Submission to Parliamentary Inquiry Unconventional Gas in Victoria

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Submission basis

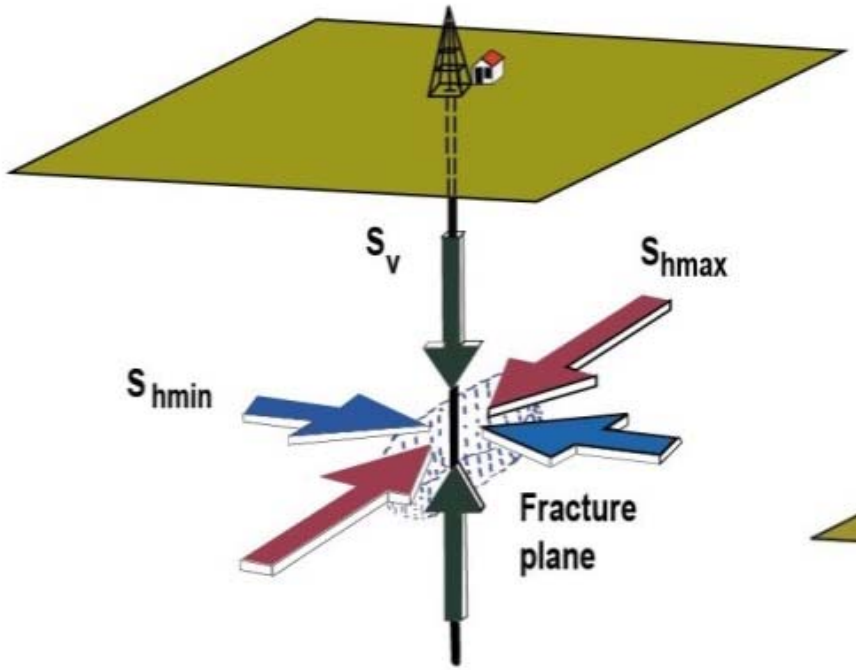
Submission addresses TOR:

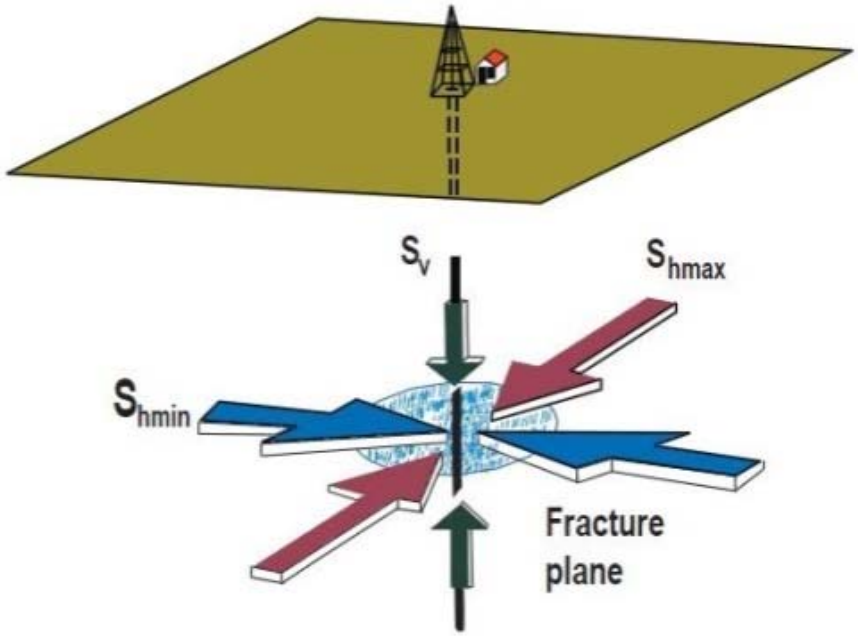
1. Item 2: The environmental, land productivity and public health risks, risk mitigations and residual risks of onshore unconventional gas activities
2. Item 3: The coexistence of onshore unconventional gas activities with existing land and water uses

Supported by the following papers:

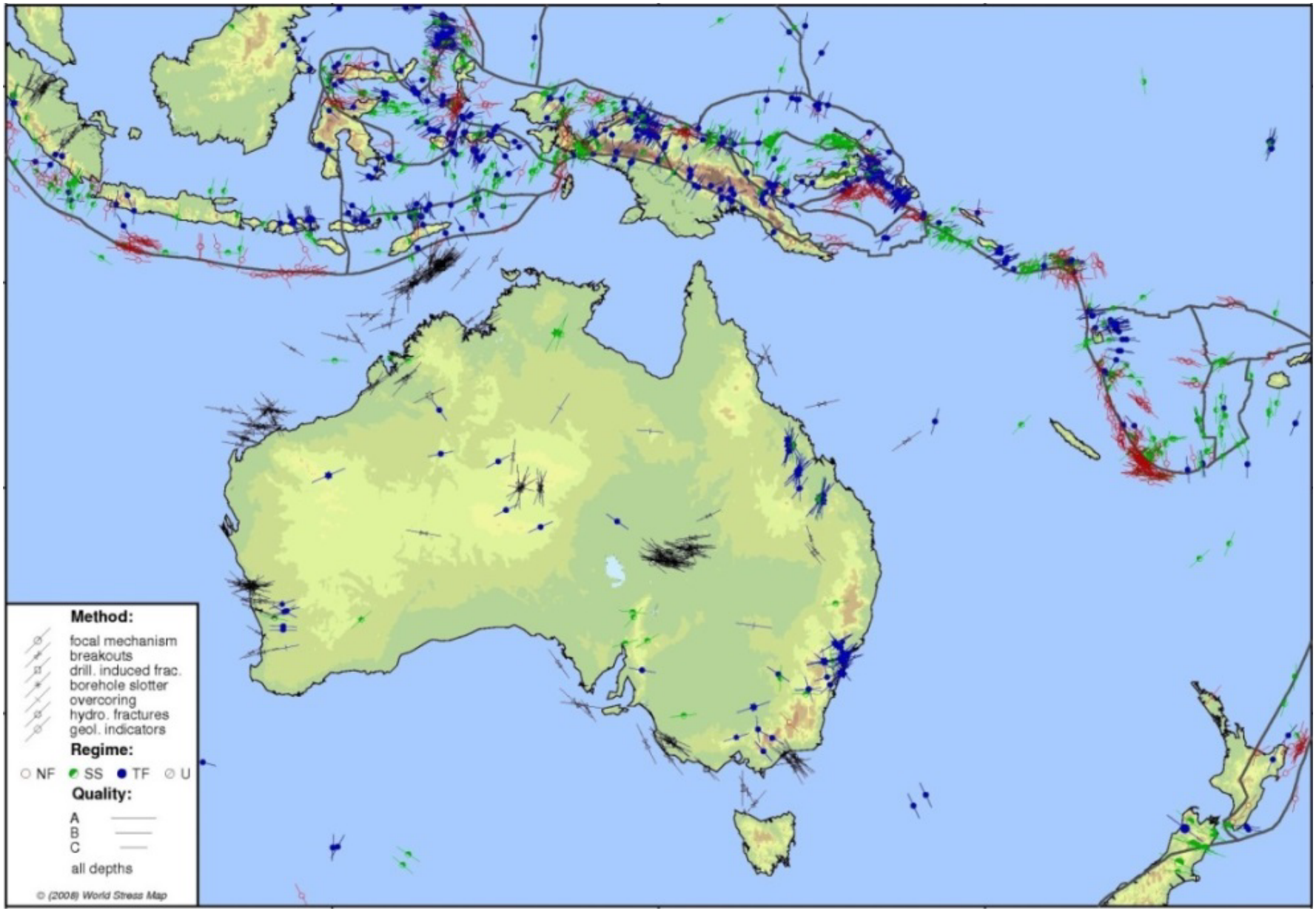
1. Geomechanics of hydraulic fracturing - environmental effects in the Australian context (Blackam, 2015)
2. Source, fate and water-energy intensity in the coal seam gas and shale gas sector (Blackam, 2014)

Stress and fracture plane development under different stress regimes

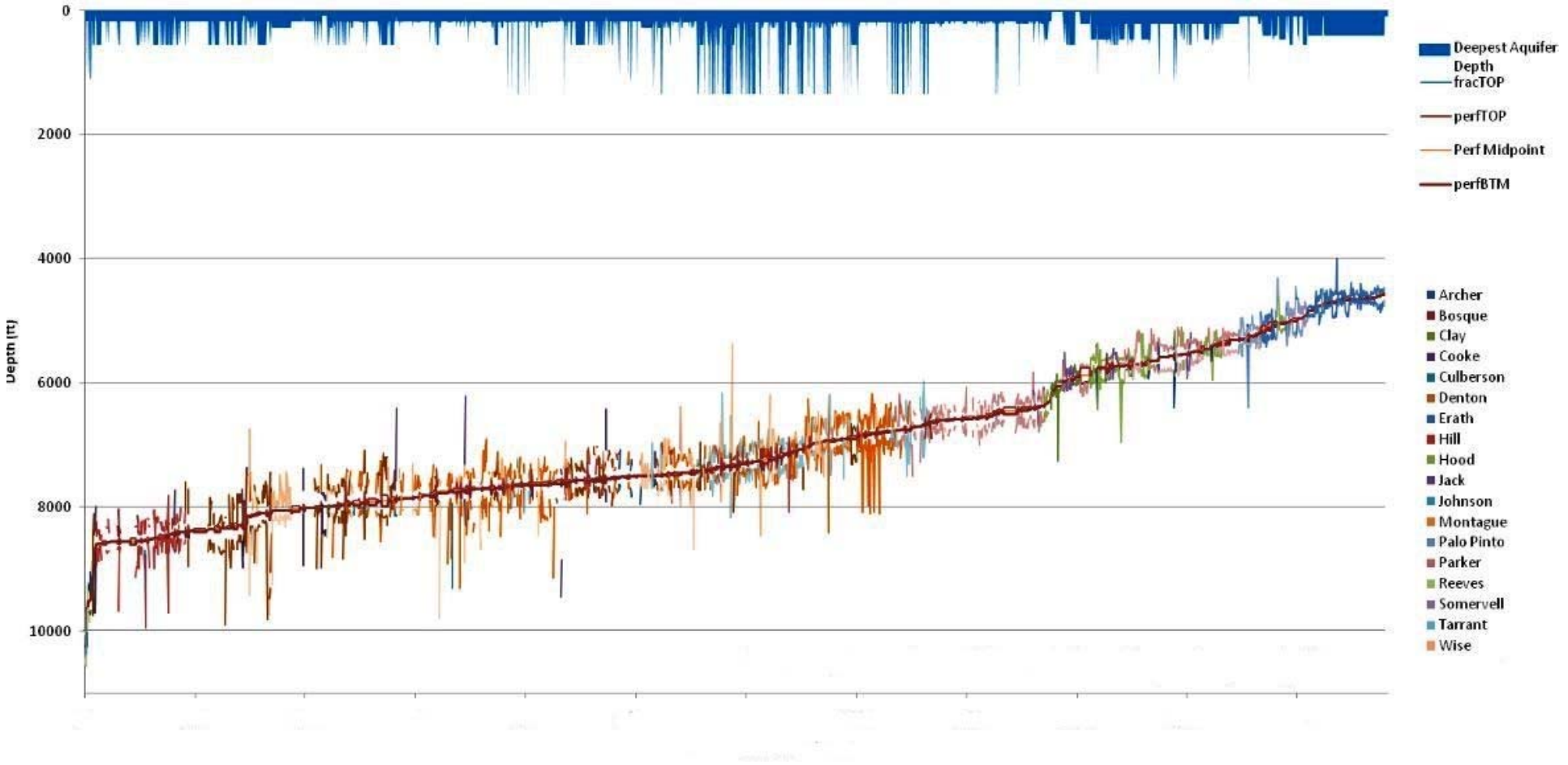




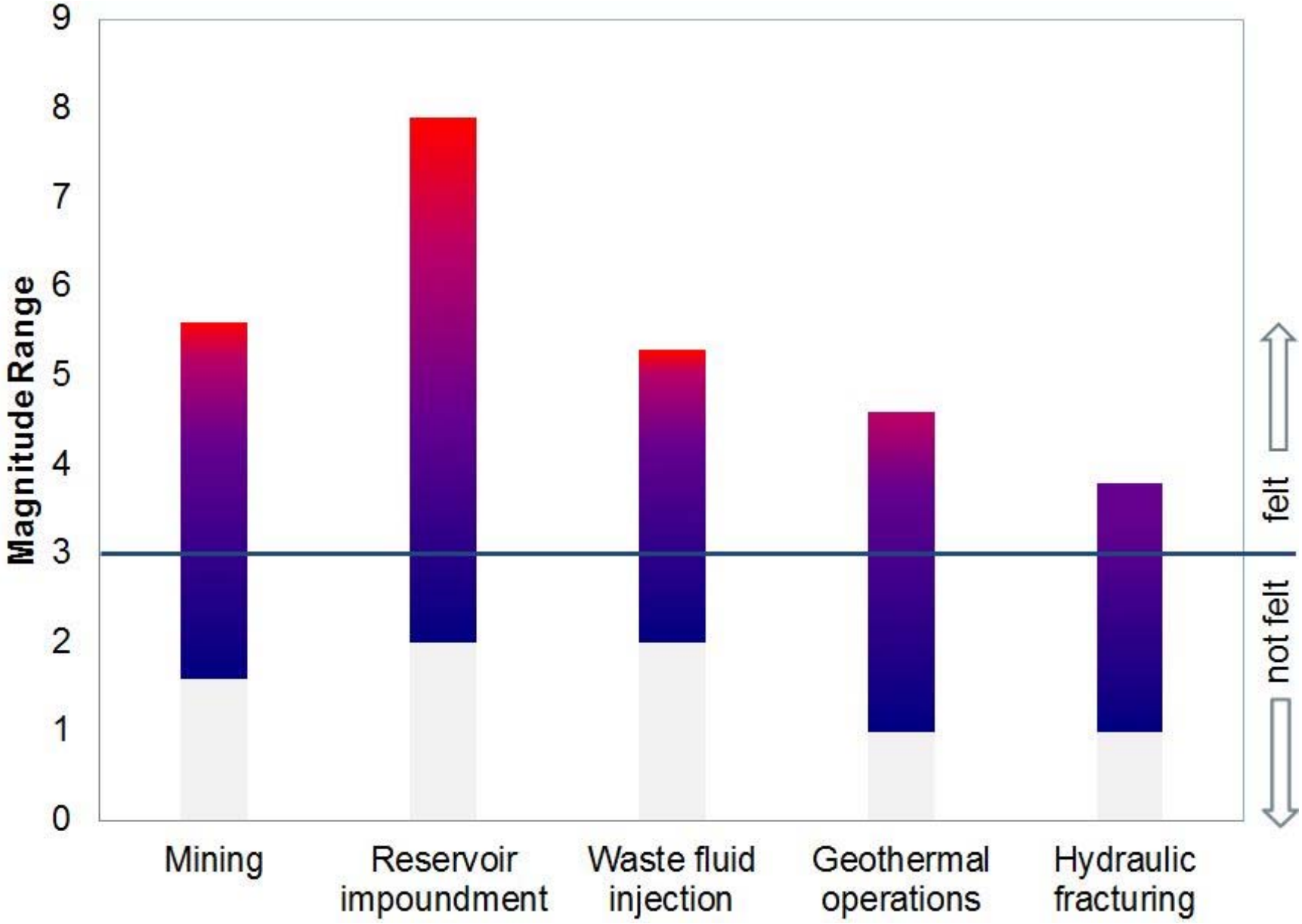
Australian tectonic stress regime



Vertical extent of Barnett Shale (US) hydraulic fractures (extensional tectonic regime)



Magnitude ranges of induced seismic events

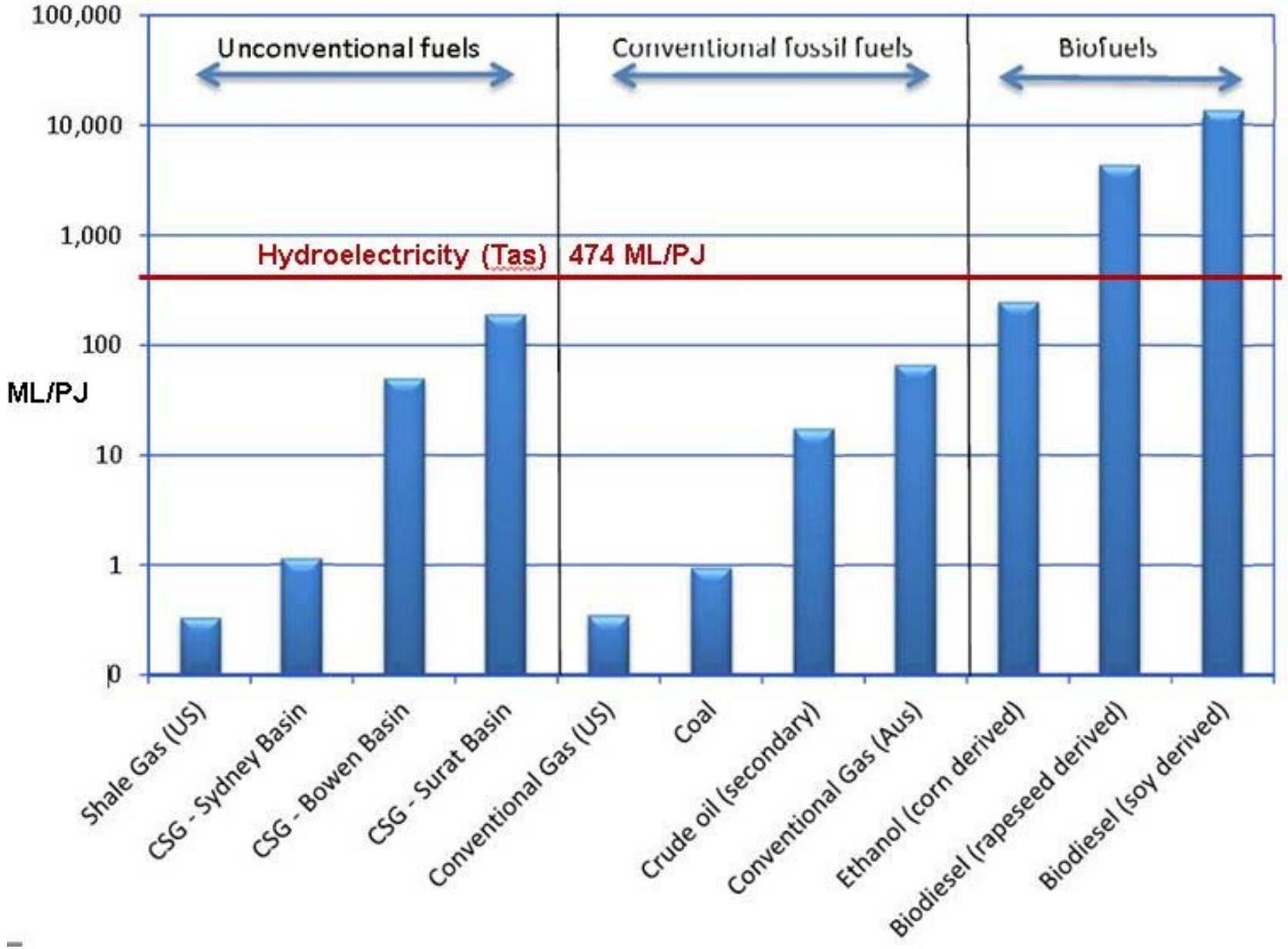


Water-energy intensity values

Fuel Type	Water-Energy Intensity (ML/PJ)	Notes (refer below)
Shale gas (US) (average)	0.33	a
Conventional gas (US)	0.35	b
Coal	0.95	c
CSG – Sydney Basin	1.15	d
Crude oil (secondary)	17.3	b
CSG – Bowen Basin	50.4	d
Conventional gas (Aus)	67	d
CSG – Surat Basin	192.5	d
Ethanol (corn derived)	250	e
Biodiesel (rapeseed derived)	4436	f
Biodiesel (soy derived)	14111	c

a – US Geological Survey data
b – Mielke (2010)
c – US Department of Energy data
d – RPS (2011)
e – Wu et al. (2009) cited in Mielke (2010)
f – Berndes (2008) cited in Mielke (2010)

Water-energy intensity values



Summary of conclusions

Based on a review of the science:

- The primary enabling technology - hydraulic fracturing – is mature and predictable
- The science and the evidence shows that risk of damage to property or environment due to induced seismicity is very low
- These conclusions are consistent with the findings of the US EPA
- Unconventional gas, in particular shale gas, is not seen to be unfavourable in terms of water-energy intensity when compared with other energy sectors