



## MEMO

<b>DATE</b>	19 June 2018
<b>TO</b>	Senior Regional Officials
<b>PREPARED BY</b>	Abby Cheeseman
<b>CONSULTATION WITH</b>	MBIE – Energy and Resources Team
<b>SUBJECT</b>	Rakiura Stewart Island Wind Power – Funding MBIE Departmental (SRO)

### PURPOSE

1. To seek approval from Senior Regional Officials to fund up to \$<sup>Commercial Inform</sup> towards the cost of further investigating wind power options on Rakiura Stewart Island.

### RECOMMENDATIONS

2. It is recommended that Senior Regional Officials:
  - a. **Approve funding** of up to \$30,000 towards the cost of further investigating wind power options on Rakiura Stewart Island from MBIE departmental funding (SRO).

### CONSULTATION

3. Consultation has been with the Energy and Resources Team within MBIE and the Southland District Council.

### BACKGROUND

4. MBIE previously provided funding to the Southland District Council to engage an independent consultant to work with the Rakiura Stewart Island community, and relevant stakeholders, to form a balanced vision for future economic and environmental prosperity. The funding was \$<sup>Commercial Inform</sup> from MBIE Departmental (SRO).
5. The independent consultant held a number of workshops with the Rakiura Stewart Island community including a workshop with local and central government (Southland District Council, Environment Southland, Department of Conservation, Ministry of Primary Industries and the Ministry of Business, Innovation and Employment), and has produced a report which has now been presented to the Southland District Council and made public (27 March 2018).
6. The report identified that sustainable, affordable electricity was seen as the number one issue Rakiura Stewart Island is facing. It was seen as a major issue for residents and especially for attracting new businesses to Stewart Island. There was a desire for a 'green' approach to be considered with ideally Rakiura Stewart Island running off renewable



energy within the next 10 years. This will also align with the governments “Just Transition” work and for a net zero carbon economy by 2050.

7. Rakiura Stewart Island is supplied with electricity from diesel generators. This is supplied through the Council Controlled Organisation, Stewart Island Electricity Supply Authority (SIESA). The consumers of the electricity include the hotel, the water pumping, and fish cool stores, but the majority of users are the approximately 380 permanent residents on the Island. There are 420 electricity accounts and approximately 500 metered supply points on the Island.
8. In Southland, electricity retails at approximately 25c/kWh, while on Stewart Island the charge is around 62c/kWh, which covers the operations and maintenance costs of running the diesel gensets and provides for replacement of those gensets.
9. The Southland District Council, through the Stewart Island Power Project Task Force (the taskforce), has commissioned numerous reports over recent years to investigate <sup>Comme</sup>. The most recent report “Stewart Island Future Power Supply – September 2016” is attached as annex two to this memo.
10. The Minister for Economic Development, David Parker requested a briefing on this work in February 2018, this is attached as annex one to this memo.
11. Since the briefing, we have met with the Minister for Economic Development who strongly supports a desire for government to work with the Council and community and look to assist financially.
12. Collectively with the Southland District Council and the Energy Resources Team, MBIE have scoped the work necessary to understand the preferred option of wind power, and how viable, and affordable this would be for Rakiura Stewart Island.

## **FUNDING PROPOSAL**

### ***What***

The overall aim of the project is to investigate the provision of a cost-effective renewable (or at least more renewable) electricity supply for Rakiura Stewart Island to reduce its reliance on expensive diesel.

A reasonably detailed study was carried out by a independent consultant to the Southland District Council in 2016. This review indicated that the most cost effective option, as of 2016, was wind generation. While other options exist such as power cables from the mainland and hydro generation, these all face considerable resource consent issues and much higher costs. For a robust decision to be made now, the information in this study needs to be bought up to date and a number of identified gaps in the information remedied.

### ***Who***

This work will need to be undertaken by a qualified engineer with experience in standalone power systems for small isolated communities. MBIE has no such consultants on any of our available panels. However, through reference from other experts in electricity generation and



installation, we have identified a suitable independent consultant with the necessary skills and experience. Direct sourcing this independent consultant may require a procurement exemption. The expected cost of this contract will be around \$ [REDACTED] <sup>Commercial Inform</sup>.

***How will this be managed***

The independent engineering consultant will be engaged by MBIE. They will deliver a report back to MBIE, to Abby Cheeseman of the Provincial Development Unit, and Mark Pickup and Craig Barry of Energy and Resource Markets. [REDACTED] <sup>Privacy of natural persons</sup>, who has been engaged by the Minister for Economic Development as a subject matter expert on wind energy and related energy development, will also be engaging with the independent consultant. This will also be carried out in consultation with the Southland District Council and the Department of Conservation.

***Deliverables***

The independent consultant will deliver updated estimates on the expected performance of wind generation at various sites on Rakiura Stewart Island, including an updated analysis of the expected generation profile and economics of generation. This will likely lead to a proposal for a renewable power solution which may be sought from the Provincial Growth Fund, or other suitable sources from central and local government likely with private options.

Post investigation we will know the viability, sites, costs and any impediments of the wind turbine option. This will allow government and community to fully engage to develop a sustainable long term zero carbon power solution and identify investment options.

**RISKS**

The island is 95% Conservation Estate – Rakiura National Park, a wind turbine may require a National Park Plan change.

The community has had multiple reports done to date, so the engagement with the community will need to be handled carefully.

**ANNEXES:**

**Annex one:** Briefing for the Minister for Economic Development – Stewart Island Power supplies 21 February 2018

**Annex two:** Report Stewart Island Future Power Supply – September 2016.

## BRIEFING

### Stewart Island – Power supplies

<b>Date:</b>	21 February 2018	<b>Priority:</b>	Low
<b>Security classification:</b>	In Confidence	<b>Tracking number:</b>	2109 17-18

Action sought		
	Action sought	Deadline
Hon David Parker  <b>Minister for Economic Development</b>	<p><b>Note</b> officials will continue to work with the Stewart Island community and Southland District Council. We will provide you a further update within the next month.</p> <p><b>Agree</b> to circulate this briefing to relevant portfolio Ministers; Regional Economic Development and Energy and Resources.</p>	7 March 2018

Contact for telephone discussion (if required)			
Name	Position	Telephone	1st contact
Stephanie Weller	Regional Economic Development Implementation Manager	Privacy of natural persons	
Andrew Hume	Manager, Energy Markets Policy		
Abby Cheeseman	Senior Policy Advisor, Regional Economic Development		✓
Mark Pickup	Senior Policy Advisor, Energy Markets Policy		

The following departments/agencies have been consulted
Southland District Council

Minister's office to complete:

Approved

Declined

Noted

Needs change

Seen

Overtaken by Events

See Minister's Notes

Withdrawn

Comments

## BRIEFING

### Stewart Island – Power supplies

<b>Date:</b>	21 February 2018	<b>Priority:</b>	Low
<b>Security classification:</b>	In Confidence	<b>Tracking number:</b>	2109 17-18

#### Purpose

To update you on the current power supply to Stewart Island, reports on power supply undertaken to date, and potential solutions to a more affordable, resilient and sustainable power supply for the Island residents.

#### Executive summary

This briefing outlines the current situation in Stewart Island regarding high power prices. Stewart Island electricity costs over double the rest of Southland, due to power being generated by diesel generators. Residents have identified sustainable, affordable electricity supply as the number one issue Stewart Island is facing. Research has been conducted into solutions, however these all cost significantly more than the Southland District Council can provide, which has stalled action on this issue. We suggest moving forward with a Request for Proposal to gain clarity on viable options and their costs.

#### Recommended action

The Ministry of Business, Innovation and Employment recommends that you:

- a **Note** officials will continue to work with the Stewart Island community and Southland District Council. We will provide you a further update within the next month.
- b **Agree** to circulate this briefing to relevant portfolio Ministers; Regional Economic Development and Energy and Resources.

*Noted*

*Agree / Disagree*

Stephanie Weller  
**RED Implementation Manager**  
 MBIE

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Hon David Parker  
**Minister for Economic Development**

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## Background

1. Your office has requested a briefing which updates you on what the current power supply to Stewart Island is.
2. This briefing outlines; the current power supply to Stewart Island; reports on power supply undertaken to date; and potential solutions to a more affordable, resilient and sustainable power supply for the Island residents.
3. The Ministry is providing funding to Southland District Council (the Council) to engage a consultant to work with the Stewart Island community and relevant stakeholders to form a balanced vision for the Islands future economic and environmental prosperity. This work commenced in the last quarter of 2017.
4. The first outcome will be a current state assessment of the community and business resilience. This will lead to a community developed and owned mini-action plan for expansion and/or diversification of economic activity on the Island. This action plan will directly link to the Southland Regional Economic Strategy – Action Plan.
5. It will also consider how the community can develop infrastructure that supports the coexistence of tourism, conservation, aquaculture and fishing, as the primary economic industries on the Island, and a link to mainland support services.
6. The consultant has held a number of workshops with the community and a draft report has been produced. The next step is for local and central government (Southland District Council, Environment Southland, Department of Conservation, Ministry of Primary Industries and the Ministry of Business, Innovation and Employment) to attend a community workshop to discuss the contents of the first report and support the consultant with the next steps which will be seeking funding (community, local and central government) for some of the options identified. This workshop will take place 5 March 2018.
7. The draft report identifies that **sustainable, affordable electricity** was seen as the number one issue Stewart Island is facing. It was seen as a major issue for residents and especially for attracting new businesses to Stewart Island. There was a desire for a 'green' approach to be considered with ideally the island running off renewable energy completely within the next 10 years.

## Current power supply to Stewart Island

8. The Stewart Island community is supplied with electricity from diesel generators. This is supplied through the Stewart Island Electricity Supply Authority (SIESA). The consumers of the electricity include the hotel, the water pumping and fish cool stores, but the majority are the approximately 380 permanent residents on the Island. There are 420 electricity accounts and 500 or so metred supply points on the Island.
9. The marginal cost of generation is calculated at <sup>Commercial Information</sup> [redacted] which is essentially the cost of <sup>Commercial Information</sup> [redacted] <sup>Commercial Information</sup> [redacted].
10. In Southland electricity retails around <sup>Commercial Information</sup> [redacted], while on the Island the charge is around <sup>Commercial Information</sup> [redacted]. This covers the operations and maintenance costs of running the diesel gensets and provides for replacement of those gensets.
11. The Council reports that the Island's power scheme overall is in sound condition. The powerhouse, and diesel powered generators are a mix of modern and aging motors. The modern motors are the

main generators and the aging motors are the backups. The control system is effective but is old mechanical equipment. New controls would be much more compact.

12. However, the distribution network is in poorer condition. Transformers, poles, insulators and conductors are nearing the end of their life. Replacement programmes are in place for the major assets and the business has financial reserves to cover the cost of these.
13. The Council reports that the major risk with the business is the price of diesel. The cost of diesel represents about <sup>Comm</sup> % of the cost of generating electricity. A large rise in diesel cost will create a need to spike up the electricity cost in order for the business to remain financially sustainable.

## REPORTS TO DATE

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14. The Council through the Stewart Island Power Project Task Force (the taskforce) has commissioned numerous reports over recent years. The most recent report "Stewart Island Future Power Supply – September 2016" is attached as annex one to this briefing. Power Business Limited who wrote this report was asked to address the question "What is the most cost effective and best source of power generation for the residents of Stewart Island?" This report also summarises some of the reports produced to date on the pathway to renewable electricity generation for the Island.
15. It has been agreed by the Stewart Island community and the task force that they would like to reduce the dependence on imported fuel used to run diesel generators and move to renewable generation.

### Power Options explored

16. Undersea cable: Stewart Island is 35kms from Bluff and it could be feasible to connect the Island to the Southland power network via an undersea cable. Initial reports noted that for the more economic (cheaper) routes, this could cause some major issues with respect to aquaculture operations in the Foveaux straight.
17. Alternative routes which bypass these operations are possible, but they add considerably to the cost. Furthermore with all cable options, there remains a risk of damage to the cable(s) from oyster boats dredging and other boats stopping or anchoring. For example, there previously was an underwater cable provided by Telecom for communications to the Island. We understand it was damaged frequently and was replaced by a microwave transmitter to avoid this risk.
18. Initial costs explored in the report ranged from \$<sup>Commercial Information</sup> up to \$<sup>Commercial Information</sup> for a two cables solution. This option goes through the oyster beds.
19. We note that at \$<sup>Commercial Information</sup> to \$<sup>Commercial Information</sup> this is a significant cost for the power supply for 420 electricity accounts.
20. Wind: Wind appears to be the most viable power option for the Island and was recommended in the most recent report if cost effective battery backup could be obtained. There is currently a wind farm in Bluff which performs well with a load factor<sup>1</sup> of around <sup>Comme</sup> per cent, and wind generation on the Island could be expected to have similar load factors.
21. The Island is mainly conservation estate (approximately 95%); this option would likely involve clearing of a site(s) in the National Park.

<sup>1</sup> Load Factor is a measure of the proportion of time that the generation is able to generate. A value above 30 per cent is generally regarded as very good for wind.



22. Initial costs for a wind development are expected to be around \$<sup>Commercial Information</sup> for capital infrastructure set up costs.
23. Solar: There has been a trial project using solar on the Island however, a storm destroyed the installation. Initial modelling suggests that this option could assist over the warmer months, but would not support the Island in full, nor provide sufficient power in winter and would remain vulnerable in storms.
24. The report estimated that a <sup>Com</sup> acre solar farm would be required at a minimum. Initial capital infrastructure costs for this are expected to be around \$<sup>Commercial Information</sup>.
25. Hydroelectric: This option has been talked about frequently on the Island, with no detailed feasibility work undertaken. Environmental impacts of most options would be considerable, given that the majority would be in national parks and would require significant infrastructure and development, including access roads and overhead transmission.
26. Hydro options evaluated previously started at around \$<sup>Commercial Information</sup> for capital infrastructure. It should be noted that all of the hydro options investigated to date are challenging in some manner, be it from; insufficient inflows in dry periods, unsuitable topography, limited storage potential, difficult access, significant engineering challenges, high environmental impact and remoteness from demand (requiring long transmission lines).

## Analysis of options

27. All of the options explored by the report have high cost (relative to the population).
28. The barrier for the Council to continue exploring the options has been the cost. The Southland District has approx. 30,000 residents, and so spending millions of dollars for the approx. 380 based on the Island has not been viable. The Councils' view is that if support was available to assist with the capital costs of an alternative to diesel generation, they would be most supportive of the undersea cable option for resilience purposes; however they believe this would need to be the higher cost (up to \$<sup>Commercial Information</sup>), two cable option to provide additional resilience. The report concluded that no option was commercially viable without significant subsidy or a suspensory loan.
29. The most promising option evaluated was wind, but even then the report noted that the marginal cost of wind, at <sup>Commercial Information</sup> was still above the marginal cost of diesel generation, at <sup>Commercial Information</sup>. It also noted that <sup>Com</sup> wind turbines would provide only about <sup>Comm</sup> per cent of the needed power and so would still require battery and/or diesel backup.
30. The report concluded that diesel generation continue and that wind combined with high capacity battery storage be re-evaluated in two years, when battery storage costs were expected to be lower.

## Next steps

31. Options identified to date through the numerous reports could be explored further within the context of the current work on creating a vision for the Islands future economic and environmental prosperity.
32. One way to develop this further would be to seek through a Request for Proposal (RFP), a more detailed design of what could be built and its actual capital and maintenance costs.
33. The Ministry of Foreign Affairs and Trade (MFAT) through its Pacific Programmes has experience in contracting for energy developments on Island's. MFAT has indicated that it would be willing to



assist MBIE in the development of an appropriate RFP for energy services for Stewart Island and in particular would make available its list of suitable engineering contractors.

34. Such an RFP would provide the information required to come back to you in the following months with a more accurate idea of viable options and their costs.
35. We note that the Councils' preferred option is the most expensive two undersea cables option, costed at \$<sup>Comm</sup> - \$<sup>Commercial Information</sup> in 2016. If an RFP is undertaken for alternatives, then this option should be re-examined as well to provide a bench mark of the most expensive option for comparison purposes.

PROACTIVELY RELEASED