Electrifying the Pilbara

The compelling case for common user transmission infrastructure to electrify the Pilbara, recognising its central role in our net zero emissions future

Australian Government

About this Investment Insight

The CEFC commissioned the development of detailed analysis from Marsden Jacob Associates to quantify and assess the economic, financial, social and emission abatement impacts and benefits of building common user transmission infrastructure in the Pilbara.

The analysis, reflected in the *Common user transmission and decarbonising Pilbara energy demand* report compares the construction and economic impacts of the common user transmission infrastructure approach with the existing 'go-it-alone' model where industry participants have historically built and operated their own transmission systems.

The analysis considers some of the costs and benefits of each approach, both in economic and emissions terms, to inform capital allocation decisions around the Pilbara's future energy needs. This Investment Insight – *Electrifying the Pilbara* – provides an overview of the Marsden Jacob Associates report. Visit **cefc.com.au** for more information.

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In this report

Acknowledgement of Country

The CEFC acknowledges the Traditional Owners and Custodians of this land, and we pay our respects to all Elders, past and present. We recognise their continuing connections to country, water and culture.

A message from the CEFC

Electrifying the Pilbara

Australia's Pilbara region has long been characterised by the iconic deep red tones of its vast landscapes, its abundant natural resources and the outsized influence of the world-leading companies that have spearheaded its growth.

As we look to the future, we see a Pilbara characterised by an additional colour – green. In terms of its energy, its industries, and its contribution to our national emissions abatement ambitions, a 'green' Pilbara can be at the centre of Australia's decarbonisation, complementing its central role in our resources-based economy. In that sense, electrifying the Pilbara represents a unique opportunity for the regional and national economy, with the role of new common user transmission infrastructure likely to be a critical success factor.

An economic and export powerhouse

The Pilbara is already an economic and export powerhouse. Heavy industries, dominated by iron ore mining and liquefied natural gas production, contribute a third of national exports and nearly 20 per cent of Western Australia's total economic output.[1]

The commodities exported through Pilbara Ports in 2024–25 alone were valued at an estimated $153 billion.[2] Australia's enviable economic prosperity draws much of its strength and continuity from the contribution of the Pilbara.

With industrial decarbonisation gathering momentum, the Pilbara's economic and export leadership can endure for decades to come. The continued growth of the industries of today will be accompanied by accelerated progress among the new 'green' industries of tomorrow, from green iron and steel to green ammonia and green hydrogen.

Rapid and widespread electrification

Electrification is as critical to the Pilbara's well-established industries as to the exciting emerging opportunities of the future. The Pilbara's competitive advantages are likely to become even more important to our economy as we transition to a net zero future. As a specialist investor in Australia's net zero future – with more than a decade of experience right across the economy – the CEFC recognises the scale and complexity of this change.

While the investment requirements and lead times for electrification are considerable, it has the potential to 'green' these industries. The benefits can include future competitiveness, a compelling return on investment and significant emissions abatement compared to maintaining the current fossil-fuel based approach.

Shared ambition

In working with the Western Australian Government, industry and energy system leaders, we have been impressed by the shared ambition for the future of the Pilbara in a decarbonised economy. Our goal in sponsoring expert analysis from Marsden Jacob Associates – *Common user transmission and decarbonising Pilbara energy demand* – has been to provide further information around the investment decisions that will support electrification of the Pilbara.

Ian Learmonth
Chief Executive Officer – CEFC

Paul McCartney
Chief Investment Officer – CEFC Rewiring the Nation

1. Pilbara Development Commission, Pilbara Economic Snapshot, Government of Western Australia, June 2024.
2. Pilbara Ports, Pilbara Ports achieves record throughput for sixth consecutive year, 24 July 2025, accessed 1 August 2025.

Energy transformation

Building the energy grid of the future

Electrification is a key means for achieving the emissions reduction targets in the Pilbara region. The on-site decarbonisation of heavy industries largely relies on the ability to electrify existing practices to displace existing use of fossil fuel primary energy sources with renewable energy.

It is widely recognised[3] that a key driver of the Pilbara's low emissions future will be the delivery of a fit-for-purpose energy transmission grid. While renewables currently account for just two per cent of Pilbara energy use, against 98 per cent from fossil fuels, the region is rich in solar and wind resources and will increasingly benefit from rapid improvements in the economics of large-scale storage and technical maturity of electrified transport. These will make renewable energy the lowest cost option for future energy generation.

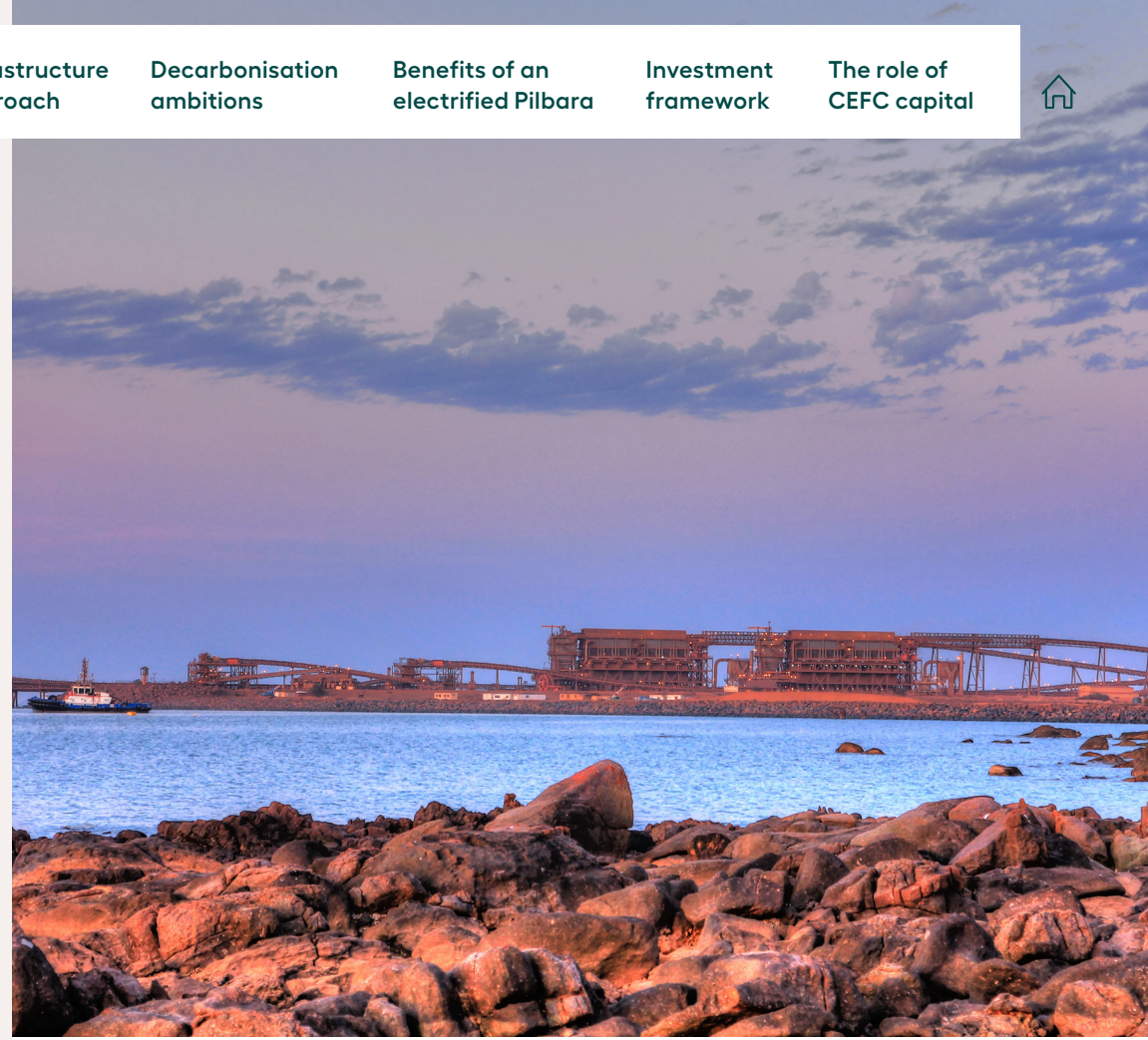
The Pilbara is rich in solar and wind resources. New transmission infrastructure across the North West Interconnected System (NWIS) is needed to unlock this opportunity, while maintaining or growing resource and industrial production.

This energy transition can deliver economic savings in terms of energy costs and lower emissions:

1. The cost of primary fuels decreases because the amount of primary fuel used decreases, even for a fossil fuel-based electricity system, because of the higher efficiency of the electrical equipment that puts that energy to its final use.

2. The costs of electricity generation decrease as the system transforms to renewable energy.

3. See for example the Pilbara Roundtable.



> "The Pilbara is rich in solar and wind resources. New transmission infrastructure across the North West Interconnected System is needed to unlock this opportunity, while maintaining or growing resource and industrial production."
>
> **The CEFC**

Energy transformation Cont'd

Compelling case for electrification and common user infrastructure

The Marsden Jacob Associates analysis provides a compelling economic and emissions case for the delivery of electrification and common user transmission infrastructure in the Pilbara. Notably:

Less transmission infrastructure

A common user approach requires around 29 per cent less *new* transmission kilometres – **representing a saving of some $4 billion in transmission capital expenditure** over 25 years – for the same energy, reliability and emissions outcomes. It also requires around **21 per cent less land**.

~$4b

in transmission capital expenditure savings

More efficient energy investment

The common user approach requires around 16 per cent less renewable energy and storage assets – **representing savings of as much as $26 billion in generation capital expenditure over 25 years**.

~$26b

in generation capital expenditure savings

Less fuel consumption and emissions

Electrification reduces diesel fuel consumption by some 2.8 to 3.6 billion litres per year, with estimated economic savings of between $4.2 billion and $5.3 billion annually. With the shift to renewable energy, much less gas is used to generate electricity, saving nearly $2.2 billion per year. Together with some industrial electrification, this avoids some 24 million tonnes per annum of carbon dioxide.

Green industries of the future

Common user infrastructure can also help unlock future growth and prosperity in the region by **enabling new green industry development**. In a 'high demand' scenario, common user infrastructure contributes to the development of substantial new energy-intensive industries, with the avoided emissions increasing to some 35 million tonnes per annum of carbon dioxide.

Note: Figures reflect Marsden Jacob Associates modelling horizon to 2050.

Infrastructure approach

The Pilbara energy system is at an inflection point. Decarbonisation of the NWIS provides the opportunity for wholesale system change in the Pilbara, as it does across Australia and the world.

Today, the Pilbara energy system is dominated by a small number of very large, mostly islanded, diesel and gas-based energy systems operating outside of, or with relatively small physical links, to the NWIS. The bulk of current demand is supplied by vertically integrated supply chains within each major demand portfolio of major iron ore and gas resource companies.

The decarbonisation of heavy industries such as those that dominate the Pilbara largely relies on the ability to electrify existing operations and displace fossil fuels, and then transform the electricity system to produce, store and transport renewable energy generation.

It is important to view the construction of a common user grid in the Pilbara in context. Across Australia, the construction of substantial transmission infrastructure is underway, attracting both domestic and international capital.

This investor interest recognises the twin drivers of energy demand:

1. Expanding industrial output to meet population growth and raising living standards globally.

2. Concerted government, industry and consumer efforts to reach net zero emissions by 2050, to moderate the worst effects of our changing global climate.

“

New common-use infrastructure in the Pilbara will reduce environmental impact by preventing unnecessary infrastructure duplication. It will also enable access to diverse renewable energy sources, support energy security and reliability and reduce the impact of industry on the environment.”

Pilbara Energy Transition Plan

Infrastructure approach Cont’d

Momentum around the common user approach

Consensus is a critical accelerator for future change. In that context, we are seeing growing momentum around the common user approach, a model already in place in the National Energy Market and Western Australia’s Southwest Interconnected System. This includes evidence in the landmark consensus achieved at the Pilbara Industry Round Table in March 2023[4], and welcome progress in the awarding of development rights for four major transmission corridors in December 2024[5].

The Marsden Jacob Associates analysis shows that isolated decision making and a ‘go-it-alone’ approach to the future Pilbara energy system will be inefficient and risk the social license required for an energy and decarbonisation solution in the Pilbara. However, meeting industry’s goals and timelines with a common user solution requires all stakeholders to commit to the challenge and evolve to meet future system needs.

Continued development of a common user NWIS, requires:

1. **The continuing leadership and support of the WA Government** for the duration of the transition, coordinating the efficient planning, legal and regulatory evolution and actions of all stakeholders through each phase of change.

2. **All Pilbara stakeholders to work collaboratively and pragmatically** with Government and transmission developers to support the most efficient outcomes.

3. **All parties to work urgently and with escalating commitment** to meet 2030 timelines. Key to this will be the early support of energy consumers.

4. WA Government, Landmark agreement on Pilbara decarbonisation, WA.gov.au, 2023, accessed 1 May 2025.
5. WA Government, Expressions of Interest for Priority transmission projects in the Pilbara, WA.gov.au, 2024, accessed 1 May 2025.

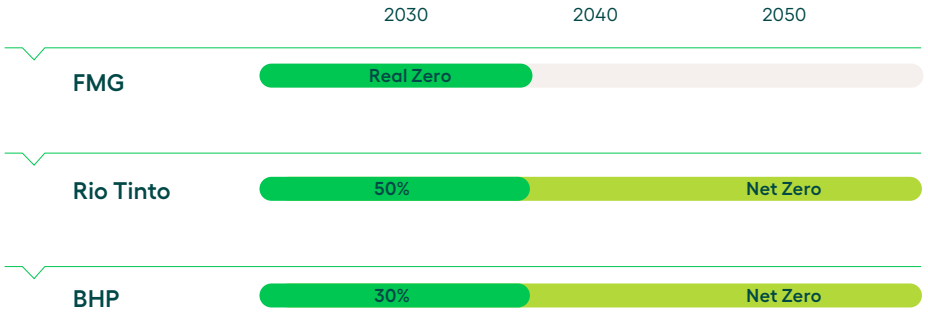
Decarbonisation ambitions

Industry leaders of today

The undeniable economic benefits of the Pilbara bring with them a historically unavoidable emissions cost. Today, the Pilbara accounts for 23 per cent of Australia's industrial emissions[6] and over 40 per cent of Western Australia's emissions.[7]

There is increasing recognition that these emissions are no longer an inevitable or unavoidable outcome of these economic activities, with decarbonisation gaining greater focus from key industry players. The Safeguard Mechanism is also a key driver for reducing emissions from heavy industry, keeping Australia on track for its emission reduction targets. In fact, many large industrial companies in the Pilbara have committed to substantial emissions reduction targets:[8]

Emissions reduction ambitions of key Pilbara companies – Scope 1 and 2



Source: Marsden Jacob Associates analysis of company reports.

Industry leaders of tomorrow

Any discussion about the future of electricity transmission in the Pilbara must consider the green industries of the future, which represent very substantial investment and income benefits for WA and Australia more generally.

Green iron processing, downstream mineral processing and the potential for green hydrogen for chemical and mineral processing, will all require access to a grid that provides diversified renewable energy resources.

These and other significant industries (such as lithium mining, ammonia/fertiliser production) need access to a common, renewable electricity system to meet their own decarbonisation commitments under the Safeguard Mechanism.

> "A co-ordinated scale-efficient transmission system based around common user infrastructure – and including open access for users and generators – can deliver optionality to better anticipate future system needs from decarbonisation and new green industries."
>
> **The CEFC**

6. As measured under the Safeguard Mechanism.
7. WA Government, Pilbara Energy Transition Plan, WA.gov.au, accessed 1 May 2025.
8. Source: Marsden Jacob Associates and company reports.

Benefits of an electrified Pilbara

Economic and emissions

The Marsden Jacob analysis shows that for the same energy, reliability and emissions outcome, around 29 per cent fewer *new* transmission kilometres will be required over 25 years through a common user approach, saving around $4 billion in transmission infrastructure when changes in new and upgraded lines are considered.

The common user approach will also deliver significant savings in generation costs. Around 16 per cent less renewable energy and storage assets are required due to the more efficient common user approach, allowing savings of around $26 billion in aggregate generation capital expenditure costs.

Electrification reduces diesel fuel consumption by approximately 2.8 to 3.6 billion litres per year, with estimated costs of between $4.2 billion and $5.3 billion.[9] With the shift to renewable energy, much less gas is used to generate electricity, saving around $2.2 billion annually. Together with some industrial electrification, this avoids some 24 million tonnes per annum (Mtpa) of carbon dioxide, which, based on Infrastructure Australia's guidance for valuing emissions, corresponds to an average value of $7.6 billion annually.

These savings are being driven through efficiency in energy use and asset deployment, along with the lower cost of finance from specialist energy infrastructure players and investors, such as the CEFC.

9. On average between 2031 to 2050. This is the fuel cost saving, rather than a cost benefit analysis. Capital costs for electric mining equipment were not estimated. Fuel tax credits were not estimated.

Broader benefits

Investment in effective and efficient energy transmission infrastructure is a critical element of any modern economy. But its benefits extend well beyond the industries powering today's Pilbara.

A common user approach can be expected to deliver additional regional, environmental, social and community-related benefits, including:

1. Ensuring transmission lines are appropriately sized to accommodate future demand growth, preventing the unnecessary duplication of assets in the same areas.
2. Easing the pressures on traditional landowners and local communities seeking to limit environmental and social disruption, while supporting timely development.
3. Enabling small and mid-tier industrials and miners to access the grid, to transition to cheaper, cleaner renewable energy, facilitating their own decarbonisation.

According to the Marsden Jacob Associates analysis, these benefits allow a lower cost energy system that can benefit all stakeholders in the Pilbara. The improved efficiency and productivity also benefit the Australian economy overall through more efficient use of capital and labour, avoiding pressure on supply chains and skilled labour at a time the energy transition is moving at pace across the country.

Investment framework

A common user investment framework enables physical assets to be accessed by multiple users and operated under a defined set of terms.

Infrastructure can be owned, operated, and delivered by private or public entities and may include transport, utilities, port infrastructure, and even workers' accommodation.

This framework enables investors and developers to 'right size' infrastructure to meet future requirements. This may benefit all users and stakeholders, for example, by reducing overall input costs through reduced duplication, access to lower-cost finance, more efficient land use, or reduced carbon emissions.

The benefits come in three categories:

1. Avoided direct liquid fuel (diesel) use.
2. Avoided direct gas use as fuel or feedstock.
3. The renewable mix of electricity generation.

What the modelling shows

The Marsden Jacob Associates modelling based on the Energy Policy WA approach and inputs, shows that a common user grid costs less to build and run than the go-it-alone approach historically dominant in the Pilbara. In summary:

Go-it-alone

Were industry participants to go-it-alone and build their own transmission infrastructure, **the capital cost of transmission is forecast to be 40 per cent higher, and the capital cost of generation around 25 per cent higher, over 25 years**.

↑40%

higher capital cost of transmission over 25 years

Common user approach

For the Pilbara, a common user or "fit for system purpose" approach **can reduce the infrastructure footprint by 2,845 ha or 21 per cent for transmission and 9,704 ha or seven per cent for generation** (~12,500 ha or eight per cent in total), requiring fewer approvals and consultations.

↓2,845ha

reduction in infrastructure footprint for generation

Investment framework Cont'd

Investment requirements

Substantial investment is required to achieve this energy shift, but if industry participants were to 'go it alone' in meeting their individual infrastructure and generation needs, the costs are in fact higher.

Over 25 years to 2050 the cost of transmission in the $14.7 billion go-it-alone model is forecast to be some $4 billion or 40 per cent higher than that of the common user approach of $10.5 billion.

The capital cost of generation to 2050 of $131.6 billion in the go-it-alone case is some 25 per cent higher than that of the common user approach of $105.4 billion.

A multi-party common user approach will attract lower cost of funding infrastructure capital than would bespoke go-it-alone solutions. This capital is available from global investors looking for opportunities in renewable energy and decarbonisation with appropriate returns.

Electrifying the Pilbara represents a unique opportunity for the regional and national economy, with the role of new common user transmission infrastructure likely to be a critical success factor.

The CEFC

The role of CEFC capital

CEFC Rewiring the Nation Fund

Through the Rewiring the Nation Fund, the CEFC is investing in the development of a secure, reliable and affordable electricity system as Australia targets net zero emissions by 2050. The CEFC has a strong track record in investing ahead of market participants to address financial, technical and/or commercial market gaps. This experience is vital to the success of grid modernisation, where financial barriers to investment reflect a complex regulatory environment, involving both private sector and Government-owned operators.

Investment approach

The CEFC undertakes a thorough evaluation of the commercial merits and relative investment attractiveness of prospective investments. The selection of particular investments is influenced by the anticipated emission reduction outcomes and impacts, the risk profile of the investment and having regard to the relevant risk settings for CEFC capital. The provision of concessional financing arrangements may include non-market characteristics such as alternate risk positions, lower finance costs, deferred payment arrangements and longer loan tenors.

WA Letter of Intent

In August 2023, the Australian Government and the WA Government announced a letter of intent for up to $3 billion in concessional finance to be made available by the CEFC through the Rewiring the Nation Fund. This capital is intended to leverage private investment to meet the transmission, and infrastructure needs that underpin decarbonisation across WA and the Pilbara and to attract further industry to the region.

About the CEFC

The CEFC is Australia's specialist climate investor, helping cut emissions in the race towards net zero by 2050. We invest in the latest technologies to generate, store, manage and transmit clean energy. Our discounted asset finance programs help put more Australians on the path to sustainability, in their homes and on the road. CEFC capital is also backing the net zero transformation of our natural capital, infrastructure, property and resources sectors, while providing critical capital for the emerging climate tech businesses of tomorrow. With access to more than $32 billion from the Australian Government, we invest to deliver a positive return for taxpayers.

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