

Summary of Stewart Island Energy Futures Workshop, 24th February 2012

Southland District Council in conjunction with Venture Southland ran a workshop at Oban for vendors and experts to present to the local community the options and difficulties to implement full, or partial replacement of the current engine-alternators with the view to minimising the cost of electricity on Stewart Island.

WORKSHOP

The intention was to seek community consensus for investigating any, or all options. The workshop was held at the Oban Community Hall on Friday 24th February 2012, starting at 1:00pm, finishing at 6:30pm.

Some 50 - 60 people attended in addition to the presenters. Most people attending were Oban rate-payers, but some members of the audience had come from as far away as

Auckland and Christchurch.

The programme was devised to consist of three sections: the first was to set the scene and explain legislative and planning constraints for options; the second session looked at the technology options available.

The third and last session comprised a presentation on the Meridian wind power scheme at Ross Island, Antarctica, which has many lessons for Oban.

Colloquium opening	Erik Barnes, SDC Bruce Ford, SDC Jon Spraggon, Stewart Island CB
SESSION I: SETTING THE SCENE	
Introduction to session	Robin McNeill, VS
World and National Trends and Developments in Energy generation and Use	Emeritus Professor Arthur Williamson, University of Canterbury
Stewart Island Electricity Demand and Supply Summary of Progress to Date	Robin McNeill, VS
Environmental Matters	Sharon Pasco, DOC
The Resource Management Act and Energy	Kylie Galbraith, ES
How EECA can assist remote communities	David Rohan, EECA (not present at the workshop due to illness)

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SESSION II: TECHNOLOGY OPTIONS

Introduction to session Grid Stability Issues HVDC-Lite from the South Island Grid	Dr Hamish Laird, ELM G
Small Hydro Opportunities for Stewart Island	Jeff Wilson, Wilson Hire
Is Hydrogen Storage an Option for Stewart Island?	Dr Alistair Gardner, IRL
The SHED (Southland Hydrogen Economy Development) Project	Anthony Hine, REACH Power Ltd
Partial Gas Substitution for Industrial and Marine Engines	Basil Walker
Wind Potential for Stewart Island	Dr. Phil Murray, Massey University
The Tangaroa Marine Energy Trial near Oban	Kevin McGrath, Tangaroa Energy

SESSION III: SCOPING THE FUTURE

Remote Island Power Supply Case Study: Ross Island, Antarctica	Iain Miller, Antarctica New Zealand
Colloquium Round-up	Erik Barnes, SDC

The presentations and supporting report, McNeill, R.G. A Proposed Way Forward To Deal With Electricity Supply At Stewart Island (2007), have been posted to the SIESA website, www.siesa.co.nz and hardcopy versions made available at the SDC Oban Office.

OUTCOMES AND COMMENT

The following observations are provided to give a flavour of the presentations and the predominant thinking of the presenters.

ENVIRONMENTAL CONSIDERATIONS

Depending on the types of renewable energy source, the resulting environmental impacts can range from major to very minor. The public conservation land nearest Oban was deliberately not included in the Rakiura National Park so that it could be used for such purposes and the current Department of Conservation Conservation Management Strategy acknowledges this.

Undertaking works within the National Park is rather more problematic and could involve quite considerable consenting effort and costs if they were pursued. The marine environment is more straightforward, but again site selection is critical.

WILL THE PRICE OF ELECTRICITY DROP ON STEWART ISLAND?

It is too early to know if renewable energy sources do indeed offer the possibility to reduce the cost of electricity at Oban: no-one knows for sure if the waves are big enough and frequent enough; if the wind can be relied on; if a hydro scheme would really be viable, or if the cost of solar panels and inverters are yet cheap enough.

On the other hand, the presenters at the workshop overwhelmingly

believed that the price of diesel would only increase over time and some harboured concerns for international long term certainty of supply. It may be that renewable energy sources can at best only halt price increases. Only by collecting site data over a year or so can the economic viability of renewable generation be truly understood.

IS THERE A PREFERRED RENEWABLE TECHNOLOGY FOR STEWART ISLAND?

The experts suggested that a mix of renewable energy sources may best suit Stewart Island rather than to rely on one technology only as no source – including hydro – stood out as likely to provide consistent electricity supply.

This will, of course, require confirmation that a range of technologies are indeed available and affordable. One possibility would be to use wind for a base load, with hydro for peaking and diesel for backup.

IS THERE A PLACE FOR DIESEL?

Consensus among the speakers was that diesel generation on Stewart Island will be around for a while yet, no matter what progress is made with development of renewable energy technologies.

This is in part to do with grid stability (ensuring that there are now brown-outs, black-outs, over-voltage, or other problems with the electricity provided by the generators through the power network). One way suggested was to slowly increase the amount or type of renewable electricity generators to the grid as they became viable. Greymouth Petroleum suggested from the audience that diesel could be supplanted by natural gas in the longer term.



GRID STABILITY

Dr Laird spent some time discussing the importance of grid stability so that there would not be brown-outs, black-outs and voltage spikes on the electricity supply.

Properly dealing with grid stability is not a trivial engineering problem, especially when there are solar and wind energy sources which are directly dependant on the weather for their generating capacity. 'Smart grids' provide a way around this, but they are still not commonplace and are rare enough to excite media interest when they are installed.

grid issues although he was open to it. However, he is not a vendor of wind turbines so is a useful independent voice.

There was no understanding of the effect of storage on grid stability.

The ownership of the hydro and wind survey data and information by an equipment vendor may limit options for the SDC/SIESA. The wind and the hydro survey results will be more valuable when used together as this will allow the design of the complete system.

The Antarctica experience was a great example of a real small project with all the vendor issues. The vendor issues cannot be overstated.

A solution that displaces the diesels completely will impact the accounting book value of the present system.

PRICE

Dr Laird also showed that the "silver bullet" for a reliable electricity supply at Stewart Island would be a high voltage DC (HVDC) cable to the mainland. This would provide grid stability and guaranteed supply, but the smallest converters would cost over \$10M for Stewart Island, plus the cost of the cable. Going to AC would be no cheaper and would introduce operating complications.

None of the other presenters provided costs.

NEXT STEPS

A report is to be produced by Venture Southland in conjunction with SDC that will set out the work packages and likely costs required to evaluate those options for Stewart Island that could be practically implemented in the near to medium future.

The report would also address ownership strategies, risks in both implementation and long term operation, and funding strategies. This should be completed before the end of June.

The current short-list of technologies comprises:

- Load management, including grid and supply management – with and without smart metering
- Continued diesel generation, including bio-diesel
- Wind generation
- Solar generation, including large-scale solar farm and community distributed installations
- Hydro

It became clear at the workshop that hydrogen storage, marine energy, and gas reticulation are all very promising, but are highly unlikely to be commercially viable in the near term.

A power cable feed from the mainland was found to be neither practical nor economic.

GENERAL SUMMARY

Dr Laird provided the following comments after the workshop:

The diesel engines, generators and switchgear seem to be well maintained. Some of the switch gear is no longer supported by the vendors.

Commercial hydrogen options are not available from credible vendors.

The hydro generation and wind resource needs to be measured and established to an acceptable level of certainty. The key issue for hydro is the effect of rainfall variation on output. That is will the minimum flow cover the load in 0.06% situation (Six hours per year). When I asked them, the hydro presenters said that the diesels should be kept for backup, allowing the hydro to have limited storage.

There was limited understanding from the wind and hydro generation people as to the requirement for storage. The wind presenter had not addressed any