

TECHNICAL APPENDIX 14.5.2

Carbon Calculator Outputs



ScottishPower Renewables

9th Floor Scottish Power Headquarters

320 St Vincent Street

Glasgow

G2 5AD

ITP Energised

7 Dundas Street

Edinburgh

EH3 6QG

Registration Number: SC450178

Tel: 0131 557 8325

© Copyright 2018 . The concepts and information contained in this document are the property of Energised Environments Limited. Use or copying of this document in whole or in part without the written permission of Energised Environments Limited constitutes an infringement of copyright. ITP Energised is a trading name for the legal entity Energised Environments Limited.

Limitation: This report has been prepared solely for the use of the Client and any party with whom a warranty agreement has been executed, or an assignment has been agreed. No other parties may rely on the contents of this report without written approval from Energised Environments Limited, for which a charge may be applicable.

Energised Environments Limited accepts no responsibility or liability for the consequences of use of this document for any purpose other than that for which it was commissioned, nor the use of this document by any third party with whom an agreement has not been executed.



Table of Contents

1 Carbon Calculator Outputs

3

1 Carbon Calculator Outputs

Payback Time and CO₂ emissions • MHEA-39DJ-9PFR v7

1. Windfarm CO ₂ emission saving over...	Exp.	Min.	Max.
...coal-fired electricity generation (t CO ₂ / yr)	216,090	194,481	237,699
...grid-mix of electricity generation (t CO ₂ / yr)	59,561	53,605	65,517
...fossil fuel-mix of electricity generation (t CO ₂ / yr)	105,696	95,126	116,266
Energy output from windfarm over lifetime (MWh)	9,395,205	8,455,685	10,334,726

Total CO ₂ losses due to wind farm (tCO ₂ eq.)	Exp.	Min.	Max.
2. Losses due to turbine life (eg. manufacture, construction, decommissioning)	90,507	90,033	90,981
3. Losses due to backup	79,471	79,471	79,471
4. Losses due to reduced carbon fixing potential	2,432	904	3,821
5. Losses from soil organic matter	50,889	11,270	75,919
6. Losses due to DOC & POC leaching	2,341	0	6,025
7. Losses due to felling forestry	64,205	52,006	77,689
Total losses of carbon dioxide	289,844	233,683	333,904

8. Total CO ₂ gains due to improvement of site (t CO ₂ eq.)	Exp.	Min.	Max.
8a. Change in emissions due to improvement of degraded bogs	1,153	0	-11,214
8b. Change in emissions due to improvement of felled forestry	0	0	0
8c. Change in emissions due to restoration of peat from borrow pits	89	0	-865
8d. Change in emissions due to removal of drainage from foundations & hardstanding	0	0	0
Total change in emissions due to improvements	1,242	0	-12,079

RESULTS	Exp.	Min.	Max.
Net emissions of carbon dioxide (t CO ₂ eq.)	291,086	221,604	333,904
Carbon Payback Time			
...coal-fired electricity generation (years)	1.3	0.9	1.7
...grid-mix of electricity generation (years)	4.9	3.4	6.2
...fossil fuel-mix of electricity generation (years)	2.8	1.9	3.5
Ratio of soil carbon loss to gain by restoration (not used in Scottish applications)	No gains!	0.93	No gains!
Ratio of CO ₂ eq. emissions to power generation (g/kWh) (for info. only)	30.98	21.44	39.49



Registered Address:

7 Dundas Street

Edinburgh

EH3 6QG

+44 (0) 131 557 8325