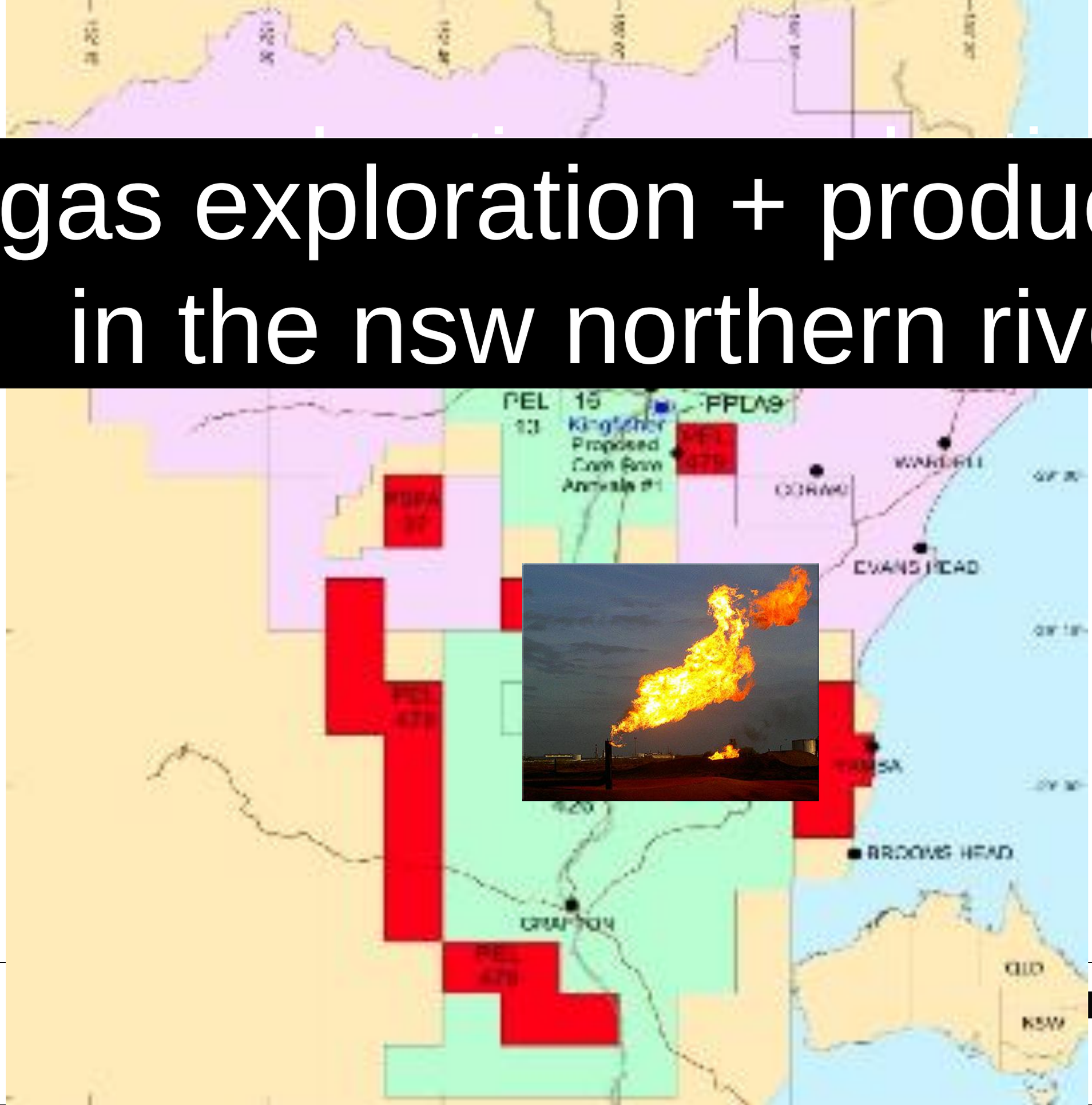
gas exploration + production in the nsw northern rivers



rn rivers

about the EDO

"To promote the public interest and improve environmental outcomes through the informed use of the law"

Legal advice and litigation

Policy and law reform

Community education

Scientific assessment and advice

tonight

- what's happening in this area
- what might the environmental impacts be
- what the law says

ecologically sustainable development

- ‘…development that meets the needs of present generations while not compromising the needs of future generations to meet their needs.’

- the precautionary principle
- inter-generational equity
- conservation of biological diversity
- improved valuation, pricing and incentive mechanisms (“polluter pays”)

the precautionary principle

- “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

Primum non plus nocere

cumulative impacts

- individual project proposals should be considered in context of environmental impacts of similar past, current and likely future projects
- recognised in case law as a “public interest” matter to be considered in determining development applicaitons in the EPA Act

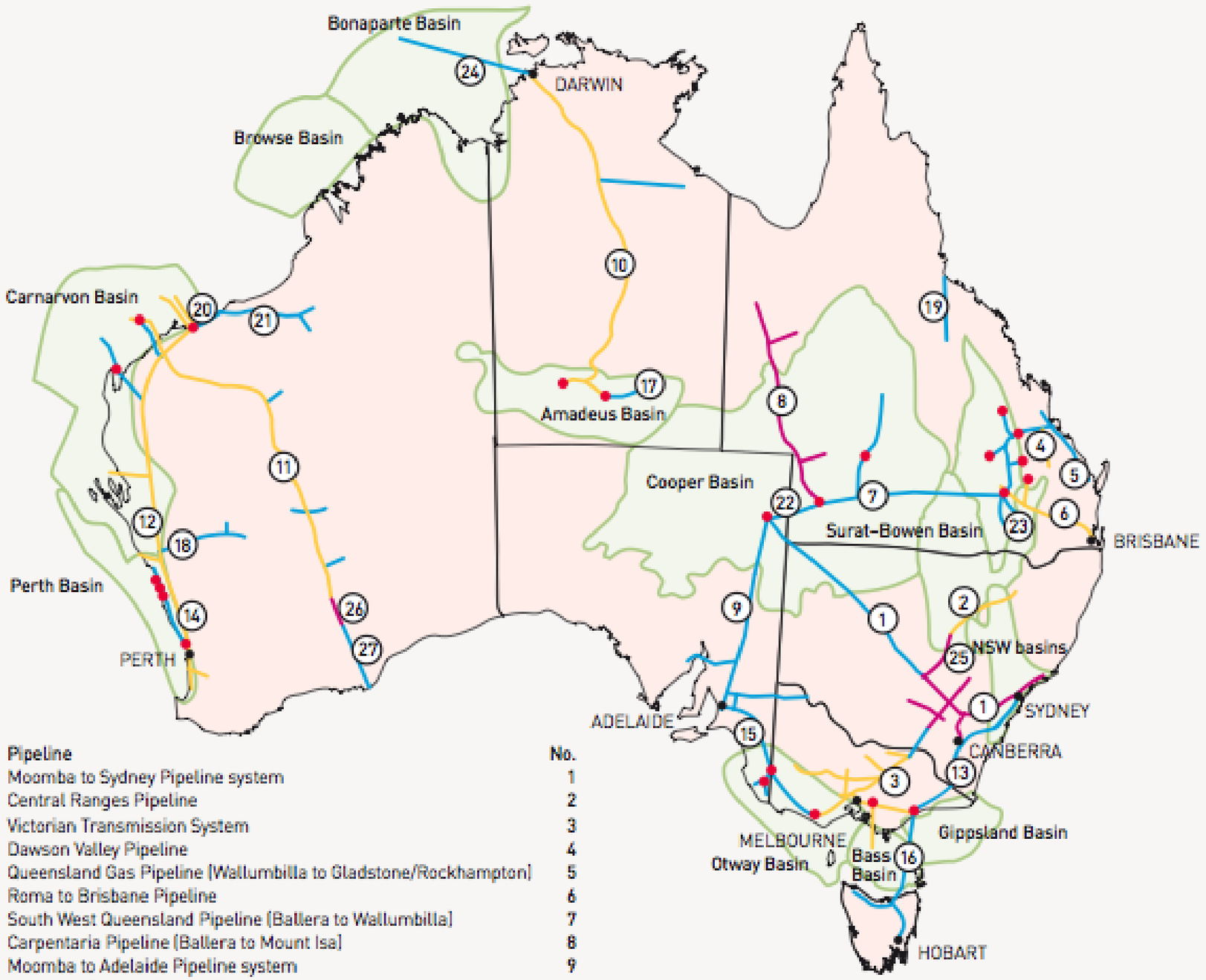
techie stuff

- coal seam gas + natural gas both mostly methane, CH4
- reserves
  - 1P = possible (P10)
  - 2P = probable (P50)
  - 3P = proven (P90)
- energy units
  - 1 petajoule (PJ) = 10 to power of 15 joules = 2.8 megawatt hours

1 what’s happening?

Figure 3.1

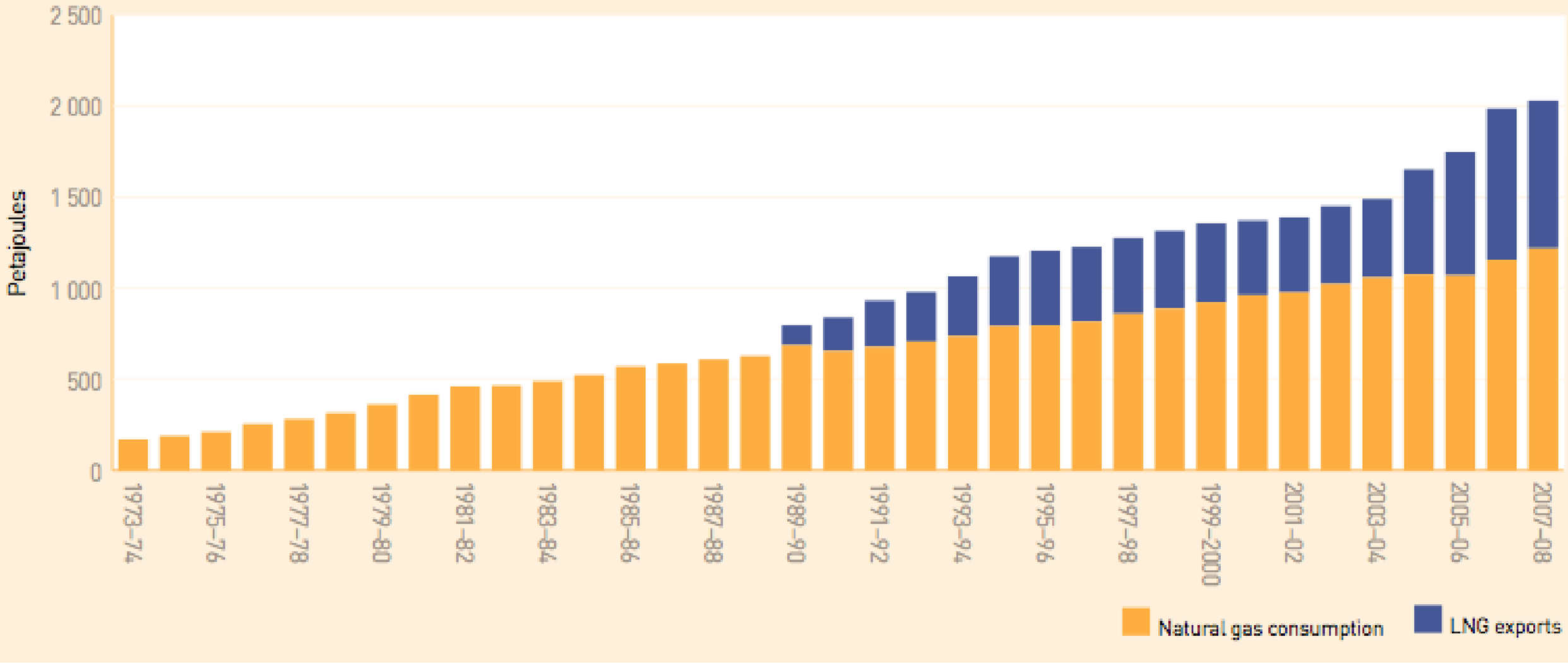
Australian gas basins and transmission pipelines



Pipeline	No.
Moomba to Sydney Pipeline system	1
Central Ranges Pipeline	2
Victorian Transmission System	3
Dawson Valley Pipeline	4
Queensland Gas Pipeline (Wallumbilla to Gladstone/Rockhampton)	5
Roma to Brisbane Pipeline	6
South West Queensland Pipeline (Ballera to Wallumbilla)	7
Carpentaria Pipeline (Ballera to Mount Isa)	8
Moomba to Adelaide Pipeline system	9
Amadeus Basin to Darwin Pipeline	10
Goldfields Gas Pipeline	11
Dampier to Bunbury Natural Gas Pipeline	12
Eastern Gas Pipeline (Longford to Horsley Park)	13
Parmelia Pipeline	14
SEA Gas Pipeline	15
Tasmanian Gas Pipeline	16
Palm Valley to Alice Springs Pipeline	17
Midwest Pipeline	18
North Queensland Gas Pipeline	19

Figure E.1

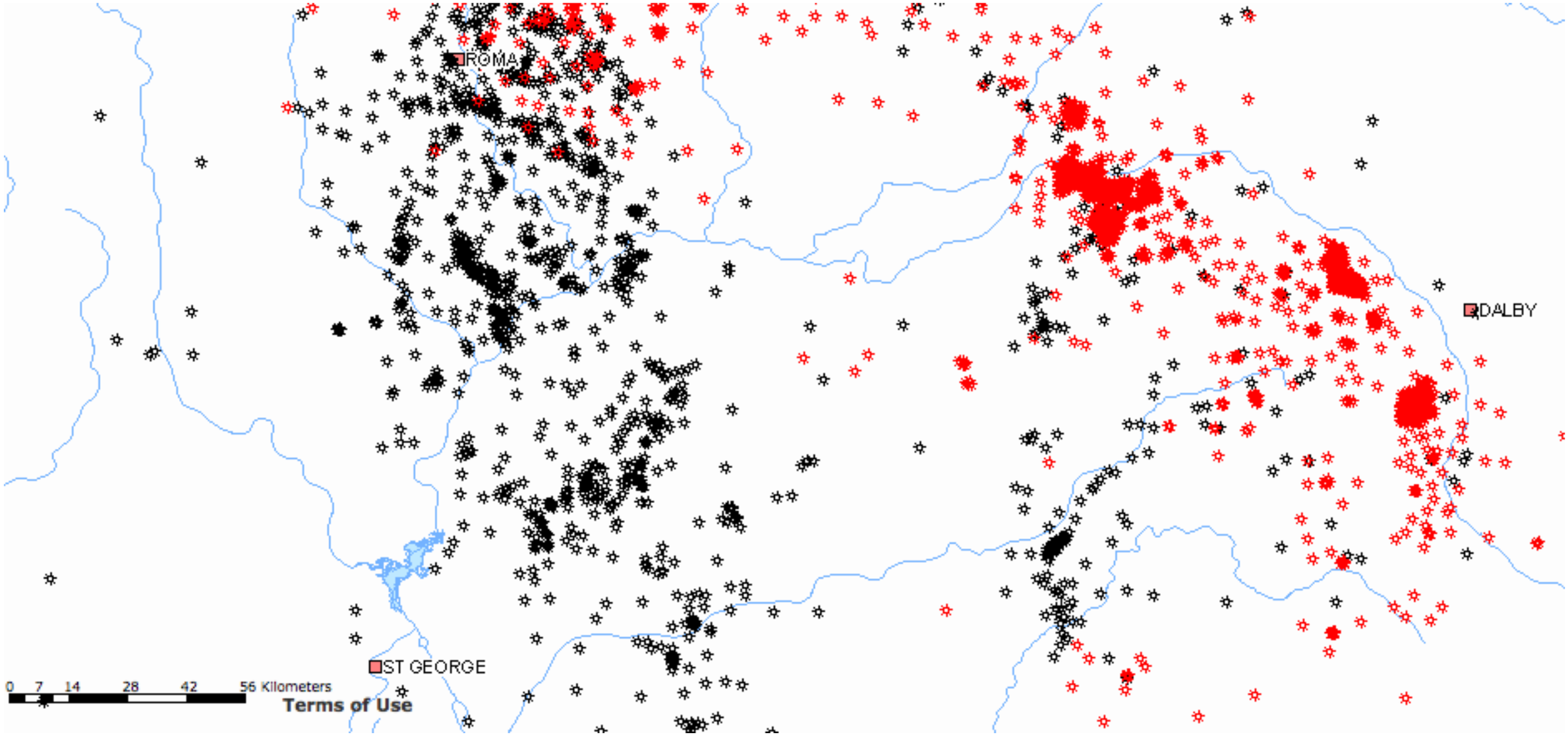
Australian natural gas production

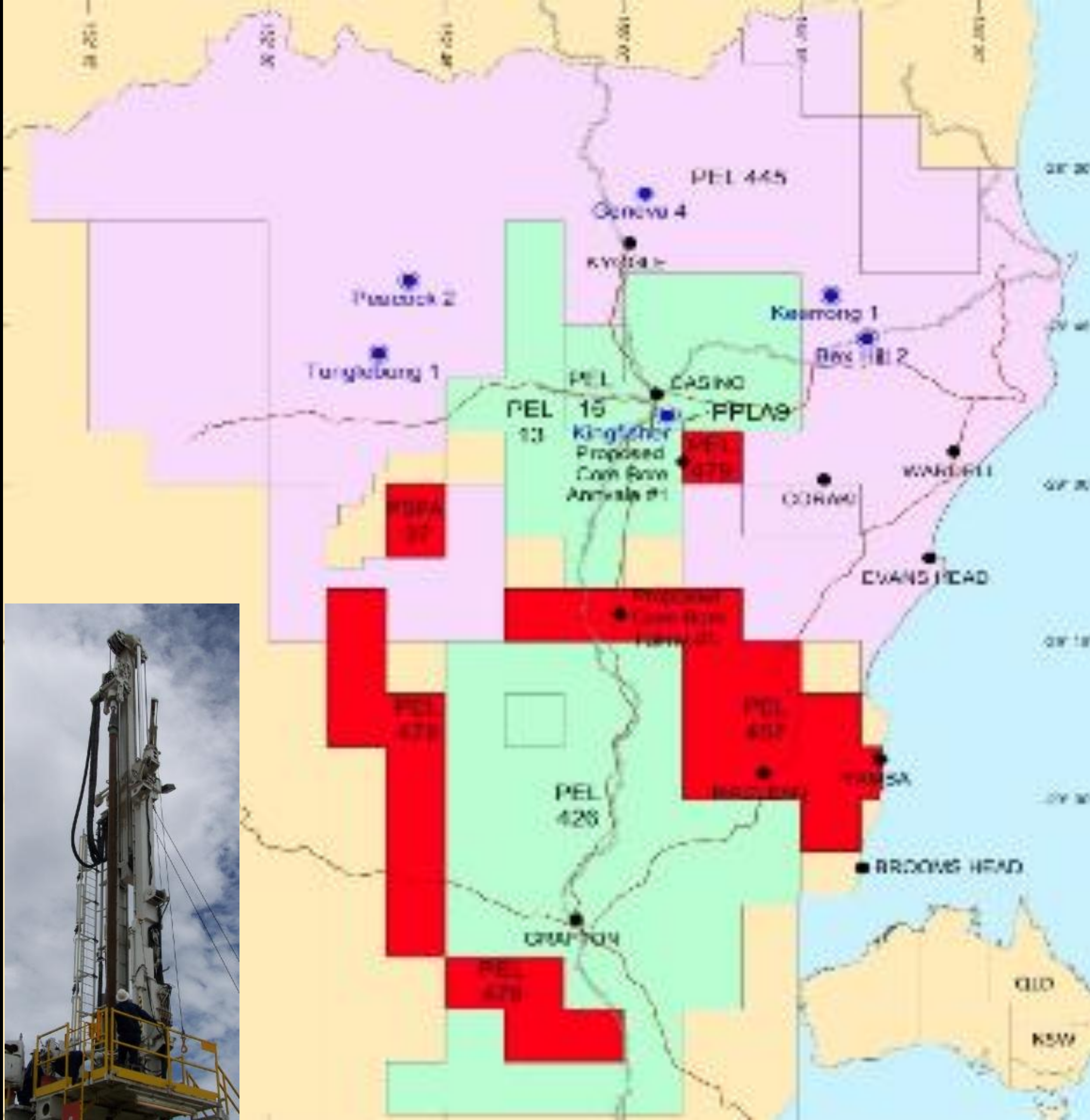


Sedimentary Basin

Petroleum exploration or development well

wells in southern Qld





PEL 445
Peacock 2
Tunglebung 1
CASINO
PEL 16
PEL 13
PPLA9
Kingfisher
EVANS HEAD
WARDELL
PEL 426
BROOMS HEAD
GRAFTON
QLD
NSW

Queensland
New South Wales
GOONDIWINDI
MOREE
INVERELL
PEL 477
New England Fold Belt
GUNNEDAH
COFFS HARBOUR
PORT MACQUARIE
Surat Basin
PEL 476
Sydney Basin
NEWCASTLE
SYDNEY
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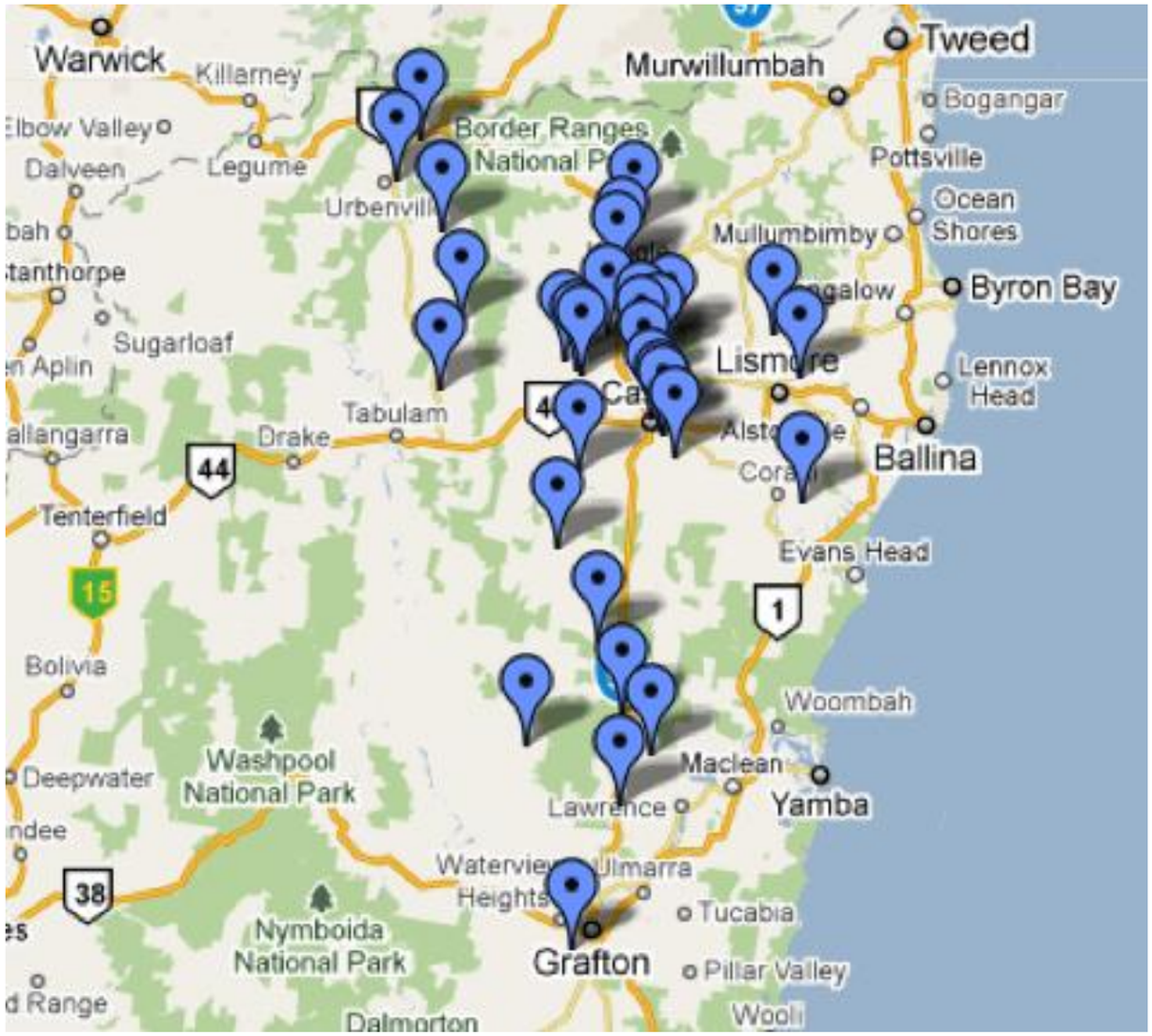
0 20 40 80 120 160
Kilometers

google map



Coal seam gas wells in the Clarence Moreton Basin 2005-10

what can you do with gas?

- town gas
- electricity production
- liquification (LNG)

“To capture value from our exploration activities, Metgasco is now exploring a number of commercialisation options. These include delivering gas to local customers, developing local gas fired power generation, the delivery of gas to customers to south east Queensland and the production of LNG. Both mini-LNG for transport and industrial customers and large scale export LNG projects are on our commercialisation agenda.”

current + planned activity

- exploration
  - Metgasco - ~ 25 wells
  - Arrow - ~ 7 wells
  - Red Sky - 2 wells
- production - Metgasco only
  - Richmond Valley Power Station (30 MW) including up to 45 wells over 7-12 years + up to 12 ha of evaporation ponds
  - Lions Way pipeline (Casino-Ipswich)
- future plans - Metgasco (media reports only)
  - 200 MW power station from natural gas deposit under Casino?
  - pipelines to Gladstone or NSW north coast for offshore processing?

richmond valley power station

environmental concerns

- Potential contamination of groundwater from drilling fluids + fracking chemcials
- Disposal of produced water including salt, naturally occuring heavy metals, + drilling + fracking chemicals
- Long term disposal of drilling + fracking chemicals
- Effects of floods on evaporation ponds
- Greenhouse impacts of burning fossil fuels
- Air pollution - release of methane to atmosphere

other concerns

- Lack of prior notification to neighbours
- Misinformation about rights
- Affects on property values
- Truck movements on narrow country roads
- Aesthetics

what happens next?

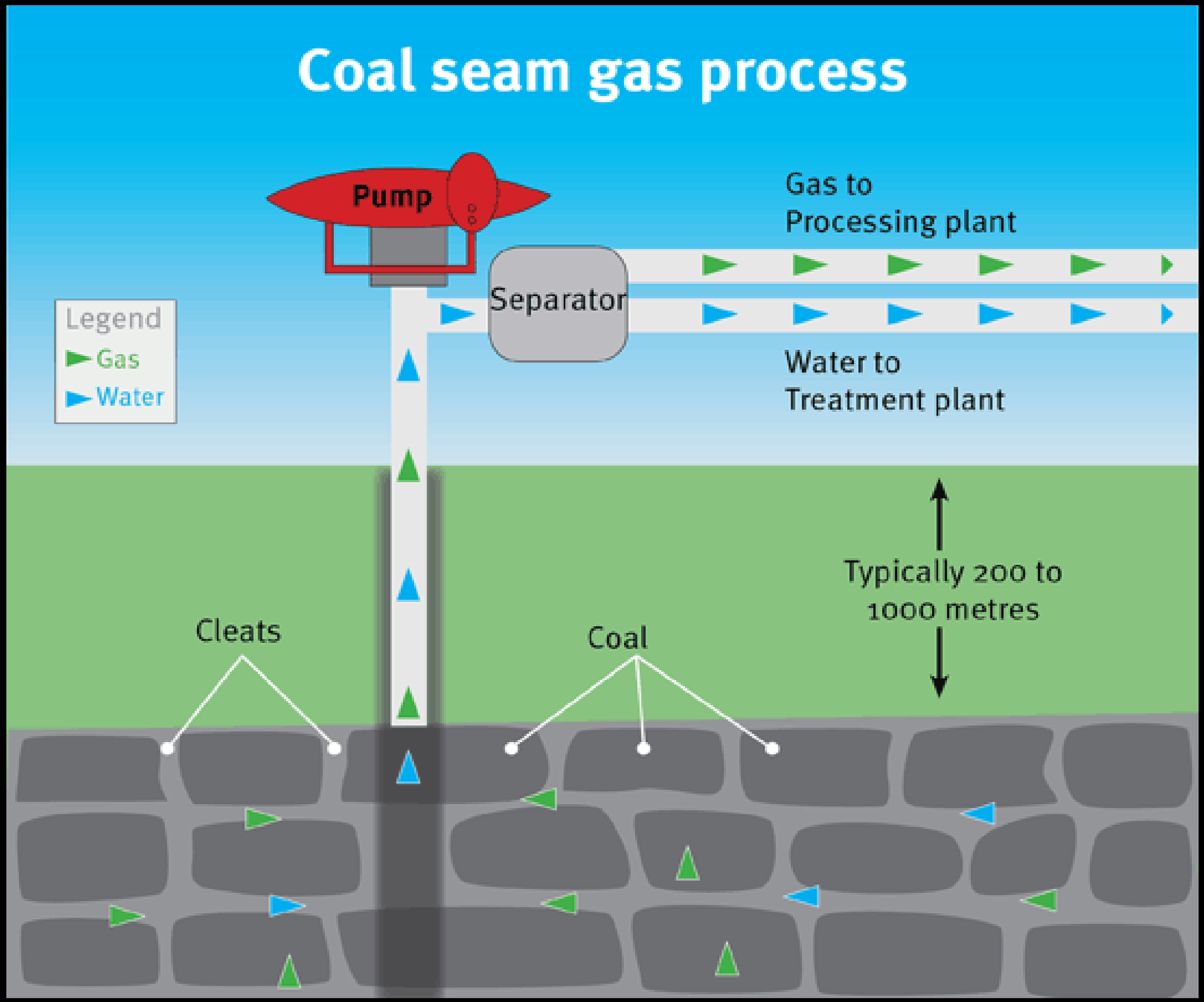
- RVC development consent for Metgasco storage pond at Woodview quarry?
- exhibition of environmental assessment (EA) for Metgasco Lions Way pipeline?
- more exploration licences?
- more applications for production leases?
- new NSW government in March?
- DoP seeking input on new NSW coal + gas strategy by 15 April

2 what about the environmental impacts?

stages of exploration

- locating coal seams
  - seismic surveys and drilling (weeks)
- does coal seam have accessible gas?
  - drilling exploration bores (weeks)
- testing economic viability
  - pilot testing (months – a year) of gas production

Coal seam gas process



water extraction

- often very large volumes
- potential to affect surface and groundwater availability in connected systems
  - waterways
  - bores
  - water-dependent ecosystems
- cumulative impacts?

produced water

- variable quality
- saline
  - Walloon Coal Measures
    - 3000-6000 µS/cm Metgasco Casino
    - 50-31,000 µS/cm more broadly
  - ANZECC water quality guidelines 125-2200 µS/cm
- Could be alkaline or acidic
- potentially high levels of other elements
  - magnesium, sodium, calcium, trace metals

what to do with produced water?

- discharge into waterways
  - water quality issues
- evaporation ponds
  - potential for leakage
  - legacy in soils
- treat and discharge
  - residual brine (useful product?)
- reinjection
  - could change aquifer characteristics

pressure changes

- reduction in pressure in the coal seam could cause:
  - pressure changes in adjacent aquifers
    - water availability (surface and groundwater)
    - water quality
  - subsidence
- some impacts may take decades to centuries to reverse

Roughly 200 tanker trucks deliver water for the fracturing process.

A pumper truck injects a mix of sand, water and chemicals into the well.

Natural gas flows out of well.

Recovered water is stored in open pits, then taken to a treatment plant.

Storage tanks

Natural gas is piped to market.

Pit

0 Feet

Water table

Well

1,000

2,000

3,000

4,000

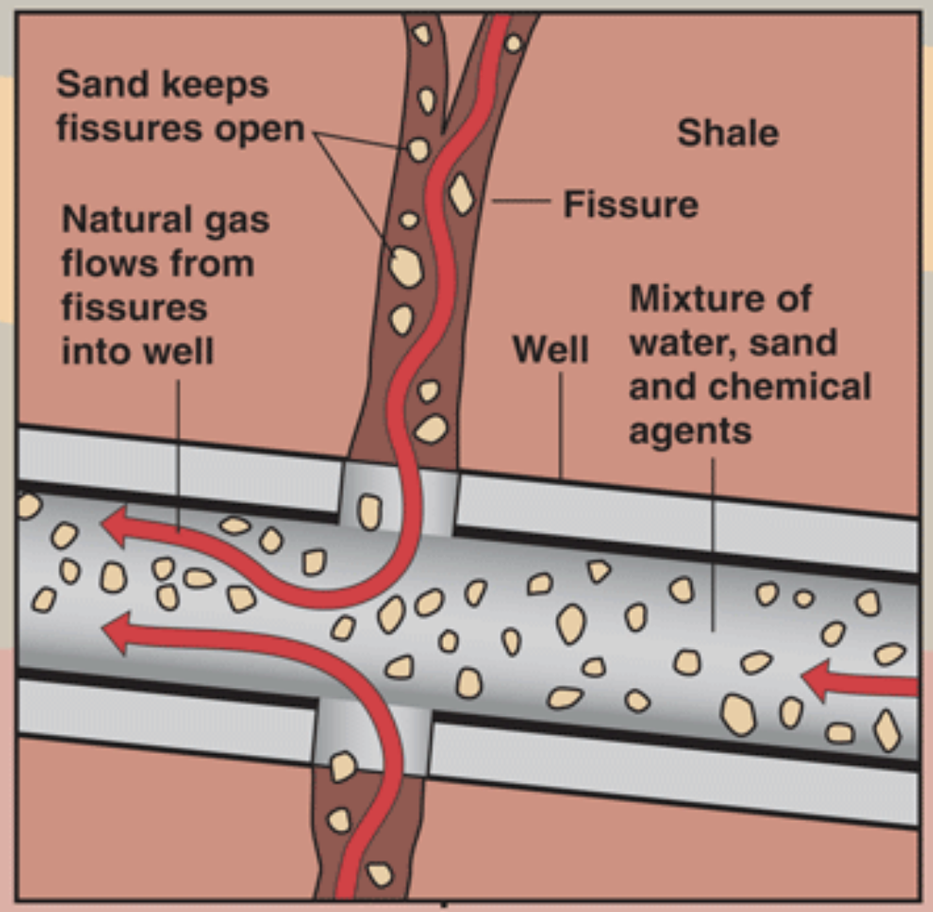
5,000

6,000

7,000

Hydraulic Fracturing

Hydraulic fracturing, or "fracing," involves the injection of more than a million gallons of water, sand and chemicals at high pressure down and across into horizontally drilled wells as far as 10,000 feet below the surface. The pressurized mixture causes the rock layer, in this case the Marcellus Shale, to crack. These fissures are held open by the sand particles so that natural gas from the shale can flow up the well.



Well turns horizontal

Marcellus Shale

Fissures

The shale is fractured by the pressure inside the well.

hydraulic fracturing or “fracking”

- potentially creating new connections between aquifers
  - water quality
  - water availability
  - more produced water
- introducing a range of chemicals

fracking chemicals – Metgasco Kingfisher well

Nitrogen 70%

BE-7 bactericide

BE-6 preventative bactericide

WG-11 – HPG gelling agent

SP Breaker and CAT-3

BC-140 gel crosslinker

HC-2A foaming agent

Gelsta-L - neutraliser

acetic acid and caustic solution

Gasperm 1100 – surfactant

KCl – clay control additive

HAI-150E acid inhibitor

HCl

FE-2 iron chelator

ceramic beads embedded w radionuclides

fracking chemicals - storage

- Kingfisher E01 well will have a maximum of 111 300L of fracking fluid to store post-fracking
- stored temporarily in lined pit at well site
- transferred for storage in existing offsite lined evaporation pond (Woodview quarry?)

what about BTEX?

benzene, toluene, ethylene, xylene

- Qld: BTEX found in 8 fracked exploration wells (Australia Pacific); benzene in 3 samples (Arrow) in fracked wells
- BTEX does occur naturally
- can be liberated during coal seam gas extraction
- BTEX has been used in CSG in the US – now voluntarily discontinued; banned in Qld

recommendations

- apply precautionary principle
- understand cumulative impacts at a regional level
- baseline assessment of surface + groundwater systems to benchmark ongoing monitoring
- license water extraction
- strict water quality requirements

3 what are my rights?

petroleum law basics

- all petroleum (hydrocarbons) on or below surface of land are property of Crown
- regulated by NSW Petroleum (Onshore Act) 1991, administered by DII + Minister for Primary Industries
- also subject to NSW EPA Act, C'th EPBC Act + other environmental legislation
- royalties payable to Crown in most cases

types of titles

- exploration licences
  - up to 140 blocks + 6 years, may be renewed
- assessment leases
  - only used where licencee not ready to produce
- production leases
  - up to 4 blocks + 21 years
- low impact prospecting titles
  - under C’th Native Title Act

exploration

- granting of exploration permit subject to Review of Environmental Factors (REF)
- SEPP (Mining, Petroleum Production + Extractive Industries) 2007 says permissable without consent
- thus local environmental plans (LEPs) don’t apply to exploration licences
- but compliance required with REF including neighbour notifications, monitoring + site rehabilitation

production

- development consent (where required) under EPA Act must be obtained before production lease can be granted
- Minister for Planning is consent authority for Part 3A major projects
- local council is consent authority for Part 4 projects
- both involve public exhibitions of environmental assessments
- more appeal rights for Part 4 projects that are designated development

environmental protection

- before deciding to grant a licence or lease, the relevant Minister must take into account “the need to protect the flora, fauna” etc on the land
- Review of Environmental Factors (REF) usually required under Part 5 of the EPA Act if development consent not required
- rehabilitation of site usually required (as specified in REF or consent)
- DII monitors compliance with conditions of licence or lease, may make orders for remediation etc

landholder rights

- licence holder has no obligation to inform landholders of exploration licence application
- licence holder must attempt to negotiate access arrangement with landholder; otherwise determined by arbitrator or L+E Court
- compensation for access payable to landholder
- no mining on cultivated land without consent
- no exploration or mining within 20 metres of house, 50 metres of garden/orchard or on improved land without consent

“tough new rules”

- announced by NSW Govt in Dec 2010, but not clear if legislation will be altered
- Dept of Planning + DECCW to review workplans + REFs including fraccing chemicals
- information to be provided to councils + landowners (but not water authorities?)
- banning of BTEX to be “examined”

what else could be done?

- more information to affected landholders
- public exhibition of licence + lease applications
- banning of BTEX
- risk assessment of all drilling + fracking chemicals by NICNAS
- independent monitoring of ground + surface water
- licencing of water extraction