

To be read in conjunction with the companion Presentation Slides

SLIDE 1 – cover page

I thank the Planning Assessment Commission (PAC) members for the opportunity to speak here today.

My name is **Geoff Miell**. I have no political affiliations.

I am a resident and rate payer in the Lithgow Local Government Area (LGA).

On May 11, I made a presentation to the PAC at a public hearing concerning the R040/17 Bylong Coal Project. Many of the issues that I canvassed that day, are also applicable to the Invincible proposal here today. I note that the proponent's agents for the Bylong Coal Project produced an extensive document in response to the negative issues raised at the PAC Bylong public hearing, but completely ignored ALL the issues that I raised at that hearing. I speculate these issues were far too inconvenient for the proponent to address. I urge the PAC members to view my PAC Bylong presentation and submission available on the PAC website.

SLIDE 2 – Invincible Southern Extension MOD 5

This slide outlines some of the key details for the Invincible proposal.

This proposal means potentially a much higher concentration of trucks on our local roads, more noise and dust, more pollution in our streams, and likely worse energy efficiency and pollution for Mount Piper Power Station's operations.

I oppose the Invincible Southern Extension MOD 5. You should too.

SLIDE 3 – Why bother reopening Invincible Mine?

Why bother reopening Invincible? There are ample supplies and alternate suppliers of nut coal already available elsewhere for the Shoalhaven Starches Plant. Will Invincible displace some jobs from Clarence Mine and Whitehaven's operations? I think there's a distinct possibility, considering coal market outlooks.

The clear majority of Invincible Mine's coal reserves are of inferior quality. If Mt Piper buys this coal it means there will be less coal acquired from Springvale Mine. Will Invincible displace some jobs from Springvale Mine?

Invincible means more pollution in our streams. If it's necessary for Springvale Mine to have a Water Treatment Plant, then Invincible should be doing substantially more to minimise its environmental impacts to our water resources.

The proponent claims global greenhouse gas (GHG) contributions are negligible. Many small contributions add-up to an enormous overall impact.

High EROI petroleum and coal are being consumed to produce low EROI ethanol biofuels. Contrary to the promotional spin by biofuel proponents, this is not environmentally friendly, nor sustainable, and in fact worsens GHG emissions.

SLIDE 4 – 2016 top 5 coal country rankings

This table highlights how heavily concentrated coal producers and consumers are, represented by only a very few significant countries. Coal still is widely regarded to be an abundant resource. However, internationally coal is only available from a few countries having large export capacities.

SLIDE 5 – Looks like global coal production & demand have peaked

World coal production fell by 6.2% in 2016, the largest decline on record. China's production fell 7.9%, also a record decline. US production fell by 19%.

Global coal consumption fell by 1.7%, the second successive decline. The largest decreases were seen in the US (-8.8%), China (-1.6%) and the UK (-52.5%).

Plenty of coal reserves, but energy consumers are requiring less energy through efficiency measures, or switching from coal to cheaper energy alternatives.

SLIDE 6 – Current top 5 coal producer outlooks

China is on a rapid diversification of its entire electricity-generating capacity away from coal towards hydro, renewables and nuclear. 100-gigawatts of new coal-fired plants were cancelled at the start of this year.

USA's coal industry has been on a steady decline for about a decade, and is likely to continue declining further, despite Trump's hollow promises.

It appears to be rather bleak prognosis for the global coal industry – **why reopen another thermal coal mine with this outlook?**

SLIDE 7 – Australia's ageing coal-fired power stations

Here's a list of Australia's currently operating, and ageing coal-fired power stations. Within a decade, around half of Australia's coal-fired generation fleet will be over 40 years old, with these all using obsolete subcritical coal technology.

Liddell is likely to close in March 2022 – less than 4½ years to go. Yallourn W, Gladstone and Vales Point B will also reach their use-by-dates next decade.

This means there will be less domestic demand for thermal coal within a few years – **why reopen another thermal coal mine?**

SLIDE 8 – New coal-fired generation is unlikely to be built

In June, Australia's Chief Scientist, Dr Finkel, presented the *Independent Review into the Future Security of the National Electricity Market*, which included this figure showing the comparative costs of various new electricity generation technologies. During the preparation of this review, utility-scale batteries, wind and solar photovoltaic have declined in cost substantially more than expected.

In August, the South Australian Government announced it had contracted the US company SolarReserve, to build a 150-megawatt concentrated solar thermal (CST) generator with 8 hours of energy storage, which would be the world's largest, to deliver power at just \$78 per megawatt-hour, to be built by 2020.

CST appears now to be cost-competitive with and can be built much sooner than new ultra-supercritical coal-fired generators, CST provides 'dispatchable' power like gas-fired generators but for a cheaper price, and with zero carbon emissions.

Jim Barry, the global head of BlackRock's infrastructure investment group, which has more than \$US5 trillion of assets under management, was reported in an article in the *Australian Financial Review* on May 26, to have said:

"Coal is dead. That's not to say all coal plants are going to shut tomorrow. But anyone who's looking to take beyond a 10-year view on coal is gambling very significantly."

SLIDE 9 – Adani Carmichael Mine in northern Qld will displace jobs

Wood Mackenzie recently published a report on the likely impact of the proposed Adani Carmichael Mine in northern Queensland on existing coal production in southern Queensland and in New South Wales. A figure from this report is shown here in this Slide, highlighting the likely impact on Hunter Valley coal output.

I'm puzzled that the New South Wales Government appears not to be protesting to the Federal Government about the possibility that the federal Northern Australia Infrastructure Facility (NAIF) could be used, in effect, to displace coal mining jobs, and reduce royalty receipts by as much as \$10 billion from 2023 to 2035, in NSW.

Similarly, the Invincible Mine proposal may displace existing jobs elsewhere, albeit on a much smaller scale.

SLIDE 10 – Estimated economic impact of Climate Change

At the Global Warming Policy Foundation 2017 Annual Lecture, in October, former-PM, Tony Abbott MP said:

"...at least so far, it's climate change policy that's doing harm. Climate change itself, is probably doing good, or at least, more good than harm."

On 21 October 2015, Burke, Hsiang and Miguel's paper was published in the scientific journal *Nature*, which looked at the impacts of climate change on GDP per capita of various countries out to year-2100. Some countries would be better off, shown in blue, but most would be worse off, shown in red, including Australia.

The proponent for the Invincible proposal claims their GHG emissions contribution is insignificant. Many seemingly insignificant GHG emission contributions all add-up to a large overall effect – a 'tragedy of the commons'. Why risk humanity's newest generation's future, and for an ephemeral, short-term gain?

SLIDE 11 – There ain't such a thing as a free lunch

To get usable energy we must first expend energy to access primary resources and convert them into a usable form. EROI is defined as the ratio of energy returned to energy invested.

This Slide shows the "Hierarchy of Energetic Needs", indicating that the minimum EROI required for energy resources to support a specific level of societal sophistication. A society would not be sustainable at a basic subsistence level, if the average EROI of the energy resources utilised is less than about 5:1. To support our current level of societal sophistication, the average EROI of the energy resources utilised needs to be at or better than about 14:1.

SLIDE 12 – Energy Returned On Investment (EROI)

Humanity has been spoilt by the abundance of high EROI fossil fuels, that has enabled a rapid and prosperous growth for many, over the last 1½ to 2 centuries. EROIs for oil, gas and coal resources have been steadily declining over the decades, as the higher quality and easier to access resources are consumed first, leaving lower quality and progressively costlier to extract resources for exploiting later. Declines in EROI of energy resources have a large impact on economies.

SLIDE 13 – Published EROIs for various fuel and energy resources

This table indicates a range of EROI values for various fuel and energy resources and regions. This is a critically important and expanding field of study.

Current data suggests biofuels have poor to very poor EROIs, meaning they are unsuitable to sustain our current level of societal sophistication without energetic subsidies from higher EROI energy resources. Unless this situation improves significantly, biofuels will not be sustainable long-term for large-scale utilisation.

SLIDE 14 – Biofuels: something that sounds good in theory

Biofuels may seem a good thing to do at first glance to mitigate GHG emissions, and as an alternative to petroleum, but an analysis of the key characteristics of liquid transportation fuels across the domains of physics, chemistry, biology, and economics, indicates there are significant deficiencies that preclude biomass from becoming a large-scale, long-term sustainable, primary energy resource, and biofuels from replacing petroleum as a national-scale transportation fuel.

Manildra Group's claim that they are one of Australia's largest producers of a range of ethanol grades suitable for all applications, including "*for cleaner vehicle fuel*", needs to be seriously challenged from a GHG emission perspective, as well as from a long-term sustainability and poor to very poor EROI perspective.

SLIDE 15 – Beyond Zero Emissions Zero Carbon Australia plans

Here's a list of affordable solutions from BZE available to transition Australia to a zero-carbon emissions and energy sustainable future for some areas of the economy. BZE is continuing to develop a suite of plans and reports providing detailed, researched and costed roadmaps to a zero-carbon and energy sustainable economy for Australia. Other independent studies concur it's possible.

Think about this: If we are unable to effectively transition to affordable, reliable, sustainable renewable energy solutions, then our civilisation is doomed when non-renewable fossil and nuclear fuel resource supplies begin an inevitable, sustained decline. **Unaffordable energy means life becomes unaffordable!**

SLIDE 16 – Is this how our society is dealing with our future

Is this how our society is dealing with our long-term, sustainable future?

We must leave petroleum oil, before oil leaves us. We must leave fossil natural gas, before gas leaves us. We must leave oil, gas and coal to mitigate dangerous climate change. No ifs, no buts! Let's get on with dealing with these challenges.

SLIDE 17 – Final thoughts

The proposed Invincible Southern Extension Modification is not needed, and is contrary to the "Paris Climate Agreement". Stop this proposal!

Make the correct decision for your descendents' sakes.

Thank you for your attention.

Some *YouTube.com* videos are listed on Slide 18 that I think are worth viewing for further background information concerning our looming energy security and climate change challenges.