An Australian Government Initiative

Powershop Carbon Neutral Electricity Product

Life Cycle Assessment

FY2016

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1. Organisation and Emission details

Table 1: Organisation and Emission Details

Organisation name	Powershop Australia Pty Ltd	
Contact person	Haiden Jones	
Position title	Retail Compliance Co-ordinator	
Telephone number	+61 478 326 289	
Email address	haiden.jones@powershop.com.au	
Name of the subject(s) of certification	All Australian electricity Sales under Powershop Australia	
Type of certification (tick all applicable)	☒Product/service ☐Organisation ☐Event ☐Part of organisation	
Standard(s) this LCA has been prepared in accordance with	GHG Protocol: Product Life Cycle Accounting and Reporting Standard ISO 14044:2006 GHG Protocol: Corporate Value Chain (Scope 3) Accounting and Reporting Standard	
Reporting period	From: 1/07/2015	To: 30/06/2016
Total emissions in reporting year	Tonnes CO_2e Total Emissions: 356,729 Total Offsets: 356,729 Net Emissions: 0	
Base year period	From: 1/07/2014	To: 30/06/2015
Total emissions in base year	Tonnes CO_2e Total Emissions: 189,836 Total Offsets: 189,836 Net Emissions: 0	

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2. Description of Organisation Activities

Meridian Energy Limited is Australasia's largest entirely renewable electricity generator and New Zealand's largest electricity generator. Meridian Energy Australia is the subsidiary corporate group responsible for Meridian's electricity generation, wholesale, retail and corporate support activities in the Australian market. Powershop Australia is the organisation's retailing arm.

Meridian Energy Australia owns and operates the Mount Millar Wind Farm in South Australia and the Mount Mercer Wind Farm in Victoria. The business also manages its own wholesale electricity trading in the Australian National Electricity Market ("***NEM***") and the Powershop Australia retail electricity business sells retail electricity to customers in Victoria and NSW and is exploring expansion plans into other states.

This Life Cycle Assessment relates specifically to the electricity "Product" that is created by Powershop Australia when it buys electricity from the NEM and on-sells that electricity to its retail customers under the Powershop brand. It is this Product which is accredited under the National Carbon Offset Scheme Carbon Neutral Program.

Meridian Australia's goal in maintaining accreditation at both an Organisational level and Product level via Powershop's accreditation is to assure all Meridian Energy Australia stakeholders they are supporting a better future through lower greenhouse gas emissions. Powershop's goal in being accredited under NCOS is to give its customers piece of mind that the electricity they consume is 100% offset by Powershop, at no extra charge to the customer.

Further information about Powershop can be found at www.powershop.com.au

Further information about Meridian Australia can be found at www.meridianenergy.com.au.

3. Product Description

Powershop Australia purchases electricity from the NEM (via Meridian Finco) and on-sells that electricity to its retail customers in Victoria and NSW.

Powershop offsets all emissions associated with the quantity of electricity purchased for sale to its customers by:

- Surrendering voluntary GreenPower LGCs bought by customers;[1] and
- Voluntary surrender of Certified Emission Reduction certificates ("CERs").

Powershop also complies with its obligation to surrender Large-scale Generation Certificate ("LGC") as per the mandatory requirements of the Renewable Energy Targets Renewable Power Percentage[2].

1 Each LGC equals 1 MWh

2 The quantum of Mandatory LGCs to be retired by Retailers is set by the rate of the Renewable Power Percentage which is adjusted at the end of each calendar year. The rate is designed to achieve the current target of 33,000GWhs of electricity being produced from renewable resources is reached by 2020. For current and future

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4. Scope and System Boundary

Powershop Australia retails electricity bought from the NEM to end use customers. In calculating the GHG emissions from electricity purchased and on sold to Powershop customers, we have applied scope 2 and scope 3 emission factors to the quantity of electricity purchased from the NEM. The boundary of Powershop's Carbon Neutral electricity product therefore incorporates greenhouse gas ("***GHG***") emissions associated with extraction, production and transport of fuels, electricity generation, transmission and distribution to Powershop customers.

5. Functional Unit

The functional unit for this analysis is Megawatt Hour ("***MWh***") of customers' electricity usage, with emissions to be expressed on the basis of tonnes of CO_2-e per MWh of usage.

Calculations of life-cycle usage for Scope 2 will be undertaken by multiplying the electricity volume (MWh) for as per invoices from AEMO to Powershop by the indirect (Scope 2) emission factors for consumption of purchased electricity for end users from the grid in Victoria and NSW.

For indirect emissions (Scope 3), calculations of life-cycle usage will be undertaken by multiplying the electricity volume (MWh) as per customer usage data (derived from actual meter read data – where available), net of Powershop customer solar generation, from the Powershop system by the indirect Scope 3 emission factors.

6. Emission Calculations, Emission Factors and Methodologies

The total electricity sold is derived from invoices provided by AEMO for each state.

The instruments used to lower the gross carbon emissions from the sale of electricity are as follows:

- Voluntary GreenPower LGCs bought by customers; and
- Voluntary surrender of CERs.

Each LGC is the equivalent of 1MWh of electricity; each CER represents the equivalent of 1 tonne of CO_2-e.

The emissions from the electricity purchased by Powershop and sold to customers are categorised as:

- Scope 2 emission i.e.:

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targets see - http://www.cleanenergyregulator.gov.au/RET/About-the-Renewable-Energy-Target/The-certificate-market/The-renewable-power-percentage/Annual-targets

Indirect GHG emissions (Scope 2): The release of greenhouse gas as a result of electricity generation, heating, cooling or steam - that is consumed by a facility[3]

- Scope 3 emissions i.e.:

Indirect GHG emissions (Scope 3): Emissions are all indirect emissions that occur as a consequence of the activities of the organisation, but occur from sources not owned or controlled by the organisation.

The tCO_2-e produced by the generation of this electricity has been calculated by:

1) Reducing the gross carbon emissions of the volume (MWh) of electricity purchased in each state (Victoria and NSW) as shown on AEMO invoices and National Meter Identifier ("NMI") data by the surrender of GreenPower eligible LGs in an amount equal to the amount of voluntary GreenPower bought by customers[4]; then
2) Calculating the scope 2 Carbon Footprint of the Powershop Electricity Product by multiplying the remainder volume (MWh) of electricity purchased by the relevant Emission Factors for each state as shown in the National Greenhouse Accounts Factors (2015) at: Table 5 (a): Indirect (scope 2) emission factors for consumption of purchased electricity from the grid; and
3) Calculating the Scope 3 Carbon Footprint of the Powershop Electricity Product by multiplying the remainder volume (MWh) of electricity supplied[5] (as per Powershop NMI data) by the relevant Emission Factors for each state as shown in the National Greenhouse Accounts Factors (2015) at: the third bullet point that follows Table 41: Scope 2 and Scope 3 emission factors – consumption of purchased electricity by end users.[6]
4) The sum of the products of these multiplications is the total of tonnes CO_2 –e remaining to be offset to achieve a zero emissions target for the Powershop electricity Product; then
5) CERs are surrendered to cancel out the quantum of the remaining tCO_2 –e.[7]

The National Greenhouse Accounts ("***NGA***") Factors continue to be an appropriate source for emissions calculation:

- NGA is listed as an appropriate source under section 2 of the National Carbon Offset Standard.
- NGA is published by the Department of Environment, the same entity that regulates NCOS.
- The emissions analysis within the NGA covers manufacture (including of materials), electricity production, electricity distribution, electricity use and then the end of life activities associated with decommissioning, dismantling and recycling at the facility.
- The methods used to generate the default factors are consistent with international guidelines and are subject to international expert review each year.[8]

[3] National Carbon Offset Standard-V3
[4] Each LGC equals 1 MWh
[5] Powershop customer's electricity consumption, net of solar generated by Powershop customers - data derived from Powershop's billing system.
[6] The point of metering that Powershop uses to calculate its electricity products carbon footprint is at the Node (i.e. before the loss in the distribution networks) as such it is appropriate when calculating the Products Scope 3 emissions to use the same emissions factors as the distribution network.
7 CERs = 1 tCO_2-e

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The following is a copy of the relevant sections of the tables setting out those emissions factors from the National Greenhouse Accounts Factors document.

(Note: Table numbering below is from the NGA document).

Table 1 (a): Indirect (scope 2) emission factors for consumption of purchased electricity from the grid.

State or Territory	Emission factor kg CO_2-e/kWh
New South Wales and Australian Capital Territory	0.84
Victoria	1.13
Queensland	0.79
South Australia	0.56
South West Interconnected System (SWIS) in Western Australia	0.76
North Western Interconnected System (NWIS) in Western Australia	0.66
Darwin Katherine Interconnected System (DKIS) in the Northern Territory	0.57
Tasmania	0.12
Northern Territory	0.67

Sources: National Greenhouse and Energy Reporting (Measurement) Determination 2008 (Schedule 1) and Department of the Environment.

Example: calculation of emissions from electricity consumption

A company in New South Wales consumes 100,000 kWh of purchased electricity from the grid.

Emissions of greenhouse gases (scope 2) in tonnes of CO_2-e are estimated as follows:

= 100,000 x (0.84 /1000)

= 84 tonnes.

Total scope 2 GHG emissions = 84 tonnes CO_2-e

Electricity emission factors for end users

Table 41: Scope 2 and 3 emissions factors - consumption of purchased electricity by end users. Dot point three:

- Scope 3 emission factors for transmission and distribution network operators are lower as they include only emissions attributable to the extraction, production and transport of fuels and not emissions attributable to the electricity lost in transmission and distribution networks. Transmission and distribution network operators should use the scope 2 factors in the table above and the following latest estimate scope 3 factors for 2012/13: NSW and ACT: 0.03kg CO_2-e/kWh, VIC: 0.01kg CO_2-e/kWh, QLD: 0.04kg CO_2-e/kWh, SA: 0.05kg CO_2-e/kWh, WA: 0.02kg CO_2-e/kWh, TAS: 0.02kg CO_2-e/kWh, NT:0.05 kg CO_2-e/kWh.

[8] This approach was discussed and approved by the Department of Environment on 3 August 2015.

The application of this calculation for the FY2016 is shown in the following tables; *Table 2 – Powershop net Carbon Footprint* and *Table 3 – Emissions to be offset by CERs from the Powershop Retail Electricity Product (Quantification).*

Table 2 – Powershop net Carbon Footprint

Large-scale Generation Certificates (LGC) and GreenPower	2015 (July - Dec)	2016 (Jan - June)	Totals for FY2016
Electricity purchases Vic (MWh)	123,194	130,838	254,033
GreenPower Purchases Vic (MWh)	6,855	8,228	15,083
Electricity purchases NSW (MWh)	29,953	47,693	77,646
GreenPower Purchases NSW (MWh)	3,721	4,831	8,552
National Totals (MWh)	**163,723**	**191,590**	**355,313**
Mandatory LGC surrender (% of total MWh)	11.11%	12.75%	
Mandatory LGC Liability	18,130	24,424	42,554
LGCs Surrendered (period)	18,130	0	
LGC Liability Outstanding	0	24,424	LGCs to be surrendered in February 2017 in accordance with market practices
GreenPower LGC Liability			
GreenPower LGCs Surrendered (period)	10,501	0	
GreenPower LGC Liability Outstanding	(0)	12,990	LGCs to be surrendered in March 2017 in accordance with market practices
Electricity Purchases Vic – Net of voluntary GreenPower LGCs (MWHrs)	123,194	130,838	254,033
Electricity Purchases NSW – Net of voluntary GreenPower LGCs (MWHrs)	29,953	47,693	77,646
Net National Totals (MWh)	153,147	178,531	331,679

Table 3 – Emissions to be offset by CERs from the Powershop Retail Electricity Product (Quantification)

Scope	Emission source	Source of activity data	Methodology reference	Energy content factor	Emission factor	Activity data	Unit	t CO_2-e
2	Electricity purchased from the NEM and sold to Powershop's Victorian customers (net of voluntary GreenPower LGC surrender	AEMO Finalised Market Invoices	National Greenhouse Accounts Factors (August 2015) published by Australian Department of the Environment. Table 5 (a): Indirect (scope 2) emission factors for consumption of purchased electricity from the grid - Victoria. Powershop purchased 269,048 MWh of electricity from the NEM to sell to Victorian customers. Powershop sold 15,015 MWh worth of accredited GreenPower to Victorian customers during the 2016 financial year.	N/A	kg CO_2-e/KWh 1.13	254,033	MWh	287,057
2	Electricity purchased from the NEM and sold to Powershop's NSW customers (net of voluntary GreenPower LGC surrender)	AEMO Finalised Market Invoices	National Greenhouse Accounts Factors (August 2015) published by Australian Department of the Environment. Table 5 (a): Indirect (scope 2) emission factors for consumption of purchased electricity from the grid - Victoria. Powershop purchased 86,199 MWh of electricity from the NEM to sell to NSW customers. Powershop sold 8,553 MWh worth of accredited GreenPower to NSW customers during the 2016 financial year.	N/A	kg CO_2-e/KWh 0.84	77,646	MWh	65,223

3	Electricity purchased from the NEM and sold to Powershop's Victorian customers (net of voluntary GreenPower LGC surrender and solar generated by Powershop customers)	Customer electricity usage data at the NMI	National Greenhouse Accounts Factors (August 2015) published by Australian Department of the Environment. Third bullet point in Notes that follow Table 41: Scope 2 and 3 emissions factors - consumption of purchased electricity by end users (pg. 70). Powershop supplied 252,061 MWh of electricity (net of solar generated electricity by customers) from the NEM to Victorian customers. Powershop sold 15,015 MWh worth of accredited GreenPower to Victorian customers during the 2016 financial year.	N/A	kg CO2-e/KWh 0.01	237,046	MWh	2,370
3	Electricity purchased from the NEM and sold to Powershop's NSW customers (net of voluntary GreenPower LGC surrender and solar generated by Powershop customers)	Customer electricity usage data at the NMI	National Greenhouse Accounts Factors (August 2015) published by Australian Department of the Environment. Third bullet point in Notes that follow Table 41: Scope 2 and 3 emissions factors - consumption of purchased electricity by end users (pg. 70). Powershop supplied 77,824 MWh of electricity (net of solar generated electricity by customers) from the NEM to sell customers. Powershop sold 8,553 MWh worth of accredited GreenPower NSW customers during the 2016 financial year.	N/A	kg CO2-e/KWh 0.03	69271	MWh	2,078
Total Footprint net of mandatory and GreenPower LGCs								**356,729**

7. Assumptions/ Limitations

Table 4: Assumptions/ Limitations

Emission source/ activity	Assumption/ limitation and justification
LGC surrender	LGC liabilities (surrender) for both mandatory requirements and GreenPower for the period 01/01/2016 – 30/06/2016 have been taken as completed however in line with common market practices, these surrenders will only occur in February 2017 and it is only at that time that actual serial numbers of certificates will be available. It is intended that this fact will be reported in the Product Disclosure Summary that describes this Product and that compliance with requirements will be regularly updated, on a rolling basis, in subsequent iterations of the PDS.
Other limitations on Corporate emissions	As identified in Meridian Energy Australia Corporate Greenhouse Gas Inventory.

8. Emissions Exclusions from Within the System Boundary

Table 5: Exclusions

Emission source	Scope	Justification for exclusion & overall implications for footprint
Operations of Meridian Energy Australia and its Subsidiary Powershop Australia	Scope 3	All scope 2 & 3 emissions associated with the back office support of this product have been excluded as they have been separately accounted for within the GHG Inventory prepared for the Meridian Energy Australia Corporate Group.

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9. GreenPower, GreenPower Eligible LGCs and CERs

As per section 6 Emission Calculations, Emission Factors and Methodologies, Powershop Australia surrendered mandatory LGCs, GreenPower LGCs and CERs to ensure its retail electricity was carbon neutral for the FY2016 period under the NCOS Standard. The details of those instruments surrendered are set out in the following tables.

Table 6: GreenPower LGCs pertaining to Powershop Retail Electricity Product (Quantification)

Type	Volume	Unit	tCO_2-e	Status
GreenPower Compliance	10,501	MWh	10,501	Surrendered Part of surrender March 2016: WD00SA17 412,448 – 417,727 (5,280) WD00SA17 386,686 – 388,659 (1,974) WD00SA17 402,448 -403,447 (1,000) WD00SA17 406,769 – 409,016 (2,247)
GreenPower Compliance	12,990	MWh	12,990	Purchased To be surrendered in March 2017

Table 7: LGCs pertaining to Powershop Retail Electricity Product (Quantification)

Details of LGCs surrendered as per mandatory Renewable Power Percentage requirements	
Quantity	**Serial Number**
18,130	Surrendered Part of surrender 2016 WD00NMS08 70,639 – 71,138 (500) WD00SA06 139101 – 148,792 (9692) WD00VC17 132,102 – 140,039 (7938)
24,424	To be surrendered in February 2017

Type 8: CERs pertaining to Powershop Retail Electricity Product (Quantification)

Details of CERs voluntarily Surrendered		
Quantity	**Serial number**	**Date of surrender**
1,552	52,907,153 - 52,908,704	Surrendered 2014-15 (surplus)
68,633	2,210,404 – 2,227,037	April 2016
108,313	1,445,203 – 1,553,515	April 2016
14,107	74,743,773 - 74,757,880	September 2016
164,124	83,496,110 - 83,660,233	September 2016

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10. Purchase of Carbon Neutral Products

The purchase of Carbon Neutral products will be reported on a Meridian Energy Australia group level as part of Meridian Energy Australia's corporate accreditation.

11. Emissions per Functional unit

For the FY2016, emissions per MWh have been are as follows:

Scope 2 & 3: 637,996 (MWh) / 356,729 (tCO_2-e) = 1.78 tCO_2-e/MWh

12. Assessment of Uncertainty

Section 6 provides an overview of how data has been collected to verify the total amount of electricity purchased and on-sold to Powershop's retail customers (scope 2). This data is sourced from AEMO invoices which undergo a range of true-up iterations and are audited to ensure reliance.

The extrapolation of the AEMO data into a format that is applicable to this carbon reporting format is transparent and no uncertainty exists.

The data for scope 3 emissions is calculated using customer usage data at the NMI based on average or verified reads, less solar electricity generation from Powershop customers. Where verified reads are not available, there is an estimation algorithm in the Powershop system to estimate the electricity volume for the portion of the period where actual data was not available at the time.

The Powershop system data that is applicable to this carbon reporting format is transparent and no uncertainty exists.

The calculation to convert those amounts of energy purchased into the emissions liability for the Product is simple and non-complex so again, there is no uncertainty.

There are no incremental Scope 1 emissions; hence the uncertainty around emissions is contained within the MEA Corporate Greenhouse Gas Inventory.

13. Base Year Recalculation Policy

In the 2015 base year period, Powershop reported Scope 3 emissions using AEMO invoice data and then applied the third bullet point in Notes that follow Table 41: Scope 2 and 3 emissions factors - consumption of purchased electricity by end users.

For this 2016 period Powershop have applied the same emissions factors, but instead of using AEMO invoice data Powershop have used customer usage data at the NMI, derived from internal system data. Using Powershop NMI data instead of AEMO invoice data provides a better representation of what Powershop customers are consuming as end users.

The customer NMI usage data is run through the Powershop system prior to customer's solar electricity generation being deducted. The NMI usage data is based on average or verified reads. Where verified reads are not available, there is an estimation algorithm in the Powershop system to estimate volume of usage for the portion of the period where actual reads were not available at the time.

As this is not a significant change, there will be no recalculation of base year data.