-gas-producing counties.207 During construction and drilling, gas wells significantly increase heavy truck traffic, and locals bear the cost of repairing wear and tear on local roads. Pennsylvania Department of Environmental Protection estimates that building and fracking a well requires 1,000 heavy truck trips.208 Increased truck traffic damages local infrastructure and can increase the risk of truck accidents on small, rural roads.209 Fracking also requires pipelines to transport the gas, which can pose safety hazards from explosions.210 In 2011, a pipeline explosion in Allentown killed five workers; other explosions have occurred in Ohio, Pennsylvania, California, Michigan and Texas, some fatal.211 Farmers, whose livelihoods depend on the health of the land, face especially stark choices. Persistently low milk prices have threatened dairy farms in Pennsylvania and New York, and the prospect of gas royalty payments is tempting. Farmers lease their land to gas companies with the promise of minimal impact.212 However, livestock have died from drinking water tainted with spilled fracking fluids. In 2009, 16 cattle died after apparently drinking fluid that escaped from a Louisiana fracking well.213 In 2010, Pennsylvania quarantined 28 cows that may have consumed water tainted by a fracking spill that could contaminate their meat.214 Organic farmers could lose their premium prices if industrial fracking fluid pollutes their crops or livestock.215 Farm sales could be destroyed if pollution threatens livestock, crops or farmland.

201 Considine, Timothy J., Ph.D. et al. "The Economic Impacts of the Pennsylvania Marcellus Shale Natural Gas Play: An Update." May 24, 2010.

202 Maykuth, Andrew. "Pa. tapped, drillers not." *Philadelphia Inquirer*. October 25, 2009.

203 Heinkel-Wolfe, Peggy. "Drilling can dig into land value." *Denton Record Chronicle.* September 18, 2010.

204 Grace, Tom. "Otsego committee rejects hydro-fracking ban." *Oneonta (New York) Daily Star*. May 27, 2010.

205 Phillips Long, Barbara. "Lectures: No time to waste in fracking decisions." *Carlisle (Pennsylvania) Sentinel*. February 13, 2011.

206 Barth, Jannette M. PhD., "Hydrofracking offers short-term boom, long-term bust." *Engineering News-Record.* March 7, 2011.

207 Barth, Jannette M. PhD., JM Barth & Associates, Inc. "Unanswered Questions about the Economic Impact of Gas Drilling in the Marcellus Shale: Don't Jump to Conclusions." March 22, 2010

208 Fears, Darryl. "Sitting atop huge gas reserve, Md. debates drilling practice." *Washington Post*. March 28, 2011.

209 Barth (2011).

210 Volz (2010).

211 Cauchon, Dennis. "Allentown pipeline explosion revives natural gas worries." *USA Today*. February 12, 2011.

212 Hamill, Jim. "Couple regrets gas well lease." *WNEP*. October 28, 2010.

213 Lustagraten, Abraham. "16 cattle drop dead near mysterious fluid at gas drilling site." *ProPublica*. April 30, 2009.

214 "Pennsylvania quarantine cattle over gas drilling fluid." *Reuters*. July 1, 2010.

215 Blacklock, Colleen. Potential Impacts of Gas Drilling on Agriculture in the Marcellus Shale Region of New York State. December 11, 2008.

ARROW Energy has capped a gas well that was spewing methane and water up to 90 meters high for more than a day at its project site near Dalby.

The company, a Shell subsidiary, said it would now investigate how the incident occurred. A company spokesman confirmed that it had experienced other problems at the site since it started drilling there 10 years ago. He said there was little risk of explosion and people should not be "overly concerned''. The gas leak happened on Sunday at a remote location west of Dalby, about 4km from the nearest residence.
Arrow Energy says it was a new well that was being prepared for gas production. The well was uncapped to install a pump when water and gas burst to the surface, the company says. Queensland Fire and Rescue Service crews and Arrow Energy staff have been on site overnight monitoring the situation and they established a 100 metre exclusion zone around the well. Property owner Tom O'Connor said it was the fourth incident in recent years on his property, known as the Daandine field, about 25km west of Dalby. ``Every time it's a different issue,'' Mr O'Connor said. Mr O'Connor said the pressure in the blow out was beginning to die down. But he said there were concerns about getting near the blow out. ``If they get one spark it will be a fire,'' he said. It is understood Western Downs mayor Ray Brown was also at the scene and was in hourly communication with Premier Anna Bligh. Mr O'Connor said his movements were restricted but he had concerns about the safety of the gas wells. `How do you know?'' he said.
The wells are part of Arrow Energy's coal seam gas project. The company said there were no injuries and the well was undamaged and retains full integrity above and below ground. It said the incident occurred when contractors were preparing to install a down-hole pump into a new well, which is a routine activity to bring it into gas production. After initial checks, the well was uncapped in order to install the pump. Before this could occur water and gas began to flow to surface with increasing intensity.
The contractor crew moved a safe distance from the well and advised Arrow personnel. The site has been secured and local emergency services have been advised. An Arrow Energy incident response team and drilling engineers have put in place a plan to stem the gas flow. The standard method in this situation involves filling the well with dense drilling fluids (water based drilling muds). The weight of these fluids acts to prevent the gas flowing to surface. "We expect the matter will likely be resolved within the next two to three days," a spokesman said. Arrow has notified the government regulators (DERM and DEEDI) as well as the landholder and local council.
Queensland Mining Minister Stirling Hinchliffe told AAP there were no public health concerns because of the restrictions which have been put in place. Mr Hinchliffe said investigators would looking into communication between the landholder, the company and authorities to see if correct protocols were followed. "It's important for us to get to the bottom of this instance and be confident that the correct protocols and regulations were being observed," he said. Mr Hinchliffe said an initial report was due later on Monday and at this stage he did not have all the details. "While the Queensland government stands ready to take appropriate action we need to have the full information and details before pursuing these sort of issues," he said. He assured Queenslanders there would be a full disclosure of the incident. "We need to make sure the whole community has an understanding and is confident in the strict guidelines and regulations we have in place to regulate this industry."

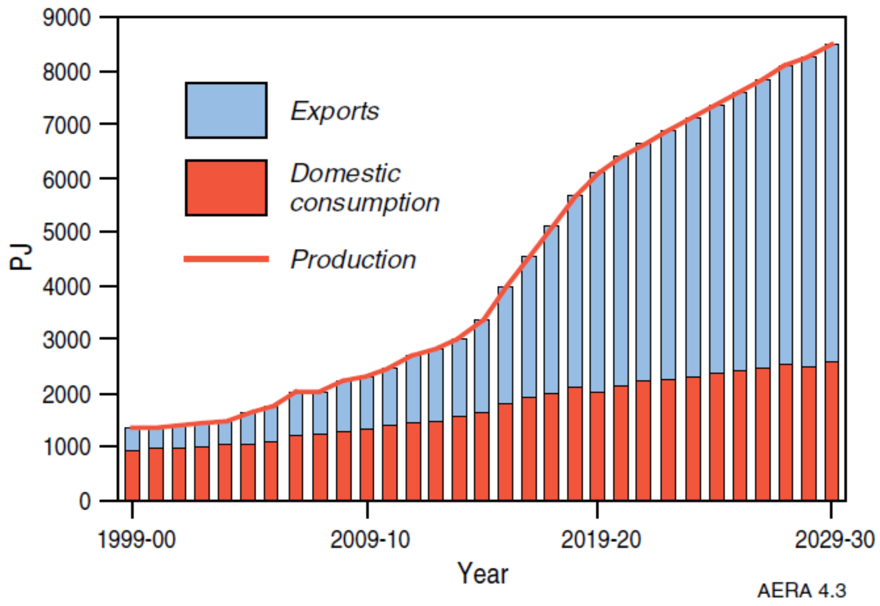


Figure 4.3 Outlook to 2030 for the Australian gas market

Source: ABARE 2009a, 2010

Methane escape is only one of three major CSG cost externalities, the other two are health and water contamination, which will be paid for by the community whilst the largely foreign shareholders bank their criminal profits.


2. Coal

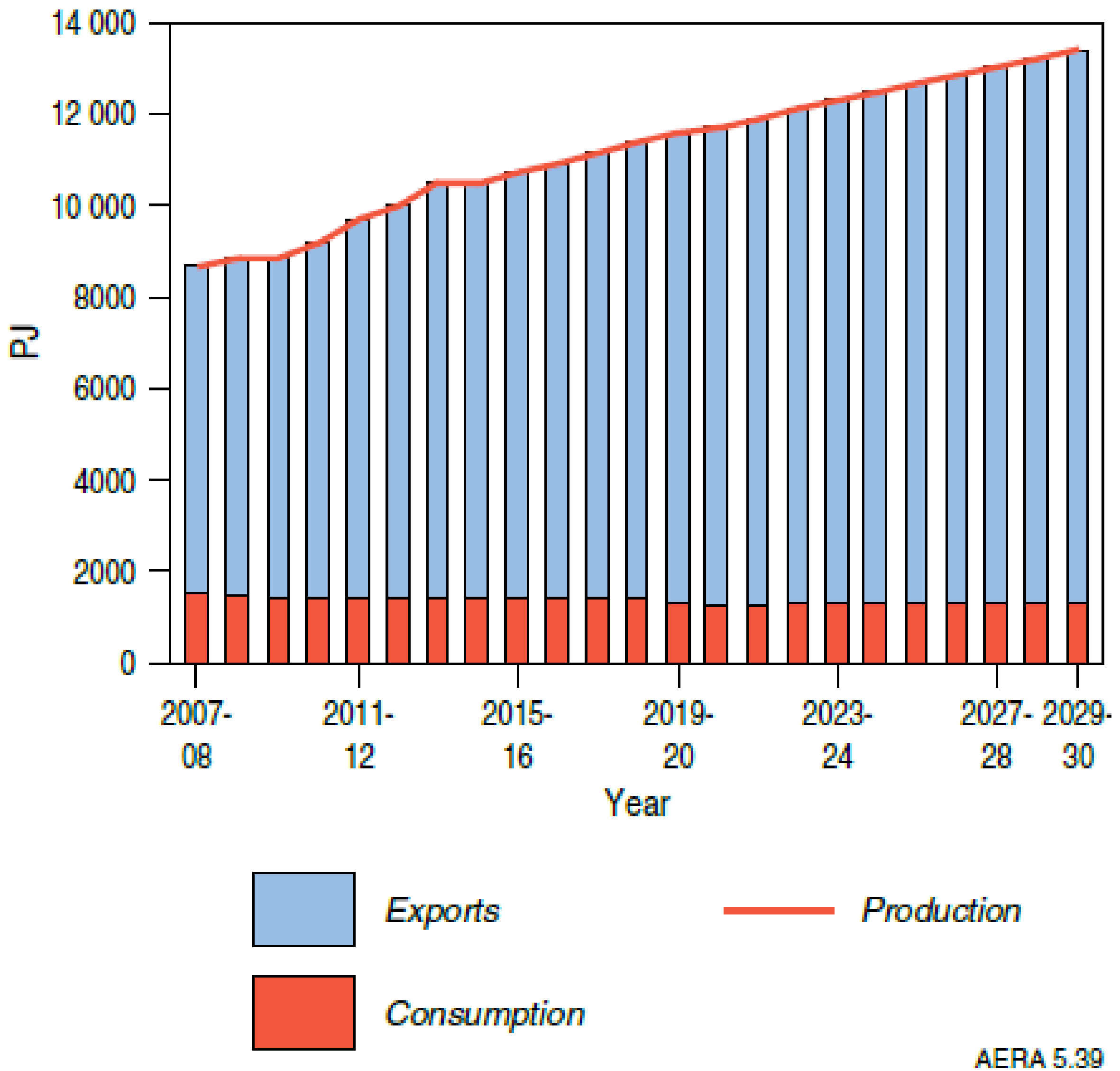


Figure 5.39 Australia's black coal projected supply-demand balance to 2029–30

Source: ABARE 2010

Inequitable Distribution of Revenue from Community Asset

•Mining companies made $67,402 million profit in 2008-09, an increase of $27,218 million from 2007-08.

•Net mining royalties in NSW in 2008-09 were $1,280 million, an increase of $706 million from 2007-08.

•Black coal is NSW's biggest export. In 2008-09, coal exports were worth $12,898 million.

•Coal exports were worth $8,185 million in 2007-08.

•77% of the coal produced in 2008-09 was exported.

•Of the remaining 23%, 21% was used to produce electricity.

•The Hunter coalfield is by far the largest producer of coal. 80.44 Mt of saleable coal was produced in 2007-08 in the Hunter coalfield whereas the next largest production area was the Western coalfield, which produced 22.24 Mt of saleable coal.

Coal production (saleable) and employment in NSW in 2007-08

Coalfield	Production (Mt)	Employment(2008)
Gloucester	1.89	152
Gunnedah	4.03	325
Hunter	80.44	8384
Newcastle	16.11	1984
Southern	10.44	2636
Western	22.24	1865
Total	135.15	15346

Mining & The Economy, e-brief 18, L Montoya, NSW Parliamentary Library Research Service

Sustainable Development Globally Defined

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (World Commission on Environment and Development. *Our Common Future.* 1987)

Sustainable Development defined in NSW

Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) the precautionary principle -namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

(ii) an assessment of the risk-weighted consequences of various options,

(b) inter-generational equity -namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

(c) conservation of biological diversity and ecological integrity -namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,

(d) improved valuation, pricing and incentive mechanisms -namely, that environmental factors should be included in the valuation of assets and services, such as:

(i) polluter pay s-that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Protection of the Environment Administration Act 1991, section 6(1)(a) and (2)

Department of Premier and Cabinet. New South Wales Whole of Government Sustainability Principles. 2006.

4.1 Definition

Sustainability in the NSW public sector means addressing the needs of current and future generations through the integration of social justice, economic prosperity and environmental protection in ways that are transparent, accountable and fiscally responsible.

4.2 Principles

4.2.1 Foundation principles

Inter-generational equity

The quality of life of the current generation of people in NSW does not reduce the capacity of future generations to enjoy a similar quality of life.

Sustainable communities

Human settlements maximise social, economic, environmental and cultural opportunities for all residents.

Economic prosperity

Economic resources (such as land, labour, capital and technology) are used in ways that maximise productivity, minimise pollution and waste, and meets the social needs of all, now and for future generations.

Ecologically sustainable development

Economic, social and natural resources are used in ways that conserve and enhance ecological processes, on which life depends, so that quality of life is improved, now and in the future.

Full pricing

The prices of natural resources are set to at least recover the full social and environmental costs of their extraction, use and where appropriate, restoration.

Bio-diversity

The conservation of biological diversity is a fundamental consideration in all economic and social decision-making and action.

The precautionary principle

Where there are risks of serious or irreversible damage, lack of scientific certainty shall not be used as a reason to postpone cost-effective measures to prevent environmental degradation or reduce social harm.

4.2.2 Process principles

Sustainable practice

All NSW government agencies implement their legislation, policies and programs in ways that meet the needs of current and future generations.

Stewardship

Public sector agencies are responsible for the long-term stewardship of the resources under their control and for accounting publicly for the resource use.

Shared responsibility

NSW government agencies work in partnership with other governments, Local Councils, the private sector, non-government organisations, communities, households and individuals on sustainability issues.

Participation

All people likely to be affected by the decisions of agencies have the opportunity to contribute to the decision-making before the decision is made, and to participate in any review of the decision.

The local-global principle

The sustainability of NSW is not achieved at the expense of other jurisdictions or regions

EXTERNAL COSTS OF COAL – LIFECYCLE ACCOUNTING

Each stage in the life cycle of coal—extraction, transport, processing, and combustion— generate a waste stream and carry's multiple hazards for health and the environment. These costs are external to the coal industry and are thus often considered "externalities."

It is estimated that the life cycle effects of coal and the waste stream generated are costing the U.S. public a third to over one-half of a trillion dollars annually. Many of these so-called externalities are, moreover, cumulative.

Accounting for the damages conservatively doubles to triples the price of electricity from coal per kWh generated, making wind, solar, and other forms of non-fossil fuel power generation, along with investments in efficiency and electricity conservation methods, economically competitive

Paul R. Epstein, Jonathan J. Buonocore, Kevin Eckerle, Michael Hendryx, Benjamin M. Stout III, Richard Heinberg, Richard W. Clapp, Beverly May, Nancy L. Reinhart, Melissa M. Ahern, Samir K. Doshi, and Leslie Glustrom. 17 Feb 2011. Full cost accounting for the life cycle of coal in "Ecological Economics Reviews." Robert Costanza, Karin Limburg & Ida Kubiszewski, Eds. *Ann. N.Y. Acad. Sci*. 1219: 73–98.

EXTERNAL COSTS OF COAL – AUSTRALIAN LIFECYCLE ACCOUNTING

The Australian Coal Industry is highly successful in privatising the profits while socialising the costs of its operation and product such that cost to the community far exceed the return to the community from mining, via royalty and taxation.

External costs include health and environment but NOT the cost of subsidies paid directly or indirectly through local or other programs such as infrastructure provision etc.

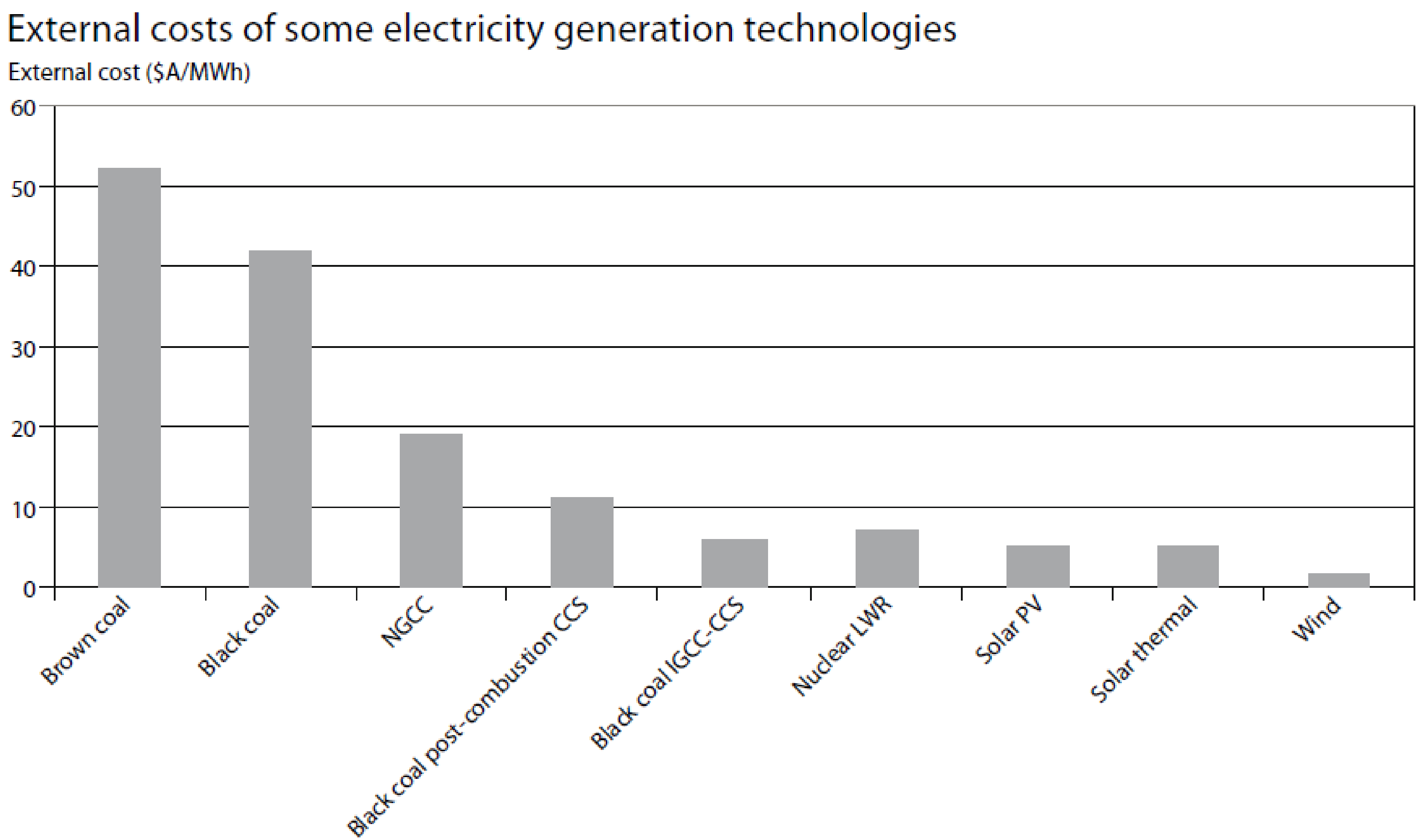
- The aggregate health cost burden in Australia of power station emissions from coal-fired power stations, with the mid-range estimate of $13.2/MWh and an annual coal-fired output of 197TWh, is therefore approximately $2.6 billion.

- The health cost burden[1][2] [3] [4] [5] [6]from coal-fired power stations in NSW for 2007-08 was $947.5 million.

- The total externality cost from coal-fired power stations in NSW for 2007-08 was approximately $3 billion.

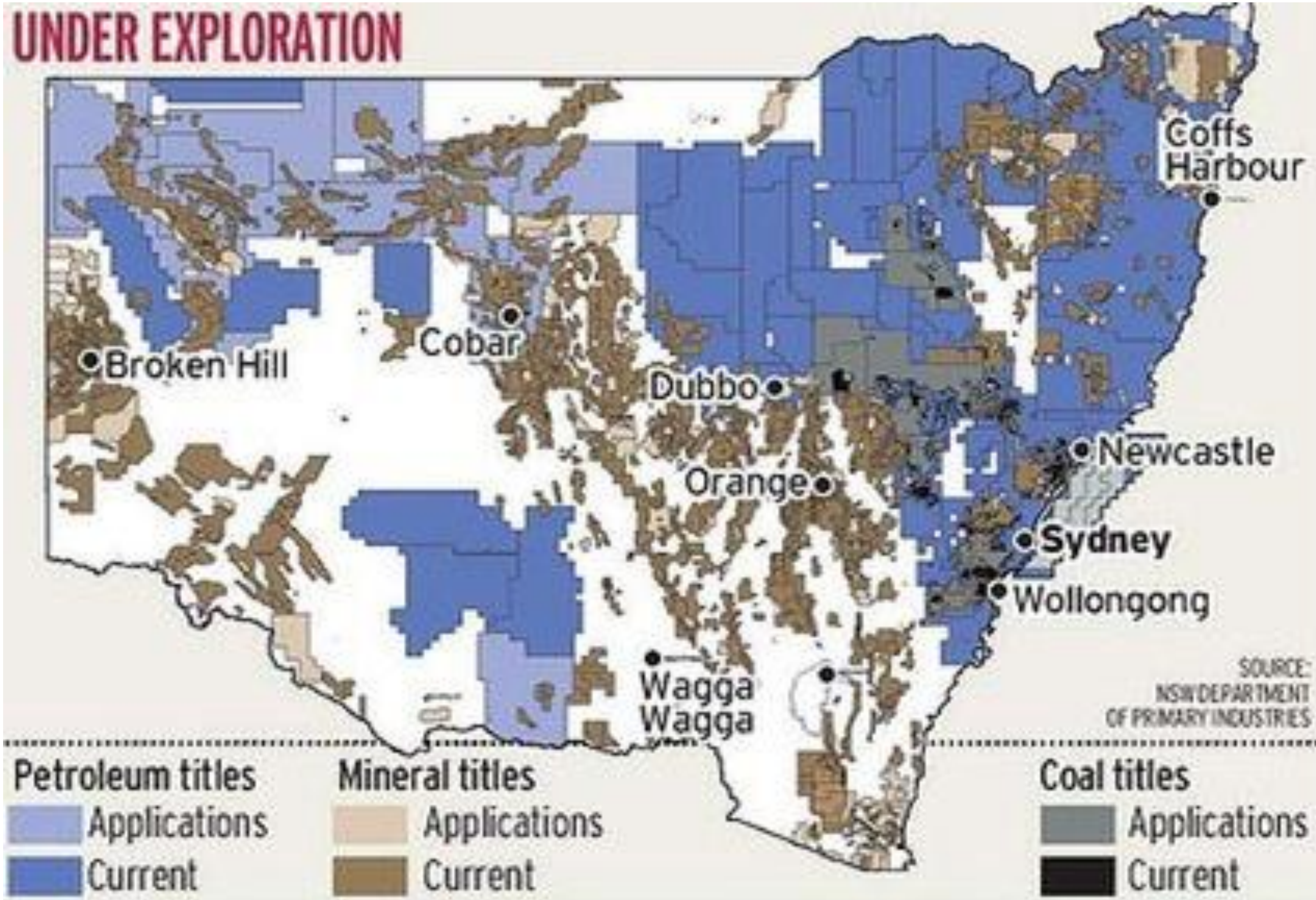
- The total externality cost from coal-fired power stations[7] in Australia for 2007-08 was approximately $8.3 billion.

[1] Hunter high in child asthma, Matthew Kelly Health Reporter, Newcastle Herald, 7 May 2010
[2] Health fears for Lithgow residents amid coal boom, Matthew Benns, SMH, June 6 2010
[3] Coal & Autism Study Link, Matthew Kelly Health Reporter, Newcastle Herald, 12 June 2010
[4] Half state's dust comes from Hunter centres, Matthew Kelly Health Reporter, Newcastle Herald, 28 Sept 2010
[5] Muswellbrook is Hunter's sickest town, Donna Page, Newcastle Herald, 4 Oct 2010
[6] Upper Hunter asthma persists, Michelle Harris, Newcastle Herald, 6 Nov 2010
[7] Death, Disease & Dirty Power - Mortality and Health Damage Due to Air Pollution from Power Plants, Clean Air Task Force, Boston, Oct 2000

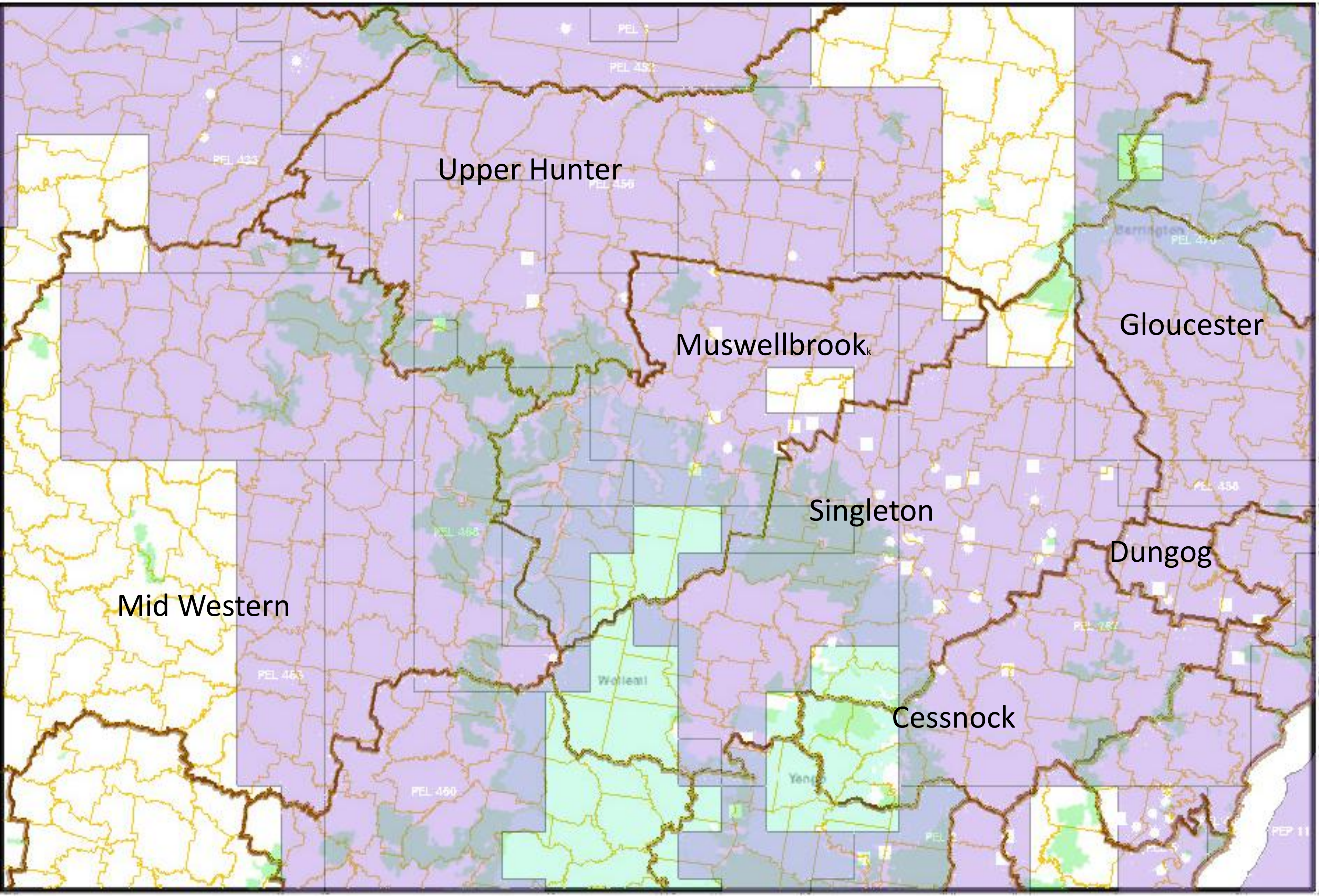


THE HIDDEN COSTS OF ELECTRICITY: Externalities of Power Generation in Australia, The Australian Academy of Technological Sciences and Engineering (ATSE) March 2009

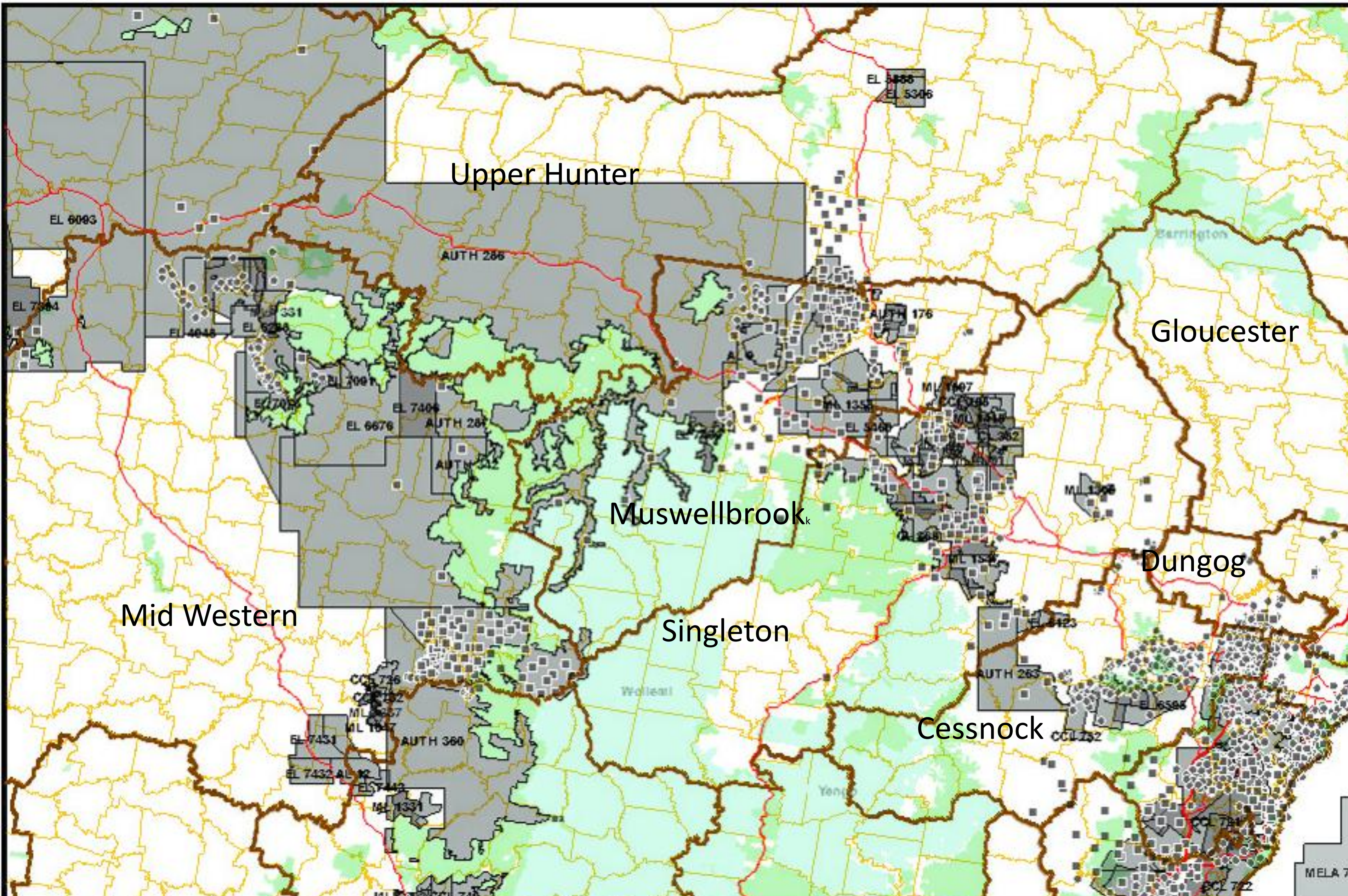
Invisible Poisons From Coal	Health Effects
Arsenic	Cancer, nausea, vomiting, diarrhea, abnormal heart rhythm
Beryllium	Inflammation of lungs, pneumonia, cancer
Boron	Headaches, lethargy, convulsions, children more susceptible to fluid in lungs
Cadmium	Lung scarring, kidney damage, chest pains
Carbon Monoxide	Headache, fatigue, vision problems, heart disease
Chromium 111	Asthma attacks, skin allergy, eczema rashes
Cobalt	Respiratory irritation, possible cancer, kidney and lung damage
Copper	Liver damage, kidney damage, diarrhea, cramps, nausea
Fluoride	Possible cancer, possible birth defects
Lead	Brain damage, kidney damage, dangerous to children
Manganese	Possible cancer or birth defects
Mercury	Chest pain, shortness of breath, fluid in lungs
Nickel	Asthma, blood and kidney disorder, lung cancer
Nitrogen Oxide	Fluid in lungs, can be fatal
Sulphur Dioxide	Burning eyes, headaches, lung damage
Zinc	Cancer, birth defects
Xylenes	Cancer, birth defects
Volatile Organic Compounds	Eye/nose/throat irritation, headache, liver and kidney damage, cancer.


UNDER EXPLORATION
Coffs Harbour
Cobar
Broken Hill
Dubbo
Newcastle
Orange
Sydney
Wollongong
Wagga Wagga
SOURCE: NSW DEPARTMENT OF PRIMARY INDUSTRIES
Petroleum titles
Applications
Current
Mineral titles
Applications
Current
Coal titles
Applications
Current

Petroleum titles in the Upper Hunter (purple) Mbk >80% rateable land mass



<u>Coal Mining titles in the Upper Hunter (grey) Mbk > 50% rateable land mass</u>

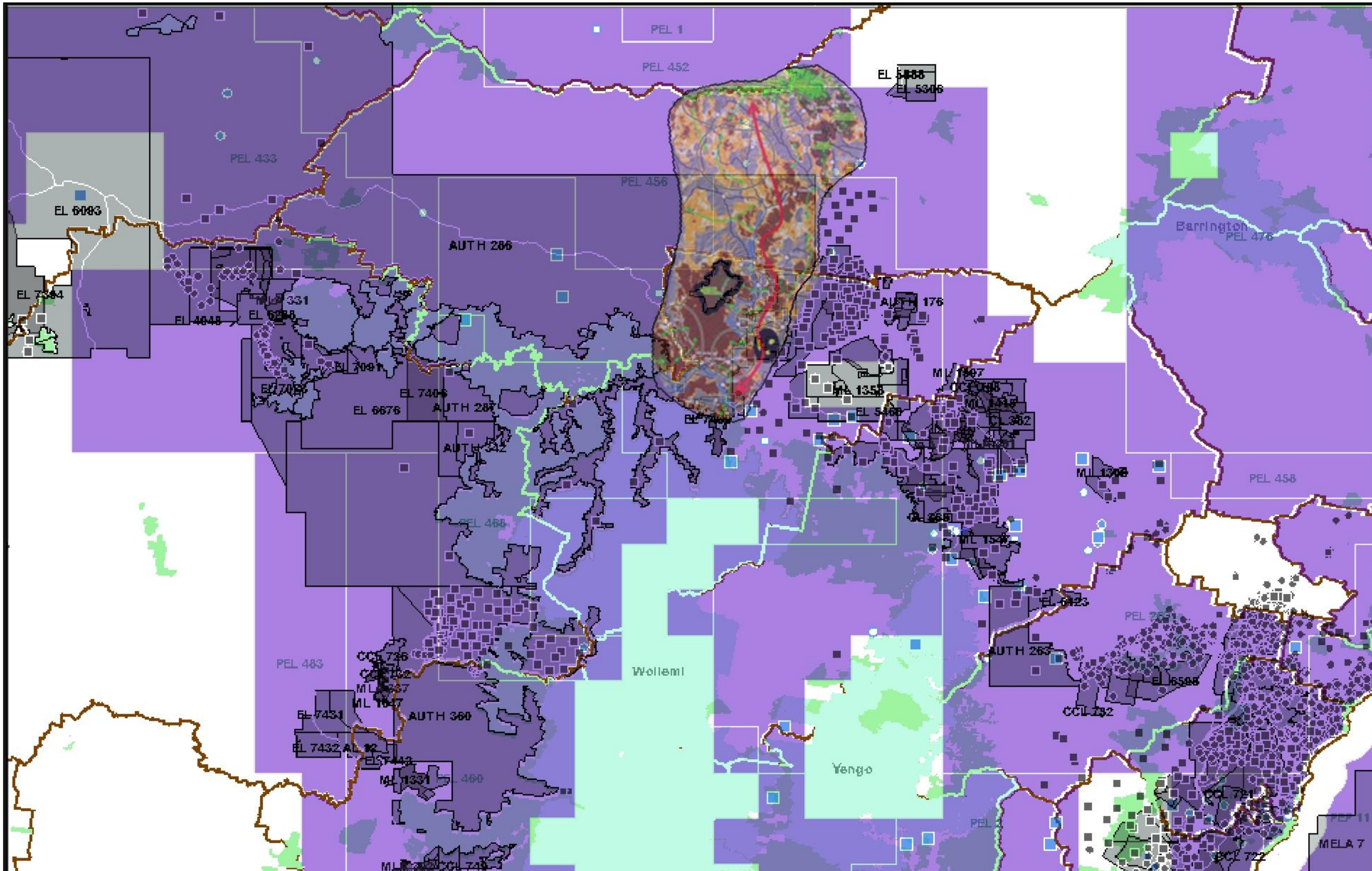


Greater Eastern Ranges Continental Biodiversity Project

The Australian response to Global Warming - defeated by the NSW Governments reckless and wanton allocation of exploration and extraction licences.

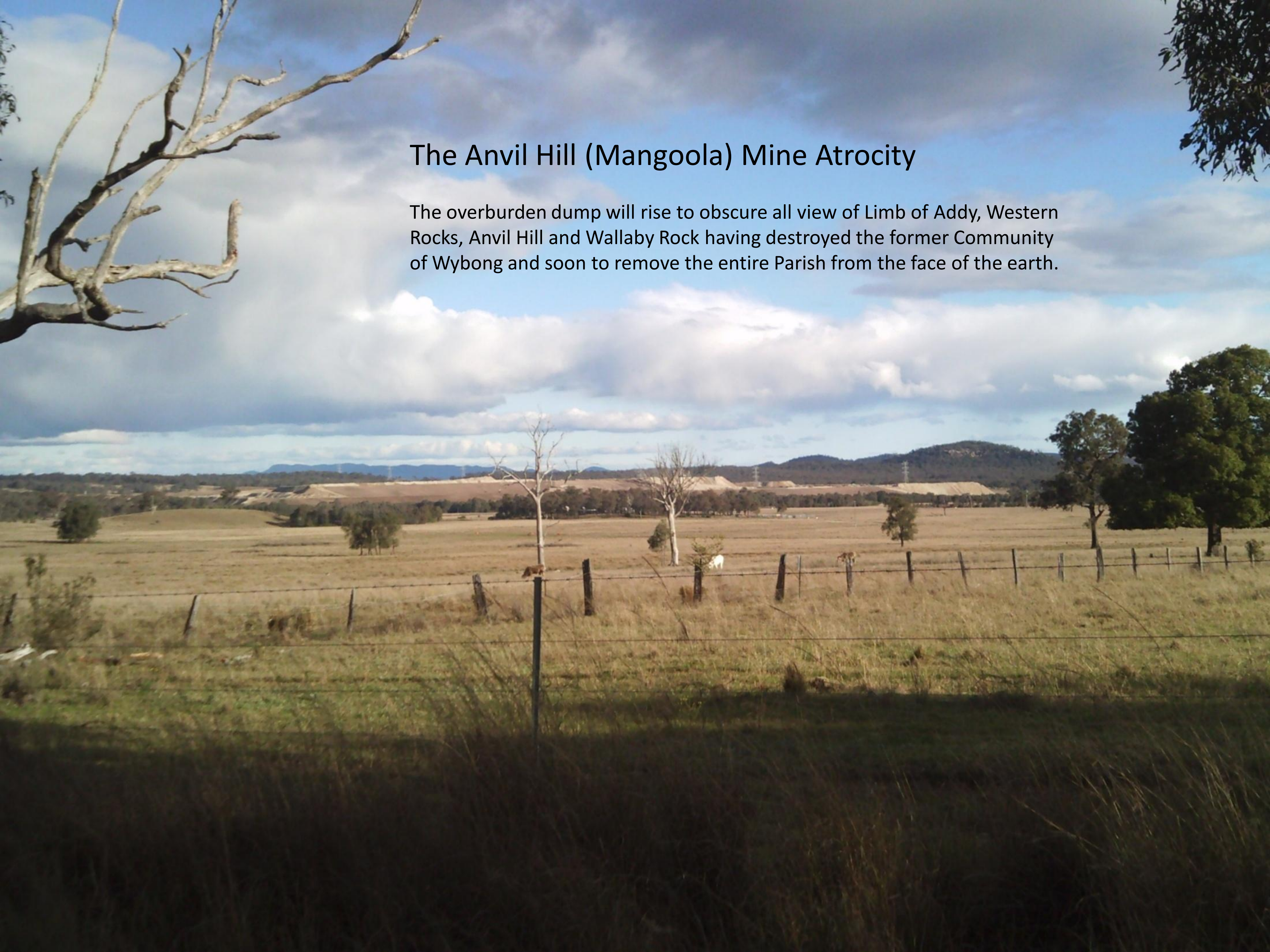
Defying the constitutional requirement for “good government” and replacing it with “Government for the Corporation and Shareholder” at cost of the citizens health.

Greater Eastern Ranges Focus Area in Upper Hunter showing NSW Government issued Coal & Petroleum titles taking precedence over Australia's global commitment



The Anvil Hill (Mangoola) Mine Atrocity

The overburden dump will rise to obscure all view of Limb of Addy, Western Rocks, Anvil Hill and Wallaby Rock having destroyed the former Community of Wybong and soon to remove the entire Parish from the face of the earth.



<u>The Next Coal Crime</u>

Ridgelands ELA 4244 (6 May 2011)

A speculative application in response to a contemptuous tender by disgraced former NSW Minister for Minerals & Energy Ian MacDonald with nil regard whatsoever to good government, the Australian Government Continental Biodiversity Project or Australian International Treaty Obligations.

<u>Port Jackson Fig</u>

- 200 yrs age
- 1 Ha
- Former Reserve 1907-1938

Voluntarily Conserved within old growth biota on private property to date. Placed at risk of destruction by mining.


2011/04/09 15:59


View from the centre of Ridgelands
ELA 4244

Aquifer Connectivity in the Wybong Creek Catchment

Despite the claims of the CSG industry to the absolute discrete and unconnected nature of surface, ground, aquifer and coal seams, inter-connectivity is a common and frequent occurrence.

For example, “The occurrence of saline surface and groundwater in the Wybong Creek catchment [is] attributed to discharge from the regional groundwater system occurring in the Wittingham Coal Measures, with the abrupt increases in salinity at Manobalai indicating mixing between local, intermediate and/or regional groundwater systems.”

Any interference with the coal seams, groundwaters, aquifers and surface waters upstream at Brawboy, Bunnan or Black Springs (by exploration and CSG production) will be detrimental to both water flows and quality within the lower Wybong Creek, Goulburn and Hunter Rivers and adversely affect irrigation, agriculture and RAMSAR wetlands in the Lower Hunter.

(Origins of salinity and salinisation processes in the Wybong Creek Catchment, New South Wales, Australia, March 2010, - A thesis by Julia Jasonsmith, submitted for the degree of Doctor of Philosophy of The Australian National University Research School of Earth Sciences & Fenner School of Environment and Society, pg 'x')

COAL IN ANY FORM IS COSTING US THE EARTH

Globally, fossil fuels currently receive USD $312 billion (2009) in consumption subsidies, versus USD $57 billion (2009) for renewable energy (IEA, 2010g). In Australia the fossil fuel subsidy base is reported to be AUD $12 billion .

Clean Energy Progress Report, IEA, April 2011
Billions spent on fossil fuel incentives, Adam Morton, SMH, 1 March 2011
Australia spending billions more encouraging pollution than cutting it, Climate Spectator, 1 March 2011

Clearly the intention of the Global, NSW and Australian Governments to maintain the economic reliance of the Australian Community on production of electricity from and to dramatically increase the mining and export of Coal and Coal Seam Gas and failure to develop definitive or significant goals for reduction of carbon emissions or adoption of alternative renewable low-carbon emission electricity generation technologies identifies that Australia is not serious in its response to Climate Change.

Recommendations

To avoid catastrophic climate and economic change and adequately manage the transition to a Low Emission, Non-Fossil Fuel and Energy Economy NSW and Australia must:

Industry Policy: Strategic Planning, Coal, CSG, Electricity Generation

1. Immediately commence publicly transparent independent strategic planning to identify and exclude, in perpetuity, areas of potential agriculture, potable water supply, sustainable human habitation or environmental reservation from extractive and eco-human health polluting industry and to identify discrete aquifer systems suitable for dedication to discrete 50 MW base load CSG power generation.
2. Recognise that there is no social, economic or environmental scope for an ongoing increase in coal extraction beyond that currently proposed or planned to commence by 2019 in a global low-emission fuel and energy future.
    1. Institute an immediate moratorium on any further coal exploration or extraction licences or approvals, including coal seam gas exploration licences and,
    2. Independently review and re-determine all existing extraction development proposals permitting right of third party intervention and appeal.
    3. Remove all fossil fuel environmental concessions (eg cease exemptions to land clearing provisions of Native Vegetation Act etc)
3. Recognise that carbon capture and storage is not and will never be commercially viable on any scale capable of satisfying the carbon management challenge of (current or projected increased) base load electricity generation from fossil fuels.
4. Recognise that coal is the amongst the world's most expensive energy sources. Coal is artificially cheap because its production, transport and use is directly subsidised and resources . If priced fully for its embodied health, social, economic and environmental costs then coal quickly becomes one of the world's most expensive energy sources – not the cheapest.
5. Phase out <u>all</u> brown coal-fired power plants by 2013.
6. All new coal extraction and electricity generation projects including any extensions or major alterations of existing projects are fully, publicly evaluated prior to awarding of any subsequent Lease or License to Explore for Extraction or Permit to Emit is granted.
7. All EIS and project evaluations are independently provided by Experts selected by the Energy Projects Committee from a public list maintained by the Planning and Assessment Commission at the recompense to the Solicitor-General of the Lease or License or Permit holder.
8. Reduce coal-fired power generation to 20% of national power generation by 2020. This means not approving any new coal-fired power plants and withdrawing approval for non-commenced but approved coal-fired power plants.
9. Land ownership reverts to Crown on Crown payment or equivalent of original lease fee adjusted for inflation but only following successful rehabilitation of site.
10. Water infrastructure and allocation ownership reverts to Annual Crown Lease (Sovereign) on Crown payment or equivalent for such quality/quantity adjusted for inflation less depreciation but only following successful rehabilitation of site.
11. All aspirating engine emissions including mine site engines and unregistered (off-road) vehicles to be tested annually and/or randomly for emission filtering efficiency and maintained to [specification].

Economic Policy: Taxes & Subsidies

1.Eliminate all fossil fuel subsidies so that by 2020 fossil fuels carry the full and complete costs of extraction, conversion, transport, use, waste disposal, health impact and environmental opportunity cost and remediation.
2.Redirect removed fossil fuel subsidies to promote uptake and growth in low emission technologies particularly in architecture (building & construction), transport, energy, information, non-fossil fuels, stored and distributed energy.
3.Apply Carbon Taxation (in reference to energy and fuels) in increasing degree - from ‘zero rated Conventional Natural Gas’ calorific or emission/eco-human health impact equivalent renewable, low emission, non-fossil fuel, to ‘Black Coal equivalent’ [Oil, Coal or Coal Seam Gas] power generation.
4.World Parity Price (Carbon Tax Exports) to any economic destinations that do not have an equivalent quantum Carbon Tax payable on import.
5.Apply benefits of Taxations and Royalty, Sovereign Fund to transition and social adjustment costs of coal phase out.
6.Mandate a State ‘*Coal Licence* Royalty’ system components to reflect the social contract and ensure sufficient income particularly from ‘super prices’ > 39.9% above historical long term industry average, currently being received by largely foreign recipients, is partly transferred to fund a Sovereign ‘Transition Fund’ to invest in low emission, renewable, non-fossil fuels and power generation adoption and research.
7.Mandate Export Quality and adjust the State ‘*Ad Velorum* Coal Royalty’ system components to a calorific or emission/eco-human health impact equivalent system so that markets for lesser GHG efficient products are displaced and in doing so mandate non-removal of waste coal tonnage from *ad velorum* Royalty and domestic Electricity Generation to use only specified low GHG, low eco-human health impact emitting coal.
8.Commercialise state based energy extraction, power generation and distribution systems as components of a regulated National Energy System with mandated and ongoing transmission, emission and generation technologies efficiency, research and improvements.

Health Policy

1.Legislate NSW Air Quality Standards to incorporate mandatory PM 2.5 air quality targets with independent state wide and regional monitoring and internet reporting commencing 2013.
2.Continue with State Health Coal Mining Areas Comparative Population Health Studies and corrective regional health improvement programs with 25% mandated contribution at the recompense to the Solicitor-General of the Coal Industry.
3.Provision of rainwater tank filtering/water treatment and metering to all such (stock or domestic consumption) water supply within PM2.5 [monthly average 4g/m^2] dust deposition footprint of any mine or group of mines at Coal Industry recompense.
4.Provision of air quality/air treatment and metering to all such occupied domestic residences within PM2.5 [monthly average 4g/m^2] dust deposition footprint of any mine or group of mines at Coal Industry recompense.
5.Covering or product treatment to eliminate all transport and storage coal dust emissions.

Transport & Taxation Policy

1.Employ low emission, low-carbon, renewable, non-fossil fuel energy technologies for urban, intra- and inter- urban transit systems.

   1.Conversion of diesel product and national distribution system to nationally produced 100% bio-diesel equivalent by 2030
   2.Conversion of motor vehicle fleet, product and national distribution systems to 10%, 85% & 100% ethanol by 2020
   3.Complete National Gas Grid for transfer of NW LNG/CNG by 2019
   4.Tender for National 'Special Oil Products' refineries (2): Sth Qld, WA

Agriculture, Environment, Air, Water

1.Recognise that there is a growing justifiable, economic, environmental and social imperative for sustainable, on-going, low emission increases in GM-organism-free cropping and agriculture, efficiency, output and security of supply in a global environment impacted by climate change.
2.Rebate all taxpayers private investment into domestic and commercial renewable energy generation, storage and distributed grid connected projects, including water conservation projects to a maximum of $10,000 indexed per residential premises per annum (and $50,000 agricultural/industry operation pa)
3.Requirement for Aquifer Interference Approvals under the Water Act 2007 for any commercial or industrial activity that will impact on groundwater.
4.Prohibit use of The Hydraulic Fracturing Process for CSG extraction.
5.Immediate commencement of Carbon Farming Initiatives including Conservation and Regeneration Agreements.

Specifically in the Upper Hunter, Wybong Creek & Goulburn River catchments:

1. Immediate moratorium on all coal and coal seam gas exploration and extraction activities.
2. Immediate transfer of all Crown Lands adjoining or in the near vicinity of Manobalai Nature Reserve for inclusion in an (expanded Nature Reserve or similar Statutory Reserve) extension to the Greater Eastern Ranges Initiative in the Upper Hunter.
3. Priority funding of Greater Eastern Ranges Initiative priority programs in the Upper Hunter.
4. Additional planning/environment compliance officers to be based at Muswellbrook and Jerrys Plains and expansion of operational hours to include weekend and after hours investigation.
5. Disputation over matters of air, water or noise compliance in Mining and Power Generation Emission areas subject to reporting by planning/environment compliance officers to be resolved by independent monitoring committee at the recompense to the Solicitor-General of the Coal Industry.
6. Immediate commencement to progressive mining rehabilitation enforcement including collection and propagation of local species and variants with emphasis on Threatened Species Conservation Act (NSW) and EPBC Act (Qwlth) listed species and habitats, and control of weeds and introduced species.
7. Process of Public Transparency to involve determinations of all coal and coal seam gas proposals.

NSW Legislation:

Wholesale review of the Mining Act 1992 and Petroleum Act 1992 to include:

1 Landholder veto over coal, coal seam gas and extractive industry exploration and mining access (per legislation existing in other Australian jurisdictions)
2 Removal of sole power to issue exploration licences and mining applications from the Minister for Minerals and Energy without involvement and evaluation of the proposed lease area by other interested government departments eg NOW, O&H etc, Statutory Authorities eg CMA's, LHPA, Councils and LGA residents.
3 Realistic setbacks from homes, communities, other industries, watercourses, aquifers etc
4 State Taxation of resource revenues at full cost recovery and full resource rental
5 Removal of defacto exemptions from all other Acts eg Native Vegetation, Water Act etc
6 Imposition of realistic and proportionate sanctions, including forfeiture of licences to operate for breaches of consent conditions
7 Full recognition of LEP's such that Community LEP's and REP's instruct development
8 Full Recognition of the citizen as the primary stakeholder
9 Full Recognition & empowerment of CCC's to inform and seek instruction from affected citizens and to commence proceedings for breach of consents where Government Departments fail to act.

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