



White Hill Wind Farm

2008 Annual Emission Reduction Report

Version 2
10 March 2009

CONFIDENTIAL



White Hill Wind Farm 2008 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.





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 – 2008 calendar year

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.

This schedule requires that Meridian records the quantities of petrol and diesel used in the construction of the project, and the quantities of cement, iron, steel and aluminium introduced into the project during the construction and operation of the project.

The White Hill wind farm was operational during the 2008 calendar year. Emissions from sources other than cement, iron, steel and aluminium will be reported in Meridian's GHG Inventory which is prepared on a financial year basis.

There were no emissions generated on site at White Hill wind farm in 2008 from cement, iron, steel or aluminium.

Emissions generated – 2008 calendar year (operational emissions)			
Material	Quantity	Emission factor¹	Emissions generated
Diesel	15,166 litres	0.00271 tCO ₂ /litre	Not required to be reported
Petrol	195 litres	0.00232 tCO ₂ /litre	Not required to be reported
Iron and steel imported	11 tonnes	0 tCO ₂ /tonne	0 tCO ₂ e
Iron and steel produced in New Zealand	0 tonnes	2.01 tCO ₂ /tonne	0
Aluminium imported	0 tonnes	0 tCO ₂ /tonne	0

¹ Emission factor as prescribed in Schedule 2 of the Project Agreement



Emissions generated – 2008 calendar year (operational emissions)			
Material	Quantity	Emission factor¹	Emissions generated
Aluminium produced in New Zealand	0 tonnes	1.62 tCO ₂ /tonne	0
Cement	0 tonnes	0.46 tCO ₂ /tonne	0
Total operational emissions generated 2008			0 tCO₂e

4 Electricity exported – 2008 calendar year

This table shows the total electricity exported from White Hill wind farm in 2008 as recorded at the Grid Injection Point by The Marketplace Company (MCo)

Revenue Meter	kWh
Total electricity generated (kWh)	170,030,696

Appendix 1 sets out the generation from each turbine and a combined generation total of 181,726,208 kWh. The total electricity output of the Project as measured by the Revenue Meter is 11,695,512 kWh 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.

There is no other generation that is not part of the project that flows through the above meters.



5 Emission reductions generated – 2008 calendar year

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.

Element	Annual Production	Factor	t CO ₂ -e
Total electricity generation (GWh)	170.03 GWh	625tCO ₂ e/GWh	106,269.19
		Less reported operational emissions	0
Less other generation not part of the project, recorded by the meters (GWh)	0 GWh		-
		Net emission reductions generated for the year	106,269.19

The volume of emission reductions generated for the 2008 year is 38,106tCO₂e less than the 144,375 tCO₂-e specified in the Project Agreement. The number of emissions reductions generated is less than that specified in the Project Agreement as these emission reductions were based on project generation of 231 GWh for the calendar year. As outlined above the wind farm generated just over 170 GWh for the 2008 year.

Wind resource is variable from season to season and the 2008 year was a significantly low wind year, not just in Southland, but across other parts of New Zealand. In more average wind years we would expect generation to be in the 215GWh to 241GWh range.

6 Emission units claimed – 2008 calendar year

106,269.19 net emission reductions x 0.89² = 94,579 Emission Units claimed.

Meridian claims 94,579 ERUs for the 2008 calendar year.

7 How the generation is measured

The total electricity generated is recorded at the Grid Injection Point by The Marketplace Company (MCo).

Appendix 2 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".

² Ratio specified as C in clause 5.1 of the Project Agreement



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

8 Statements

As at 31 December 2008, 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: 10 March 2009



9 Unit Transfer Details

1	Project name:	Project White Hill
2	Name of the project developer:	Meridian Energy Limited
3	Project ID:	NZ- 1000002
4	Calendar year for which units are being transferred:	2008
5	Participant's account identifier:	NZ-1024
6	Quantity of units:	94,579
7	Type of units:	ERUs



Appendix 1

Generation for each turbine – 2008
(This data is generated by the Vestas Online database)

Parkunit	Actual Output kWh
WHL12	6,572,506
WHL13	6,431,233
WHL14	6,306,894
WHL15	6,736,317
WHL16	4,934,480
WHL17	7,013,810
WHL21	5,913,517
WHL22	6,702,847
WHL23	6,176,468
WHL24	5,267,653
WHL25	5,430,733
WHL31	5,904,140
WHL32	6,312,036
WHL33	5,827,048
WHL34	4,215,207
WHL41	6,790,143
WHL42	7,175,600
WHL43	7,344,713
WHL44	6,742,307
WHL45	6,887,894
WHL46	6,410,120
WHL47	6,874,672
WHL51	4,692,702
WHL52	6,078,502
WHL53	6,298,639
WHL54	6,251,710
WHL55	7,093,622
WHL56	6,948,609
WHL11	6,392,086
Total	181,726,208



Appendix 2

Letter from The Marketplace Company confirming net generation from the White Hill wind farm.



27 January 2008

Toni Nevin
Meridian Energy Limited
P O Box 2128
Christchurch

Dear Toni

White Hills windfarm generation for the 2008 calendar year

The reconciliation manager wishes to advise Meridian Energy Limited, that the total generation recorded for the calendar year of 2008 for White Hills was 170,030,696 kWhs. The volume reported is net generation, i.e. injection quantities less any load at White Hills as supplied by Meridian Energy to the reconciliation manager.

If you have any questions regarding this letter please call me on 04 498 0044.

Yours sincerely

Zane Doran
For and on behalf of
The reconciliation manager

we make marketplaces work

The Marketplace Company Limited
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Appendix 3

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

The certificates for the White Hill meters follow.



Meter Test House

CERTIFICATE OF COMPLIANCE

Certificate Number: 34013

Installation Name: White Hills Wind Farm

Equipment Certified: Metering Installation

Component Information:

<u>Component:</u>	<u>Serial No.:</u>	<u>Certification No.</u>
METER	PI-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

Signatory:

Expires: 29/05/2010

Malcolm Hoare
for TSL E&T Meter Test House
Electronically Created by: Malcolm Hoare on
06/09/2007

TSL E and T Meter Test House, Brunner Street, PO Box 18-219, Christchurch (03 349 0873)



**TRANSFIELD
SERVICES**
Meter Test House



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

Signatory:

Expires: 29/05/2010

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)



**TRANSFIELD
SERVICES**
Meter Test House



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

Signatory:

Expires: 29/05/2017

*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 18-219, Christchurch (03 349 0973)



**TRANSFIELD
SERVICES**
Meter Test House



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

Signatory:

Expires: 29/05/2017

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 18-218, Christchurch (03 349 0873)

