meridian

White Hill Wind Farm

2007 Annual Emission Reduction Report

CONFIDENTIAL

meridian

White Hill Wind Farm 2007 Annual Emission Reduction Report

1 Background

The report fulfils the reporting obligations set out in the Project Agreement between Meridian and the Crown dated 9 May 2005.

2 The Project

White Hill is Meridian's second wind farm development and the first in the South Island.

It is six kilometres south-east of Mossburn in Southland and is sited on an area of mostly forestry land approximately eight kilometres by three kilometres.

It was fully commissioned in October 2007. Twenty-nine 2MW turbines at White Hill generate enough electricity for 30,000 average homes and the wind farm connects directly to the local area network owned by The Power Company and operated by PowerNet.

meridian

Key dates during the development and construction of White Hill Wind Farm	
Project announced and public consultation commenced	September 2004
Resource consents granted	December 2004
Karakia and construction commencement ceremonies	March 2006
Emission reductions and electricity generation commence	8 June 2007
Official opening by Prime Minister	8 June 2007
Wind farm fully commissioned	1 October 2007

3 Emissions generated – 2006 & 2007 calendar years

Both 2006 and 2007 emissions are included in this report because the Project Agreement (as amended) did not require an annual report for 2006. Total emissions during 2006 and 2007 were 5,578.12 tCO_2. Of these, 5,560.59 tCO_2 (99.6%) were from construction. In future years the emissions generated by the project will be negligible.

The emissions generated have been assessed using the methodology of Schedule 2 – Methodology for Determining Emission Reductions, of the Project Agreement dated 9 May 2005. Emissions generated by the project are derived from construction of foundations, turbines and roads. Inputs of cement, iron, steel, aluminium, petrol and diesel have been recorded as prescribed.

The electricity used by the turbines is netted off the amount exported to the grid. Electricity used at the site office and workshop is negligible. The following data is based on the best available information.

Emissions generated – 2006 calendar year (construction emissions)			
Material	**Quantity**	**Emission factor**	**Emissions generated**
Petrol	12,000 litres	0.00232 tCO_2/litre	27.84 tCO_2
Diesel	545,000 litres	0.00271 tCO_2/litre	1,476.95 tCO_2
Cement	3,350 tonnes	0.46 tCO_2/tonne	1,541.00 tCO_2
Iron and steel imported	6,235 tonnes	0 tCO_2/tonne	0 tCO_2
Iron and steel produced in New Zealand	1,000 tonnes	2.01 tCO_2/tonne	2,010.00 tCO_2
Aluminium imported	60 tonnes	0 tCO_2/tonne	0 tCO_2
Aluminium produced in New Zealand	0 tonnes	1.62 tCO_2/tonne	0
Total emissions generated 2006			**5,055.79 tCO_2**

meridian

Emissions generated – 2007 calendar year (construction emissions)			
Material	**Quantity**	**Emission factor**	**Emissions generated**
Petrol	5,000 litres	0.00232 tCO_2/litre	11.60 tCO_2
Diesel	75,000 litres	0.00271 tCO_2/litre	203.25 tCO_2
Cement	285 tonnes	0.46 tCO_2/tonne	131.10 tCO_2
Iron and steel imported	210 tonnes	0 tCO_2/tonne	0 tCO_2
Iron and steel produced in New Zealand	75 tonnes	2.01 tCO_2/tonne	150.75 tCO_2
Aluminium imported	45 tonnes	0 tCO_2/tonne	0 tCO_2
Aluminium produced in New Zealand	5 tonnes	1.62 tCO_2/tonne	8.10 tCO_2
Total construction emissions generated 2007			**504.80 tCO_2**

Emissions generated – 2007 calendar year (operational emissions)			
Material	**Quantity**	**Emission factor**	**Emissions generated**
Petrol	225 litres	0.00232 tCO_2/litre	0.52 tCO_2
Diesel	4,791 litres	0.00271 tCO_2/litre	12.98 tCO_2
Cement	0 tonnes	0.46 tCO_2/tonne	0
Iron and steel imported	0 tonnes	0 tCO_2/tonne	0
Iron and steel produced in New Zealand	2 tonnes	2.01 tCO_2/tonne	4.02 tCO_2
Aluminium imported	0 tonnes	0 tCO_2/tonne	0
Aluminium produced in New Zealand	0 tonnes	1.62 tCO_2/tonne	0
Total operational emissions generated 2007			**17.53 tCO_2**

meridian

4 Electricity generated – 2007 calendar year

The total electricity generated in 2007 as recorded at the Grid Injection Point by Energy Market Services (EMS) was 75,845,000 kWh.

Appendix 1 contains "a report which verifies the total electricity generated from the Project and injected into the national transmission system in that Year by the person responsible for the reconciliation of electricity injected into and taken from electricity networks in New Zealand or any other person authorised to administer and certify the reconciliation of such data by that person".

Appendix 2 sets out the generation from each turbine and a combined generation total of 81,324,400 kWh. The total electricity output of the Project as measured by the Revenue Meter is 5,479,400kWh less than this combined total because the revenue meter output incorporates generation losses. Generation losses include wind farm distribution losses (i.e. cables between turbines), transformer losses, transmission losses, and local service supply at the White Hill substation. This is within expected limits.

Appendix 3 contains evidence that the metering and recording equipment has been certified by a reputable, independent quality assurance service provider.

Meridian expects to generate the full amount of Eligible Generation during the commitment period.

5 Emission reductions generated – 2006 & 2007 calendar years

The table below sets out the emission reduction units generated by the project to date. This is calculated using the methodology prescribed in Schedule 2 of the Project Agreement.

Electricity and emission reductions generated **To end of 2007 calendar year[1]**	
Total electricity generation	75.845 GWh
Electricity Emission Factor	625 tCO_2/GWh
Gross emission reductions generated	47,403 tCO_2
Less total emissions (2006 & 2007 years)	5,578.12 tCO_2
Total emission reductions generated	**41,825 tCO_2**

The volume of emission reductions generated by the project before the Commitment Period is less than the 69,693 tCO_2 specified in the Project Agreement. This shortfall is due to delayed commissioning of the plant as previously reported in the Milestone Reports. The wind farm is now fully operational and previous delays will not impact on the emission reductions anticipated in the future.

[1] This table includes all the emission reduction units generated from the commencement of the project until the end of the 2007 calendar year.

meridian

6 Emission units claimed from the Crown

Meridian is not claiming any emission units from the Crown in respect of the 2007 calendar year.

7 Project Benefits and Sustainable Development Indicators

Wind power provides important diversity in New Zealand's energy mix, making the country less reliant on non-renewable fossil fuels such as coal. Wind generation is an excellent complement to hydro generation.

Wind farms have a minimal impact on the landscape and their sites can be used for other things, like farming. This site was chosen as the landscape had already been modified through farming, forestry and existing forestry tracks could be modified during construction.

Meridian took special care of the local flora during construction - fencing off significant areas and saving topsoil and red tussock for replanting later.

- New 38ha area of beech reserve created by fencing off remnant bush from agricultural activities.
- An erosion and sedimentation control plan was in place during construction
- Access roads and placement of turbines were located on ridges or spurs to prevent sediment and contaminant discharge into streams

Construction of White Hill provided an average of 75 fulltime jobs for the duration of construction.

An open day held during construction raised $62,600 for a local community venture.

Meridian also funded and constructed a public "off farm" visitor viewing site in conjunction with the Southland District Council.

meridian

8 Statements

As at 31 December 2007, nothing has, or has the potential, to be an impediment to achieving the agreed emission reductions during the first commitment period.

This report:

- has been prepared using the methodology of Schedule 2 – Methodology for Determining Emission Reductions, of the Project Agreement dated 9 May 2005.
- meets all other requirements of Schedule 4 - Contents for Annual Reports, of the Project Agreement dated 9 May 2005.

Signature: 

Name: Anna Broadhurst

Position: Manager – Climate Change

Date: 30 January 2008

meridian

Appendix 1

Report from Energy Market Services

ems
energy market services

15 January 2008

Toni Nevin
Meridian Energy
P O Box 2128
Christchurch

Dear Toni

White Hill windfarm generation for 2007 calendar year

Thank you for your enquiry regarding the White Hill windfarm generation for 2007.

The total generation, as recorded by the Reconciliation Manager, for the calendar year of 2007 for White Hill windfarm was 75,845,000 kWhs. The reported generation is the net amount, i.e., injection less load at White Hill windfarm as supplied by Meridian Energy to the Reconciliation Manager.

If you have any questions regarding this letter please call me on 463 0832.

Yours faithfully

Stephen Kemp
Reconciliation Manager
energy market services limited

energy market services limited
Ground Floor | 96 The Terrace | PO Box 5363 Wellington | New Zealand
phone +64 4 463 0800 | fax +64 4 463 0801 | www.ems.co.nz

meridian

Appendix 2

Generation for each turbine – 2007 – (This data is generated by the Vestas Online database)

Parkunit	Active Prod. Total kWh
WHL11	3,385,392.40
WHL12	3,716,614.40
WHL13	3,385,470.50
WHL14	3,147,794.50
WHL15	3,487,156.70
WHL16	2,363,945.40
WHL17	3,446,147.20
WHL21	3,024,607.50
WHL22	3,456,812.40
WHL23	3,203,876.00
WHL24	3,288,883.90
WHL25	3,534,654.30
WHL31	3,005,855.50
WHL32	2,833,884.70
WHL33	2,535,724.50
WHL34	2,112,430.90
WHL41	2,955,767.60
WHL42	3,160,860.80
WHL43	2,959,208.40
WHL44	2,987,742.00
WHL45	1,886,975.30
WHL46	2,348,645.50
WHL47	2,706,312.80
WHL51	2,256,401.60
WHL52	2,402,847.20
WHL53	1,461,746.40
WHL54	2,073,516.70
WHL55	2,020,764.50
WHL56	2,174,360.80
Total	**81,324,400.40**

meridian

Appendix 3

The metering equipment is certified in accordance with the Electricity Governance Rules 2003.

The certificates for the White Hill meters follow.

meridian

TRANSFIELD SERVICES

Meter Test House

TRANSFIELD SERVICES

CERTIFICATE OF COMPLIANCE

Certificate Number: 34013

Installation Name: **White Hills Wind Farm**

Equipment Certified: Metering Installation

Component Information:

Component:	Serial No.:	Certification No.
METER	PJ-0611A329-01	34013M
CT	0693106, 0693105, 0693104	34013C
VT	0690324, 0690325, 0690326	34013V

Conditions of Issue: Nil

Installation Category: 6

This certifies that the above metering equipment has been calibrated in accordance with the Electricity Governance Rules.

Issue Date: 29/05/2007

Expires: 29/05/2010

Signatory:

Malcolm Hoare
for TSL E&T Meter Test House

Electronically Created by: Malcolm Hoare on 06/08/2007

TSL E and T Meter Test House, Brunner Street, PO Box 16-219, Christchurch (03 349 0873)

meridian

TRANSFIELD
SERVICES
Meter Test House

TRANSFIELD
SERVICES

CERTIFICATE OF COMPLIANCE

(Component Only)

Certificate Number: 34013M

Installation Name:	**White Hills Wind Farm**
Equipment Certified:	METER: Power Measurement / ION 7650
Serial Number(s):	PJ-0611A329-01
Calibration Report No.:	CMR11683
Conditions of Issue:	Nil

This certifies that the above metering equipment has been calibrated in accordance with the Electricity Governance Rules.

Issue Date: 29/05/2007

Expires: 29/05/2010

Signatory:

Malcolm Hoare
for TSL E&T Meter Test House

Electronically Created by: Malcolm Hoare on 05/08/2007

TSL E and T Meter Test House, Brunner Street, PO Box 16-219, Christchurch (03 349 0973)

meridian

TRANSFIELD
SERVICES
Meter Test House

TRANSFIELD
SERVICES

CERTIFICATE OF COMPLIANCE

(Component Only)

Certificate Number: 34013C

Installation Name:	**White Hills Wind Farm**
Equipment Certified:	CT: Merlin Gerin / AJR/A1/N2J
Serial Number(s):	0693106; 0693105; 0693104
Calibration Report No.:	CMR11681
Conditions of Issue:	Nil

This certifies that the above metering equipment has been calibrated in accordance with the Electricity Governance Rules.

Issue Date: 29/05/2007

Expires: 29/05/2017

Signatory:

Malcolm Hoare
for TSL E&T Meter Test House

Electronically Created by: Malcolm Hoare on 06/03/2007

TSL E and T Meter Test House, Brunner Street, PO Box 16-219, Christchurch (03 349 0873)

meridian

TRANSFIELD
SERVICES
Meter Test House

TRANSFIELD
SERVICES

CERTIFICATE OF COMPLIANCE

(Component Only)

Certificate Number: 34013V

Installation Name:	**White Hills Wind Farm**
Equipment Certified:	VT: Merlin Gerin - VRQ1n/S1
Serial Number(s):	0690324; 0690325; 0690326
Calibration Report No.:	CMR11683
Conditions of Issue:	Some errors at 1005 Rated burden are outside the IEC limits of error for a Class 0.2 VT

This certifies that the above metering equipment has been calibrated in accordance with the Electricity Governance Rules.

Issue Date: 29/05/2007

Expires: 29/05/2017

Signatory:

Malcolm Hoare
for TSL E&T Meter Test House

Electronically Created by: Malcolm Hoare on 05/06/2007

TSL E and T Meter Test House, Brunner Street, PO Box 16-219, Christchurch (03 349 0973)