The Point Solar Farm

Economic Assessment

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Far North Solar Farms

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Contents

Figures and Tables

Executive Summary

The Point Solar Farm is a proposed 450 MWp photovoltaic solar farm on a 678ha site near Lake Benmore in the Mackenzie Basin. The project is proposed by Far North Solar Farms (FNSF) and is a listed project under Schedule 2 of the Fast-track Approvals Act 2024 (FTAA). Resource consent is sought for a term of 35 years. This report is an economic assessment of the proposed project's impact by Market Economics Ltd.

The site is currently a cut-and-carry runoff block supporting a dairy farm located 10 – 15km away. The site generates negligible economic value in its present state. It generates no rental income and has a total labour input of around 5 – 7 hours per week. The site has a Land Use Capability classification of 6 (non-arable), and the Department of Conservation has described it as ecologically depauperate. If it were to be rented, the estimated rental value of the portion of the site where the solar farm will be located is just $300 per ha. The total economic value of the land and its output under the business-as-usual scenario is essentially nothing[1], and all economic activity associated with the proposal is additional to the status quo.

The total estimated capital cost is $[redacted], of which $[redacted] (47%) is domestic expenditure. The balance is imported inputs which New Zealand does not currently manufacture. We model the GDP and employment impacts of domestic expenditure through a Multi-Region Input-Output framework. This modelling estimates total value added of approximately $330m over the 33-year appraisal period (comprising 36 months' construction and 30 years' operation), discounted at 8%. Total employment supported is approximately 4,000 MEC years, distributed across Mackenzie District, the wider Canterbury region, Otago and nationally.

The construction phase is estimated to support 772 direct jobs, equivalent to 257 per year, which aligns closely with the estimate by FNSF of 250 per year. The operational phase is estimated to sustain around 15 direct jobs per year, with these jobs associated with spending on land lease payments, operations and maintenance, and ecological restoration projects.

Lease payments of $[redacted] per year represent a direct transfer to the landowner approximately 6x the estimated farming rental value. Meanwhile, the annual energy generation of 718GWh is sufficient to power around 100,000 homes and has an estimated wholesale market value of $[redacted] per year.

The Ecological Enhancement Plan involves an initial investment and then sustained ongoing investment as part of the operational and maintenance costs. This This will fund the restoration of 80 ha of dryland habitat, pest-proof fencing across the entire site, pest control, and dedicated reserves for threatened species including the Robust grasshopper and habitat supporting the Kakī Recovery Programme. These activities would not occur under the counterfactual. The MRIO modelling estimates an average of 3 direct jobs and $4.3 million in direct value added from this spending over 30 years. However, we also note that

[1] Some impacts are calculated net of the potential land rental value to demonstrate additionality under conservative counterfactual assumptions.

there is social and intrinsic value of these ecological outcomes, and these substantially exceed the GDP and employment contribution of the spending itself.

The project will contribute to New Zealand's emissions reduction targets, with emissions from solar PV among the lowest of any generation technology. Solar generation also supplements the existing hydroelectric capacity, enabling damns to store more water for peak usage and thus improving the resilience of the South Island's system.

The project is consistent with the FTAA's purpose of facilitating infrastructure with significant regional or national benefits. It aligns with the NPS for Renewable Electricity Generation, the Emissions Reduction Plan, the Climate Change Response (Zero Carbon) Amendment Act 2019 and relevant provisions of the Mackenzie District Plan. It meets the criteria identified in section 22(2)(a) of the FTAA across multiple benefit streams: significant economic benefits, nationally significant infrastructure, climate change mitigation, and climate change adaptation.

In our assessment, the economic benefits of the Point Solar Farm are significant at a regional level, and a strong case exists for national significance.

1 Introduction

1.1 Background

Far North Solar Farm Ltd (FNSF) proposes to construct and operate a 450 MWp photovoltaic solar farm near Lake Benmore in the Mackenzie Basin, Canterbury. The solar farm will occupy a 678ha site within Section 3 SO 384036. The property is a 970ha site, of which 290ha is planned to be leased back to the owner to continue farm operations. Consent is being sought under the Fast-track Approvals Act 2024 (FTAA).

Market Economics Limited (M.E) has been engaged to provide an independent economic assessment in support of the resource consent application. M.E is an independent economic consultancy with extensive experience in economic impact assessments for renewable energy and infrastructure projects. This report contains independent analysis and is designed to inform decision-making under the FTAA.

1.2 The Application

FNSF proposes to construct and operate a photovoltaic solar farm on a site adjacent to the Haldon Arm of Lake Benmore in the Mackenzie Basin. The site is located within the Rural Zone and the Mackenzie Basin Subzone, identified as an Outstanding Natural Landscape (ONL) in the Mackenzie District Plan. Resource consent is required from Mackenzie District Council and Canterbury Regional Council as a discretionary activity.

The proposed solar farm will comprise approximately 450 MWp of photovoltaic panels on single-axis tracker systems, a Grid Injection Point (GIP) connecting to the adjacent Benmore-Islington 220 kV transmission line, associated substations and ancillary infrastructure. Panels will cover approximately 33% of the site area once setbacks, spacing and ecological areas are accounted for. The site will include approximately 80ha of non-solar land dedicated to ecological enhancement, screen planting, and a 14ha invertebrate reserve the Robust Grasshopper (*Brachaspis robustus*), New Zealand's largest lowland grasshopper and a species found only along the braided rivers of the Mackenzie Basin. The EEP provides for approximately 36,000 native plantings for screening purposes, site-wide rabbit-proof fencing, expanded pest control across adjacent river and delta areas, and support for the Department of Conservation's (DoC) Kakī (Black Stilt) Recovery Programme. None of these measures is currently undertaken on the site.

The site is currently a runoff block providing dairy support to a farm located 10 – 15 km away. The land is intensively tilled for green feed cropping and hay production. Assessment by DoC ecologists has described the site as "ecologically depauperate," with vegetation cover predominantly comprising grazed exotic

grassland and cropland[2]. The soil is classified as LUC Class 6, indicating it is non-arable, with limitations to pastoral use and therefore productive output potential.

The construction phase is anticipated to span 36 months. Resource consent is sought for a term of 35 years, consistent with the lease agreement between FNSF and the landowner.

1.3 Assessment under the FTAA

The Point Solar Farm is a listed project under Schedule 2 of the FTAA. As a listed project, the Minister for Infrastructure has determined that the Project has significant regional or national benefits. That determination is not revisited at the substantive application stage. The Panel must take into account the purpose of the FTAA and give it the greatest weight; it may decline the application only where adverse impacts are sufficiently significant to be out of proportion to those benefits, after accounting for any conditions or modifications of the proposal. The extent of the Project's benefits is therefore the relevant matter for the Panel's assessment and are to be determined in this assessment.

Although not strictly the test at the substantive stage, the referral criteria in section 22 of the FTAA provide a useful frame for organising the economic evidence. The criteria most directly applicable to this assessment are whether the Project:

- will deliver significant economic benefits (s22(2)(a)(iv));
- will deliver new regionally or nationally significant infrastructure (s22(2)(a)(ii));
- will support climate change mitigation, including the reduction or removal of greenhouse gas emissions (s22(2)(a)(vii)); and
- will support climate change adaptation, reduce risks arising from natural hazards, or support recovery from events caused by natural hazards (s22(2)(a)(viii)).

The purpose of this report is to quantify the Project's regional and national economic benefits and to provide guidance as to their extent, to assist the Panel. The FTAA does not prescribe quantitative thresholds for "significant economic benefits". Significance is inherently contextual. The Waihi North Mine panel confirmed that significance is an indication of scale and is not determined solely by whether regional or national GDP will change appreciably[3]. This recognition is consistent with the approach adopted in this assessment. The report also addresses the remaining section 22 criteria listed above insofar as they bear on the economic assessment.

[2] DoC letter DOCCM-7507754 24 November 2023 - Page 5 of Appendix X - DoC Engagement (referenced via substantive application, 07/07/2025)

[3] Waihi North Decision – FTAA-2504-1046

1.4 Data sources

The assessment draws on the following data sources

- FNSF's project documentation, including the substantive application, construction plans, expenditure estimates, and the reports of other experts;
- Overseas Investment Office (OIO) Investment Plan documentation, including FarmWise rental appraisal data;
- Stats NZ data on regional population, employment and economic output;
- MBIE energy market data and electricity generation statistics;
- the Electricity Authority wholesale energy price data;
- the Treasury's Extended Cost Benefit Analysis (CBAx) model for emissions shadow pricing;
- lifecycle emissions data from academic literature on employment creation from solar farm development, reviewed in the Annex;
- Transpower's Whakamana i Te Mauri Hiko (2020) and other publicly available energy sector publications;
- news and academic articles for sources of emissions factors, current events and contextual data, references included as used; and
- M.E's Multi-Regional Input-Output (MRIO) model, calibrated using Statistics New Zealand supply-use tables with prices updated to current levels.

1.5 Caveats and Limitations

This report is subject to several caveats. Most are detailed in the sections to which they relate, though we describe some overarching limitations here.

- M.E does not independently verify the technical evidence prepared by other experts or details in the substantive application.
- Several of the project parameters have changed slightly between different applications being lodged. This report is based on the latest known data.
- The assessment assumes that the activity can be undertaken within the environmental parameters described in the substantive application and supporting technical reports.
- Some elements of the analysis are constrained by data availability; where necessary, the assessment uses indicative ranges or scenario analysis, which are designed to be conservative and transparent.
- The economic modelling relies on input-output tables derived from published Statistics New Zealand data, which reflect historical sectoral relationships and may not perfectly capture current economic structures.

1.6 Code of Conduct

The author of this report is Tom Harris (BSc/MSc Economics), Senior Consultant at Market Economics. Tom has three years' experience at Market Economics, during which time he has carried out a number of

economic assessments in support of FTAA applications. Prior to joining M.E, Tom worked in the UK Civil Service as an economist across a challenging portfolio of projects and sectors. During the Covid-19 pandemic he was the principal analyst in the Department for Education modelling the pandemic's impacts on Children's Social Care. His other roles included leading on graduate outcomes analysis, supporting high-profile national policy implementation, being embedded in the permanent secretary's office, and working closely with external academics and stakeholders. Tom has taught undergraduate economics at the University of Exeter and runs Good with Data, a New Zealand-based charity doing pro bono data-led project for charities.

Director approval and quality assurance has been provided by **Greg Akehurst (BA Geography/BCom. Economics)**, Director Market Economics, RMLA, NZ Association of Economists. Greg has 30 years' experience in economic consulting, including 25 years as a Director of Market Economics Ltd. During this time, he has carried out numerous assessments of economic benefits and effects of developments and projects under the RMA, the COVID-19 Fast Track Act and the Fast Track Approvals Act 2024. With respect to aggregate, Greg has carried out economic studies including Kings Quarry Stage 2, Drury Quarry, Waihi North Mine, Waingaro Quarry and Belmont Quarry in Wellington. Greg has also acted as a peer reviewer for Councils and others on economic matters.

Full C.V's for Tom and Greg are contained in the Annex.

While this assessment and application is not before the Environment Court, this report has been prepared and reviewed in accordance with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2023. Other than where it is stated that reliance is placed on the advice of another person, the author(s) confirm that the issues addressed in this report are within their area of expertise. The author(s) have not omitted consideration of any material facts known to them that might alter or detract from the opinions expressed.

2 Project Context

2.1 Economic Context

The Point Solar Farm site is located in Mackenzie District, Canterbury. The population of Mackenzie district was 5,520 in 2025, representing 0.8% of Canterbury's total population of 698,200[4]. Twizel, Lake Tekapō, and Fairlie are the primary service centres. The site is near the boundary with Waitaki District and Waimate District, with the total population across the three districts of just under 40,000.

Table 1 - Population Counts in Local Districts

Territorial Authority	2025 population estimate	Share of Canterbury total
Mackenzie district	5,520	0.8%
Waimate district	8,450	1.2%
Waitaki district	24,600	3.5%

Mackenzie District is a predominantly rural economy with a strong reliance on agriculture and tourism. Nearly half of workers in the district are employed in either agriculture, forestry, and fishing or accommodation and food services – the two dominant employment sectors. Other sectors each constitute less than 7% of the employment base[5].

Table 2 - Local Employment by Sector

ANZSIC1D	Mackenzie District	Waimate District	Waitaki District
2024 Employment Count			
Agriculture, Forestry and Fishing	627	1,390	506
Accommodation and Food Services	896	78	172
Share of District Employment			
Agriculture, Forestry and Fishing	19%	42%	49%
Accommodation and Food Services	28%	2%	16%

In 2024, Canterbury region's GDP was $51.7bn, an increase of 6% on 2023[6]. This was 12.5% of New Zealand's total GDP, making it the second largest region behind Auckland. Christchurch City, the largest urban and economic centre in Canterbury, contributed 71% of the Canterbury total ($37bn)[7]. Mackenzie

[4] Subnational population estimates – Aotearoa Data Explorer (Stats NZ). Figures at 30 June 2025.

[5] Market Economics Analysis of Stats NZ and LEED Data. Figures expressed as Modified Employment Counts.

[6] Regional Economic Tool – MBIE, 2024 (accessed 19/03/2026)

[7] Ibid

District GDP was just $417m in 2024. This works out at $76k per capita, slightly below the national value of $80k per capita.

The construction phase of the Point Solar Farm is expected to draw on both local and regional labour pools, given the limited size of the Mackenzie District workforce. The site is approximately 250 km from Christchurch, meaning reliance on Christchurch-based labour would necessitate temporary relocation to the project area, though there are closer labour pools in Canterbury and Central Otago. The extent to which construction labour resides within Mackenzie District will be a key determinant of the project's local economic impact. Factors such as seasonal labour availability, accommodation capacity and the scale of supporting industries will determine the extent to which workers are drawn from or reside in the local area rather than the wider region. Workforce requirements are comparatively smaller for the operational phase, providing a more limited but sustained contribution to local economic activity over the life of the project.

2.2 Tourism in the Mackenzie District

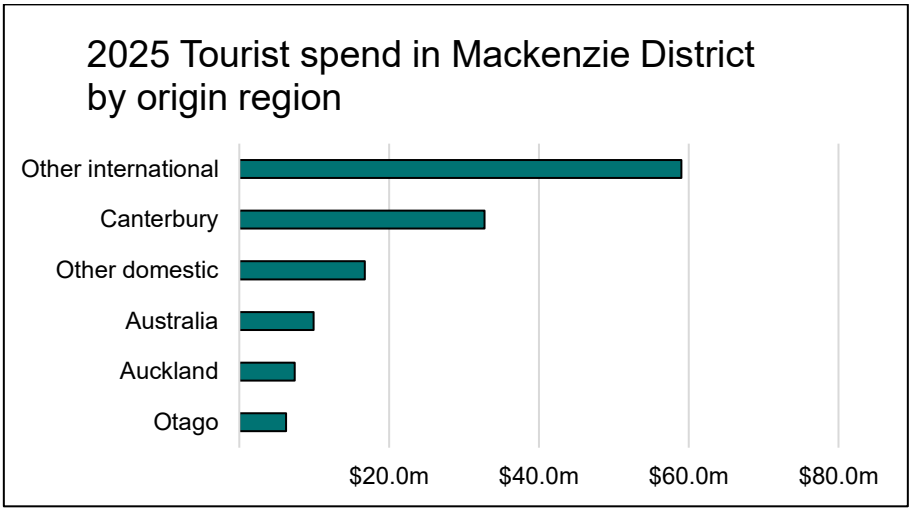
Tourism is a significant contributor to the Mackenzie District economy, supported by the District's renowned natural landscapes. The majority of visitors are drawn to Aoraki/Mount Cook National Park and Lake Tekapō, with 84% of international visitors travelling only to a combination of these destinations and Twizel[8]. The areas around the Point Solar Farm site are not primary tourism destinations.

There is a seasonal element to tourism activity, with visitor numbers peaking during the summer months[9]. Of these visitors, international tourists account for the largest share of spending in the District.

[8] New Zealand International Visitor Survey via Te Manahuna Ki Uta / Destination Mackenzie – Mackenzie District Council

[9] Regional Reliance on Tourism Data Tool – MBIE (2025)

Figure 1 - Tourist Spend in Mackenzie District



Tourism activity generates flow-on effects across multiple sectors, including retail, transport and accommodation. The site is not located in an area that constitutes a primary tourism draw, and the landscape assessment has concluded that adverse visual effects from publicly accessible viewpoints are generally nil to low, with some moderate effects from more remote vantage points. The economic implications of any landscape effects on tourism are therefore assessed as minimal and are not separately quantified.

2.3 New Zealand's Energy Market

New Zealand's energy market operates through a combination of regulated transmission and distribution and a competitive generation and retail market. Hydroelectric generation provides 54% of electricity supply, with geothermal contributing 20%, wind 9%, and the balance from thermal (gas and coal) and other sources. The composition of the split is evolving, with Hydro generation up 7 percentage points from 2023 to 2024[10]. Conversely, the share generated by coal and wind fell by 3 and 2 percentage points respectively.

Table 3 shows the share of energy generation. Accounting for all energy sources, only 45.5% of New Zealand's primary energy supply came from renewables in 2024[11]. This was a record high, however, up from 43% the year before. As electrification continues – driven by electric vehicle adoption, the decarbonisation of process heat and displacement of fossil fuels in industry – electricity's share of total energy consumption will increase. Each shift converts demand currently met by fossil fuels into demand that must be met by the electricity system. This trend is recognised the second Emissions Reductions Plan[12]

[10] Electricity Statistics – MBIE (2024, accessed 19/03/2026)

[11] Energy in New Zealand – MBIE (2024, accessed 20/03/2026)

[12] Second Emissions Reductions Plan – Ministry for the Environment (2026, p38)

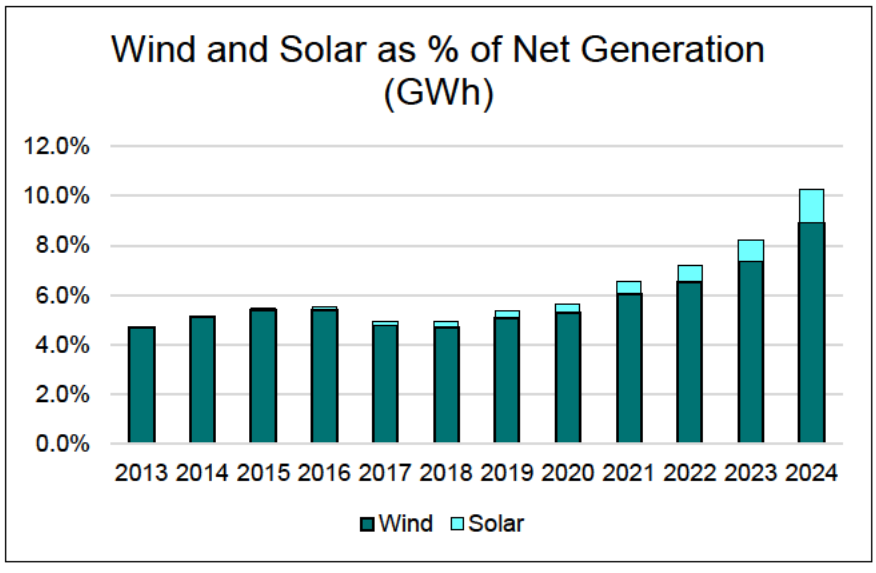
Table 3 - New Zealand Energy Generation (2024, Net GWh)

Generation Source	GWh	Share
Hydro	23,490	53.5%
Geothermal	8,741	19.9%
Gas	4,082	9.3%
Wind	3,919	8.9%
Coal	2,243	5.1%
Solar	595	1.4%
Wood	442	1.0%
Biogas	310	0.7%
Waste Heat	27	0.1%
Oil	25	0.1%

2.4 Renewable Energy in New Zealand

New Zealand has committed to achieving net-zero carbon emissions by 2050. The Emissions Reduction Plan identifies increasing the share of renewable electricity generation as a critical pathway to this target[13]. Between 2013 and 2024, solar generation grew from 7 GWh to 595 GWh, with 224 GWh added between 2023 and 2024 and more added since[14]. Transpower forecasts that solar will deliver 9% of New Zealand's electricity in 2050, which may even prove conservative given global trends[15].

Figure 2 - Wind and Solar Shares of Net Generation in New Zealand (% of GWh)



[13] New Zealand's First Emissions Reduction Plan – Ministry for the Environment

[14] Electricity Statistics – MBIE (accessed 19/03/2026)

[15] Figure 9, Whakaman I Te Mauri Hiko – Transpower (2020)

Global solar installation trends reflect a fundamental shift in the energy landscape. The International Solar Energy Society projects that solar power will surpass nuclear generation by 2026, wind by 2027, hydroelectric generation by 2028, gas by 2030 and coal by 2032[16]. New Zealand's growing solar sector is consistent with this global pattern. By adding 450 MWp, the Point Solar Farm would represent a significant addition to New Zealand's renewable generation capacity.

2.5 Energy Security

On 16 March 2026, the head of the International Energy Agency (IEA) said that U.S. and Israeli attacks on Iran had triggered "the largest supply disruption in the history of the global oil market."[17] At the time of writing (23/03/2026), the wholesale price of oil is significantly above historic levels and there are global concerns about fuel availability. And the disruption extends beyond crude oil. The Ras Laffan facility in Qatar, which supplies 20% of global liquefied natural gas, has recently shut down, too[18].

As exposed by recent events, New Zealand is vulnerable to international energy markets. While electricity generation is largely insulated from fossil fuel supply chains, the broader energy system is heavily reliant on them. Incremental electrification – whether in transport or industry – reduces this exposure. New, domestically generated renewable electricity that displaces imported fossil fuel consumption improves national energy security. It also paves the way for more future shifts towards electrification. The output from the Point therefore has strategic value, expanding domestic renewable generation and insulating New Zealand from geopolitical supply risks.

[16] The International Solar Energy Society via The Economist – Solar power is going to be huge. (20/06/2024)

[17] "IEA says more emergency oil releases possible as Iran war shakes market" – E&E News by Politico (17/03/2026). Quote from Fatih Birol (16/03/2026).

[18] The world's largest natural-gas complex is battered – MarketWatch (19/03/2026)

3 Economic Effects

This section assesses the economic effects of the proposed Point Solar Farm. The assessment quantifies economic effects at local, regional, and national levels, focusing on employment, value added and broader economic outcomes.

The economic evaluation incorporates three elements.

1. A business-as-usual scenario reflecting the continuation of current land use – a low-intensity farming operation with negligible employment and no material economic output.
2. A project scenario reflecting the construction and operation of the proposed 450 MWp solar farm.
3. An assessment of wider economic effects including emissions reductions, energy security improvements, energy price effects and the opportunity cost of the land.

The assessment uses a Multi-Regional Input-Output (MRIO) model to capture the direct, indirect and induced economic effects associated with the project. Economic effects are presented in both annualised terms and as a cumulative present value over the panels' 30-year lifespan. This means the appraisal period is 33 years, comprising the 36-month construction phase and 30-year operational phase.

We do not model the effects of sheep grazing on the land as project impacts. The primary function of this grazing will be fire risk management and weed control rather than to generate farming output. The stocking rates are low, and any returns are offset by the cost of labour to move the sheep around the site. The omission is conservative. If grazing did generate any net revenue, it would represent a small additional benefit not captured in the modelled outputs.

3.1 Business-as-Usual Scenario

The site is currently operated as a cut-and-carry runoff block supporting a dairy farm located approximately 10 – 15 km away by road. The landowner does not receive rental income from the site, with the crops produced used for the landowner's own dairy operations on a separate property. The only labour input is around 5 – 7 hours per week of unpaid owner-operator time[19].

The site has a Land Use Capability classification of 6, indicating non-arable soil with limitations to pastoral use. There is no farming infrastructure on the solar farm site[20].

A market rental appraisal undertaken by FarmWise Consultancy in June 2023 concluded that the site has a current market rental value of approximately $650 per ha. This was $300/ha for non-irrigated land and $1,000/ha for irrigated land. The solar site is located on the non-irrigated part of the site, meaning the land has very limited rental value for farming.

[19] OIO Investment Plan (3.6)

[20] The pivot irrigator and water bore are located in the area to be subleased back to the landowner

The business-as-usual scenario assumes that the site would remain in its current state: low intensity cropping, no employees, no economic output and no planned investment. No active environmental management is currently undertaken on the site either.

The site therefore generates negligible economic value, strengthening the case for the solar farm because effectively all economic activity associated with the proposal represents a net addition to local, regional and national economies.

3.2 Solar Farm Electricity Generation

The Mackenzie Basin benefits from high solar irradiance and above-average sunshine hours, positioning it as a tier-1 solar resource in New Zealand. The substantive application estimates the project will generate sufficient electricity to meet the annual demand of approximately 100,000 homes[21].

FNSF's modelling estimates income from the electricity of $[redacted] per year. This reflects the wholesale market value of the output (the price at which electricity is sold into the grid)[22]. It is an indication of the resource's productive value but understates the total economic value of generation. End-use value substantially exceeds the wholesale price because of other costs such as transmission, distribution, levies and retail margins. The wholesale price also ignores the system-level benefits of additional renewable supply, as discussed in Section 2.

3.3 Economic Impact Analysis

The economic effects of the project's expenditure are modelled using a Multi-Regional Input-Output (MRIO) model, calibrated between the local, regional and national economies. The analysis traces how direct spending might spread through the interconnected economies and generate successive rounds of purchasing activity, causing output and employment beyond the initial stimulus. We set up the model to capture inter-sectoral transactions across the Mackenzie District, Rest of Canterbury Region, Otago Region, Rest of the South Island and the North Island.

The core economic structure is derived from the supply-use tables from Stats NZ. Prices are updated with PPI data from RBNZ and the relationships between employment and output converted from the 2019-20 structure to the relationships shown in the most recent Stats NZ and LEED data.

Input-output frameworks are a well-established tool in economic impact assessments. However, they do have limitations, and these have received scrutiny in recent FTAA panel decisions and the wider professional economic discourse. We address some of the key limitations below.

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[21] Substantive Application (Section 4.1). 718,000 MWh / 7.2 MWh (average per-home figure) = 99,722

[22] The calculation is based on modelled production in year 1 and the annual price over the past 5 years at that location, matching the generation to the time of day and month of year.

IO models measure gross economic activity generated by a defined stimulus. They do not represent net welfare gains. The labour, capital, and materials mobilised by the project carry opportunity costs: in a fully employed economy, resources directed to one activity are drawn from another. The IO results presented in this assessment should therefore be interpreted as establishing the scale and sectoral composition of the project's economic footprint, rather than as a measure of net national benefit.

This is consistent with emerging panel decisions. The Waihi North panel treated significance as an indicator of scale, rather than requiring evidence that regional or national GDP would shift appreciably[23]. This effectively confirms that an Input-Output (IO) framework is an appropriate tool for assessing the magnitude of economic effects. Similarly, the Pound Road Industrial Development draft decision reinforced this position, stating that the FTAA does not require a full monetised cost-benefit analysis[24]. That panel accepted that economic disbenefits should be recognised where material and capable of monetary assessment, but that environmental and other non-market effects need not be monetised. Rather, the panel would consider the economic benefits of the proposal, then weigh any identified disbenefits, as part of its assessment of the extent of regional benefits and its proportionality assessment.

Against those standards, IO analysis has informational value without the welfare interpretation that a cost-benefit analysis might provide. It establishes the order of magnitude of economic activity, identifies the geographic distribution of effects across modelled regions, and reveals the breadth of sectors engaged. Critically, it also captures the structure of sectoral input requirements, including the extent of leakages through imports and capital consumption. In this project, for example, it makes clear the lack of indirect value added from land rental payments, and that indirect value added from construction spending in Mackenzie is likely to occur outside the district due to Mackenzie's scale and the limited extent of backward linkages.

3.3.1 MRIO Modelling Parameters

All modelling is presented as real values using 2026 prices. The site lease is 35 years, and the panels have an estimated operational lifespan of 30 years. We appraise economic effects over a 33-year horizon: construction begins in 2027 and lasts 36 months, with lease costs borne in each year and operating and maintenance expenditure commencing in 2030. By year 33 the panels would be approaching the end of their operational life and due for replacement. Any capital investment associated with replacement or repowering falls outside the appraisal period and is excluded from this analysis.

Because Value Added impacts are discounted at 8%, value added generated in the medium-long term has a smaller bearing on totals. By contrast, employment is not discounted. Employment impacts therefore dwarf value added impacts for the operating expenditure and land lease spend strands, which occur in each year from 2030 to 2059. Results of sensitivity analysis using a 2% discount rate are shown in the Annex.

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[23] Waihi North Decision – FTAA-2504-1046

[24] Pound Road Industrial Development Draft Decision – FTAA-2505-1057, at paragraph 677

Operational Expenditure

We model and consider three strands of operating expenditure separately:

1. Lease costs;
2. Ongoing operational costs; and
3. Spending on ecological restoration.

3.3.1.1 Lease Costs

The lease costs are $[redacted] per year, increasing with CPI. All lease spending in the model is allocated to the non-financial asset leasing sector within Mackenzie district.

The impacts are shown in Table 4. Notably, the indirect impacts are concentrated outside Mackenzie District due to the sector's limited backwards linkages within the District itself.

Table 4 - Value Added and Employment Impacts of Lease Costs

Region	Total Value Added ($m)			Employment Impact (MECs)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Mackenzie District	11.7	0.4	2.1	58.6	5.1	2.4
Rest of Canterbury Region	0.0	2.4	2.1	0.0	57.0	44.4
Otago Region	0.0	1.2	0.6	0.0	33.7	12.3
Rest of South Island	0.0	1.6	0.5	0.0	40.5	10.9
North Island	0.0	6.0	4.2	0.0	139.5	79.6
Total	**11.7**	**11.6**	**9.5**	**58.6**	**275.7**	**149.6**

3.3.1.2 Ongoing Operating Expenditure

Table 5 shows the impacts of the $[redacted] of ongoing operating expenditure to maintain the site. We allocate this between three sectors: Electricity generation and on-selling (60%), Electricity transmission and distribution (20%) and Construction services (20%). Expenditure is assumed to commence in 2030 and occur entirely within Mackenzie District.

Over the 30-year period, an average of 7.3 direct jobs will be sustained. This is slightly lower than the financial estimates from FNSF, which estimates 10 direct ongoing jobs from the spending. While the MRIO derives employment from the average relationships between output and labour in the sector, FNSF's estimate reflects site specific staffing requirements and experience from other projects, making their estimate more robust.

Table 5 - Value Added and Employment Impacts of Ongoing Operating Expenditure

Region	Total Value Added ($m)			Employment Impact (MECs)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Mackenzie District	13.9	9.5	3.6	219.9	29.4	4.7
Rest of Canterbury Region	0.0	10.0	4.7	0.0	217.3	120.8
Otago Region	0.0	1.6	0.7	0.0	27.4	16.5
Rest of South Island	0.0	1.5	0.6	0.0	29.9	14.5
North Island	0.0	4.8	4.1	0.0	82.1	88.6
Total	**13.9**	**27.4**	**13.7**	**219.9**	**386.2**	**245.0**

3.3.1.3 Ecological Restoration

The Ecological Enhancement Plan (EEP) is a key part of the Project's impact. The restoration programme involves the planting of approximately 36,000 native plants for screening, the long-term restoration of 80ha of land, pest-proof fencing around the entire 678ha site, ongoing pest mammal control and the creation and management of dedicated reserves for threatened flora and invertebrate species.

The ecological programme would not occur under the counterfactual. No active environmental management is currently undertaken on the site. Without the Project, the land would remain in its current degraded state. The EEP therefore represents a net ecological and economic gain that is entirely attributable to the Project. Importantly, the social and intrinsic value of these activities greatly exceed the GDP and employment contribution of the spending outlay. These effects are considered in Section 3.7.5. Here we use the MRIO model to capture GDP and employment impacts only.

FNSF's operations and maintenance budget includes provisions for ongoing ecological restoration. We have modelled the initial estimates of these figures, which are split between funding for avifauna compensation to DoC and the reserve build. Future costs will cover pest control, watering, weeding and planting.

We model all spending as happening within Mackenzie District. Of the initial cost, we assume half is in heritage and artistic activities and half is in construction services. Within these sector definitions, we assume the works relate to ANZSIC codes for 'nature reserves and conservation parks operation' (heritage and artistic activities) and 'landscape construction services' (construction services). For the ongoing costs, we allocate this to agriculture, forestry and fishing support services.

Table 6 shows the MRIO output estimates. Over the 30-year period, we estimate an average of 3 direct jobs will be maintained and direct value creation will be $4.3m.

Table 6 - Value Added and Employment Estimates of Ecological Restoration Expenditure

Region	Total Value Added ($m)			Employment Impact (MECs)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Mackenzie District	4.3	0.7	1.4	180.7	29.3	1.8
Rest of Canterbury Region	0.0	0.8	1.1	0.0	25.1	24.6
Otago Region	0.0	0.3	0.2	0.0	12.1	4.5
Rest of South Island	0.0	0.4	0.2	0.0	12.6	4.1
North Island	0.0	1.3	1.2	0.0	32.1	24.8
Total	**4.3**	**3.5**	**4.1**	**180.7**	**111.2**	**59.8**

3.4 Initial Capital Expenditure

The project's estimated capital cost is $[redacted]. A significant portion (53%) of capital expenditure will be on imported components (solar modules, inverters, specialist high-voltage equipment), as New Zealand does not currently manufacture these items. The domestic component of capital expenditure is estimated as 47% of the total ($[redacted]). This is the economic stimulus modelled through the MRIO.

Pre-construction expenditure on the project to services such as resource consent processing, planning, site survey, engineering, legal advice and other technical assessments are excluded from the model. These services have already been provided and have already contributed to economic outcomes.

We use three scenarios to model the impact of $[redacted] of domestic capital expenditure. Scenario 1 is our best estimate of how spending might occur. We allocate 60% of spending to construction services, reflecting the tasks required for solar farm installation, with the rest split between heavy civil engineering and non-residential building construction. The majority of activity is serviced from the wider Canterbury region, with smaller shares in Mackenzie and Otago.

Scenarios 2 and 3 test the sensitivity of our core results to these assumptions. Scenario 2 distributes spending equally across all three sectors and geographies. Scenario 3 removes Otago entirely and splits activity between Mackenzie and Canterbury, testing the effect of a more locally concentrated workforce. These breakdowns are shown in Table 7 below.

Scenario 2 and Scenario 3 allocate an impossibly high share of spending to Mackenzie District, given total GDP is only $417m, but the results help to understand marginal differences in Scenario 1.

Table 7 - Capital Expenditure MRIO Inputs

Sector	Cost assigned	Mackenzie District	Rest of Canterbury Region	Otago Region
Scenario 1				
Heavy and civil engineering construction	[redacted]	25%	50%	25%
Non-residential building construction	[redacted]	25%	50%	25%
Construction services	[redacted]	17%	67%	17%
Total	[redacted]			
Scenario 2				
Heavy and civil engineering construction	[redacted]	33%	33%	33%
Non-residential building construction	[redacted]	33%	33%	33%
Construction services	[redacted]	33%	33%	33%
Total				
Scenario 3				
Heavy and civil engineering construction	[redacted]	50%	50%	
Non-residential building construction	[redacted]	50%	50%	
Construction services	[redacted]	50%	50%	
Total	[redacted]			

The results in

Table 8 show that value added is relatively stable across the three scenarios, ranging from $232m - $234m. Reallocating the expenditure between regions and sectors doesn't make much difference to total figures.

There is more variation in employment, ranging from 2,160 MEC years in Scenario 3 to 2,320 in Scenario 1. This reflects differences in labour intensity across the sectors and regions. Scenario 1 generates the highest total employment because a larger share of spending is in Construction services, which has a higher employment to output ratio than the other sectors. In Scenario 3, where more spending is allocated to Mackenzie District, the small local economy has fewer backward linkages to sustain indirect and induced employment in the District.

A key implication of the modelling is that while the project will generate substantial economy activity regardless of how construction spending is distributed, the local employment benefit within Mackenzie District is sensitive to the share of the workforce that resides in or relocates to the area.

The direct employment estimate of 772 (Scenario 1) is very similar to FNSF's estimate of 750 FTE across the 36-month construction period, with an assumed 600 (200 p.a.) on site and 150 (50 p.a.) off site. This similarity provides additional confidence in modelling approach used.

Table 8 - Value Added and Employment Impacts of Capital Expenditure

Region	Total Value Added ($m)			Employment Impact (MECs)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Scenario 1						
Mackenzie District	12.7	2.9	5.0	153.5	27.7	2.5
Rest of Canterbury Region	41.6	47.4	35.1	456.9	517.5	336.3
Otago Region	12.7	12.8	8.8	161.2	146.0	79.9
Rest of South Island	0.0	4.6	3.5	0.0	47.9	30.9
North Island	0.0	19.3	25.8	0.0	156.8	199.2
Total	**67.0**	**87.0**	**78.2**	**771.6**	**896.0**	**648.9**
Scenario 2						
Mackenzie District	19.3	5.0	7.9	189.0	51.4	3.8
Rest of Canterbury Region	19.3	39.5	27.2	189.6	435.6	256.9
Otago Region	19.3	21.3	13.3	230.2	248.3	118.2
Rest of South Island	0.0	6.4	4.0	0.0	67.0	35.0
North Island	0.0	23.2	28.0	0.0	193.0	215.3
Total	**57.9**	**95.4**	**80.4**	**608.8**	**995.3**	**629.2**
Scenario 3						
Mackenzie District	29.0	7.3	11.7	283.4	76.3	5.4
Rest of Canterbury Region	29.0	56.1	37.4	284.5	618.6	350.3
Otago Region	0.0	5.3	3.5	0.0	53.7	31.2
Rest of South Island	0.0	6.6	3.6	0.0	69.4	30.3
North Island	0.0	19.9	25.0	0.0	163.5	190.7
Total	**58.0**	**95.2**	**81.2**	**567.9**	**981.5**	**607.8**

3.5 MRIO Outputs summary

Table 9 shows the sum of the value added and employment outputs. Only Scenario 1 from the construction outputs is included as this represents our most realistic assessment of how spending might be distributed. The spending will generate an estimated $97m in direct value added, increasing to $332m when including indirect and induced impacts. The direct employment is estimated at 1,231, equivalent to an average of 257 per year during construction and 15 per year during the operating period. A significant share of the impacts are assumed to accrue locally, which we estimate as 43% of value added but 49% of employment, though this will be determined by a range of factors outlined above.

Table 9 - Sum of MRIO Outputs

Region	Total Value Added ($m)			Employment Impact (MECs)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Mackenzie District	43	14	12	613	92	11
Rest of Canterbury Region	42	61	43	457	817	526
Otago Region	13	16	10	161	219	113
Rest of South Island	0	8	5	0	131	60
North Island	0	31	35	0	410	392
Total	**97**	**130**	**106**	**1,231**	**1,669**	**1,103**

3.6 Opportunity Cost of Land

Under the business-as-usual scenario, the site generates negligible economic output. No income accrues to the landowner, no wages are paid and total labour input amounts to only 5 – 7 hours per week.

The FarmWise market rental appraisal establishes a reference value of $650 per ha for the site as a whole. However, the non-irrigated portion, where the solar farm is proposed, is only estimated to be worth $300 per ha. Given the landowner does not receive any income in practice, $650/ha represents a theoretical upper bound of the site's productive value. Across the whole solar farm site (680ha), this equates to $204k – $442k per year.

Under the project scenario, FNSF will pay $[redacted] per ha plus GST, totalling $[redacted]. This represents a direct annual transfer approximately six times the estimated farming rental value.

Another way to consider this is that the net economic impacts from the MRIO analysis of lease payments are the impact of $[redacted] less the counterfactual rental payment. I.e. mathematically the same as decreasing the modelled outputs by 7.6% - 16.4%, depending on counterfactual ($300/ha vs $650/ha). These outputs are shown in Table 10.

Table 10 - MRIO Land Lease Outputs minus Counterfactuals

Region	Value Added Less $300/ha			Value Added Less $650/ha		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Mackenzie District	10.8	0.4	1.9	9.8	0.3	1.8
Rest of Canterbury Region	0.0	2.2	1.9	0.0	2.0	1.8
Otago Region	0.0	1.1	0.6	0.0	1.0	0.5
Rest of South Island	0.0	1.5	0.5	0.0	1.3	0.4
North Island	0.0	5.5	3.9	0.0	5.0	3.5
Total	**10.8**	**10.7**	**8.8**	**9.8**	**9.7**	**7.9**

3.7 Additional Impacts

3.7.1 Landscape Effects

The site is located within an Outstanding Natural Landscape in the Mackenzie District Plan. The Landscape and Visual Assessment prepared by Rough Milne Mitchell Landscape Architects has assessed adverse visual effects from surrounding public places as follows:

- State Highway 8 — nil to very low;
- Alps to Ocean Trail — nil to very low;
- McAughtries Road (upper stretch) — moderate;
- Falston Road — low to low-moderate, reducing to nil once screen planting matures;
- Haldon Road and Haldon Arm Road — very low to low, reducing to nil once screen planting matures;
- Lake Benmore — very low, reducing to nil once screen planting matures;
- the Benmore Range — moderate; and
- the Ben Ōhau–Greta Track — moderate[25].

The primary tourism attractions in the Mackenzie District – Aoraki/Mount Cook National Park, Lake Tekapō, and the Dark Sky Reserve – are located at a substantial distance from the site. The site is privately accessed via a 7 km gravel track through Bendrose Farm and is not on any established tourist route. The economic implications of landscape effects are assessed as negligible.

3.7.2 Emissions Abated

Electricity generation from renewable solar sources carries substantially lower lifecycle carbon emissions than fossil fuel alternatives.

Using the estimates of the health costs of pollutants, New Zealand Treasury's shadow emissions value of CO_2 and estimates for electricity emissions intensity, the emissions cost differential between solar generation and alternative sources can be quantified[2627]. Table 11 shows the emissions per GWh generated over the lifetime of infrastructure with carbon capture and storage. These values are not uniform – they vary by technology and location. For solar PV, lifecycle emissions vary between 3,000kgCO2e/GWh to 21,000kgCO2e/GWh based on technology and installed location. For hydroelectricity, the principal source of lifecycle emissions is the decomposition of organic matter in flooded reservoirs, an effect that is likely to be less pronounced in New Zealand's hydroelectric infrastructure than in the international studies that these estimates are based on. With the exceptions of wind and nuclear, every alternative generation source

[25] Appendix F via Substantive Application (3.4 – Landscape Values)

[26] Monetised benefits and costs manual v1.7 May 2024 – Waka Kotahi (NZTA). Prices updated from 2021 average to 2026 prices using RBNZ CPI series (December 2025 CPI index). Central price path used for CO_2.

[27] Understanding future emissions from low-carbon power systems by integration of life-cycle assessment and integrated energy modelling – Pehl et al. (2017)

produces higher lifecycle emissions than solar PV. The sources where the differences are largest, notably coal, are probably more likely to be the sources displaced by new solar capacity.

Table 11 – Energy Generation and Emissions Costs

Generation Source	kg CO_2-e/GWh	Emissions $ per GWh	Emissions cost for 718GWh	Cost relative to Solar PV
Solar PV	6,000	$929	$667,286	$0
Wind	4,400	$682	$489,343	-$177,943
Nuclear	3,500	$542	$389,250	-$278,036
Gas	78,300	$12,128	$8,708,083	$8,040,797
Hydro	97,100	$15,040	$10,798,913	$10,131,627
Bioenergy	98,400	$15,242	$10,943,492	$10,276,206
Coal	109,000	$16,884	$12,122,364	$11,455,078

FNSF estimates the project will displace annual carbon emissions equivalent to removing approximately 65,000 cars from the road[28]. A 2024 report by the National Renewable Energy Laboratory (NREL) indicates that modern utility PV systems achieve energy payback times of between 0.5 and 1.2 years[29]. That is well within the project timescales of 30+ years.

3.7.3 Energy Supply Composition

The Point Solar Farm will diversify electricity supply in the South Island, which is currently dominated by hydroelectric generation. Solar generation provides a natural hedge against drought: dry conditions are typically accompanied by clear skies and increased solar irradiance, meaning solar output rises when hydro output falls. The co-location of the Point Solar Farm adjacent to the Waitaki hydro scheme amplifies this complementarity. Power from the Point will flow into the core of the grid, with options to transmit the energy north to Christchurch or south to the Benmore HVDC converter station, from where it can be transferred to elsewhere.

It is anticipated that this solar energy will displace hydroelectric generation in the dispatch order, enabling water to be conserved for later that day or the upcoming winter[30]. The hydroelectric generation can then displace gas or coal, which is currently needed at peaks. By conserving water, the solar generation helps to displace the dirtier generation methods and provides a hedge against drought vulnerability. The system was exposed in the 2024 winter price crisis. In early August 2024, the daily spot price for electricity reached $820 per MWh, up from an average over the previous 5 years of $180[31]. This was driven by high demand

[28] Substantive Application (Section 6.2)

[29] Substantive Application (Section 6.2). Sourced from PV FAQs.

[30] This feature is evident in market prices

[31] Review of winter 2024 – Electricity Authority (2025)

associated with cold conditions but also dry conditions causing major lakes to drop and accordingly hydro storage to steadily decline.

As discussed in Section 2.5, the current geopolitical disruption to global energy markets underscores the strategic value of domestically generated renewable electricity that is insulated from fossil fuel supply chains.

3.7.4 Price Effects

Increasing electricity supply from a renewable source with low marginal costs has the potential to moderate wholesale energy prices. Once the initial capital investment is accounted for, marginal costs of solar generation are minimal, making it a competitive alternative to other generation sources. The New Zealand Emissions Trading Scheme further strengthens this dynamic by imposing a price on greenhouse gas emissions, making fossil fuel generation relatively more expensive. Quantifying the precise magnitude of any price effect is beyond the scope of this assessment, but the nature of any contribution is likely to be positive.

3.7.5 Ecological Restoration

Ecological restoration generates economic value through ecosystem services – the benefits that functioning ecosystems provide to people. Their exclusion from GDP reflects a measurement limitation, not that they don't have value.

Patterson and Cole (2013, updating their earlier studies from 1997 and 1999) estimated that land-based ecosystems produced $57 billion of ecosystem services, equivalent to about 27% of New Zealand's GDP for 2012[32]. These values have been applied in individual farm and ecosystem concepts, such as for the Pāmu Landcorp farm units, which found that non-productive land (indigenous scrub, forest and wetlands) generated more per-hectare economic value than pastoral farmland[33].

The non-market value of the EEP is amplified by the conservation deficit in New Zealand's dryland ecosystems. The Mackenzie Basin is within the eastern dryland zone, which historically supported a mixture of tussock grassland, scrubland and dryland forest. Over 70% of indigenous habitat has been lost from these zones, and the remaining ecosystems are heavily modified[34]. Less than 2% of New Zealand's drylands are formally protected, compared with approximately 30% of total land area nationally[35]. Relative to a 1840s

[32] Total Economic Value of New Zealand's land-based ecosystems and their services – Cole and Patterson (2013)

[33] Economic valuation of the ecosystem services provided by Pāmu Landcorp farms – Cameron et al. (2020)

[34] Conservation context for New Zealand's dryland ecosystems – Mokomoko Dryland Sanctuary

[35] Ibid

baseline, only 42% of montane-subalpine short tussock grassland remains, and only 3% was formally protected as of 2002[3637].

[36] Montane-subalpine short tussock grassland considered the most relevant for the site and Mackenzie basin

[37] Recent progress with the conservation and protection of temperate indigenous grassland in New Zealand – Alan F Mark (2012)

4 Regulatory and Policy Framework

4.1 The FTAA

The purpose of the FTAA is to facilitate the delivery of infrastructure and development projects with significant regional or national benefits. The expert panel must weigh the extent of the project's regional or national benefits against any adverse impacts in reaching its decision.

Section 22(2)(a) identifies a range of matters relevant to the assessment of benefits. This assessment addresses the economic dimensions of four of those matters.

4.1.1 Significant economic benefits (s22(2)(a)(iv))

The project will generate an estimated $330 million in value added (direct, indirect and induced) over its 33-year appraisal period, supporting approximately 4,000 MEC years of employment. Annual electricity output is valued at $[redacted] at wholesale prices. Annual lease payments of $[redacted] represent a sixfold increase over the theoretical farming rental for the site. The counterfactual generates negligible economic value: 5 – 7 hours' labour per week, no income to the landowner and no planned investment. Effectively, all of the quantified economic activity is additional.

These effects are significant in both the local and regional context. For Mackenzie District, with a GDP of $417 million, the construction phase alone will generate domestic capital expenditure of $[redacted]. While only a fraction of this will occur in the district, it represents a significant stimulus for the whole area. The operational phase will sustain employment and lease payments for the 35-year duration of the consent. At the Canterbury regional level, the project contributes to the region's electricity generation capacity, construction sector activity and emissions reduction objectives.

The FTAA does not prescribe quantitative thresholds for significance. Our analysis assesses the economic effects of the Point Solar Farm to be significant at least at a regional level.

4.1.2 Regionally or nationally significant infrastructure (s22(2)(a)(ii))

The project will add 450 MWp of renewable generation capacity to the national grid, meeting the annual demand of approximately 100,000 homes. As noted in the Substantive Application, the Government has identified that an additional 300–500 MW of new generation capacity is required per year over the next 30 years to meet projected demand[38]. By delivering one year's additional capacity with a single project, the Point meets the threshold for regionally (and probably nationally) significant infrastructure.

4.1.3 Climate change mitigation (s22(2)(a)(vii))

Solar PV has among the lowest lifecycle emissions of any generation technology (only lower than nuclear and wind). By displacing generation that would otherwise be met by fossil fuel sources, the project will

[38] Substantive Application (Section 7.5.1)

contribute directly to New Zealand's emissions reduction targets. The emissions reduction is equivalent to removing 65,000 cars from the road[39].

4.1.4 Climate change adaptation and natural hazard risk reduction (s22(2)(a)(viii))

The project improves the resilience of the electricity system to climate-related risks. New Zealand's reliance on hydroelectric generation makes the system vulnerable to drought. Solar generation provides a natural hedge: output is strongest during dry, clear conditions, which is when hydro storage can come under pressure. The addition of 450 MWp of solar capacity to the South Island grid reduces dependence on any single generation source and mitigates the economic consequences of drought-driven supply shortfalls.

4.2 RMA

Under schedule 6 of the FTAA, the panel must consider the RMA provisions that apply to the resource consents sought[40]. The panel must have regard to the efficient use and development of natural and physical resources (s7(b)), any finite characteristics of natural and physical resources (s7(g)), and the effects of climate change (s7(i)).

The project represents an efficient use of a site that currently generates negligible economic output, situated in an area of tier-1 solar irradiance and existing grid transmission infrastructure. It directly addresses the effects of climate change through emissions abatement and reduces dependence on finite fossil fuel resources. Moreover, there is virtually no damage to the potential economic productivity of the site. At the end of the panels' lifespan, they can be deconstructed and removed with negligible impact to the site.

4.3 NPS for Renewable Electricity Generation (NPS-REG)

The NPS-REG[41] requires decision-makers to recognise and provide for the national significance of renewable electricity generation activities, including their benefits at local, regional and national levels. It recognises that meeting New Zealand's renewable generation targets will require significant new investment and that renewable generation activities have a functional need to locate where the resource is available.

The Point Solar Farm is directly supported by the NPS-REG. It is sited where the solar resource is strongest (the Mackenzie Basin has some of the highest sunshine hours in New Zealand); adjacent to existing national

[39] This calculation, provided by FNSF uses the average electricity generated on similar sites and divides annual CO2 of a NZ car. This excludes emissions in manufacturing because these are foregone.

[40] The Resource Management Act 1991

[41] National Policy Statement for Renewable Energy Generation (2011) – Ministry for the Environment.

grid infrastructure that can accommodate the connection; and on land with limited productive value for other purposes.

4.4 National Emissions Reduction Targets and Energy Strategy

The Climate Change Response (Zero Carbon) Amendment Act 2019 mandates that New Zealand achieve net-zero carbon emissions by 2050[42]. The (second) Emissions Reduction Plan repeats the target of doubling renewable energy by 2050 and the role of initiatives to reduce consenting times and increase investment in New Zealand[43]. It also acknowledges that an estimated $100 billion of investment in generation, transmission and distribution infrastructure is required by 2050. The project is directly aligned with these objectives.

4.5 Mackenzie District Plan

The Mackenzie District Plan establishes objectives, policies and rules to manage land use and development while balancing environmental protection and economic growth[44]. The site is located within the Rural Zone and the Mackenzie Basin Subzone, identified as an Outstanding Natural Landscape.

The Landscape and Visual Assessment prepared by Rough Milne Mitchell Landscape Architects concludes that adverse visual effects range from nil to moderate depending on the viewpoint, with effects from most locations reducing to nil once screen planting matures. From an economic perspective, the assessment in 3.7.1 concludes that the landscape effects will have negligible economic implications for tourism or visitor amenity in the district.

[42] Climate Change Response (Zero Carbon) Amendment Act (2019)

[43] Our journey towards net zero – MBIE

[44] Mackenzie District Plan – Mackenzie District Council

Conclusion

The proposed Point Solar Farm will deliver significant positive economic effects at local, regional and potentially national levels. This conclusion is supported by the quantitative analysis presented in this report and by the broader policy alignment of the project with New Zealand's energy, emissions and economic objectives.

The site currently generates negligible economic value. This means that effectively all economic activity associated with the proposal is additional to the status quo.

The MRIO analysis estimates total value added of approximately $330m (direct, indirect and induced) over the 33-year appraisal period, under our preferred scenario and an 8% discount rate. Total employment supported is approximately 4,000 MEC years. These effects are distributed across the Mackenzie District, the wider Canterbury region, Otago and the national economy.

The construction phase will involve $[redacted] of domestic capital expenditure, which we estimate could support around 2,320 MEC years of employment. The operational phase will sustain around 15 direct jobs per year for 30 years, along with indirect and induced employment across the wider economy.

The annual lease payment of $[redacted] represents a direct transfer to the landowner approximately six times the estimated farming rental value of the site. Over the consented life, this alone constitutes a substantial improvement in the productive return from the land. Annual electricity output is valued at $[redacted] at wholesale prices, with this figure underestimates the full economic value of the site's generation. There will be spending on ecological restoration as part of the operations and maintenance budget, which will continue for each year of the site's operation. The ecological restoration spending has marginal GDP and employment value, but significant use value because of the services that ecosystems provide.

Beyond the quantified effects, the project will contribute to New Zealand's emissions reduction targets, enhance energy security and resilience, and could have modestly positive impacts on the price of electricity.

The project is consistent with the FTAA's purpose of facilitating infrastructure with significant regional or national benefits. It aligns with the NPS-REG, the Emissions Reduction Plan, the Climate Change Response (Zero Carbon) Amendment Act 2019 and relevant provisions of the Mackenzie District Plan. It meets the criteria of multiple benefit streams identified in section 22(2)(a) of the FTAA: significant economic benefits, nationally significant infrastructure, climate change mitigation and climate change adaptation.

In our assessment, **the economic benefits of the Point Solar Farm will be significant at a regional level**, and a strong case could be made for national significance too.

Annex

A1: Sensitivity Outputs

Table 12 - MRIO Value Added Outputs 2% Discount Rate

Region	Total Value Added ($m, 2% DR)		
	Direct	Indirect	Induced
Operational Activity			
Mackenzie District	31.0	21.1	8.0
Rest of Canterbury Region	0.0	22.2	10.5
Otago Region	0.0	3.5	1.6
Rest of South Island	0.0	3.4	1.4
North Island	0.0	10.7	9.1
Total	**31.0**	**60.9**	**30.6**
Land Lease Costs			
Mackenzie District	23.1	0.9	4.2
Rest of Canterbury Region	0.0	4.8	4.1
Otago Region	0.0	2.4	1.2
Rest of South Island	0.0	3.2	1.1
North Island	0.0	11.8	8.2
Total	**23.1**	**23.1**	**18.8**
Ecological Restoration			
Mackenzie District	9.3	1.6	3.1
Rest of Canterbury Region	0.0	1.8	2.3
Otago Region	0.0	0.7	0.5
Rest of South Island	0.0	0.9	0.4
North Island	0.0	2.7	2.6
Total	**9.3**	**7.7**	**8.9**
Capital Expenditure (assumed scenario)			
Mackenzie District	13.4	3.0	5.3
Rest of Canterbury Region	43.9	50.1	37.1
Otago Region	13.4	13.5	9.3
Rest of South Island	0.0	4.9	3.7
North Island	0.0	20.4	27.3
Total	**70.7**	**91.9**	**82.7**
Capital Expenditure (Scenario 2 - Sensitivity)			
Mackenzie District	20.4	5.2	8.3
Rest of Canterbury Region	20.4	41.8	28.7
Otago Region	20.4	22.5	14.0
Rest of South Island	0.0	6.8	4.3
North Island	0.0	24.5	29.6
Total	**61.2**	**100.8**	**84.9**
Capital Expenditure (Scenario 3 - Sensitivity)			
Mackenzie District	30.6	7.8	12.3
Rest of Canterbury Region	30.6	59.2	39.5
Otago Region	0.0	5.6	3.7
Rest of South Island	0.0	7.0	3.8
North Island	0.0	21.1	26.4
Total	**61.2**	**100.7**	**85.7**

Table 13 shows household income outputs from the MRIO modelling. This is the returns to households as a result of the economic activity. It captures both the wages and salaries paid to workers and owners and a portion of Operating Surplus generated as a result of the additional economic activity (set at 10% for the purposes of this study), that is expected to be returned to business owners.

Table 13 - MRIO Household Income Outputs

Region	Household Income Impact (8% DR)			Household Income Impact (2% DR)		
	Direct	Indirect	Induced	Direct	Indirect	Induced
Operational Activity						
Mackenzie District	4.6	2.5	0.8	10.2	5.5	1.7
Rest of Canterbury Region	0.0	1.9	1.7	0.0	4.2	3.8
Otago Region	0.0	0.6	0.3	0.0	1.3	0.6
Rest of South Island	0.0	4.3	1.9	0.0	9.5	4.3
North Island	0.0	0.7	0.2	0.0	1.5	0.5
Total	**4.6**	**10.0**	**4.9**	**10.2**	**22.0**	**10.9**
Land Lease Costs						
Mackenzie District	4.0	0.2	0.5	7.9	0.3	0.9
Rest of Canterbury Region	0.0	3.2	1.7	0.0	6.2	3.4
Otago Region	0.0	0.6	0.2	0.0	1.3	0.4
Rest of South Island	0.0	1.2	0.9	0.0	2.5	1.7
North Island	0.0	0.8	0.2	0.0	1.6	0.4
Total	**4.0**	**6.0**	**3.5**	**7.9**	**11.9**	**6.8**
Ecological Restoration						
Mackenzie District	2.4	0.4	0.3	5.2	0.9	0.7
Rest of Canterbury Region	0.0	0.7	0.5	0.0	1.4	1.1
Otago Region	0.0	0.2	0.1	0.0	0.3	0.2
Rest of South Island	0.0	0.4	0.4	0.0	0.9	1.0
North Island	0.0	0.2	0.1	0.0	0.4	0.2
Total	**2.4**	**1.9**	**1.4**	**5.2**	**3.9**	**3.2**
Capital Expenditure (assumed scenario)						
Mackenzie District	7.6	1.6	1.1	8.1	1.7	1.2
Rest of Canterbury Region	0.0	9.5	11.2	0.0	10.1	11.8
Otago Region	7.6	6.8	3.2	8.1	7.1	3.4
Rest of South Island	24.1	26.0	14.1	25.4	27.5	14.9
North Island	0.0	2.4	1.4	0.0	2.6	1.5
Total	**39.3**	**46.3**	**31.0**	**41.6**	**49.0**	**32.8**
Capital Expenditure (Scenario 2 - Sensitivity)						
Mackenzie District	12.1	2.9	1.7	12.8	3.0	1.8
Rest of Canterbury Region	0.0	11.5	12.0	0.0	12.2	12.7
Otago Region	12.1	11.4	4.8	12.8	12.1	5.1
Rest of South Island	12.1	21.7	11.0	12.8	23.0	11.6
North Island	0.0	3.4	1.6	0.0	3.5	1.7
Total	**36.3**	**50.9**	**31.1**	**38.4**	**53.8**	**32.9**
Capital Expenditure (Scenario 3 - Sensitivity)						
Mackenzie District	18.1	4.3	2.5	19.2	0.0	0.0
Rest of Canterbury Region	0.0	9.8	10.7	0.0	0.0	0.0
Otago Region	0.0	2.6	1.3	0.0	0.0	0.0
Rest of South Island	18.1	30.9	15.0	0.0	0.0	0.0
North Island	0.0	3.5	1.4	0.0	0.0	0.0
Total	**36.2**	**51.1**	**30.9**	**19.2**	**0.0**	**0.0**

A2. Literature review and analysis of job creation

This section reviews academic literature on job creation across the stages of solar farm development: manufacturing, construction, installation, operation and decommissioning. The review contextualise the employment inputs used in this assessment and benchmarks the MRIO modelling outputs against independent estimates. This further validates the outputs which cannot be compared to FNSF's own estimates, such as the direct employment outputs.

No reviewed source addresses solar farm construction in New Zealand specifically. The literature therefore does not reflect the characteristics of the New Zealand economy specifically. Measurement units and methodologies also vary across studies. The values are used as indicative reference points, not direct inputs.

The academic literature on solar farm employment remains inconsistent. Three factors account for the bulk of the variation:

- Project-specific factors. Differences in project scale, site conditions and regional economic context produce very different employment outcomes. Several sources originate from countries with domestic module manufacturing, capturing supply chain employment that does not exist in New Zealand.
- Geographic and timing variation. Employment intensities change over time as construction methods evolve, technology costs decline and regulatory frameworks differ between jurisdictions.
- Data limitations. Detailed cost breakdowns, which underpin most employment estimates, are commercially sensitive. Some published data is consequently older than would be ideal.

A bottom-up approach is commonly used to estimate direct and some indirect employment. Indirect and induced effects are typically modelled using IO or Computable General Equilibrium (CGE) frameworks. Because the panels are being imported rather than manufactured in New Zealand, sources that disaggregate manufacturing from construction and installation are therefore preferred. Across the sources reviewed, the underlying logic and scale of estimates are broadly consistent with a project of this nature.

The inputs used for the table are 718 GWh, 450 MWp and USD$155 million.

Table 14 – Job creation from solar farms, review of existing literature

Stage	Author(s)	Year	Job Type	Unit	Value	Job Years
Stage 1	EPIA and Greenpeace[45]	2006	Construction, Installation and Manufacturing	Job-years / GWh	0.84	603
				Job-years / MWp	1.48	666
	REPP[46]	2006	Construction, Installation and Manufacturing	Job-years / GWh	0.74	531
				Job-years / MWp	1.29	581
	Hondo and Moriizumi[47]	2017	Construction (Direct)	Job-years / GWh	0.59	424
			Construction (Indirect)		1.12	804
	Fragkos and Paroussos[48]	2018	Manufacturing	Job years / GWh	0.13	93
			Installation		0.24	172
Stage 2	EPIA/Greenpeace[49]	2006	Operations and Maintenance	Job-years / GWh	0.57	409
				Job-years / MWp	1	450
	REPP[50]	2006	Operations and Maintenance	Job-years / GWh	0.21	151
				Job-years / MWp	0.37	167
	Hondo and Moriizumi[51]	2017	Operations and Maintenance (Direct)	Job-years / GWh	0.89	639
			Operations and Maintenance (Indirect)		0.23	165
	Fragkos and Paroussos[52]	2018	Operations and Maintenance	Job years / GWh	0.18	129
Stage 3	IRENA[53]	2023	Decommissioning	Proportion of jobs in decommissioning	3.0%	-
Misc.	Arvanitopoulos and Agnolucci[54]	2020	Total jobs	Job-years / GWh	3.5	2,513
	Sovacool et al.[55]	2023	Direct Jobs	Job-years / $USD investment	2	310
			Indirect Jobs		0.7	109
			Induced jobs		3.69	572

[45] Solar electricity for over one billion people and two million jobs by 2020, Hoffman and Teske, European Photovoltaic Industry Association (EPIA) and Greenpeace (2006)
[46] Jobs and Renewable Energy Project Final Technical Report, Sterzinger & George, Jobs and Renewable Energy Project and Renewable Energy Policy Project (REPP) (2006)
[47] Employment creation potential of renewable power generation technologies, Hondo and Moriizumi (2006)
[48] Employment creation in EU related to renewables expansion, Fragkos and Paroussos (2018)
[49] Hoffman and Teske (2006) – European Photovoltaic Industry Association (EPIA) and Greenpeach via Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US? – Max Wei, Shana Patadia, Daniel M. Kammen (2009)
[50] Jobs and Renewable Energy Project Final Technical Report – George Sterzinger (2006)
[51] Employment creation potential of renewable power generation technologies: A life cycle approach – Hiroki Hondo and Yue Moriizumi
[52] Job creation related to renewables – Panagiotis Fragkos and Leonidas Paroussos (2018)
[53] International Renewable Energy Agency (IRENA) Annual Review (2023)
[54] The long-term effect of renewable electricity on employment in the United Kingdom, Arvanitopoulos and Agnolucci (2020)
[55] Building a green future: Examining the job creation potential of electricity, heating, and storage in low-carbon buildings, Sovacool et al. (2023). To apply the job years per $USD, several assumptions are used. First, that the ratio between domestic and international spend is the same in the USA as New Zealand, i.e., that the key componentry is also imported in these studies. The first step of the calculation is the nominal value of total spend (using 2% CPI assumption), $133m. This is then converted 2015 USD terms for multiplying the ratios.

A3: CVs

Tom Harris – Lead Author

Senior Consultant

MSc (Economics); BSc (Economics)

- [redacted]
- Location: Wānaka

Professional Experience

2023 to date	*Senior Consultant – Market Economics*
2021 – 2023	Economist – Department of Education (UK)
2019 – 2021	Fast Stream Assistant Economist – Department of Education (UK)
2018 – 2019	Economic Scholar – University of Exeter

Tom joined Market Economics from the UK Civil Service in 2023 where he worked as an economist across a challenging portfolio of projects and sectors. During the Covid-19 pandemic he was the principal analyst in the Department for Education modelling the pandemic's impacts on Children's Social Care. His other roles included leading on graduate outcomes analysis, supporting high-profile national policy implementation, being embedded in the permanent secretary's office, and working closely with external academics and stakeholders.

Tom taught undergraduate macroeconomics at The University of Exeter, then completed his Master's part-time alongside his work in the UK Civil Service. Using his access to novel administrative governmental datasets, he authored research into topics which included comparing the scarring effect on early-career earnings of graduating during the Covid-19 years with the Global Financial Crisis, and assessing whether prospective university students could be nudged into making better application choices. Tom has extensive experience working with senior officials and politicians to guide policy- and decision-making with analysis. As a proficient and interested coder, Tom has written a book on the R programming language and published open-source software packages to aid data analysis.

Tom has founded and runs Good with Data, a charity that connects analytical professionals to third sector organisations, enabling charities to benefit from pro bono expertise and for analysts to contribute their time towards meaningful causes productively.

Areas of Expertise

Econometrics| Game Theory | Empirical Industrial Organisation | Mathematical and Algorithmic Modelling | Machine (Statistical) Learning Models | Quantitative and Qualitative Research Methods | Public Economics | Economic Appraisal | Sectoral Analysis | Cost Benefit Analysis | Demand Analysis and Forecasting | Policy Analysis and Advice | Business Cases | Project Management

Tom has successfully completed a range of economic assessments with the following recent projects showing the breadth of relevant experience.

- Fergursson and Bledisloe Wharfs Extensions. Fast-Track Economic Impact Assessment for the Ports of Auckland.
- Brookby Quarry Stage 3. Economic assessment to support Fast-Track Application.
- Southern Screenworks fill site application. Fast-Track Economic Impact Analysis.
- Auckland Prison. Fast-Track Economic Impact Assessment for the Department of Corrections.
- Dirtworks consent application. Fast-Track Economic Analysis.
- Lochaburn Quarry. Fast-Track Eligibility Assessment.
- National Aggregate Sufficiency. Research for Aggregate Quarry Association into inter-regional dependence for aggregate and national supply sufficiency.
- Haldon Solar Farm. Economic Impact Assessment.
- Waerenga and Rangiriri Solar Farms. Peer reviews of economic assessments.
- Opunake and Carterton Solar Farms – Economic Impact Assessments.
- Dunedin Heritage Protections. Economic Impact Assessment for Dunedin City Council focussing on development feasibility and regression analysis of property price impacts.
- Hamilton WISE model to developer contributions modelling.
- Waihi Gold Mine extension. Economic Assessment and Peer Review of Applicant's assessments for Hauraki District Council.
- Forecasting the price path of Greenshell Mussels. VAR and ARIMA forecasting methods for NZTE.
- Taylorville Resource Park. Resource Consent Economic Impact Assessment.
- Timaru Showgrounds retail park configuration and liquor store, economic effects analysis.
- Auckland Developer Contributions, assessment of economic equity impacts.
- Queenstown Lakes District impact of Airbnb and short-term rental accommodation on property prices and rents.
- Queenstown Lakes District economic impact of Queenstown Cable Car proposal.
- Auckland Council policy analysis for Plan Change 78; Plan Change 79.
- Nelson Housing and Business Development Capacity Assessment (HBA) Analysis.

Gregory Akehurst – Director Approval and Quality Assurance

Director

BA/BCom (Geography and Economics)

- Email Address: [redacted]
- Mobile Number: [redacted]
- Location: Auckland

Professional Experience

- 2001 – 2025: Director, Market Economics Ltd
- 1996 – 2001: Senior Analyst, McDermott Fairgray Ltd.

Greg is a founding Director of Market Economics and has 30 years' experience consulting to a wide range of sectors in both the New Zealand and Australian markets. His experience covers assessment of market structure, size and change for development clients, economic impact assessment for commercial and government clients, as well as strategic policy, social infrastructure and amenity studies carried out for local councils. He has developed models to assess community needs and assess allocation networks set up to meet those needs. Greg leads 20-30 projects annually and has given expert witness evidence in local government hearings, before the EPA, the Environment Court and provided affidavits as an expert for the High Court.

Greg headed the team investigating the Canterbury Earthquake Rebuilds, labour force, materials and temporary housing requirements for government. In recent years he has led studies into infrastructure projects, Air Quality Impact modelling, as well as sector studies (in particular the Marine Industry, Quarrying and the aggregate sector and Construction). These studies draw together all aspects of inputs, to present central and local government with comprehensive assessments on economies' growth and change. Greg has also specialised in assessing Council funding mechanisms – in particular Development Contributions and Financial Contributions for both Councils and the development sector.

Greg authored the Guidebook for Growth Councils that needed to carry out non-residential land capacity and demand assessments to meet their obligations under the National Policy Statement on Urban Development Capacity (NPS-UDC). He was Auckland Council's chief economic witness with respect to Business Land in the Unitary Plan Hearings and led a number of projects around the country investigating business land requirements under the NPS for high growth Councils (Auckland, Future Proof, Queenstown). Greg has also carried out numerous economic studies in support of Fast Track applications under the COVID-19 FT Bill and the Fast Track Approvals Act 2024. Greg is currently the independent expert on the Development Agreements Committee for Waikato District Council.

Relevant Areas of Expertise

Spatial and Economic Analysis and Modelling | Input-Output Modelling | Urban and Regional Economics | Skills and Labour Force Modelling | Economic Growth Modelling | Supply and Demand Analysis | Sectoral and Specialist Market Analysis | Demand Analysis and Forecasting | Economic Impact Assessment | Policy

Analysis and Advice | Infrastructure Funding and Investment | Local Government Funding | Resource Management | Strategic Advice | Peer Review

Greg has successfully completed a range of economic assessments with the following recent projects showing the breadth of relevant experience.

- Pakiri consent renewals – economic effects assessment (consent assessment, council hearings)
- Brookby Quarry Stage 1. Economic assessment to support Expansion, Environment Court
- Drury Quarry. Economic assessment and Council hearing, FTAA 2024 application
- Hunua Quarry Consent application. Economic assessment and Council hearing , FTAA 2024 application
- Waingaro Quarry Consent application. Economic assessment, FTAA 2024 application
- Kings Quarry FT application – Economic Assessment
- Drury Metropolitan Centre – Economic Impact Assessment and Council Hearing
- Drury Metropolitan Centre – Development Contributions Assessment
- Ryman Healthcare Pukekohe – Development Contributions Assessment, Council Hearing
- Retirement Village Association – DC Assessment nationwide for 20+ Councils
- Wetland Provisions of NES for Freshwater – Economic Assessment of Aggregate loss for regions
- West Coast Coal – Peer review of Economic Assessment
- Waihi North Gold Mine – Peer Review of Economic Impact Assessment for Fast Track
- Martha Mine expansion – Economic peer review assessment
- Industrial Land Demand – Matamata Industrial land demand, private sector client
- NPS-UDC – Guidebook author for Business Land Assessment approach
- NPS – UDC – HBDA for Future Proof, Tauranga, Queenstown Lakes, Dunedin City
- NPS-UD HBDA assessment for Future Proof, oversee others.
- Marine Industry Assessment – Cracker Bay development, Wynyard Quarter
- Selwyn District – PC 73, assessment and critique of HBA prepared for SDC in support of development
- Lincoln Residential Development – Residential Demand modelling, Council evidence
- Ohoka PC 31 – Demand modelling, HBA critique, Council evidence for developer
- Auckland Prison EIA – Fast track economic assessment for Auckland Prison, Department of Corrections
- Dunedin Heritage Protections – Assess economic impacts of adding 146 properties to heritage protection list
- Waimanawa Estate Warkworth – Retail Demand assessment and economic impact assessment incl. council evidence
- Waerenga and Rangiriri Solar FT – Peer review of economic impacts for EPA
- Hamilton City Development Contributions Growth Model
- Peacocke Structure Plan – Economic Review and evidence for HCC
- Development Contributions High Court Affidavit – in support of Hamilton City DC Policy CIV-2020-419-202
- Ravenswood Economic Impact Peer Review – Infinity Holdings, overturned Hearing Panel Verdict.
- Other Fast Track Assessments:
    - Drury Metropolitan Centre
    - Haldon Solar
    - Karori Metlife Care Village
    - Mill Road Stage 1
    - Opunake Solar Farm
    - Summerset Rotorua Village

    - Summerset Half Moon Bay
    - Waihi North Mine
- Tauranga Crossing PC 33 – Demand assessment and centre assessment, Council Evidence
- NZTA Silverdale PPC 103 – Financial Contributions potential, Council evidence
- NZTA Cambridge to Piarere Economic Impact Assessment – Council evidence
- Development Contributions – High Court Affidavit, Developers vs North Shore City Council.