

# Appendix 14.2 Carbon Calculator Output

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Payback Time  
 Payback Time - ChartsInput Data

1. Windfarm CO2 emission saving over... 2. CO2 loss due to turbine life 3. CO2 loss due to backup 4. Loss of CO2 fixing potential 5. Loss of soil CO2 (a-b) 6. Loss of soil CO2 (c-d) 7. CO2 loss by DOC 8. DOC loss

1. Windfarm CO2 emission saving over...	Exp.	Min.	Max.
...coal-fired electricity generation (t CO2 / yr)	180,210	159,306	233,614
...grid-mix of electricity generation (t CO2 / yr)	49,671	43,910	64,391
...fossil fuel-mix of electricity generation (t CO2 / yr)	88,146	77,922	114,268
Energy output from windfarm over lifetime (MWh)	9,794,030	8,657,946	12,696,394

Total CO2 losses due to wind farm (tCO2 eq.)	Exp.	Min.	Max.
2. Losses due to turbine life (eg. manufacture, construction, decomissioning)	74,757	73,027	89,101
3. Losses due to backup	82,782	81,304	97,565
4. Losses due to reduced carbon fixing potential	2,703	902	4,475
5. Losses from soil organic matter	68,695	34,180	124,077
6. Losses due to DOC & POC leaching	7	2	12
7. Losses due to felling forestry	0	0	0
Total losses of carbon dioxide	228,943	189,415	315,229

8. Total CO2 gains due to improvement of site (t CO2 eq.)	Exp.	Min.	Max.
8a. Change in emissions due to improvement of degraded bogs	-7,193	-5,994	-8,392
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	-6,228	-4,671	-7,266
8d. Change in emissions due to removal of drainage from foundations & hardstanding	0	0	0
Total change in emissions due to improvements	-13,421	-10,665	-15,658

RESULTS	Exp.	Min.	Max.
Net emissions of carbon dioxide (t CO2 eq.)	215,522	173,757	304,563
<b>Carbon Payback Time</b>			
...coal-fired electricity generation (years)	1.2	0.7	1.9
...grid-mix of electricity generation (years)	4.3	2.7	6.9
...fossil fuel-mix of electricity generation (years)	2.4	1.5	3.9
Ratio of soil carbon loss to gain by restoration (not used in Scottish applications)	5.12	2.18	11.63
Ratio of CO2 eq. emissions to power generation (g/kWh) (for info. only)	22.01	13.69	35.18