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Senate Standing Committees on Rural and Regional Affairs and Transport (RRAT)
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INQUIRY INTO THE PROJECT KNOWN AS IRON BOOMERANG

Dear Senators,

I write not as a subject matter expert on the proposed Project Iron Boomerang (PIB), but as a consulting civil engineer in the State of Queensland with an interest in significant 'Nation Building' Infrastructure that benefits the economy of the nation, and the prosperity and welfare of the people that inhabit this great country of ours.

After contacting the main proponent of this project, Mr Shane Condon of East-West Line Parks (EWLP), directly it is clear that many years of solid work have been invested into this proposal, with many truly exciting headline benefits on its own merits. I will reiterate some of those exciting benefits for effect in this submission.

However, the purpose of this submission is not to provide a running commentary or deeper analysis of PIB. In my view, it is the role of the senate standing committee to investigate this in detail as part of their inquiry. Having discussed this proposal at a reasonably high-level of detail with Mr Condon, I feel very confident that this is an extremely well researched and articulated proposal and that the proponents have many well-crafted solutions to the many questions and issues that are likely to be canvassed during the senate inquiry process.

Instead, the purpose of this submission is to outline a wider view of this project within the context of many emerging trends and investments that are currently being made (by governments and the private sector) and the potential complementary benefits that PIB could bring to leverage these investments.

The sheer scope, complexity and cost of this project is likely to attract criticism from many professional and institutional naysayers in a country like Australia which unfortunately in recent times has lost its mojo in the great game of creating truly visionary and significant infrastructure schemes of this magnitude.

The main aim of this submission is to encourage the senators to 'think bigger and wider' about the potentially transformational effects that this project, in conjunction with other emerging trends, initiatives and investments, could deliver to our nation.

Yours sincerely

Max Hooper
Director (CPEng, RPEQ, MBA)



Headline Benefits – from discussions with Mr Condon (EWLP)

As previously mentioned, I contacted the primary proponent Mr Condon (EWLP) and put a series of questions to him with regards to the headline benefits and the nature of the underlying business case that underpins their assertions. Although I was vaguely familiar with PIB, I have not been able to be fully across the many thousands of pages of detailed submissions that EWLP had prepared previously (dating back to 2011 to 2013), which formed part of submissions to the 2013 Inquiry into the Development of Northern Australia.

However, the answers I received were truly impressive in their scope and detail.

Outlined below is a brief summary:

- ▲ Though commercial in confidence, my general understanding is that EWLP has secured commitments from many of the world's largest steel producers (in countries including India, South Korea and Japan) to invest directly in the project. Despite the significant project cost, it appears to be the case that the construction of the rail line and the proposed steel plants would be privately funded and underwritten.
- ▲ To leverage these investments, the project requires state and federal governments to take an active role in securing the planning and approvals (including the EIS) for the project. The cost for this is likely to be in the order of \$300M AUD. Once fully operational, the return on investment to the state and federal treasuries from royalties and taxes is likely to be in the order of tens of billions of dollars per annum.
- ▲ Australia, with its rich deposits in Iron Ore and Coking Coal, together with the economies of scale achieved with the steel mills concept, has the potential to displace China as the cheapest global producer of primary steel (i.e. steel slabs), with the potential to undercut the Chinese benchmark price by 15-20%.
- ▲ PIB is set to not only meet, but exceed, its share of the Albanese Government's commitment to a 43% reduction of domestic carbon emissions by 2030 and net zero carbon abatement by 2050, with the added benefit of more steel production onshore. EWLP's projection is to achieve around 80% emissions reductions by 2030 and carbon neutrality by 2040 with existing steel making technology (i.e. coking coal) with best practice in combination with negotiated offsets. Beyond this, the project remains flexible and adaptable to accommodate future trends in steel making (e.g. green ammonia, electric arc furnace etc.) which may become viable in the future. This will further decarbonise Australia's industrial steel production.
- ▲ Beyond the decarbonisation outcomes above, Australia's existing steel producers (i.e. located at Port Kembla, Whyalla and Port Pirie) can be significantly decarbonised with the economies of scale from the steel mills producing primary steel (i.e. steel slabs) at either end of PIB. With the delivery of steel slabs to the existing producers (as opposed to ores) blast furnaces at these locations would no longer be necessary, with the secondary and tertiary production of steel products in these locations proceeding from the rolling stage. In addition to these decarbonisation benefits, these existing steel producers are significant energy users. These efficiencies would reduce their peak demands on local energy grids, assisting and accelerating the transition towards a renewable energy economy.
- ▲ Besides the clear benefits from the revenue generated from exports of steel slabs to our regional trade partners and domestic decarbonisation efforts, PIB offers Australia the opportunity to play an important leading role in the rapid decarbonisation of other trade partners in our region, consisting of industrialising and industrialised economies, with respect to their increasing demand for steel. Mr Condon informs me that major steel producers in countries such as Indonesia and Japan have expressed that their access to low cost primary steel slabs from Australia could lead to the closure of some their own blast furnaces, with the ability to proceed straight to the rolling stage. In addition to this, there would be significant reductions in carbon emissions from the global shipping of Iron Ore and Coking Coal, from the combination of reduced volume/tonnage of shipped materials and the emergence of lower emissions shipping technologies (some of which form part of EWLP's detailed proposal).
- ▲ Even in a fully decarbonised renewable energy economy, the global demand for steel, cement and glass will continue to grow. The access to plentiful, cheap and preferably clean steel is a fundamentally important ingredient in any developed industrial economy with its application in **energy** (e.g. solar, wind turbines, reinforcement within concrete footings and structures), **transport** (e.g. railways and bridges), **heavy manufacturing** (e.g. automotive, mining equipment, shipbuilding, building trains), **defence**



industry (e.g. submarines, munitions, armoured personnel carriers, tanks, weaponry) and **construction** (i.e. steel reinforcement bar, floor plate, beams, columns, hollow sections and purlins). The nation will be aided by access to cheaper, domestically produced steel slabs reducing the potential economic shock caused by potential disruptions to the supply chain from the reliance on primary steel produced in external markets. This could potentially save industry and governments billions of dollars in the procurement and delivery of significant industrial, defence, manufacturing and infrastructure projects (refer source for further information: <https://worldsteel.org/about-steel/steel-facts/>).

- ▲ Finally, with the emergence of global supply chain disruptions and rising geopolitical tensions in our region, there are the issues of sovereign capability, national security and the avoidance of conflict. I am a believer in 'peace through economic development'. I will leave you with a memorable insight that Mr Condon left with me at the conclusion of our recent discussions (likely to be somewhat paraphrased):

"It is my belief that the break-down of mutually beneficial economic development and trade is a contributing factor in war and conflict between nations. One of the best antidotes to war is therefore the opportunity for mutually beneficial trade and economic development between nations from diverse sources, without any one country having a controlling monopoly over the critical components of that trade and development. Therefore, with the diversification in the access to a critically important commodity like steel, resulting from the increased production from a stable democratic nation like Australia, our trade partners will be too busy making money to be interested in pursuing a war or conflict that could threaten us all."

Placing PIB in a Wider Context

The primary reason for this submission was to encourage the senators to take a bigger picture view of PIB within a wider context, beyond merely examining the potential feasibility of the project in isolation.

There have been a number of significant and exciting recent developments, particularly in my home State of Queensland, (but also in Western Australia and Nationally) which I believe have mutually beneficial implications *for* and potential compatibility *with* PIB.

Amongst those notable developments are the following:

- ▲ The Queensland Government's recent announcement to proceed to the detailed design and cost analysis phase for the Pioneer-Burdekin Pumped Hydro Energy Storage Scheme. *"The Queensland Government has announced the commencement of a detailed design and cost analysis for a potential 5-gigawatt pumped hydro energy storage (PHES) facility in the western Pioneer Valley, approximately 75 kilometres west of Mackay. Developing a portfolio of potential pumped storage options will benefit Queensland by unlocking additional renewable generation development across the state to support low-cost and reliable renewable electricity. The western Pioneer Valley has significant potential for a 5-gigawatt, large-scale, long-duration pumped hydro facility. The mountainous topography can provide a large vertical separation between the reservoirs, which is needed for pumped hydro. The area is also located close to high-quality wind and solar generation sources in the Northern and Central Queensland Renewable Energy Zones, allowing it to unlock large volumes of renewable energy investment."* (source: <https://www.epw.qld.gov.au/about/initiatives/pioneer-burdekin-pumped-hydro-energy-storage>). It is notable that the proposed location of the 5GW pumped hydro storage in the Pioneer Valley, some 75km west of Mackay, is in close vicinity to the termination of PIB at Abbott Point and the proposed location of the proposed east coast Steel Mills to be located near/at the Abbott Point State Development Area (SDA).
- ▲ The Queensland Government's business case for the extension of Inland Rail from Toowoomba to Gladstone via the Surat Basin Railway (a.k.a. the "Southern Missing Link"), following the recent RRAT Senate Inquiry into the Inland Rail project (source: <https://www.tmr.qld.gov.au/projects/toowoomba-to-gladstone-inland-rail-extension-business-case>). The existing Queensland Rail North Coast Line between Gladstone and Mackay (Abbott Point, the proposed termination point for PIB) consists mostly of Class B narrow-gauge track, suitable for 20-22 tonne axle loads, with a section of Class A narrow-gauge track, suitable for 22-30 tonne axle loads, located between Gladstone and Rocklands (refer **Figure 1**, source: Queensland Rail). With the potential future upgrade of this section of track to dual gauge, combined with



PIB (with a connection to the Adelaide to Darwin Railway, north of Alice Springs) and Inland Rail, it could be possible to achieve the late emeritus professor Lance Endersbee's vision for an Australian Ring Rail for freight (or a 'transcontinental rail road' for Australia in other terms), albeit in a slightly different form (refer **Figure 2**, source: <https://citizensparty.org.au/policies/infrastructure/high-speed-rail>). Refer **Figure 3** for proposed PIB route (source: <https://www.ewlp.com.au/overview>).

- ▲ The proposed BP Asia Renewable Energy Hub (AREH), with support from the Western Australian Government, situated on a 6,500-square kilometre site in the Pilbara region, to the east of Port Hedland could be a source of energy for the proposed steel mills to be located to the south in Newman (source: https://www.bp.com/en_au/australia/home/who-we-are/reimagining-energy/decarbonizing-australias-energy-system/renewable-energy-hub-in-australia.html).

“At full capacity the project aims to:

- ▲ *develop in multiple phases up to 26 GW of combined solar and wind power generating capacity – the equivalent of producing over 90 terawatt hours per year, which is around a third of all electricity generated in Australia in 2020.*
 - ▲ *produce around 1.6 million tonnes of hydrogen or 9 million tonnes of green ammonia, per year.*
 - ▲ *abate around 17 million tonnes of carbon in domestic and export markets annually, which would equate to roughly 0.5 gigatonnes (Gt) of carbon savings over the lifetime of the project.”*
- ▲ The proposed Sun Cable project, combined with the 4,200 km Australia-Asia Power Link, is another project that would aim to propose 17-20 GWp of solar generation with 36-42 GWh in the Northern Territory (800km south of Darwin) together with a 4,200 km long transmission system to connect Darwin to Singapore (source: <https://suncable.energy/australia-asia-power-link/>).
 - ▲ One of the significant impediments in the transition to a renewable energy network at a national scale is the line losses on existing Alternating Current (AC) high-voltage network and the need for large-scale storage of generated renewable energy. These will be significant investments. One solution to the widespread transmission of renewable energy generation is the use of High-Voltage Direct Current (HVDC) transmission infrastructure. This has been achieved in China with the 3,284km long 1,100kV overhead HVDC line from Changji to Guquan which was commissioned in 2019 by the State Grid Corporation of China (source: <https://www.power-technology.com/marketdata/changji-guquan-hvdc-line-china/>). With recent significant Federal and State Government investments into the transition to energy generation from renewable sources (predominantly wind and solar, with a combination of pumped hydro and battery storage proposed) discussion in Australia is turning to the potential need for an upgraded HVDC east coast transmission grid (refer story: <https://theconversation.com/a-clean-energy-grid-means-10-000km-of-new-transmission-lines-they-can-only-be-built-with-community-backing-187438>).
 - ▲ A lot of the focus on providing the storage for renewables in Australia has been focused on batteries and pumped hydro. The problem with batteries is the ability to hold sustained charge at scale for long periods, and the vast amount of mined metals (including lithium, cobalt etc.) for their manufacture, and the resultant environmental impact of this mining. Another technology that warrants further investigation is molten salt storage which has the potential for more sustained storage and release for peak loads, as achieved with solar thermal plants in Las Vegas, Nevada to provide overnight baseload generation. In Queensland, Stanwell Energy has signed up to Vast Solar's Mt Isa thermal solar project, utilising molten salt (source: <https://reneweconomy.com.au/stanwell-signs-up-to-vast-solars-mt-isa-thermal-solar-project/>). It is worth noting that the steel parks would produce an excess of heat energy, which could conceivably stored in Molten Salt to be fed into the future east coast transmission grid.
 - ▲ The \$2.5Bn Copper String 2.0 project in Queensland aims to connect the North West Minerals Province to the renewable energy hub in Townsville, using existing high-voltage AC transmission technology, to be aligned as closely as practical to existing major infrastructure such as the Flinders Highway and the railway line running west from Townsville (source: <https://copperstring2.com.au/>). This might be better facilitated constructing a HVDC transmission line partially within the PIB corridor with a shared access agreement, potentially saving the proponents money in property acquisitions and cost of construction.



Queensland

[GRADE]

- A+ █ >30 tonne axle loads
- A █ 22-30 tonne axle loads
- B █ 20-22 tonne axle loads
- C █ 18-20 tonne axle loads
- D █ 15.5-18 tonne axle loads
- E █ <15.5 tonne axle loads

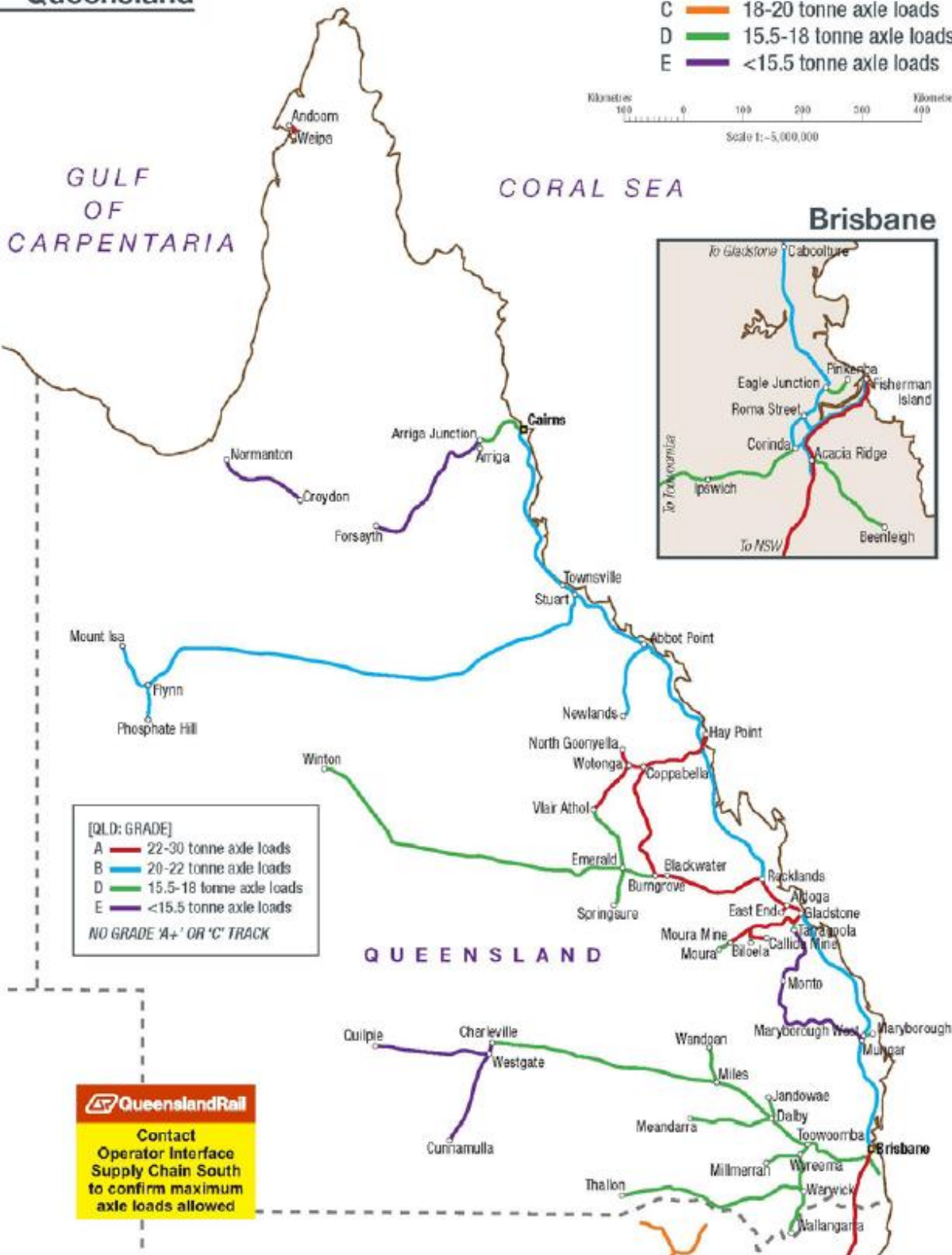


Figure 1 Queensland Rail Network Map

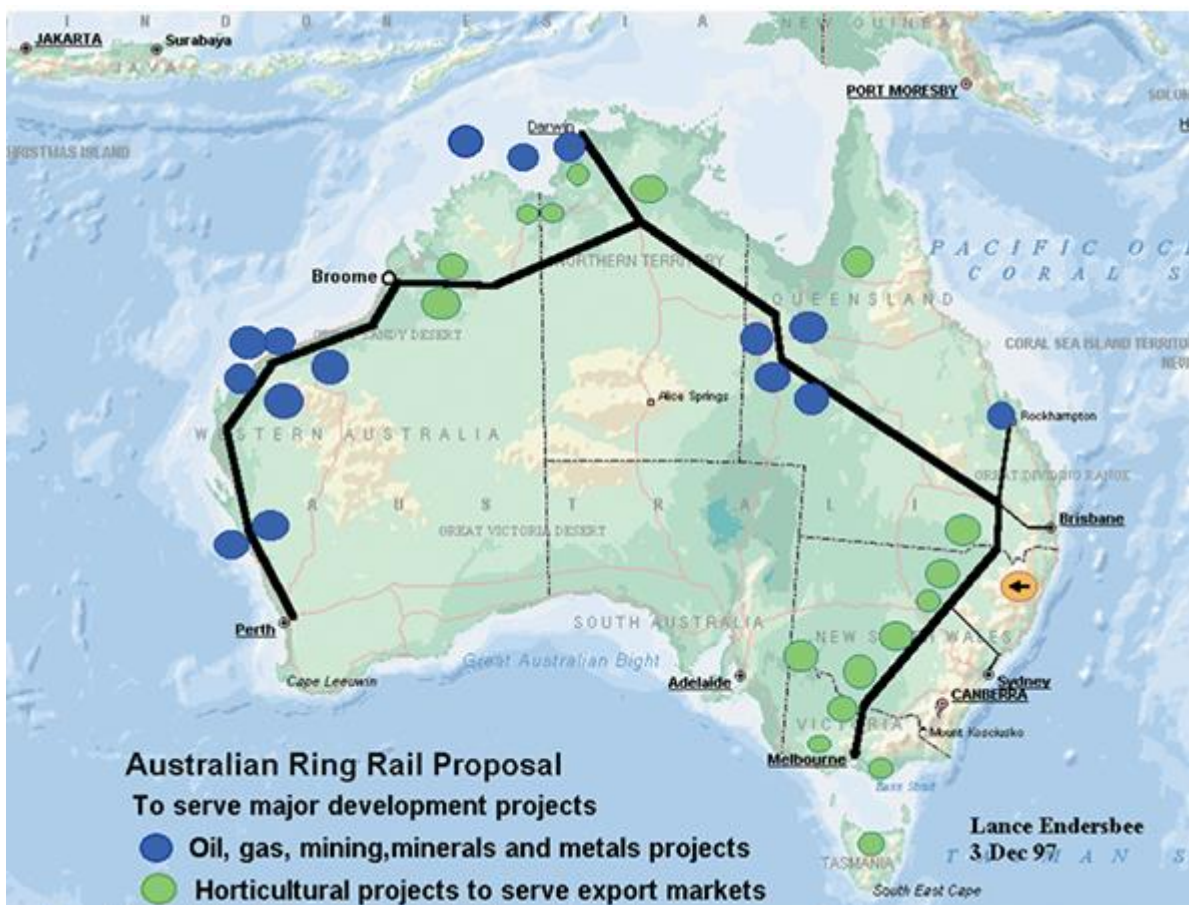


Figure 2 Professor Lance Endersbee's 1997 Proposal for an Australian Ring Rail



Figure 3 Proposed PIB Route Map Overview



Recommended Enhancements to PIB

Having laid out the direct project benefits (as outlined by the proponent), together with some of the relevant wider context, below I would like to offer some ideas of potential enhancements or value-adding to the privately funded PIB project that could leverage the already significant investments by industry and government for the benefit of the nation. One hopes that this could stimulate the senators to widen the scope of their considerations in this inquiry to fully investigate the scope and extent of the transformational benefits that could be realised in a project of this significance and scale.

- ▲ **Investigation of a Shared Use Access Agreement over the PIB Corridor, via easements.** As I mentioned earlier, it is critical that the federal, state and territory governments take an active role in the initial investment in the planning and approvals (including EIS) for securing the rail corridor. This will provide certainty for the investors that have already signalled their commitment to invest in the project and will secure significant royalties and tax revenues in return that will return tens of billions to government annually. In addition to this, the private funding model for the PIB corridor provides an opportunity for industry and government to leverage significant planned investments, particularly in energy transmission for massive renewable energy precincts, in turn improving the viability and bankability of these investments. An initial draft of the PIB corridor cross section, indicated a potential 150-200 metre wide corridor, with provision for future services, optic fibre, access roads and tracks (refer **Figure 4** below).

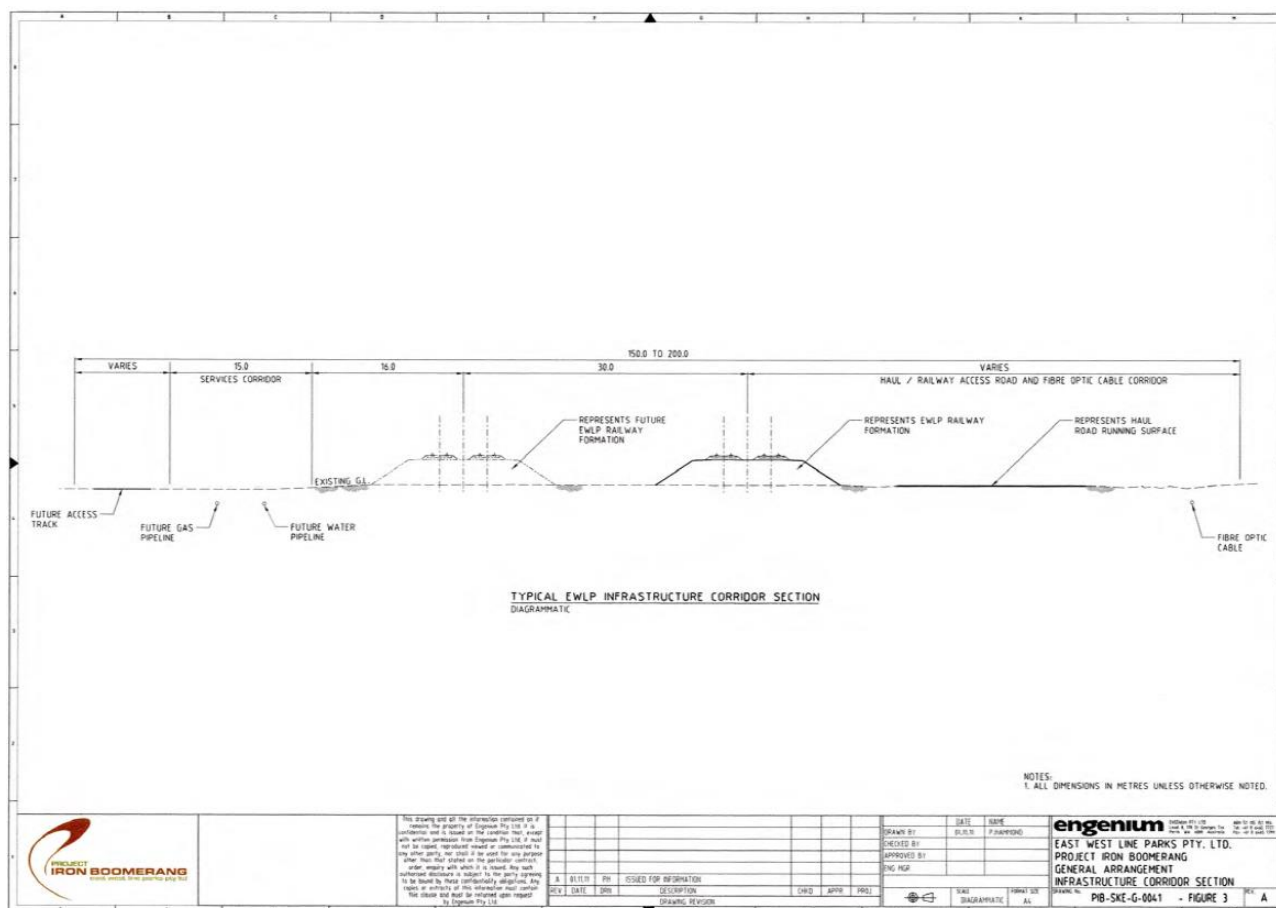


Figure 4 Typical EWLP / PIB Infrastructure Corridor Section

- ▲ **Establish an East-West Transcontinental HVDC Transmission Line in the PIB corridor.** If the opportunity were taken to co-locate a HVDC transmission line (either overhead or buried cable) within the PIB shared corridor, this would provide a transcontinental transmission line, connecting the west coast to the proposed east coast HVDC transmission grid. Given the proposals for the Pioneer-Burdekin Pumped Hydro Energy Storage Scheme, the proposed BP Asia Renewable Energy Hub (AREH) and the proposed



Sun Cable project, significant renewable energy could be fed into a national grid, simultaneously providing the opportunity to distribute solar energy generated in Western Australia into the eastern transmission grid into the PM peak and providing the confidence and certainty for those investments to proceed. It will also save money, leveraging the initial government investments in securing the planning and approvals (including EIS) for the corridor, without needing to identify alternative corridors.

- ▲ **Investigate connections to Inland Rail and Adelaide to Darwin Freight Rail.** The potential extension of Inland Rail to the Port of Gladstone, via the Surat Basin Railway (a.k.a. the “Southern Missing Link”) provides an opportunity to leverage the PIB corridor into a national freight network, linking Melbourne, Darwin, Perth and Adelaide. This would fulfil the late emeritus professor Lance Endersbee’s vision for an Australian Ring Rail for freight (or a “transcontinental rail road” for Australia in other terms), albeit in a slightly different form. This could be facilitated by state, territory and federal government investment in planning and business case development for the potential future cross connection into the Adelaide to Darwin Freight Rail and the potential upgrade of the Queensland Rail north coast line between Gladstone and Mackay (Abbott Point) to dual gauge to complete the national inland freight network.
- ▲ **Investigate installing a Water Pipeline in the PIB Corridor.** The Lake Argyle reservoir (originally conceived as part of the Ord River Irrigation Scheme) is the most efficient dam in Australia in terms of the ratio of the size of the dam wall to the amount of water stored. With a usual storage volume of 5,797 gigalitres (with a maximum storage capacity to the top of the spillway of 10,763 gigalitres) it is one of the largest and most under-utilised water storages on the continent of Australia. The construction of a water pipeline in the shared access PIB corridor has the potential to provide life-giving potable water supply and potential irrigation supply to the vast northern interior. This would significantly leverage an existing water storage asset, that never achieved its initial aims in creating a productive irrigated scheme for agriculture in close vicinity to the dam. The future potential for PIB to form part of a national freight rail system and with potential irrigated land with proximity to this corridor could potentially open up additional agricultural exports to South-East Asian markets via the Port of Darwin.

Answers to RRAT Senate Inquiry Terms of Reference

Please refer below responses to the RRAT Senate Inquiry Terms of Reference.

a) the employment likely to result from the project during construction and once completed

Questions about employment directly related to the construction and operation of the railway and in the steel parks are best directed to EWLP and others.

However, given the additional opportunities identified in leveraging the PIB corridor to complete an east-west HVDC transmission network and to complete a national freight network, the future employment projections in facilitating these connections and bringing logistics, freight, power, optical fibre and potable water to the vast northern interior, and across to both eastern and western coasts, could be far more significant.

b) the effect on Australia’s gross domestic product and balance of payments from this significant change in Australia’s productive capacity

The potential boost to Australia’s GDP and balance of payments would be extremely significant. As mentioned previously, the largest and lowest cost supplier of primary steel (i.e. steel slabs) to the global market by a distant margin is China. Australia has the opportunity to undercut the Chinese benchmark price for primary steel by 15-20%. Even displacing a modest percentage of China’s dominance in this global supply would see a massive expansion in the volume of Australia’s steel production and generate a revenue windfall and terms of trade boom to Australia in the tens of billions of dollars annually.

Many of the largest steel producers of our allies and trading partners (countries including South Korea, Japan and India) would be lining up to invest in the steel mills, taking a stake in securing their sovereign supply in the production of steel, a critical input into the development of all industrialising and industrialised economies.



Beyond the huge uplift in export revenues from a rapid expansion in our domestic production of steel, we would achieve a drastic reduction in costs and increase in security of supply in an economically critical input for development, flowing through in increased efficiencies right across the supply chain in energy, transport, heavy manufacturing, defence and construction; not just for Australia, but for all of our allies and regional trading partners.

c) capital, energy and resources required to build and operate the proposed 10 steel plants, 5 at Port Headland, Western Australia and 5 in the Bowen Basin, Queensland

As previously mentioned, incorporating a HVDC transmission line into the PIB would leverage and support significant industry and government investments in electricity generation schemes in unprecedented scope and scale in Australia; including the Pioneer-Burdekin Pumped Hydro Energy Storage Scheme, the proposed BP Asia Renewable Energy Hub (AREH) and the proposed Sun Cable project. It is also worth noting that the steel parks would produce an excess of heat energy, which could conceivably stored in Molten Salt to be fed into the future east coast transmission grid.

d) the feasibility of the proposed clamshell design and electric/diesel propulsion to safely transport iron ore and coal across the 3000 kilometre route

I am not sufficiently qualified to answer this question. Questions are best directed to EWLP and others.

e) the environmental benefit of the reduction in bulk ore exports in regard to marine pollution and energy consumption

As clearly demonstrated above, the PIB can be structured to meet and exceed Australia’s efforts to contribute to the global efforts to meet decarbonisation commitments under the COP Climate Change agreements. Australia can assume a leadership position in the efforts to decarbonise both industrialising and industrial economies regionally, specifically around steel production, with demand in this area expected to continue to grow strongly, even within a carbon constrained global economy.

For perspective, the graph in **Figure 5** below, demonstrate the significant ongoing requirement for tonnages of construction materials such as cement, concrete, glass and steel per MWh for renewable energy generation in the transition to a nett zero energy emissions economy (source: nuclearnow.com.au/sources).

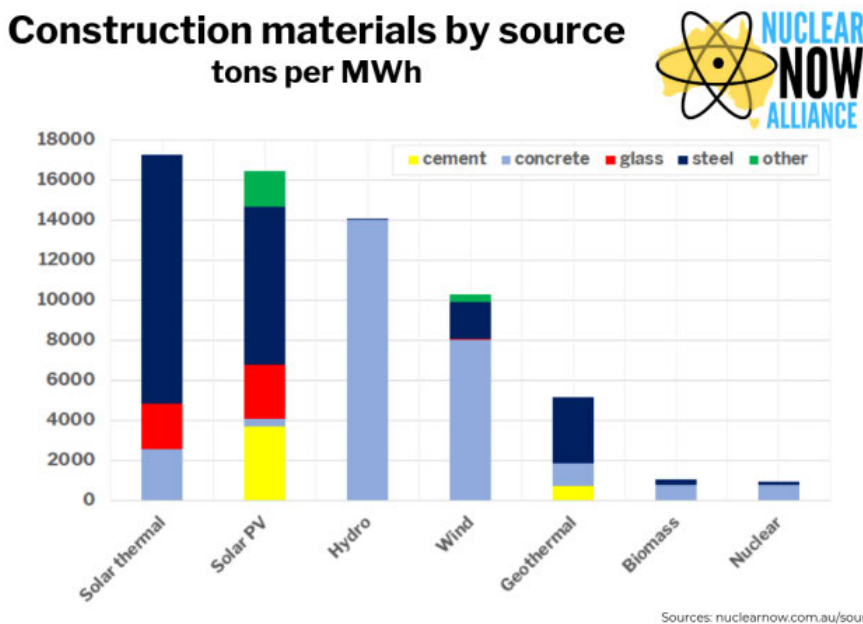


Figure 5 Construction Materials by Source – Low Emissions Energy Generation



f) any environmental impacts from the proposed alignment

The development of the alignment requires a rigorous and transparent Environmental Impact Assessment process, and the development of a comprehensive Environmental Impact Statement (EIS). From my previous experience as a member of the Australian Rail Track Corporation (ARTC) Community Consultative Committee (CCC) for the Kagaru to Acacia Ridge and Bromelton (K2ARB) section, together with my involvement in the previous RRAT Senate Inquiry Hearings into the Management of the Inland Rail Project, it is clear to me that the best placed agency to undertake this exercise in the most transparent and democratic is for federal, state and territory governments to undertake this directly. This should not be deferred to an unrepresentative corporate entity engaged to manage the project.

It is of fundamental importance to the success of this project that the federal, state and territory governments take an active role in securing the planning and approvals (including the EIS) for the project. Not to be political, but it is worth noting that all of the relevant government administrations (federal, state and territories) are currently of a single party-political persuasion. This prevents a unique opportunity to get this project off on the right footing, with a minimised potential for political disagreement between the relevant authorities.

One additional factor that is worth raising for consideration, is to implement 'rewilding' activities as part of a comprehensive approach to offsetting any potential emissions or environmental impacts that may arise out of the construction or operation of the PIB rail corridor and the proposed steel parks. This is an emerging global effort (refer article: <https://www.theguardian.com/environment/2021/jun/03/rewild-on-massive-scale-to-heal-nature-and-climate-says-un-decade-on-ecosystem-restoration-aoe>).

g) any impacts of the rail line or steel parks on the Aboriginal community

If managed well, PIB could deliver significant economic benefits and quality of living improvements to the people of Australia, including remote Aboriginal first nations communities. In particular, there are potential economic benefits in extending infrastructure services and employment opportunities to remote Aboriginal first nations communities.

Again, it is of fundamental importance to the success of this project that the federal, state and territory governments take an active role in securing the planning and approvals (including the EIS) for the project.

Within the spirit of the Uluru statement from the heart and the potential of the introduction of an Indigenous voice to the national parliament, one could expect Aboriginal and first nations peoples could play an active role in having a democratic say in the development of the project, as part of best practice public consultation.

h) the relevance of the Iron Boomerang project to our national security

The initial obvious benefit to our national security is the fundamental importance of the readily available and affordable supply of steel to domestic economic supply chains and particularly emphasising our sovereign defence capabilities (submarines, ship building, munitions, armoured personnel carriers, tanks, weaponry).

With the emergence of global supply chain disruptions and rising geopolitical tensions in our region, there are the issues of sovereign capability, national security and the avoidance of conflict. I am a believer in 'peace through economic development'. War and conflict is a function of deteriorating mutually beneficial relationships in economic development and trade between countries. One of the best antidotes to war is therefore the opportunity for mutually beneficial trade and economic development between nations from diverse sources, without any one country having a controlling monopoly over the critical components of that trade and development. PIB will diversify supply away from China's current dominance of primary steel production.

Finally, leveraging PIB into the potential completion of a national standard gauge freight rail network, this becomes an important internal logistical backbone linking our defence bases, cities and regions nationally, assisting in our rapid mobilisation and deployment in response to any hostile threat/s to our national security.

i) any other related matters

Refer "recommended enhancements to PIB".