

Economic impact assessment of TTRL's Taranaki VTM Iron Sands Project

NZIER report to Trans-Tasman Resources Limited

February 2025

About NZIER

New Zealand Institute of Economic Research (NZIER) is an independent, not-for-profit economic consultancy that has been informing and encouraging debate on issues affecting Aotearoa New Zealand, for more than 65 years.

Our core values of independence and promoting better outcomes for all New Zealanders are the driving force behind why we exist and how we work today. Our purpose is to help our clients and members make better business and policy decisions and to provide valuable insights and leadership on important public issues affecting our future.

We are unique in that we reinvest our returns into public good research for the betterment of Aotearoa New Zealand.

Our expert team are based in Auckland and Wellington and operates across all sectors in the New Zealand economy and combine their sector knowledge with the application of robust economic logic, models and data and understanding of the linkages between government and business to help our clients and tackle complex issues.

Authorship

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What we are asked to do

You have commissioned NZIER to undertake an economic impact assessment (EIA) of TTRL's Taranaki VTM Iron Sands Project (the Project) to support your application for Fast-track consenting approval. In particular, you have asked us to estimate the direct and flow-on economic impacts of the Project on:

- The local economy – South Taranaki and Whanganui
- The regional economy – the Taranaki Region (South Taranaki, New Plymouth and Stratford) and Whanganui
- The New Zealand economy.

An EIA was undertaken by MartinJenkins in 2015 on the Trans-Tasman Resources Offshore Iron Sands project based on data inputs provided by TTRL. For this EIA, we use updated inputs from TTRL and NZIER's Input-Output multipliers model to estimate the direct and indirect impacts on economic activity, gross domestic product (GDP) and employment resulting from the Project's operation. We will also estimate the additional export earnings and contribution to royalties and taxation paid to the New Zealand Government based on the inputs you provided and a more recent data series on exchange rates and the prices of the relevant commodities.

Our main findings are summarised below.

Summary of main findings

TTRL's VTM Iron Sands Project will directly create a total of 303 new full-time equivalent (FTE) jobs across the Taranaki Region and Whanganui District, with an annual direct expenditure of \$221 million on a range of industries in New Zealand

TTRL will employ 173 crew members to operate the IMV and FSO vessels, with over 50 staff members required to support, engineer, perform environmental monitoring, and conduct fuel bunkering roles. There will also be 35 staff who will undertake general administration roles for the day-to-day operation of the Project. In addition, TTRL plans to establish its New Zealand head office in New Plymouth, which will add 35 roles to provide marketing and corporate management.

TTRL plans to spend a total of \$221 million (in 2024 New Zealand dollar terms) in New Zealand across a range of industries, of which \$217 million of this direct operating expenditure will occur in the Taranaki Region and Whanganui District and within that \$47 million in the South Taranaki and Whanganui districts. In total, the Project's operational activities will directly create 303 FTE jobs in the Taranaki Region and Whanganui, with 77 of those being in the South Taranaki and Whanganui districts.

We estimate the Project will increase New Zealand's annual GDP by \$246 million and employment by 1,320 jobs, with about 83 percent of these economic impacts in the Taranaki and Whanganui economies

Based on published GDP data for the year ended March 2023 and Stats NZ's 2024 business demography data, the South Taranaki and Whanganui districts combined made up about



2.7 percent of the New Zealand economy in 2023¹, contributing a total GDP of about \$10,749 million. Meanwhile, the Taranaki region and Whanganui district combined contributed a total GDP of \$25,558 million, making up 6.5 percent of the New Zealand economy. In terms of employment, a total number of 32,000 workers were in the combined area of South Taranaki and Whanganui districts. The Taranaki region and Whanganui district combined had a total count of 74,400 workers, making up 3 percent of the total employment in New Zealand.

Table 1 summarises the total economic impacts of the Project at the local, regional and national levels.

Table 1 Direct employment by activity and region

Study area	South Taranaki/ Whanganui	Taranaki Region/ Whanganui	New Zealand
Output (\$million)	\$86	\$440	\$524
GDP (\$million)	\$40	\$205	\$246
Employment	249	1,093	1,320

Source: NZIER

For each year of the Project's operation, we estimate:

- An annual GDP contribution of \$246 million and about 1,320 jobs to the total New Zealand economy
- Within that national impact, an annual GDP contribution of \$205 million and about 1,093 jobs to the regional economy of Taranaki Region and Whanganui
- Within that regional impact, an annual GDP contribution of \$40 million and about 249 jobs to the local economy of the South Taranaki and Whanganui districts.

The three sets of economic outcomes are not additive. That is, the New Zealand impact includes the regional impact, which includes the local impact.

To the extent that our approach to estimating the economic impacts reflects the expenditure to carry out the activities for the Project, fluctuations in the exchange rate, the price of iron ore and the price of Intermediate Fuel Oil (IFO) used for bunkering will not materially affect our economic impact estimates. We recognise the impact through revenue and, in turn, tax paid to the Crown.

It is important to note that our economic impact analysis captures the benefits from the level of operational and economic activities by overlaying the current structure of the local, regional and national economies rather than the price of iron ore, price of Intermediate Fuel Oil (IFO) or exchange rate. Given that the Project's operation is a relatively fixed process, the level of the Project's operational and economic activities will be unlikely to change over time.

¹ In nominal terms

We estimate the Project could contribute annual iron ore export earnings of \$763 million, and pay annual royalties of between \$36 million to \$53 million to the Crown from its output of iron ore.

TTRL notes the additional royalties that could be generated from production of other minerals including vanadium pentoxide (V_2O_5) and titanium dioxide (TiO_2).

Based on the latest quarterly average price of iron ore and the exchange rate of the New Zealand dollar against the US dollar, we estimate that the Project will contribute additional iron ore export earnings of \$763 million per annum, making iron ore exports one of the top 15 of New Zealand's principal export categories.

Based on TTRL's cash flow projections, and the latest quarterly averages of the exchange rate, prices of inputs and prices of the commodities the Project will produce, we estimate that the Project will contribute \$36 million to \$53 million of royalties from its output of iron ore, and \$91 million to \$134 million corporate tax per year to the New Zealand Government. The lower bound of royalties and corporate tax estimates reflect the higher financing costs in the initial start-up phase of the Project.

According to TTRL, the project outputs in this impact assessment are based on only iron ore concentrate sales of 4.9 million tonne per year even though the concentrate also contains vanadium and titanium. TTRL notes the additional V_2O_5 and TiO_2 metal sales has the potential double the project's annual revenue streams, which could have flow-through effects to the foreign exchange earnings, royalties and corporate tax receipts for the New Zealand Government.

TTRL notes it will make a capital investment of approximately \$1 billion New Zealand dollars in seabed mineral extraction processing and bulk concentrate transfer equipment and supporting infrastructure, marine research and monitoring equipment to establish the operation in the South Taranaki Bight. While this offshore capital expenditure does not directly contribute to the New Zealand GDP, the development of this mining technology underpins mining activity in New Zealand once operational, which has benefits for the mining industry more broadly.

We explain our approach in estimating the New Zealand economic impacts of TTRL's operations and results in more detail in the following sections.



1 The proposed Taranaki VTM Iron Sands Project

The proposed VTM Iron Sands Project plans to extract iron sands resource from the seabed off the South Taranaki Bight (STB). The Project will produce iron ore concentrate for export and other critical minerals, such as vanadium and titanium, which are inputs for clean energy transition. The iron sands resource is located between 22 km and 36 km off the coast of South Taranaki² and in waters ranging between 20 to 50 metres deep.

TTRL plans to produce 4.9 million tonnes of iron ore concentrate per annum, which will be processed aboard Integrated Mining Vessels (IMV). The iron ore concentrate from the IMV will then be transferred to floating storage and offloading (FSO) vessels for trans-shipment, where it will be de-watered and stored, ready for transfer to bulk carrier vessels for shipping to overseas markets.

These vessels will be supported by a mid-sized Anchor Handling Tug (AHT) that will assist with the provisioning of the vessels, transfer of equipment, connecting the IMV to FSO during trans-shipment, the berthing of the FSO to the conventional bulk cargo vessels, and anchor and mooring relocation. The AHT will also provide refuelling assistance. A geotechnical survey vessel (GSV) will undertake testing and monitoring activity for the Project. TTRL will also contract a third-party company for bunker fuel supply, which has a facility in New Plymouth that employs six people.

The Project will directly employ over 170 crew to operate the IMV and FSO vessels and a further 50 plus staff in supporting engineering, environmental monitoring and fuel bunkering roles. There will also be 35 general administration staff for the day-to-day operation of the Project. In addition, TTRL plans to establish its New Zealand head office in New Plymouth, which will add 35 marketing and corporate management roles.

TTRL notes it will make a capital investment of approximately \$1 billion New Zealand dollars in leading edge seabed mineral extraction and ship board mineral processing technologies and ship to ship bulk concentrate transfer equipment, along with mining support and marine research and monitoring vessels and equipment to establish the mineral recovery operation in the South Taranaki Bight. This offshore capital expenditure does not directly contribute to the New Zealand GDP, but the development of this mining technology will underpin mining activity in New Zealand once operational. This benefits the New Zealand mining industry more broadly in the future.

While TTRL is seeking a 35-year consent for the Project, the actual harvesting activity of iron ore will take place over 20 years once the Project starts to operate.

1.1 Our task

NZIER was commissioned to assess the economic impact of the VTM Iron Sands Project's operational activity over a 20-year period, capturing the direct and the flow-on impacts on the local, regional and national economies.

We were also asked to estimate the Project's contribution to New Zealand's export revenue from exporting the iron ore concentrate, and contributions to royalties and taxes to the

² This is within New Zealand's Exclusive Economic Zone, but beyond the 12-mile limit so the Fast Track Approval applies.

New Zealand Government from its production of iron ore concentrate, vanadium and titanium.

Section 2 outlines our methodology and the key inputs and assumptions used in our analysis.

2 Methodology

2.1 Regions for economic impact analysis

Our economic impact analysis is applied to three study areas: 1) the local area, 2) the regional area, and 3) the overall New Zealand economy. The local area comprises the South Taranaki and Whanganui districts, which are closest to the location of the iron sands resource.

The regional study area is the Taranaki Region and Whanganui District. Most of the Project's operational activities will take place across the South Taranaki, Whanganui and New Plymouth districts. These include the onshore operations associated with iron sand mining and most of the direct employment in supporting offshore operations.

Besides the economic impacts on the local and regional economies, our analysis also estimates the flow-on impacts of the Project's operational activities on the New Zealand economy.

Table 2 below summarises the GDP and employment in our local and regional study areas and the total New Zealand economy. MBIE and Stats NZ's GDP estimates for the year ended March 2023 suggest that our local study area combining the South Taranaki and Whanganui districts made up about 2.7 percent of the New Zealand economy, contributing a total GDP of about \$10,749 million. Meanwhile, our regional study area combining the Taranaki region and Whanganui district contributed \$25,558 million of GDP, making up 6.5 percent of the national GDP.

Based on the employee counts from Stats NZ's business demography data, as of February 2024, a total number of 32,000 people were working in our local study area, which was only 1.3 percent of the total employee count in New Zealand. The Taranaki region and Whanganui district combined had a total count of 74,400 workers, making up 3 percent of the total employment in New Zealand.

Table 2 GDP¹ and employment² in the local, regional and national study areas

Millions of dollars and headcount

	South Taranaki/ Whanganui	Taranaki Region/ Whanganui	New Zealand
GDP	10,749	25,558	393,523
Employment	32,000	74,400	2,502,700

1 GDP for the year ended March 2023

2 Count of employees as of February 2024

Source: Ministry of Business, Innovation and Employment's (MBIE) Modelled Territorial Authority GDP, Stats NZ's GDP and business demography data

2.2 Regional input-output multiplier model

We developed a regional input-output (I-O) multiplier model specifically for the three regions to look at the direct, indirect and induced impacts of the Project's operational activities on the local, regional and national economies.

We estimate two flow-on impacts based on the expenditure on inputs used in the mining process:

- Indirect impacts – the change in economic activity in industries which provide supporting goods and services to the mining process.
- Induced impacts – the change in economic activity as a result of people working in the supporting industries or upstream industries increasing their consumption given increased earnings.

The direct impacts are provided by TTRL. The sum of direct and indirect impacts is referred to as Type I impacts, whereas direct, indirect, and induced are referred to as Type II impacts.

We assess flow-on impacts by applying indirect and induced multipliers calculated using Stats NZ input-output tables for the year ended March 2020.

National output multipliers are calculated by obtaining each supporting industry's input coefficient, the amount of output required from the industry to produce a mining industry output and summing the input coefficients across industries.

Regional output multipliers are calculated using the simple location quotient approach. The location quotient is a measure of industry concentration. It is calculated by dividing the share of Taranaki/Whanganui districts' employment in the industry by the share of national employment in the industry. If the location quotient is greater than one, then Taranaki has a higher concentration of the industry than the country as a whole. In this case, we assume the regional input coefficient is equal to the national input coefficient. If the location quotient is less than one, then Taranaki has a lower industry concentration, and we assume the regional input coefficient is equal to the national input coefficient times the location quotient. We obtain the regional indirect multipliers by summing up the regional input coefficients.

This process is repeated for the South Taranaki and Whanganui areas.

There are several limitations associated with using economic multipliers to estimate flow-on impacts:

- **Linear relationships** – they assume that relationships between industries are linear and that firms always require the same quantity and mix of inputs to produce the same level of output.
- **No displacement** – they do not consider the potential for displacement that may occur when output in one industry increases and requires additional resources.
- **No price effects** – they assume that prices remain fixed and do not consider the effects of suppliers raising or lowering prices in response to changes in demand.

- **No supply constraints** – they assume that resources (including labour and capital) are available in unlimited quantities and that extra output can be produced in one industry without taking resources away from other industries.

2.3 Key inputs and assumptions

TTRL provided us with their planned employment and expenditure per annum for the Project's operational activities. These are the inputs for our regional I-O multipliers analysis to estimate the economic impacts of those activities on the local, regional and national areas.

2.3.1 Direct employment

Direct expenditure and employment are the key inputs that go into our regional I-O multipliers to estimate the indirect and induced economic impacts of the Project's activities.

Table 3 sets out the number of employees that will be directly employed for the day-to-day operation of the Project by region. All direct employment by TTRL for the Project will be in the Taranaki/Whanganui region, adding a total of 303 FTEs. Of those, 77 FTEs will be located in the local area (South Taranaki/ Whanganui). Note that the six FTEs for bunkering will be employed by TTRL's third-party bunker fuel supplier based in New Plymouth.

Table 3 Direct employment by activity and region

Number of FTEs

Activity	South Taranaki/ Whanganui	Taranaki Region/ Whanganui
IMV and FSO vessels	52	173
Anchor Handling Tug	0	36
Bunkering	0	6
Geotechnical Survey Vessel (GSV)	18	18
General and admin	7	35
Head office	0	35
Total	77	303

Source: TTRL

Table 4 summarises the number of direct FTEs created in the local and regional areas by the relevant industry classification.

Table 4 Direct employment by industry and region

Number of FTEs

Industry	South Taranaki/ Whanganui	Taranaki Region/ Whanganui
Exploration and other mining support services	52	173
Other transport	14	50
Basic material wholesaling	0	6

Industry	South Taranaki/ Whanganui	Taranaki Region/ Whanganui
Scientific, Architectural and Technical Services	4	4
Legal and accounting services	7	35
Advertising, market research and management services	0	35
Total	77	303

Source: TTRL

2.3.2 Direct expenditure

Based on TTRL's current project plans, 67 percent of its annual operating expenditure will be spent in New Zealand, and the remaining portion will be spent offshore. We calculated that the annual direct expenditure in New Zealand by the Project will be approximately \$221 million.³ Within this expenditure in New Zealand, over 98 percent (approx. \$217 million) will be spent in the Taranaki/Whanganui region, and about 21 percent will be in South Taranaki/ Whanganui.

Table 5 shows the breakdown of the Project's direct expenditure per annum by industry classification and the region where it is expected to occur. The expenditure in the South Taranaki/Whanganui local area is within the expenditure in the Taranaki/Whanganui region, which is within the expenditure in New Zealand.

Table 5 The Project's direct expenditure in New Zealand

\$million, adjusted to 2024 using Stats NZ's GDP deflator

Industry	South Taranaki/ Whanganui	Taranaki Region/ Whanganui	New Zealand
Exploration and other mining support services	\$21.8	\$81.0	\$81.0
Basic material wholesaling	0	\$42.3	\$42.3
Fabricated metal product manufacturing	\$13.8	\$27.7	\$27.7
Other transport	\$2.6	\$13.4	\$13.4
Scientific, architectural and technical services	\$5.4	\$17.9	\$17.9
Health and general insurance	0	\$1.0	\$5.1
Legal and accounting services	\$3.7	\$18.5	\$18.5
Advertising, market research and management services	\$0	\$14.8	\$14.8
Total	\$47.4	\$216.6	\$220.7

Source: TTRL, NZIER estimates

2.3.3 Intermediate Fuel Oil prices

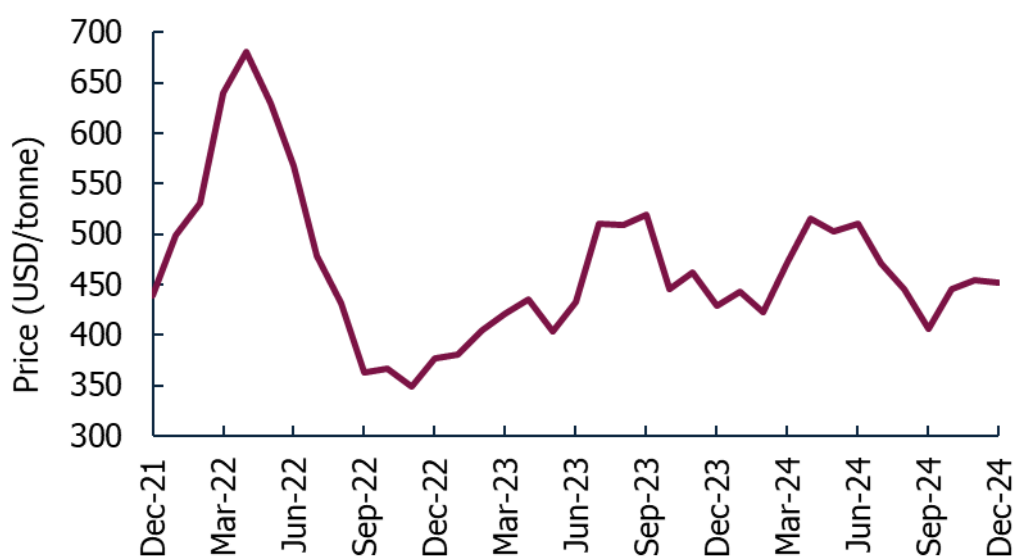
Our economic impact analysis is based on the direct expenditure in New Zealand, as shown in Table 5 above. The operation of the Project is a relatively fixed process. According to

³ This is estimated by adjusting the direct expenditure figures to 2024 dollars using Stats NZ's GDP deflator to reflect the growth in the New Zealand economy.

information from TTRL on the cost structure of the Project, over two-thirds of the direct costs are considered fixed. The remainder is the cost of Intermediate Fuel Oil (IFO) used to operate the IMVs. Although TTRL will source IFO through its supplier located in New Plymouth, IFO will be imported by TTRL's third-party supplier. This means that IFO costs are exposed to volatility in the global IFO price and exchange rates.

The type of IFO TTRL plans to use for the Project is IFO 380. This type of IFO originates from Singapore, which is the closest refiner for a New Zealand-based company to import IFO from. Figure 1 shows that, over the last three years, the price of IFO 380 fluctuated between US \$349 per tonne and US \$680 per tonne, with the average price in the December 2024 quarter being US \$450 per tonne.

Figure 1 IFO 380 Singapore bunker fuel price, monthly average



Source: Bloomberg

Looking ahead, IFO prices tend to correlate with movements in crude oil prices, which are expected to soften over the coming years as the increase in global supply is expected to outpace the increase in demand.⁴

It is important to note that our economic impact analysis captures the benefits from the Project's operational and economic activities within the current structure of the local, regional and national economies with TTRL's expected expenditure on operations. According to TTRL's plan, the Project will use 7,000 tonnes of IFO 380 fuel per month. This volume is unlikely to change over time. Our economic analysis is underpinned by the level of activities and the structure of the New Zealand economy, not the prices of inputs. Therefore, our economic impact estimates should not be materially affected by changes in IFO prices.

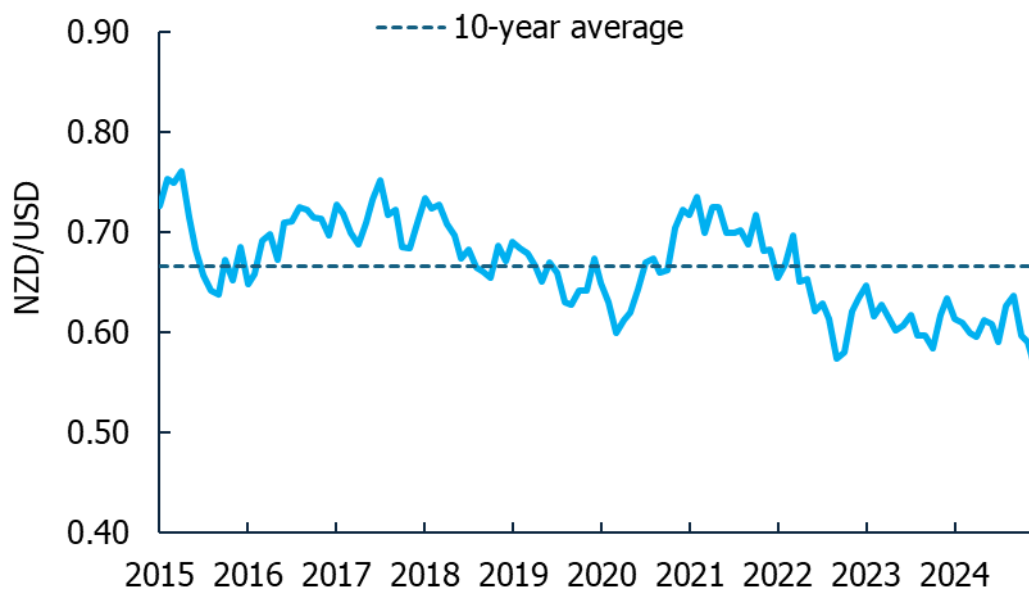
⁴ Energy, metals & agriculture consensus forecasts compiled by Consensus Economics Inc.

2.3.4 Exchange rate

The Project's IFO cost can also be affected by movements in the New Zealand dollar to US dollar exchange rate.

Figure 2 shows that the New Zealand dollar has fluctuated between US \$0.56 and US \$0.76 over the last 10 years between 2015 and 2024, with a 10-year average of US \$0.67. Since early 2021, the New Zealand dollar against the US dollar has been trending lower. In particular, since October 2024, the New Zealand dollar has been depreciating against the US dollar, averaging around US \$0.58 in the December 2024 quarter. The continued declines in the Official Cash Rate (OCR) by the Reserve Bank of New Zealand are weighing on the yield attractiveness of the New Zealand dollar. While this recent development could pose a downside risk to the outlook of the New Zealand dollar over the coming year, we expect the RBNZ to undertake OCR cuts at a more measured pace beyond February.

Figure 2 NZD/USD exchange rate, monthly average, 2015 to 2024



Source: Reserve Bank of New Zealand

Because our economic impact analysis captures the direct expenditure in New Zealand in New Zealand dollars, fluctuations in the exchange rate will not have a material impact on the economic impact of the Project's operational activities in New Zealand. However, given that the iron ore concentrate extracted from iron sands mining will be exported to global markets, movements in the exchange rate will directly impact TTRL's revenue generated from the Project. A lower New Zealand dollar against the US dollar means higher revenue received in New Zealand dollars from exporting iron ore concentrate.

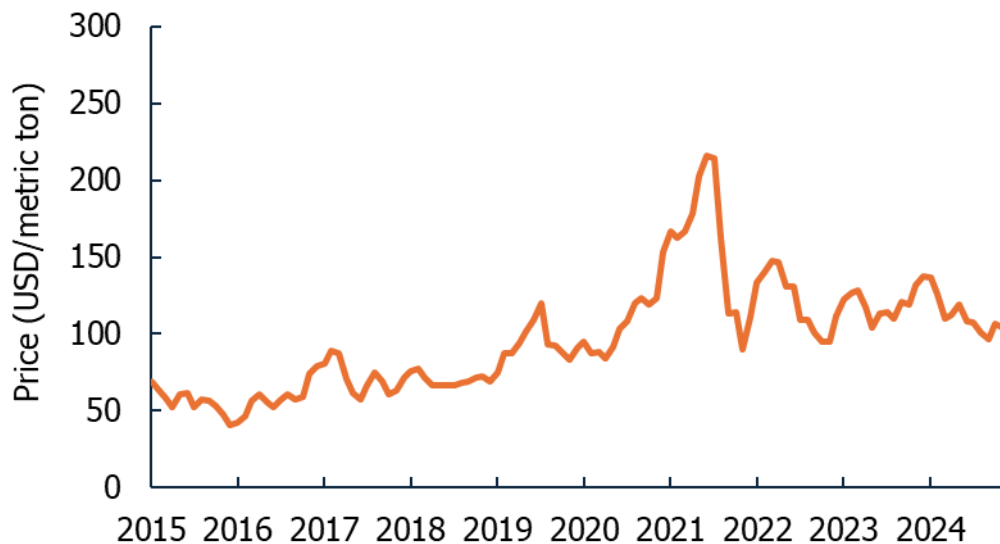
2.3.5 Prices of iron ore, vanadium pentoxide and titanium dioxide

TTRL's revenue from the Project will also depend on the prices of commodities produced by the Project, including iron ore, vanadium pentoxide (V_2O_5) and titanium dioxide

As shown in Figure 3, the average price of iron ore (compiled by the IMF) increased sharply during the first year of the COVID-19 pandemic between mid-2020 and mid-2021, reaching US \$216 per metric ton by June 2021. The price then fell in late 2021 to around US \$90 per metric ton. Since then, the iron ore price has been fluctuating between US \$90 per metric ton and US \$147 per metric ton. For the December 2024 quarter, the average price was US \$105 per metric ton. Consensus Economics' latest consensus forecasts point to expectations of a softening in iron ore prices over the coming years.

The iron ore concentrate that the Project will be extracting from iron sands mining is 58 percent iron ore concentrate, which gets exported at a discount. The discount generally varies between 10 and 20 percent, and information from TTRL recommends a discount of 13.7 percent applied to the price of the 62 percent iron ore concentrate, which is very similar to the IMF's series of average iron ore prices.

Figure 3 Iron ore price, monthly average, 2015 to 2024

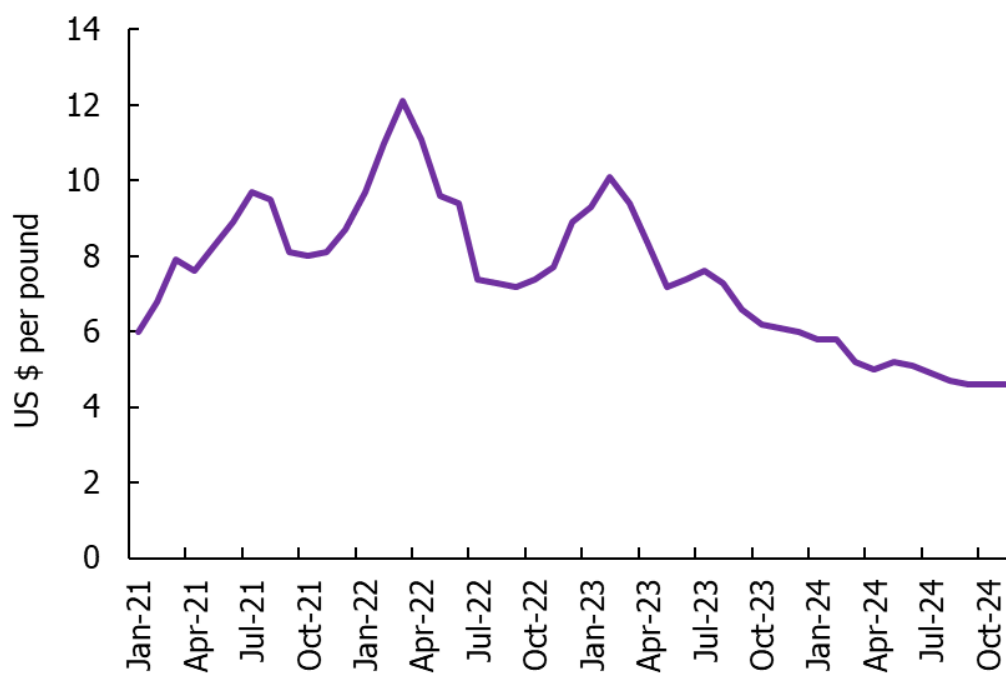


Source: IMF

The Project will also produce other minerals such as V_2O_5 and TiO_2 from its mining activity. Figure 4 and Figure 5 show the trends in the monthly average prices of V_2O_5 and TiO_2 , over the last three or four years, respectively. Price of V_2O_5 has been trending lower since April 2023, with it declining to US \$4.6 per pound. For TiO_2 , its price reached a 3-year high of US \$3,230 per tonne in March 2022 and fell sharply to US \$2,050 per tonne by October 2022. Since then, its price has been fluctuating roughly within the range of US \$2,000 to US \$2,400 per tonne. The latest quarterly average prices of V_2O_5 and TiO_2 were US \$4.6 per pound and US \$2,060 per tonne, respectively.⁵

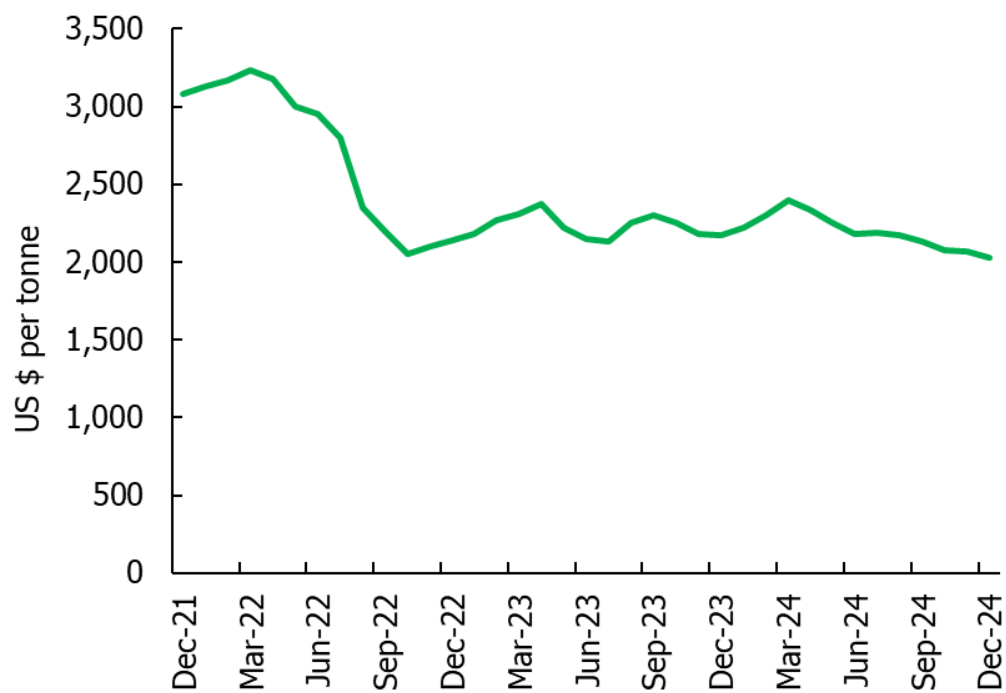
⁵ We note that there has been a sharp decrease in the global supply of TiO_2 due to a sharp increase in the cost of inputs and reduced production capacity, which has caused a price spike in the recent month. While we acknowledge this upside risk, this is outside the realms of the historic volatility in prices over the last few years. Therefore, we have excluded the recent price spike as an input into our analysis in this report.

Figure 4 Price of V₂O₅ 98%, monthly average



Source: Bloomberg

Figure 5 Price of TiO₂, monthly average



Source: Bloomberg

2.3.6 Royalties and taxes

As a mining permit holder, TTRL must pay royalties to the Crown in respect of all minerals obtained under the permit. It must pay the higher of:

- An *ad valorem* royalty of 2 percent of the net sales revenue of the minerals obtained under the permit, or
- An accounting profits royalty of 10 percent of the accounting profits, or provisional accounting profits, of the minerals obtained under the permit.

Besides royalties, TTRL will also have to pay company tax as it is a registered New Zealand Company. Any new employment will pay income taxes, and new spending generates GST and excise taxes on fuel. However, it is not practical to estimate individual taxes due to variations in tax provisions, and in any case, they are not significantly different from any other project of similar scale, so while we acknowledge this as an additional contribution to government revenues, it is not estimated here. Royalties warrant estimation as they are a distinct revenue source.

While the focus of our economic impact analysis is on the Project's direct expenditure in its operational activities, changes in exchange rates, prices of iron ore, V_2O_5 and TiO_2 or IFO prices will lead to changes in the Project's costs of inputs and revenue. These ultimately influence the Project's economic contribution in terms of royalties and taxes paid to the New Zealand Government from its production of iron ore and other minerals such as V_2O_5 and TiO_2 .

Our calculations of the additional economic contribution of the Project, in terms of export earnings, royalties and taxes, used the most recent quarterly averages of:

- exchange rate at US \$0.58
- IFO 380 price at US \$450 per tonne
- iron ore price at US \$105 per metric ton
- price of V_2O_5 at US \$4.6 per pound
- price of TiO_2 at US \$2,060 per tonne.

Given our analysis is based on the data and projections provided by TTRL, our report does not include the impact of V_2O_5 and TiO_2 credits on net revenues and foreign exchange receipts, royalties and corporate tax to the NZ Government.

3 Results of economic impact analysis

Economic impact analysis (EIA) shows the additional impact on economic activity (gross output, gross domestic product (GDP) and employment) directly attributable to an event or action. The EIA has been calculated for the local area (South Taranaki and Whanganui districts), the regional area (the Taranaki Region and Whanganui District), and New Zealand.

The three sets of economic outcomes are not additive. That is, the New Zealand impact includes the regional impact, which includes the local impact.

Expenditure in Table 5 is used to estimate the operational costs to which we have applied the multipliers.

3.1 Impacts at a local level

TTRL forecasts that \$47 million will be spent on inputs to the operation in the South Taranaki and Whanganui Districts. The increase in direct GDP as a result of this is estimated to be \$21 million, and an additional 122 people will be employed (see Table 6).

Direct employment measures are replaced for each contributing sector where there is available information (see Table 4). This is applied at all levels and flows into the Type I and Type II impacts.

When we account for Type II impacts, the initial direct expenditure of \$47 million is expected to result in an increase of \$40 million in GDP and 249 jobs (as measured by headcount).

Table 6 Economic impact of activity at a local level

Millions of dollars and headcount

	Direct	Direct + Indirect	Direct + Indirect + induced
Output	47.37	70.15	86.05
GDP	20.52	31.01	39.80
Employment	121.73	191.17	248.94

Source: NZIER

3.2 Impacts at a regional level

TTRL forecasts that \$217 million will be spent on inputs to the operation in the Taranaki Region and Whanganui District. The increase in direct GDP as a result of this is estimated to be \$96 million, and additional employment of 394 people.

When we account for Type II impacts, the initial direct expenditure of \$217 million is expected to result in an increase of \$205 million in GDP and 1,093 jobs (as measured by headcount).

Table 7 Economic impact of activity at a regional level

Millions of dollars and headcount

	Direct	Direct + Indirect	Direct + Indirect + induced
Output	216.65	353.73	440.09
GDP	96.04	158.28	205.20
Employment	393.37	792.41	1,092.77

Source: NZIER

3.3 Impacts at a national level

TTRL forecasts that \$221 million will be spent on inputs to the operation across New Zealand. The increase in direct GDP as a result of this is estimated to be \$98 million and an additional 397 people.

When we account for Type II impacts, the initial direct expenditure of \$221 million is expected to result in an increase of \$246 million in GDP and 1,320 jobs (as measured by headcount).

Table 8 Economic impact of activity at a national level

Millions of dollars and headcount

	Direct	Direct + Indirect	Direct + Indirect + induced
Output	220.71	408.89	523.97
GDP	97.82	185.23	246.23
Employment	397.02	948.15	1,319.80

Source: NZIER

4 Export earnings

According to TTRL's proposed plan for the Project, it will export all 4.9 million tonnes of the iron ore concentrate produced from iron sands mining to global markets. Based on the average iron ore price (US \$105 per metric ton) and exchange rate (NZ\$=US \$0.58) in the December 2024 quarter, the Project is expected to generate a revenue of \$763 million per annum from its iron ore exports (in 2024 dollars).

The value of New Zealand's exports in the year to June 2024 totalled about \$66 billion. This means that TTRL's iron ore exports of \$763 million from the Project would contribute 1.2 percent of New Zealand's total exports⁶ if it had been operating in 2024, and it would be one of the top 15 of New Zealand's principal export categories (see Table 9 below). This, together with the exports in the iron and steel and articles of iron and steel category, would add up to a value of about \$1.6 billion, which would be about 2.4 percent of the total exports.

These results illustrate that TTRL's VTM Iron Sands Project will contribute to the Government's goal of doubling the value of New Zealand's exports over the next 10 years.

Table 9 New Zealand's principal exports, year ended June 2024

Millions of dollars

Export category	Export value
Dairy Produce: Total	18,991
Total Meat and Edible Offal	8,616
Forest Products: Total	5,705

⁶ FOB value of exports (excluding re-exports).

Export category	Export value
Fruit and Nuts	4,010
Fish, Crustaceans and Molluscs	1,958
Machinery and Mechanical Appliances	1,919
Aluminium and Articles of Aluminium	1,560
Casein and Caseinates	1,557
Electrical Machinery and Equipment	1,106
Precious Stones, Metals and Jewellery	970
Iron and Steel and Articles of Iron and Steel	837
Mineral Fuels	778
TTRL iron ore exports⁷	763
Vegetables	520
Plastic Materials and Articles of Plastic	482
Wool	448
Raw Hides and Skins and Leather	268
Live Animals	208
Fabrics, Textiles and Apparel	140
Tallow	100
Sausage Casings	87
Carpets and Other Textile Floor Coverings	76
Printed Books, Newspapers etc	27
Methanol	Figure not available

Note: the TTRL iron ore exports are based on TTRL's projections of iron ore concentrate export volumes and the average iron ore price and NZD/USD exchange rate in the December 2024 quarter.

Source: Stats NZ, NZIER estimates

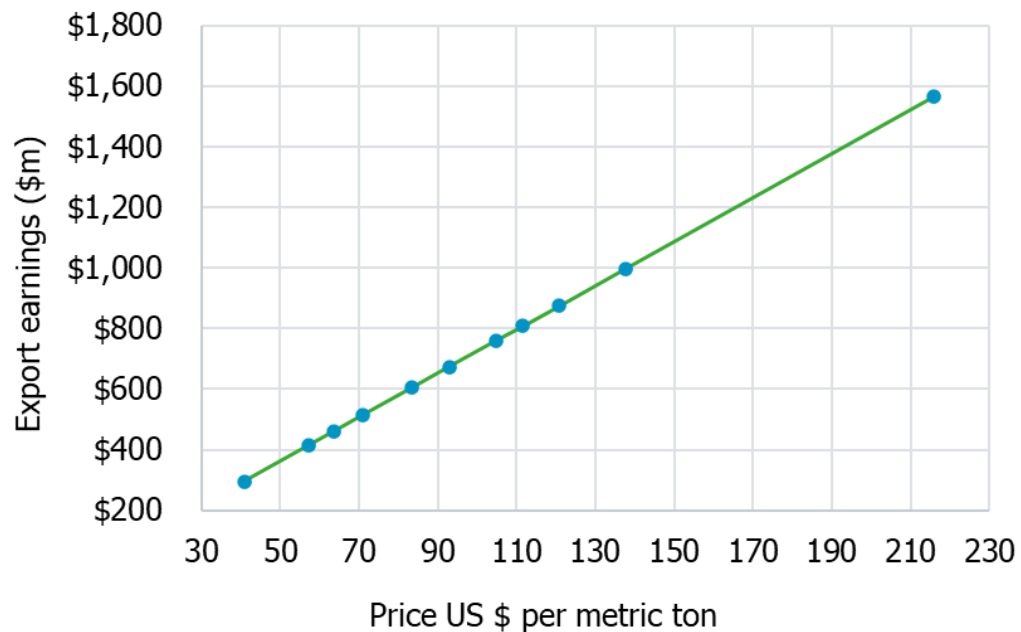
4.1.1 Iron ore price and exchange rate sensitivity

The price and the exchange rate at which iron ore concentrate is traded in the global markets will directly impact the revenue TTRL receives from its iron ore exports. We have undertaken analysis to test the sensitivity of expected iron ore export earnings to changes in iron ore price and exchange rate, respectively. Note these sensitivity tests were undertaken by changing only one input at a time and holding all other variables constant.

Figure 6 below points to a strong positive relationship between iron ore price and export earnings. By taking the minimum, maximum and the 10th to 90th percentiles of the 10-year iron ore price series, we calculated a range of iron ore export earnings between \$296 million per annum (when iron ore price is US \$41 per metric ton) and \$1.6 billion per annum (when iron ore price is US \$216 per metric ton).

⁷ Based on projections and the most up to date prices for iron ore and NZD/USD exchange rate.

Figure 6 Sensitivity of iron ore export earnings to iron ore price



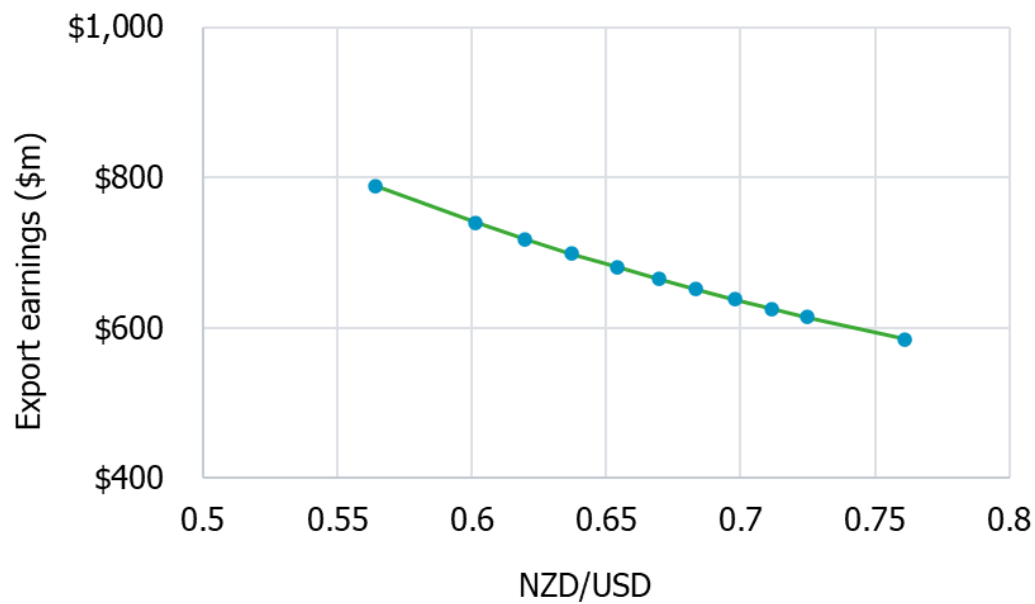
Note: Iron ore price is the only changing variable in this sensitivity test. All other variables are held constant.

Source: NZIER's estimates

In contrast, iron ore export earnings are negatively associated with the level of the exchange rate of the New Zealand dollar against the US dollar (see Figure 7 below). Holding all other variables constant, the range of exchange rate over the last 10 years would give annual iron ore export earnings ranging from \$585 million per annum (at NZ\$=US \$0.76) to close to \$790 million per annum (at NZ\$=US \$0.56).

Comparing the magnitudes of the impact of exchange rate changes to that of changes in iron ore price, our sensitivity analysis suggests that export earnings are more sensitive to the volatility in iron ore price.

Figure 7 Sensitivity of iron ore export earnings to exchange rate



Note: Exchange rate is the only changing variable in this sensitivity test. All other inputs are held constant.

Source: NZIER's estimates

5 Contribution to royalties and taxes

Figure 8 shows the annual royalties TTRL will potentially pay to the Crown based on the projected output of iron ore from the Project's operation.

At our assumed prices of iron ore, IFO cost and exchange rate, TTRL will more likely pay royalties at 10 percent of the Project's accounting profits. Based on TTRL's projected cash flows for the Project, which include interest expense, depreciation and amortisation, we calculated the annual royalty payment to be between \$36 million and \$39 million in the Project's first seven years of operation, increasing to about \$53 million per annum thereafter. After deducting these estimates of royalty payment from the Project's net profit and applying the 28 percent corporate tax rate, we calculated that annual corporate tax paid to the Crown to range from \$91 million to \$134 million. Note that the lower bound of the royalties and corporate tax estimates in reflect the higher financing costs in the start-up phase of the Project.

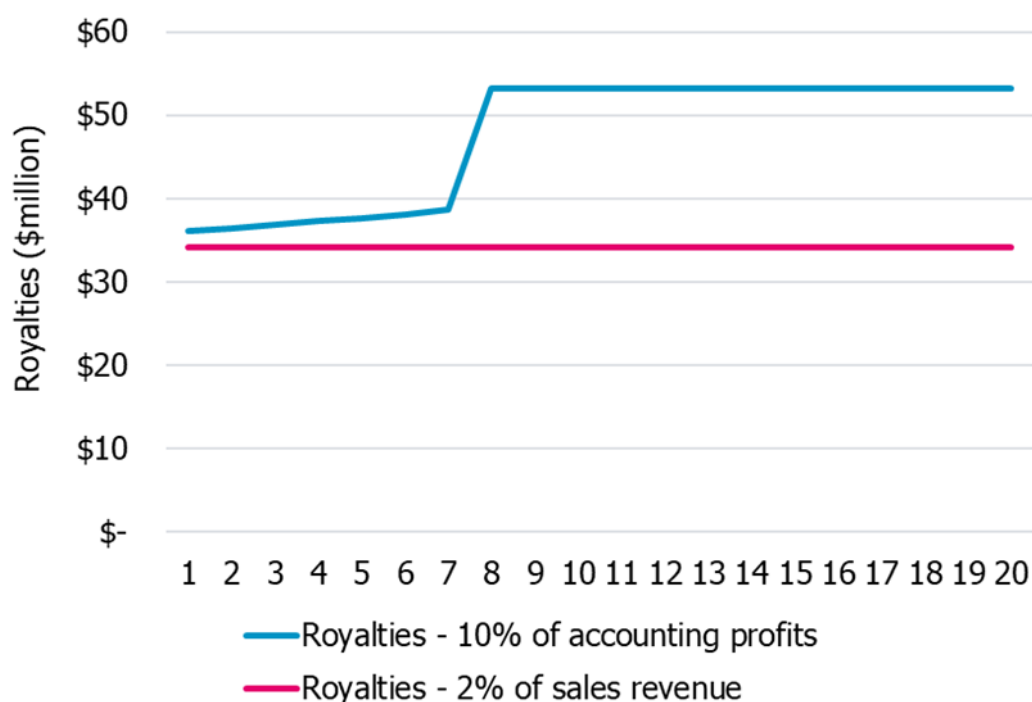
Putting the contribution to royalties into the broader context, data from New Zealand Petroleum and Minerals shows that petroleum, minerals and coal royalties were about \$221 million, of which minerals accounted for just over \$14 million (6.6 percent). With the Project in operation, TTRL's royalty payment would increase minerals' contribution to total petroleum, minerals and coal royalties to close to 20 percent.

TTRL notes the project outputs in this impact assessment are based on only iron ore concentrate sales of 4.9 million tonnes per year even though the concentrate also contains vanadium and titanium. Any potential revenue credits (sales) for vanadium and titanium



have not been included in the economic analysis. TTRL refers to estimates that this potential upside in production amounts to some 19,000 tonnes of V_2O_5 and 327,000 tonnes of TiO_2 per annum in the VTM concentrates at metallurgical recovery rates of 77% to 79%⁸. TTRL notes these additional metal sales has the potential to double the project's annual revenue streams, with flow-through effects to the foreign exchange earnings, royalties and corporate tax receipts for the New Zealand Government.

Figure 8 Estimated contribution to total annual royalties from production of iron ore concentrates



Source: NZIER's estimates based on current assumptions and TTRL's projected cash flows

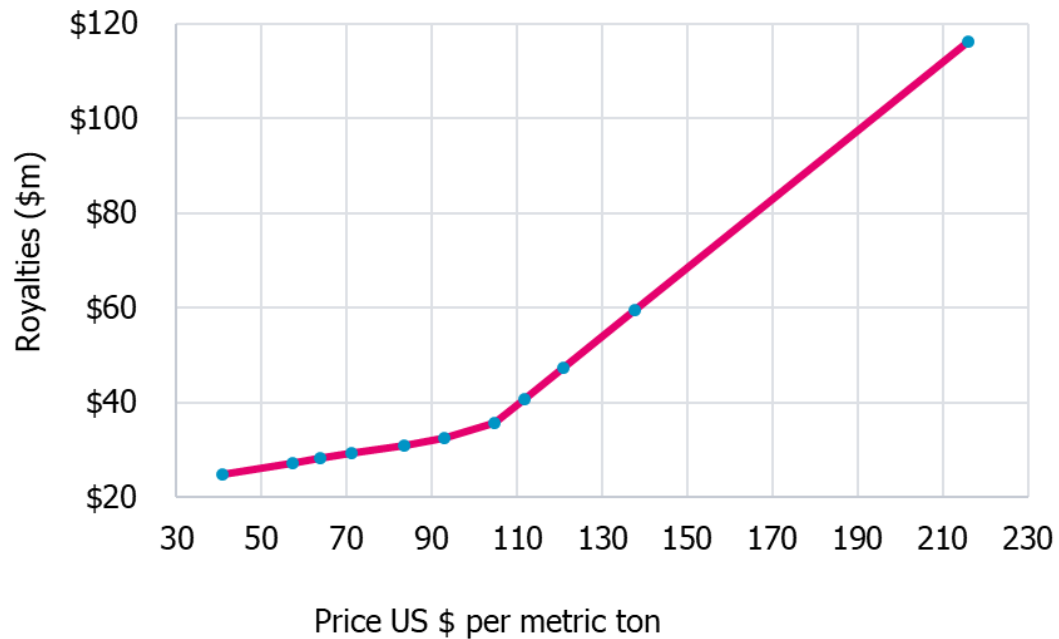
5.1.1 Sensitivity of TTRL's royalty payment to iron ore price

Our sensitivity analysis shows a strong positive relationship between royalties and iron ore prices. This is unsurprising given the relationship between iron ore export earnings and iron ore price illustrated in section 4.1.1.

Based on the range of the average iron ore price in Figure 3, the Project's minimum annual contribution to royalties can range from \$25 million to \$116 million. The kinked curve shown in Figure 9 suggests that, holding all other variables constant, at an iron ore price of below US \$103 per metric ton, TTRL's minimum royalty payment will be 2 percent of the sales revenue. It will be 10 percent of the accounting profit when the iron ore price is above US \$103 per metric ton.

⁸ TTRL internal technical report: TTR Metallurgical Review: Recovery of Vanadium from Taranaki VTM Project, Siecap (NZ) Limited 4 February 2025

Figure 9 Iron ore price and TTRL's minimum royalty contribution



Note: Iron ore price is the only changing variable in this sensitivity test. All other inputs are held constant.

Source: NZIER estimates

5.1.2 Sensitivity of TTRL's royalty payment to exchange rate and IFO price

Table 10 below shows the possible range of direct costs and minimum royalty payment using minimum and maximum exchange rates and IFO 380 price shown in Figure 1 and Figure 2.

Table 10 Estimated range of direct costs and minimum royalty payment

Millions of dollars, annual

Estimate	NZD/USD exchange rate		IFO 380 price	
	Maximum exchange rate (NZ\$=US \$0.76)	e (NZ\$=US \$0.56)	Maximum price (US \$680 per tonne)	Minimum price (US \$349 per tonne)
Direct costs	\$126	\$170	\$197	\$149
Minimum royalty payment	\$28	\$37	\$34	\$38

Note: The sensitivity analysis was undertaken by changing one variable only at a time and holding everything else constant.

Source: Stats NZ, NZIER estimates

Holding everything else constant, we calculated that TTRL's minimum royalty payment from the Project is \$28 million per annum when the New Zealand dollar is at the 10-year maximum of US \$0.76 and \$37 million per annum when the New Zealand dollar is at the 10-year minimum of US \$0.56. Although a lower New Zealand dollar increases the iron ore



export earnings received (refer to Figure 7), it also leads to an increase in direct costs, in particular, the IFO cost.

Our sensitivity analysis also indicates that at a higher price of the IFO 380 bunker fuel, higher direct costs reduce the Project's contribution to royalties. Holding everything else constant, the minimum royalty payment paid by TTRL can range from \$34 million per annum to \$38 million per annum. This variability in royalty payment is rather small, given how volatile IFO 380 prices have been over the last three years (Figure 1).

Overall, our sensitivity testing suggests that the Project's contribution to royalties is more sensitive to volatility in the iron ore price than to the exchange rate or the IFO price.

6 Concluding comments

Our analysis demonstrates that TTRL's VTM Iron Sands Project will bring benefits to the New Zealand economy. The Project will directly create a total of 303 new FTE jobs in the Taranaki and Whanganui region, with 77 of those located in the local area of the South Taranaki and Whanganui districts.

Compared to the current situation where the Project is not in place, we estimate the flow-on economic impacts from the Project's annual operational activities will be:

- An annual GDP contribution of \$246 million and about 1,320 jobs to the total New Zealand economy.
- Within that national impact, an annual GDP contribution of \$205 million and about 1,093 jobs to the regional economy of the Taranaki Region and Whanganui District
- Within that regional impact, an annual GDP contribution of \$40 million and about 249 jobs to the local economy of the South Taranaki and Whanganui districts.

Those economic impacts are estimated based on TTRL's forecast direct expenditure on its operational activities in New Zealand, as well as a limited range of assumptions on key variables. Our multiplier approach also does not account for input constraints, price changes and effects in other sectors that offset the Project's positive impacts on the economy arising from increased production.

At the current iron ore price and exchange rate, the Project is expected to contribute iron ore export earnings of \$763 million per annum, making iron ore exports one of the top 15 of New Zealand's principal export categories. During the 20-year operation phase of the Project, TTRL will contribute \$36 million to \$53 million in royalties from its output of iron ore and \$91 million to \$134 million in corporate tax per year to the New Zealand Government. These additional economic contributions are subject to potential V₂O₅ and TiO₂ metal sales generating additional revenue, changes in prices of these commodities and exchange rates.

