ESSENTIAL ECONOMICS

Evidence and Presentation

Greater Shepparton Permit Application Nos 2017-162, 2017-274, 2017-301 and 2017-344

Land: 610 Ferguson Road, Tatura East Vic 3616 (Application 2017-162)

Expert Witness Statement

John Noronha

Director - Essential Economics Pty Ltd

May 2018

Authorship

Report stage	Author	Date	Review	Date
Draft report	John Noronha	3 May 2018	Chris McNeil	3 May 2018
Revised draft	John Noronha	7 May 2018		
Final report				

Disclaimer

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1 INTRODUCTION

1.1 Professional Details

1.1 My name is John Patrick Noronha and I practice as a Director and Senior Economist at Essential Economics Pty Ltd of 96 Pelham Street, Carlton.

1.2 I hold the degrees of Master of Economics from the University of London and Bachelor of Economics and Politics (Honours) from the University of Plymouth. A copy of my CV is attached to this statement.

1.2 Area of Expertise

1.3 My area of professional expertise is urban economics, with a focus on the economic impacts of infrastructure projects – including renewable energy projects.

1.4 My opinions expressed herein are, to the context relevant, made by me in reliance upon my above expertise.

1.3 Instructions

1.5 I have been instructed in this matter by Norton Rose Fulbright, lawyers acting on behalf of CleanGen, the proponent for the proposed Tatura East Solar Farm (the 'Project').

1.6 My instructions in this matter are as follows:

(1) Review the Application and the background materials in your brief;

(2) Confer with instructing solicitors and counsel where necessary;

(3) Prepare an expert report that addresses the following matters:

(a) the economic value of agriculture within the region;

(b) the economic value of renewable energy at a project, local and regional level (identifying direct and indirect economic benefits);

(c) how the loss of agricultural land resulting from all four developments could impact the catchment's economy;

(d) whether any net economic benefit resulting from the proposed Project would outweigh any impact on agriculture, with supporting reasons;

(e) whether any net economic benefit resulting from the Applications would outweigh any impact on agriculture, with supporting reasons; and

(f) a response to issues raised by submissions to the Application, to the extent relevant to your area of expertise.

(4) Attend an expert witness conference in relation to the topic of agricultural economics;

(5) Following the expert conference, prepare a brief statement that highlights the points of agreement and disagreement between the experts;

(6) Appear at the Panel Hearing on 16 May 2018 in Shepparton for the purpose of presenting your expert opinion concerning economic matters; and

(7) If required, attend other days of the Panel Hearing.

1.7 In preparing this statement:

(a) I have been instructed by Norton Rose Fulbright that, as a witness giving evidence (by report, or otherwise) in a proceeding as an expert, I have a duty to assist the Panel and that this duty overrides any obligation that I may have to any party to the proceeding or to any person who is liable for my fee or expenses in this matter;

(b) I have neither received nor accepted any instructions to adopt or reject any particular opinion in preparing this report;

(c) I have made all the enquiries which I believe are desirable and appropriate and that no matters of significance which I regard as relevant have, to my knowledge, been withheld from the Panel;

(d) I have considered the relevant documents disclosed by the parties to the proceeding and other documents sourced in preparation of this Evidence Statement, which are listed as follows:

- Greater Shepparton City Council, Minutes Ordinary Council Meeting, 20 February 218
- IBISWorld Industry Report A0159, Hay and Other Cropping in Australia, IBISWorld, November 2017
- Kerang Solar Farm Loss Factor Impact Analysis – DigSilent Pacific, August 2013
- Shepparton Solar Farm Planning Permit Application – GHD, October 2017
- Solar Farm Development Town Planning Report, 1090 Lemnos North Road, Congupna – Spiire, November 2017
- Solar Farm Development Town Planning Report, 235 Victoria Road, Tallygaroopna – Spiire, November 2017
- Tatura East Solar Farm Planning Application Version 2 – CleanGen June 2017

- Victorian Livestock Farm Monitor 2014/15 – Department of Economic Development, Jobs and Transport, 2015

(e) I have been assisted in preparing this Evidence Statement by Mr. William Keating, a research assistant at Essential Economics, who prepared data and maps included in my Evidence Statement.

2 SUBJECT SITE AND SURROUNDING AREA

2.1 In this section of my Evidence Statement, I provide an overview of the proposed Tatura East Solar Farm.

2.1 Site Context

2.2 The Subject Site is located at 610 Ferguson Road, Tatura East and comprises 125ha of land, with street frontage to Turnbull Road on the eastern side of the site. The Subject Site forms part of a larger landholding which includes a residence and agricultural land.

2.3 The Subject Site is located in the Farming Zone and is used for hay farming and grazing.

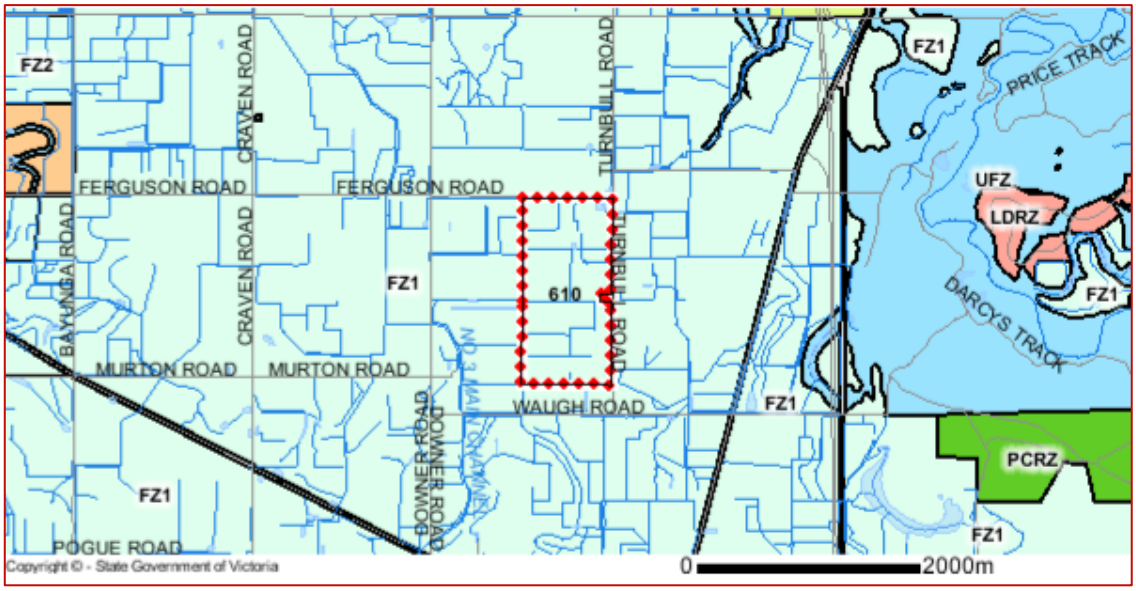
2.4 Approximately 90ha of Subject Site land will be used for solar farm infrastructure.

2.5 The solar farm will have an installed capacity of 45 Megawatt (MW) and will be connected to the Stanhope-Shepparton 66kV line on the Midland Highway approximately 5km north of the intersection with Turnbull Road.

2.6 The main entrance to the Subject Site will be Turnbull Road. Turnbull Road is a council owned road which is only part sealed.

2.7 Figure 2.1 identifies the Subject Site in a locational context.

Figure 2.1: Location of the Proposed Tatura East Solar Farm



Source: State Government of Victoria

2.2 Surrounding Area

2.8 Surrounding uses can be described as follows:

- To the north: along Ferguson Road the balance of the host landowner site (610 Ferguson Road), including a residence and agricultural land. North of the 610 Ferguson Road property is a large commercial orchard and a number of rural lifestyle properties.
- To the east: along Turnbull Road are a number of small farms with activities including beef cattle breeding and grazing.
- To the south: along Waugh Road are a number of residences and rural lifestyle properties.

  To the west: along Downer Road are a number of rural lifestyle and farming properties (beef cattle breeding and grazing).

2.9 Figure 2.2 identifies neighbouring properties to the Subject Site, with Table 2.1 providing the distance between each property and the proposed solar farm site.

Figure 2.2: Tatura East Solar Farm – Neighbouring Properties

Source: CleanGen

Table 2.1: Tatura East Solar Farm – Distance of Neighbouring Properties from the Subject Site (refer to Figure 2.2)

Neighbour	Address	Distance away
N Landlord	610 Ferguson Rd	>0.2km
N1	1280 Turnbull Rd	>0.1km
N2	1245 Turnbull Rd	>0.1km
N3	1275 Turnbull Rd	>0.1km
N4	1265 Turnbull Rd	>0.3km
N5	1295 Turnbull Rd	>0.3km
N6	280 Waugh Rd	>0.15km
N7	230 Waugh Rd	>0.45km

Source: CleanGen

2.10 From a locational perspective, the Subject Site presents as a typical solar farm development. Solar farm sites generally require good access to solar resources, a large area of flat, cleared land, with no rare flora, fauna and cultural heritage constraints, good road access and efficient connection to the electricity grid.

3 TATURA EAST SOLAR FARM – ECONOMIC BENEFITS ASSESSMENT

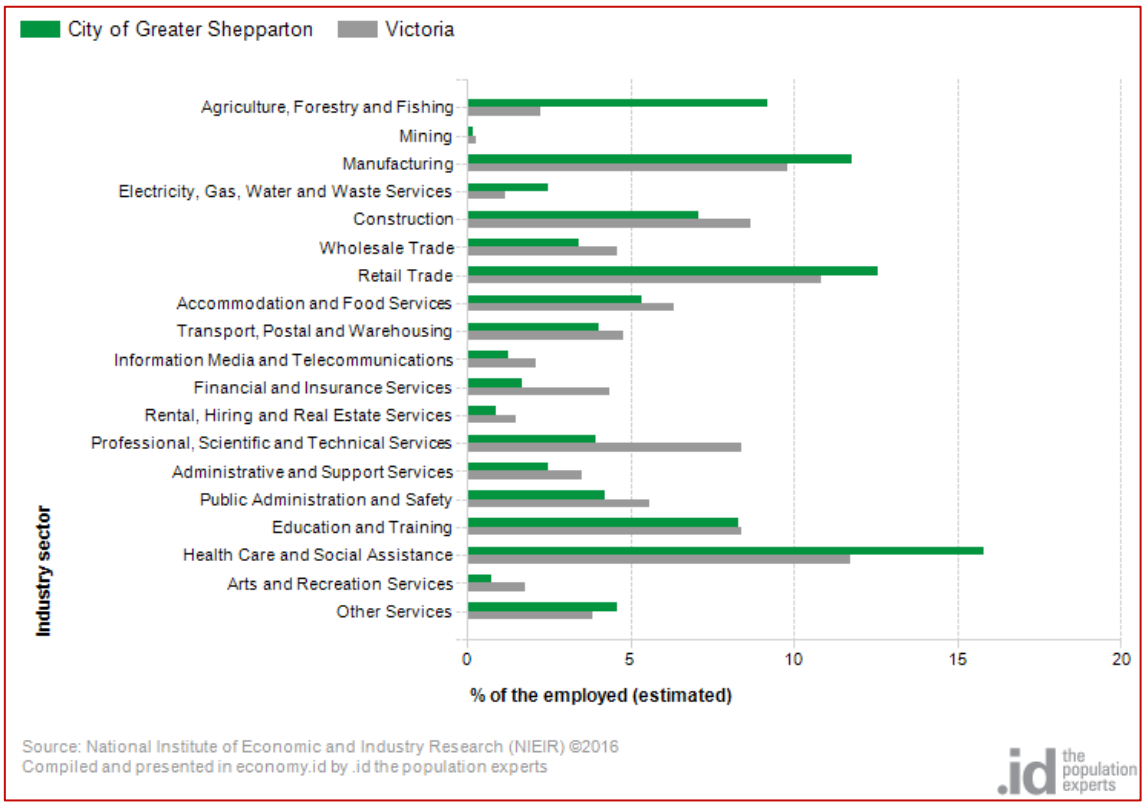
3.1 In this section of my Evidence Statement, I consider the economic benefits of the development and operation of the proposed Tatura East Solar Farm.

3.1 Greater Shepparton Economic Overview

Industry Structure

3.2 Greater Shepparton's industry structure, as measured by sectors in which residents work, highlights the importance of the agricultural sector (agriculture, forestry and fishing), which accounts for approximately 8% of the resident workforce. The largest sectors in which residents work are health care and social assistance (17%), retail trade (12%) and manufacturing (12%). This data, which is sourced from the ABS Census 2016 and outlined in Figure 3.1, highlights the diversity of the Greater Shepparton economy with strong primary, secondary and tertiary sectors.

Figure 3.1: Resident Workers Industry of Employment, 2015/16

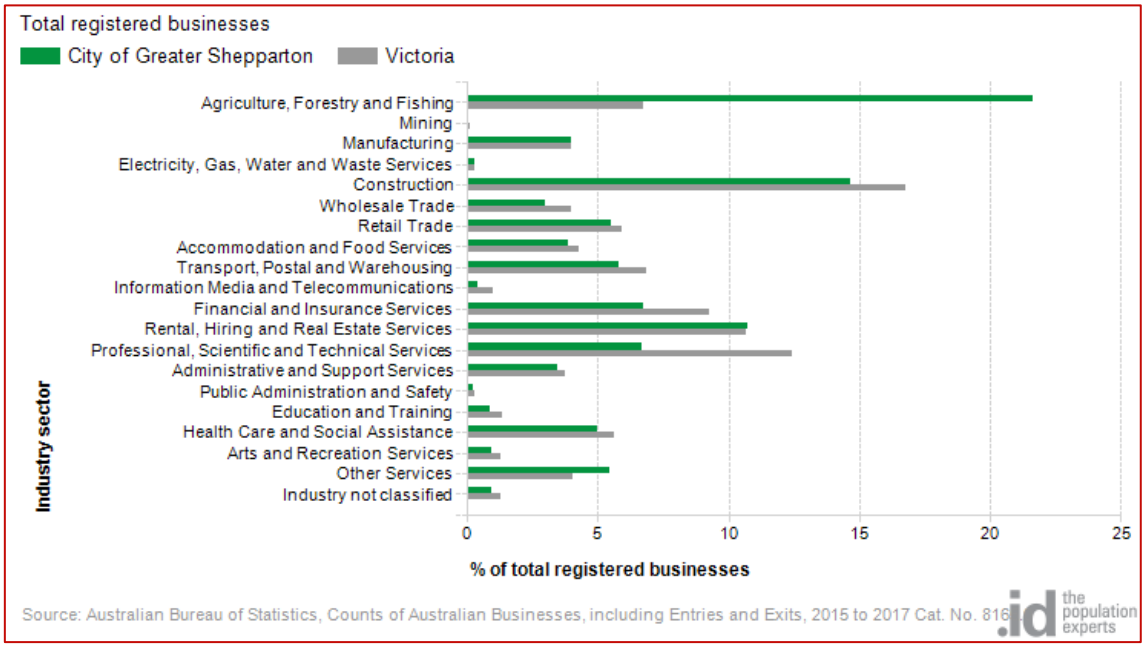


Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id, the population experts.

Business Structure

3.3 Greater Shepparton's business structure highlights the importance of the agricultural businesses (agriculture, forestry and fishing) to the economy, which this sector accounting for approximately 22% of registered businesses (eg farms). The next largest sector in terms of businesses is construction (15%) and rental, hiring and real estate (11%). This data is sourced from ABS Business Counts for 2017and outlined in Figure 3.2.

Figure 3.2: Registered Businesses by Industry, 2017



Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id, the population experts.

Occupational Structure

3.4 Greater Shepparton's occupational structure, which is detailed in Table 3.1, highlights the diversity of skills within the economy with a good spread of white and blue collar occupations. Greater Shepparton also has a higher share of construction-related occupations compared to the State average. For example, approximately 34% of Greater Shepparton occupations are related to technicians and trade workers, machinery operators and drivers and labourers and this compares to 28% for Victoria. In 2016, Greater Shepparton had approximately 9,250 resident workers occupied in construction-related occupations, and this highlights the strong workforce base available to support major infrastructure projects.

Table 3.1: Resident Worker Occupations, 2016

City of Greater Shepparton - All industries	2016		
Occupations	***Number***	***%***	***Victoria %***
Managers	3,912	14.5	13.5
Professionals	4,615	17.1	23.3
Technicians and Trades Workers	3,684	13.7	13.1
Community and Personal Service Workers	2,821	10.5	10.6
Clerical and Administrative Workers	3,173	11.8	13.3
Sales Workers	2,773	10.3	9.7
Machinery Operators And Drivers	1,810	6.7	5.8
Labourers	3,755	13.9	9.0
Inadequately described or not stated	438	1.6	1.7
Total persons	**26,981**	**100.0**	**100.0**

Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id, the population experts.

Unemployment

3.5 Greater Shepparton (7.4%) has a significantly higher unemployment rate compared to Victoria (6.0%) and Regional Victoria (5.4%). This data is sourced from the Department of Jobs and Business, Small Area Labour Markets, December 2017) and is detailed in Table 3.2.

3.6 As of December 2017, 2,510 job seekers in Greater Shepparton were unemployed. Major infrastructure projects, such as the proposed Tatura East Solar Farm, may provide a pathway for some of these job seekers to enter/re-enter the workforce (subject to suitable skills match).

Table 3.2: Labour Force data, Selected Locations, December 2017

	Employed	Unemployed	Labour Force	Unemployment Rate
Greater Shepparton	**31,490**	**2,510**	**34,000**	**7.4%**
Regional Victoria	708,200	40,100	748,300	5.4%
Victoria	3,204,400	203,000	3,407,400	6.0%

Source: Australian Government Department of Jobs and Small Business Small Area Labour Markets Australia, December Quarter 2017.

3.2 Construction Phase Economic Benefits

3.7 Capital Investment: CleanGen will invest $50 million in the development of the Tatura East Solar Farm. It is estimated approximately 20% of this investment will flow to the local economy in terms of the services and labour.

3.8 Employment generation: in terms of direct employment, CleanGen estimates 210 Full Time Equivalent jobs will be supported over the 10-12 month solar farm construction period. Significant local employment will be generated through fencing, site clearing,

parts assembly, land maintenance etc. As highlighted above, Greater Shepparton has an industry, business and occupational structure well situated to a project of this scale and nature. There are also a large number of unemployed job seekers to source project labour from.

Assuming an 80/20 split between local/non-local workers the direct local labour requirement would be 170 FTE workers. Greater Shepparton has a labour force of 9,250 workers that are occupied in construction-related activities and therefore the local labour requirement for the construction phase of the project should not present a constraint to labour supply in the economy as it represents just 1.8% of the local construction workforce. As noted above, the project offers the potential for some of Greater Shepparton's unemployed job seekers (2,510 persons) to find work, which will contribute to a reduction in Greater Shepparton's relatively high unemployment rate.

I am instructed that CleanGen is committed to ensuring 10% of the local workforce are apprentices involved in training programs in construction and operations. At least 50% of these apprentices will be women.

In addition to direct employment, significant employment will be generated indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the construction industry of 2.6 (based on ABS Input-Output tables for the category 'other construction'), the project is estimated to generate an additional 335 FTE jobs over the construction period.

Indirect or flow-on jobs (which capture industry and consumption effects) include those supported locally and in the wider economy (including in other states), as the economic effects of the capital investment flow through the economy. Indirect employment creation within the region would include jobs supported through catering, accommodation, trade supplies, fuel supplies, transportation, food and drink and the like.

In summary, approximately 545 FTE jobs (210 FTE direct jobs and 335 FTE indirect jobs) are expected to be generated by the Tatura East Solar Farm project during the 12 month construction phase.

3.9 Business participation opportunities: In terms of cost efficiencies (lower transport, equipment hire, labour costs etc.), many large construction projects located in regional areas are (where possible) serviced from within the same region.

As identified above, Greater Shepparton has approximately 926 construction firms and many other businesses associated with activities likely to be required for the project, such as transport operators, trade suppliers, vehicle and machinery hire, auto mechanics etc.

Within Greater Shepparton, especially Shepparton, there are firms of sufficient scale/expertise to compete for contracts or provide services and equipment to the project. Shepparton also has a good range of contractors and suppliers which would be well-placed to participate in the project.

In order to maximise local business participation, my instructions are that CleanGen will partner with the Industry Capability Network (as per previous CleanGen projects) to identify and sources local contractors and suppliers.

The Industry Capability Network is an independent, non-profit organisation funded by the Federal Government to support business opportunities, including linking suppliers to project contracts at a local level through its ICN Gateway website where details of work packages are advertised.

3.10 Boost to the accommodation sector: Assuming 20% of the construction workforce will be non-local workers and relocating to the area, then approximately 40 rooms (on average) will be required to accommodate theses workers across the 10-12 month construction period.

Greater Shepparton has a significant supply of commercial accommodation as measured by the ABS Tourism Accommodation series for the June Quarter 2016 (latest available). This data – which identifies supply for hotels, motels and apartments with 15 rooms or more – shows the Study Area has at least 19 establishments, 575 rooms and 1,580 beds. This data captures commercial establishments in Tatura, Mooroopna and Shepparton which are the most convenient accommodation locations for project workers.

The ABS data shows for the June Quarter 2016, the room occupancy rate across all Greater Shepparton establishments was 53% and the bed occupancy rate was 29%. A review of accommodation statistics for the March Quarter 2016 (which includes the peak holiday season) shows the room occupancy rate was 58% and the bed occupancy rate was 32%.

These figures show there is sufficient capacity in Greater Shepparton's commercial accommodation sector to absorb project workers, noting the 40 workers would only take up 7% of rooms (assuming each worker required an individual room). Importantly, the stimulus generated these workers will help improve occupancy rates, especially in off peak seasons.

Other local accommodation providers may also benefit from the project such as:

- Caravan parks/holiday parks (especially those providing cabins)
- Private rentals
- Bed and breakfast
- Farm stays

3.3 Operational Phase Economic Benefits

3.11 Improved electricity supply for local industry: the Tatura East Solar Farm will include a new substation which can be shared with local industry to improve power supply reliability in the local area and therefore allow expansion of industry without significant cost. This new infrastructure brings forward improved power supply to the

area. This factor is important recognising Tatura's strong industry base. The delivery of the substation as part of the solar farm project avoids the cost of network upgrades by the electricity distributor being passed on to local industry.

3.12 Employment generation: CleanGen indicates that 5 FTE jobs will be supported on an ongoing basis through the operation and maintenance of the Tatura East Solar Park.

A number of additional jobs will also be supported indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the electricity industry of 3.9 (based on ABS Input-Output tables) to the direct operational and maintenance jobs, a further 15 permanent FTE jobs (rounded) would be generated in the wider State and national economies, but some of these jobs would be generated locally through existing and new supply chains.

Operational-related employment is for the lifetime of the project (i.e., at least 25 years); therefore, it represents new long-term employment opportunities at a local, regional and state-wide level.

In summary, approximately 20 FTE jobs (5 FTE direct jobs and 15 FTE indirect jobs) are expected to be supported on an ongoing basis by the Tatura East Solar Farm.

3.13 Contribution to reduced power prices. The 45MW (AC) project reduces the marginal loss factor (MLF) in the area which in turn will reduce the loss factor on power bills for the local area. The value of power price savings is $7.0 million NPV over 30 years using an 8% discount rate.

3.14 Economic Stimulus Effect: CleanGen has estimated the economic stimulus associated with the project is approximately $1.5 million pa or $22.4 million over 30 years in Net Present Value (NPV) using an 8% discount rate This calculation is based on the following factors:

- Annual payments to the host landlord (confidential)
- Net increase in annual rates to Council. Note, *Rating Arrangements under the Electricity Act 2000*, April 2005 provide guidelines to assist in determining the amount of rates payable to Councils from electricity generation projects. Rates revenue from renewable energy projects is considerably higher than revenue associated with agricultural activities. It is estimated Council will receive a net increase in annual rates revenue from the site of approximately $100,000 pa.
- Annual operational and maintenance requirements of the facility ($750,000 pa)
- Local management of the facility ($350,000 pa)
- Tax and auditing requirements ($100,000 pa)
- Community funding contributions ($50,000 pa), refer to 3.17 below.

3.15 In my opinion, the economic stimulus estimates prepared by CleanGen are reasonable, and include factors typically associated with ongoing benefits accruing to local economies through the operation of solar farms.

3.4 Environmental Benefits

3.16 Electricity generation: Once fully-operational, the Tatura East Solar Farm will generate approximately 105,000 MWh of renewable energy annually which is sufficient to power approximately 20,000 homes and provide electricity to industry. This represents approximately 75% of the household electricity requirements of Greater Shepparton, which has approximately 27,000 dwellings (Victoria in Future 2016, DEWLP).

3.17 Clean power benefits: According to data provided by CleanGen, the Tatura East Solar Farm will result in the reduction of an estimated 122, 000 tonnes in carbon dioxide (CO2) emissions on an annual basis compared to the same level of electricity generation using fossil fuels. This reduction in CO2 emissions is the equivalent of taking approximately 28,000 cars off the road annually.

3.5 Community Benefits

3.18 Community Funding: I am instructed that CleanGen will provide up to $50,000 pa (linked to CPI) to local community groups for projects and programs. Funding will be focused on the following:

- Council community grant fund
- Aboriginal partnerships (Yorta Yorta Nation and Rumbalara)
- Lighthouse projects
- Women's Charter Alliance
- Start-ups and innovation

3.19 Education and training benefits: the project will provide specific training programs for apprentices, including women and indigenous trainees, in the construction and operational aspects of solar farms. Trainees will be able to transfer this knowledge to other renewable energy projects.

3.6 Conclusions

The proposed Tatura East Solar Farm will deliver the following economic, environmental and community benefits:

Construction Phase

3.20 Capital investment of $50 million, of which $10 million would be spent on local purchases and labour.

3.21 Direct employment generation of 210 FTE, of which 170 FTE positions are likely to be locally sourced (plus 335 indirect FTE positions, some of which will be supported locally). This new local employment will assist in reducing Greater Shepparton's high unemployment rate.

3.22 Project participation opportunities for local businesses and contractors (eg transport and logistics, fencing, land clearing, equipment hire).

3.23 New revenues for the accommodation operators through demand generated by 40 project workers relocating to the area. This will assist in improving relatively low occupancy rates for accommodation providers, especially in off-peak periods.

Operational Phase

3.24 Improved electricity supply for local industry through the provision of a new substation which will be shared between the solar farm and local industry. This will provide new capacity to support the expansion of industry in Tatura and the broader region.

3.25 Direct employment of 5 FTE local jobs associated with the operation and maintenance of the solar facility (plus 15 indirect FTE positions, some of which will be supported locally).

3.26 According to data provided by CleanGen, the economic stimulus for the region is estimated at $22.4 million (Net Present Value) over 30 years associated with landowner payments, council rates, expenditures on the operation and maintenance of the solar farm, and community fund payments.

3.27 Contribution to a reduction of $7.0 million (NPV) in power prices as the solar farm reduces the marginal loss factor in the area.

3.28 Clean energy generation of 105,000 MWh per year, sufficient to power 20,000 homes and support local industry, and which reduces CO2 emissions by 122,000 tonnes pa.

3.29 Community benefits including an ongoing community fund which will support local projects and programs and training/upskiling outcomes through project apprenticeships which will include women and indigenous trainees. CleanGen has a target to ensure at least 50% of apprentices employed are women.

4 AGGREGATE ECONOMIC BENEFITS OF FOUR PROPOSED SOLAR FARMS IN GREATER SHEPPARTON

4.1 This section of my Evidence Statement considers the aggregate economic benefits associated with the four solar farm projects proposed for Greater Shepparton.

4.2 This assessment is limited to the information available in planning application reports for the Tallygaroopna, Congupna and Lemnos projects.

4.1 Overview of Projects

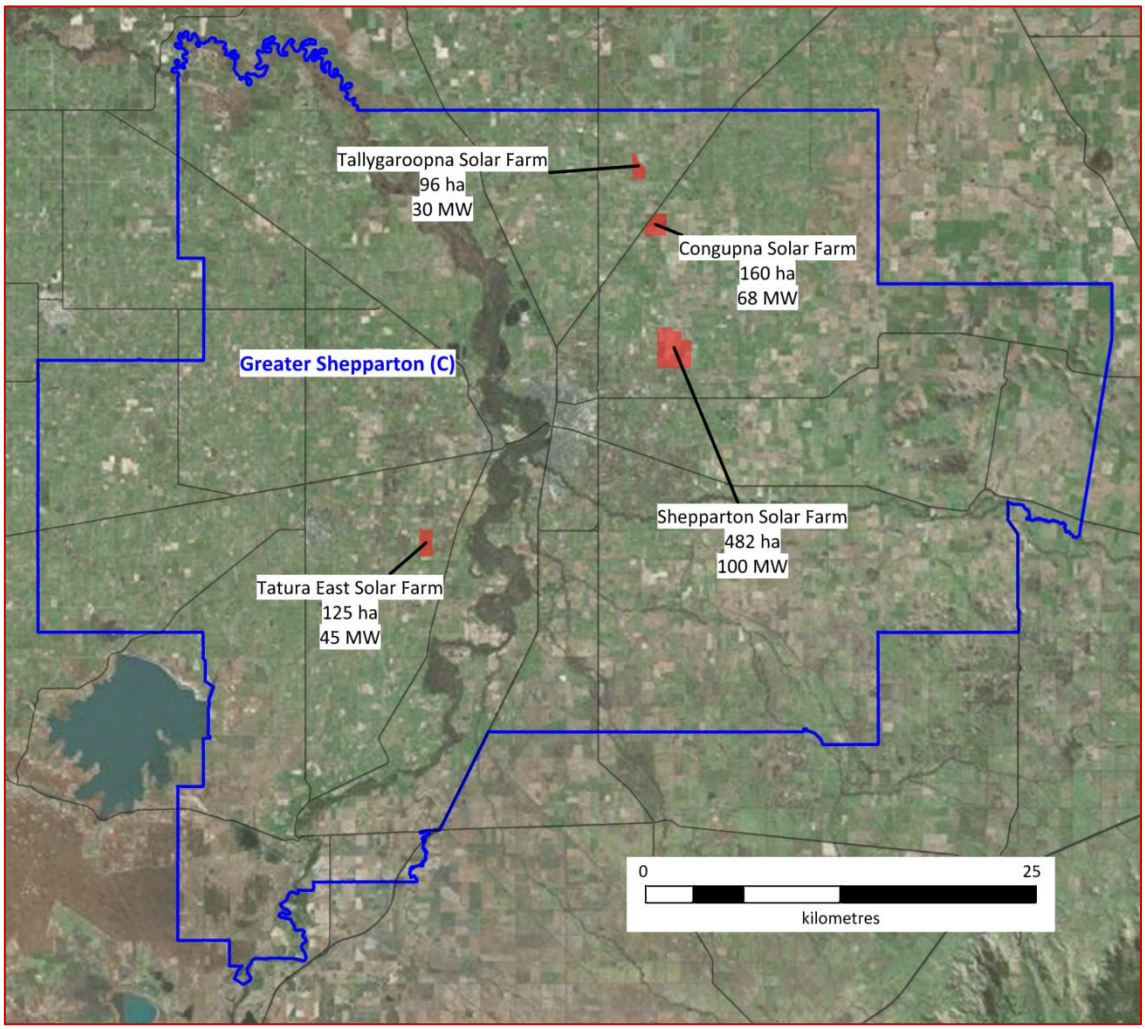
4.3 Four solar farm projects are proposed for Greater Shepparton and the proponents of each are seeking planning permits to proceed with their developments. The Minister for Planning called in these permits applications and they will be considered by an Independent Panel in May 2018.

4.4 The projects are (in order of proposed installed capacity):

- Shepparton Solar Farm, Lemnos, located on a 482ha site and with a proposed installed capacity of 100MW. The project proponent is Neon Australia Pty Ltd.
- Congupna Solar Farm, located on a 160ha site with a proposed installed capacity of 68MW. The project proponent is X-Elio.
- Tatura East Solar Farm, located on a 125ha site with a proposed installed capacity of 45MW. The project proponent is CleanGen.
- Tallygaroopna Solar Farm, located on a 96ha site with a proposed installed capacity of 30MW. The project proponent is X-Elio.

Figure 4.1 shows the location of the four solar farm projects within the Greater Shepparton municipal boundaries.

Figure 4.1: Location of Proposed Solar Farm Projects within the Greater Shepparton municipality



Source: Essential Economics with MapInfo

4.2 Aggregate Construction Phase Economic Benefits

4.5 Capital Investment: The four solar projects have a joint investment value of $307 million, of which an estimated $51 million would flow to the local economy through the purchase of services and labour.

4.6 Employment generation: in terms of direct employment, the four projects will support 850 jobs over the construction period.

In addition to direct employment, significant employment will be generated indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the construction industry of 2.6 (based on ABS Input-Output tables for the category 'other construction'), the project is estimated to generate an additional 1,360 jobs over the construction period with a proportion of these jobs likely to be supported in Greater Shepparton through local supply chains.

In summary, approximately 2,210 jobs (850 direct jobs and 1,360 indirect jobs) are expected to be generated by the four projects over the construction period.

4.7 Business participation opportunities: Refer to paragraph 3.9.

Boost to the accommodation sector: Refer to paragraph 3.10

4.3 Aggregate Operational Phase Benefits

4.9 Improved electricity supply for local industry: due to new local infrastructure, such as substations, and the generation of an estimated 580,400 MWh of clean electricity per year.

4.10 Employment generation: in terms of direct employment, the four projects will support approximately 35 jobs on an ongoing basis associated with the operation and maintenance of these facilities.

A number of additional jobs will also be supported indirectly through the employment multiplier effect. By applying an industry-standard multiplier for the electricity industry of 3.9 (based on ABS Input-Output tables) to the direct operational and maintenance jobs, a further 100 permanent jobs (rounded) would be generated in the wider State and national economies, but some of these jobs would be generated locally through existing and new supply chains.

In summary, approximately 135 jobs (35 direct jobs and 100 indirect jobs) are expected to be supported on an ongoing basis through the operation of the four facilities.

4.11 Industry transformation: Collectively the four solar farm projects represent the establishment of strong renewable energy sector in Greater Shepparton. In doing so the projects assist in transforming the economy from more traditional activities (eg manufacturing, food processing) to new activities by providing diversification opportunities for industry and workers.

4.4 Aggregate Environmental Benefits

4.12 Electricity generation: Once fully-operational, the four solar farms will generate a significant amount of renewable energy annually from the 240MW of installed capacity across the projects.

4.13 Clean power benefits: The four solar farms will result in the reduction of a significant amount of carbon dioxide (CO2) emissions on an annual basis compared to the same level of electricity generation using fossil fuels. This reduction in CO2 emissions has not been calculated at an aggregate level due to information constraints.

4.5 Conclusions

The proposed four solar farm projects will deliver the following aggregated economic and environmental benefits:

Construction Phase

4.14 Capital investment of approximately $310 million.

4.15 Direct employment generation of 850 jobs.

4.16 Project participation opportunities for local businesses and contractors.

4.17 New revenues for the accommodation operators through demand generated by project workers relocating to the area.

Operational Phase

4.18 Improved electricity infrastructure and supply for local industry.

4.19 Direct employment of 35 local jobs associated with the operation and maintenance of the solar facilities (plus 100 indirect positions, some of which will be supported locally).

4.20 Contribution to Greater Shepparton's industry transformation by providing diversification opportunities for industry and workers.

4.21 Clean energy generation and a reduction in CO2 emissions.

5 AGRICULTURAL IMPACTS

5.1 In this section of my Evidence Statement, I consider the value of the agricultural sector and economic impacts on the sector from the Tatura East Solar Farm and the four proposed solar projects to be located within Greater Shepparton.

5.1 Value of the Agricultural Sector

5.2 According to data from economy.id (prepared by the National Institute of Economic and Industry Research) the total gross value of sales associated with Greater Shepparton's agricultural sector was $550 million in 2015/16. Agricultural output represented 9.2% of Greater Shepparton's total output ($5,998 million) in 2015/16.

5.3 In 2015/16 Value-added output was approximately $320 million (or 12.3% of Greater Shepparton's total value-added output), with exports totalling approximately $140 million (or 8.4% of Greater Shepparton's total exports).

5.4 Greater Shepparton's agricultural sector supported approximately 2,790 Full Time Equivalent (FTE) jobs in 2015/16, or 11.0% of Greater Shepparton's total employment.

5.5 ABS Business Counts for 2017 show the category 'agriculture, forestry and fishing' account for 21.6% of all Greater Shepparton businesses, with the next largest number of businesses being associated with the construction sector (14.6%).

5.6 Information sourced from the Victorian Livestock Farm Monitor 2014/15 (Department of Economic Development, Jobs and Transport), shows the best performing farms in Northern Victoria averaged $630 per ha in earnings before income tax. Note, this figure represents an average for wool, lamb, beef, hay and cropping. When adjusted for CPI, this figure rises to $680 per ha (2018) dollars.

5.7 Using the above figures, the current value of production on the Tatura East Solar Farm may be up to $85,000 pa. However, based on existing uses which are principally focused on dry pastures and irrigated cropping, with a small amount of hay cropping it is unlikely a value of $680 per ha would be achieved.

5.8 A 30 year projection has been modelled for the potential value of agricultural production lost at the Tatura East site. The modelling is run over 30 years and allows for CPI increase of 2.5% pa and a discount rate of 8%. These are the same parameters used to calculate power price reductions (refer to paragraph 3.13) and the operational economic stimulus (see paragraph 3.14).

5.9 The results show a loss in production revenue for the Tatura East site of $1.3 million (NPV) over 30 years.

5.10 Modelling has not been undertaken at an aggregated level as insufficient information is available.

5.2 Loss of Irrigated Farming Land

5.11 Approximately 125ha of irrigated farming land will temporarily be lost to agricultural activities due to the operation of the Tatura East Solar Farm. This represents 0.04% of irrigated farming land (317,000ha) in the Food Bowl.

5.12 When the four projects are considered together 863ha of land will temporarily be unavailable for agricultural activities. This represents 0.27% of all irrigated farming land in the Food Bowl.

5.3 Creation of a Micro Climate

5.13 A number of submissions have made reference to the potential for the Tatura East Solar farm to create a micro climate which might impact on surrounding horticultural operators.

5.14 These technical micro climatic aspects of this issue are is outside my area of expertise; however, I note the findings of consultants Sustainable Energy Transformation who were engaged by council to review this and other technical matters raised by objectors to the project:

> *Officers engaged Sustainable Energy Transformation an expert solar consultant to review technical matters raised in the grounds of objection. The expert review concluded the following:*
>
> *The technical aspects raised in the objections have been reviewed. Some aspects have been found to be without a technical basis and others can be adequately addressed with appropriate requirements in management plans for the site development.*

Source: Minutes – Ordinary Council Meeting, 20 February 2018

5.15 In light of the lack of evidence of micro climatic impacts and associated data constraints, the economic impacts if any have not been assessed.

5.4 Host Landowners

5.16 Impacts on host landowners need to be considered when assessing the overall agricultural impacts, recognising that these farm operators have voluntarily agreed to allow solar farm infrastructure to be located on their agricultural land.

5.17 As noted in chapters 3 and 4, host landowners are compensated for the use of their land through land purchase or long-term leasing of the land.

5.18 While landowner payments are subject to confidentiality, it is highly likely that the land sale price offered by the proponent would be higher than the market rate; while the annual landowner lease payments are likely to be higher than annual production

revenues from the leased site. In this regard, these farm operators will receive an immediate (land sale) or ongoing financial stimulus due to the solar farm project.

5.19 Benefits of these new incomes for host farmers include:

- 25-30 year drought-proofed income stream (which is CPI indexed) providing a level of financial certainty for farming families (leasing landholders).
- land sales revenue (or lease revenue) can be reinvested in farming operations, which might include debt reduction, purchase of new machinery, equipment, crops, stock etc.
- Enables more flexibility in the long-term planning for farming operations, including succession planning.
- Enables new annual capital investment in farming operations, noting the host landowners will continue to operate on the balance of the land.

5.20 At the end of the 30 year lease agreement, landowners have the opportunity to recommence farming on the leased sites with the proponent responsible for removing all infrastructures and rehabilitating the land.

5.4 Conclusions

5.21 Greater Shepparton's agricultural sector is important in terms of output ($550 million), value-added ($320 million) and jobs (2,790 FTE).

5.22 The proposed Tatura East Solar Farm will result in the loss of 125ha of irrigated land, with the four projects consuming 863ha of irrigated land. We note that this land loss represents just 0.04% (Tatura site) and 0.3% (all four sites) of total irrigated land in the Food Bowl.

5.23 The loss of production for the Tatura site is estimated at 1.3 million NPV (over 30 years).

5.24 Concerns have been raised as to micro climate impacts associated with solar farm operations. In light of the lack of evidence of micro climatic impacts and associated data constraints, the economic impacts if any have not been assessed.

5.25 The projects also generate benefits to farming families who voluntarily enter into agreements to host solar farm infrastructure, these include:

- Annual landowner payments (linked to CPI) which provide a level of operational certainty and which can be reinvested into farming operations.
- More flexibility in the long-tern planning for farming operations, including succession planning.
- Ability to recommence farming operations on the site (if desired) once the lease term expires.

6 RESPONSE TO SUBMISSIONS

I have reviewed all submissions provided to me with regard to the Tatura East Solar Farm project.

The main economic issues raised are associated with the loss of productive irrigated land and the potential creation of a micro climate.

The impact on the loss of productive land is addressed in sections 5.1 and 5.2.

The impact of a micro climate is addressed in section 5.3. Note, any potential impacts are outside my area of expertise.

7 NET COMMUNITY BENEFIT ASSESSMENT

7.1 Net Community Benefit assesses economic, social and environmental factors. In this section of my Evidence Statement I assess net community benefit of the construction and operation of the Tatura East Solar Farm project and the aggregated four projects from an economic perspective.

7.1 Tatura East Solar Farm – Net Community Benefit Assessment

7.2 In my opinion, the economic and employment benefits associated with the construction and operation of the Tatura East Solar Farm outweighs the negative impacts on the agriculture sector.

7.3 While there will be a loss of 125 ha of irrigated land for the coming 30 years resulting in a $1.3 million loss in production, this should be considered against the construction phase stimulus of $10.0 million (2018 dollars) and the operational phase stimulus of $29.4 million NPV (over 30 years).

Significant local employment (and training) will be generated during the construction phase (170FTE jobs), which is important in an area of high unemployment. Ongoing local employment, while relatively small (5 FTE) should also be welcomed as these positions are ongoing for at least 30 years.

Other positive outcomes include improved power supply outcomes for local industry, contribution to the diversification of the Greater Shepparton economy and positive outcomes for the host farming landowner.

Table 7.1 summarises the negative and positive economic impacts from the development and operation of the proposed Tatura East Solar Farm.

Table 7.1: Tatura East Solar Farm – Net Community Benefit Assessment

Factor	Value
Negative Community Outcomes	
Loss of irrigated land	125 ha
Loss of agricultural production	$1.3 million (NPV) over 30 years
Economic impacts of micro climate	Unproven Potential impacts manageable
Positive Community Outcomes	
Capital investment	$50 million (2018 dollars)
Local purchases (services and labour)	$10 million (2018 dollars)
Construction employment	170 FTE local jobs (for 12 months)
Operational employment	5FTE local jobs (for 30 years)
Local economic stimulus (associated with operations)	$22.4 million NPV (over 30 years)
Reduced power prices	$7.0 million (over 30 years)
Other	
Improved power outcomes for local industry	
Contribution to the diversification of Grater Shepparton's economy	
Positive outcomes for the host farming landowner	

Source: Essential Economics

7.2 Aggregated Solar Farms – Net Community Benefit Assessment

7.4 In my opinion, the economic and employment benefits associated with the construction and operation of the four solar farms proposed for Greater Shepparton outweigh the negative impacts.

Significant local employment (and training) will be generated during the construction phase which will help to reduce local unemployment. Ongoing local employment of 35 jobs will also be supported for 30 years.

Other positive outcomes include improved power supply outcomes for local industry, contribution to the diversification of the Greater Shepparton economy and positive outcomes for the host farming landowners.

Table 7.2 summarises the negative and positive economic impacts from the development and operation of the four solar farms proposed for Greater Shepparton.

Table 7.2: Aggregated Solar Farms – Net Community Benefit Assessment

Factor	Value
Negative Community Outcomes	
Loss of irrigated land	863 ha
Economic impacts of micro climate	Unproven Potential impacts manageable
Positive Community Outcomes	
Capital investment	$307 million (2018 dollars)
Construction employment	850 jobs
Operational employment	35 jobs
Other	
Improved power outcomes for local industry	
Contribution to the diversification of Grater Shepparton's economy	
Positive outcomes for host farming landowners	

Source: Essential Economics

8 SUMMARY OF KEY FINDINGS

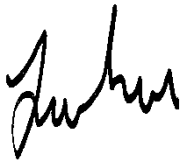
8.1 The Tatura East Solar Farm is a 45MW solar farm to be located on part of the 610 Ferguson Road property in Tatura East. Three other solar farms are proposed for the Greater Shepparton to be located at Lemnos (100 MW facility), Congupna (68 mw facility) and Tallygaroopna (30MW facility).

8.2 My Evidence has examined the net community benefit arising from the Tatura East Solar farm and the four projects at an aggregated level.

8.3 The analysis demonstrates both the Tatura East Solar Farm and the aggregated projects deliver a strong net community benefit for Greater Shepparton, with the construction and operational benefits (employment and economic stimulus) outweighing the agricultural production losses associated with the host solar farm sites, which account for a minute proportion of the Food Bowl's irrigated agricultural land.

8.4 It is my opinion the planning permits should be issued to facilitate these major investment projects.

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have to my knowledge been withheld.



John Noronha
Director and Senior Economist
Essential Economics Pty Ltd

7 May 2018

ATTACHMENT:

John Noronha CV

CURRICULUM VITAE

ESSENTIAL ECONOMICS

John Noronha

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Director

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Introduction	John is a Director at Essential Economics with wide-ranging experience in public and private sector work in both the UK and Australia. John's particular expertise is in economic development, cost-benefit analysis, and assessment of the local, regional and wider economic impacts associated with major urban and regional developments.
Disciplines, Skills, Qualifications	John has a Masters degree in Economics, and has nearly twenty years' experience in undertaking economic research for a wide range of clients. At Essential Economics, John's role is primarily in preparing economic development strategies, demand forecasting across a range of sectors, preparing economic profiles, and assessing economic impacts associated with road, tourism, commercial, residential, industrial land and renewable energy projects. John has particularly strong expertise in cost benefit analysis, economic impact assessments and business case development, considerable experience in community and stakeholder consultation, excellent report writing and presentation skills (including public speaking). John also represents clients as expert witness at tribunals and panels.
Academic Qualifications	Master of Science (Economics), University of London, England, 1991 Bachelor of Science (Hons) Economics / Politics, University of Devon, England, 1988
Present positions	Director, Essential Economics 2012 onwards
Past positions	Associate, Essential Economics, March 2011 – March 2012 Senior Economist, Essential Economics, July 2004 – March 2011 Senior Research Economist, Productivity Commission, 2002-04 Senior Economist, MacroPlan Australia Pty Ltd, 1997-2002 Tutor (Economics), David Game College, London, UK, 1995-97 Research Analyst, LCAAF, London, UK, 1994-95 Data Analyst, Department of Transport, London, UK, 1993 Research Assistant, London Transport Advertising, UK, 1992

Key Project Experience

Renewable Energy Projects

- Berrybank Wind Farm – Economic Assessment of Local Development Plan, for Vestas
- Willatook Wind Farm – Economic Impact Assessment, for Wind Prospect
- Dulacca Integrated Renewable Energy Project – Economic Impact Assessment, for RES Australia
- Avonlie Solar Farm – Economic Impact Assessment, for RES Australia
- Monarto Solar Farm – Economic Impact Assessment, for RES Australia
- Palmer Solar Farm – Economic Impact Assessment, for RES Australia
- Dalby Solar Park – Economic Impact Assessment, for RES Australia
- Emerald Solar Park – Economic Impact Assessment, for RES Australia
- Rolleston Solar Park – Economic Impact Assessment, for RES Australia
- Currawarra Solar Farm – Economic Impact Assessment, for RES Australia
- Tarleigh Solar Farm – Economic Impact Assessment, for RES Australia
- Bango Wind Warm – Economic Impact Assessment, for CWP Renewables
- Ararat Wind Farm – Regional Economic Benefits Case Study, for RES Australia
- Murra Warra Solar Farm – Economic Impact Assessment, for RES Australia
- Murra Warra Wind Farm – Economic Impact Assessment, for RES Australia
- Penshurst Wind Farm – Economic Impact Assessment, for RES Australia
- Hepburn Community Wind Farm – Economic Benefits Overview, for the Hepburn Community Wind Park Co-operative
- Mallee Solar Park – Economic and Social Impact Assessment, for TRUenergy
- North West Victoria Renewable Energy Project – Assessment of Local and Regional Economic Effects, for Solar Systems
- Sidonia Hills Wind Farm – Economic and Social Impact Assessment, for Hydro Tasmania Consulting
- Proposed Solar Power Station – Economic Impact Assessment, for Sunraysia Mallee Economic Development Board
- Bogong Hydro Power Plant – Economic and Social Impact Assessment, for Southern Hydro and Alpine Shire Council, with GHD

Economic Development, Employment Strategies, Operational Reviews and Strategic Advice

- Metropolitan Employment Clusters Analysis – for Metropolitan Planning Authority
- Benalla Performing Arts and Conference Centre – Operational Review, for Benalla Rural City Council
- 2015-16 Interface Growth Fund – Economic and Community Benefits Assessment, for SOCOM
- Latrobe "State of the City" Discussion Paper, for Latrobe City Council
- Avalon Airport Employment Report – for Linfox
- Latrobe Economic Development Strategy, for Latrobe City Council
- Victorian Budget Analysis 2012-13, 2013- 14, 2014-15, and 2016-16, for Socom
- Assessing Employment and Skills Requirements for Growth Areas, for National Growth Areas Alliance
- One Melbourne or Two? – Infrastructure and Resources Requirements in Interface Areas, for the Interface Councils
- Bell Bay Pulp Mill – Economic Development Plan & Local Procurement Policy, for Gunns Ltd
- Mitchell Shire Economic Development Strategy, for Mitchell Shire Council

- Implications of Population Growth on Resources and Infrastructure in Regional Cities, for Regional Cities Victoria
- Boroondara Economic Development Strategy, for Boroondara City Council
- Greater Shepparton Economic Development Strategy, for Greater Shepparton City Council
- Moonee Valley Economic Development Strategy, for Moonee Valley City Council
- Ballarat Economic Development Strategy, for the City of Ballarat
- Casey Economic Development Strategy Review, for Casey City Council
- Benchmarking Regional Business Costs, for Regional Development Victoria

Cost Benefit, Economic Impact Analysis and Business Cases

- Melbourne Metro Rail Project – Economic Analysis and Peer Review, for public and private clients
- Beaufort Bypass EES – Cost Benefit Analysis and Economic Impact Assessment, for VicRoads
- Goulburn Valley Highway Bypass Project – Cost Benefit Analysis and Economic Impact Assessment, for Greater Shepparton Council
- South-Eastern Melbourne Theme Park – Feasibility Study and Business Case, for private client
- Sandy Creek Road Quarry Development – Economic Impact Assessment, for private client
- SES Victoria – Economic Value Assessment, for SES
- West Gippsland Performing Arts Centre Redevelopment – Economic Impact Assessment and Business Case, for Baw Baw Shire Council
- Daveys Road Bridge Reconstruction – Economic Impact Assessment, for Baw Baw Shire Council
- Tatura Park Events – Economic Impact Assessment, for Greater Shepparton City Council
- Colac Performing Arts Centre – Business Opportunities Analysis, for Colac Otway Shire Council
- Wartook to Zumsteins Active Trail – Economic Analysis, for Horsham Rural City Council
- John Fawkner Private Hospital Redevelopment – Economic Assessment, for Healthscope
- Gasworks Arts Park – Economic Impact Assessment, for Gasworks Inc
- Grampians Peak Trail Masterplan – Business Case, for Grampians Tourism
- Victorian College of the Arts and the Melbourne Conservatorium of Music – Economic Impact Assessment of Faculty, for VCA and MCM
- Echuca-Moama Bridge Project – Environment Effects Statement, for VicRoads
- The Palais Theatre – Economic Impact Assessment and Business Case, for City of Port Phillip
- Swan Hill to Lake Boga Active Trail – Economic Impact Assessment, for Swan Hill Rural Council
- Greater Shepparton Sports and Recreation Sector – Economic Value Assessment, for Greater Shepparton City Council
- ACT Aquatic Centre and Stadium Developments – Economic Impact Assessment, for the Gemba Group
- Gunnedah Second Road Over Bridge Project – Assessment of Business Impacts, for NSW Roads and Maritime Services
- Kyneton Airfield – Economic Opportunities Study, for Macedon Ranges Shire Council
- Shepparton Sports Stadium Redevelopment – Economic Impact Assessment, for Greater Shepparton City Council
- Blacktown International Sportspark Rectangular Stadium Complex Development – Economic Impact Assessment, for Blacktown Venue Management
- Economic Impacts of SPC Ardmona's withdrawal from the Goulburn Valley Region, for Greater Shepparton City Council
- GV Link Intermodal Freight Node – Economic Analysis, for Greater Shepparton City Council

- St Albans Social Enterprise Incubator – Feasibility Study, for Brimbank City Council
- Wangaratta Arts Centre – Economic Impact Assessment, for Arts Victoria
- Avalon Airport International Terminal – Economic Benefits Assessment, for Linfox
- Port Welshpool Marina – Economic and Design Assessment, for South Gippsland Shire Council
- Shepparton Bypass – Economic Benefits Assessment, for Greater Shepparton City Council
- Quandong Quarry – Economic Impact Assessment, for Dennis Family Corporation
- Proposed New Chiltern Quarry – Economic Assessment, for Holcim (Australia) Pty Ltd
- Fonterra Dairy Operations – Economic Impacts on regional communities, for Fonterra
- Melbourne City Council Annual and Triennial Arts Grants Program – Economic Evaluation, for Melbourne City Council
- Dairy Local Roads Project – Economic Evaluation, for Regional Development Victoria
- Towards Zero Waste Policy – Cost Efficiency of Policy Options, in conjunction with Hyder Consulting Pty Ltd, for Sustainability Victoria
- Cowes-Stony Point Car Ferry Feasibility and Economic Impact Assessment, for Bass Coast and Mornington Peninsula Councils
- Docklands Harbour Esplanade – Cost Benefit Analysis of Design Options, in conjunction with BKK Architects, for VicUrban
- Victorian Desalination Plant EES – Existing Conditions and Economic Impact Assessment, for Department of Sustainability and Environment
- Economic Impact Analysis of Relocation Options for Unilever's Victorian Manufacturing Operations, for Greater Shepparton City Council
- Economic Analysis of the Altona Intermodal Freight Precinct, for private client

Industrial, Commercial and Residential Market Assessments

- Keysborough and Waverley Golf Course Rezonings – Market Analysis, for private client
- Latrobe Housing, Rural, Industrial and Employment Assessment, for Latrobe City Council
- Brimbank Council Keilor Offices – Market Assessment of Future Uses, for Brimbank City Council
- Portarlington Resort Development – Economic Impact Assessment, for private client
- 850 Whitehorse Road, Box Hill Mixed Use Development – Economic Benefits Statement, for Asian Pacific Group
- Sunbury South Precinct Structure Plan (PSP) – Land Use Assessment and Economic Analysis, for private client
- Fishermans Bend Urban Renewal Area – Business Audit and Directions Study, for City of Port Phillip
- Burns Road Industrial Estate, Altona – Assessment of Options to Facilitate Development, for Hobsons Bay City Council
- State Significance of Metropolitan Melbourne's Industrial Precincts, for Department of Business and Innovation
- Ballarat West Employment Zone – Economic Assessment, for the City of Ballarat
- Casey C21 Business Park – Economic Analysis of potential land uses and employment outcomes, for Growth Areas Authority
- City West Water Head Office – Economic Analysis of industrial, commercial and residential uses for proposed rezoning, for City West Water
- Merrifield Employment Node – Employment Estimates, for MAB Corporation and Gibson Property Corporation
- Stud Road Business Park Market Assessment, for St Hillers Property Group

- Cbus Estate One Business Park – Land Use Options Assessment, for Cbus Property Pty Ltd
- Shepparton Housing Strategy, with DLA, for Greater Shepparton City Council

Strategic and Urban Planning

- Benalla Airport Masterplan – Economic Opportunities Assessment, for Benalla Council
- Moorabbin Airport Masterplan – Economic Analysis, for Moorabbin Airport Authority
- EastLink Project – Economic Opportunities Assessment for Knox, for Kellehers Australia
- Caulfield Racecourse Masterplan – Economic Analysis, for Melbourne Racing Club
- Heidelberg Major Activity Centre Structure Plan – Economic Analysis, for City of Banyule
- Monash Specialised Activity Centre Structure Plan – Economic Analysis, for City of Monash

Economic Modelling

- Victorian Waste Management Model (2008-2021),for Sustainability Victoria
- Population Projection Model for Victorian Regional Cities, for Regional Cities Victoria
- Population and Household Model, for Nillumbik Shire Council
- Net Community Benefit Model, for the City of Yarra

Panels/Tribunals and Advisory Committee Hearings

- John Fawkner Hospital Redevelopment – Expert Witness at Panel Hearing, for Healthscope
- Chiltern Quarry – Expert Witness at VCAT Hearing, for Holcim Ltd
- Macedon Ranges Planning Scheme: Amendment C67 – Expert Witness at Panel Hearing, for Ferrier Road Residents Group
- Victorian Desalination Project Inquiry – Expert Witness at Panel Hearing, for Department of Sustainability and Environment
- Altona Freight Node VCAT – Expert Witness at VCAT Hearing, for PS Marine Pty Ltd and Salta Properties

Articles and Key Presentations

- *Generating economic benefits analysis for project advocacy –Ararat Wind Farm, All Energy Conference 2017 (Presenter)*
- *The Importance of Investment Certainty for Renewable Energy,* Planning News, Dec 2014
- *Implications of Victoria's new residential zones on property development and land values,* Urban Development Institute of Australia, Dec 2013
- *Where are we Heading – One Melbourne or Two?,* Planning News, March 2013
- *Infrastructure Challenges in Growth Areas*, Aquatics & Recreation Victoria Industry Conference, Melbourne 2013 (Presenter)
- *Addressing Skills and Employment Gaps in Outer Metropolitan Growth Areas,* National Growth Areas Alliance – 'Voices of Outer Suburbs' Forum, Sydney November 2012 (Presenter)
- *Why Planning for the Creative Industries is Good for Productivity*, Planning News, Oct 2012
- *'Show me the Money' – Economic Evidence for Infrastructure Funding*, (Space) x (People) Conference, Melbourne 2012. (Presenter)
- *Renewable Energy – It's not just about the environment*, Planning News, Nov 2010
- *Local Government's Role in Economic Development*, Local Government Focus, Oct 2005