FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX 6

AIR QUALITY AND CLIMATE

Appendix 6.1 – Carbon Calculator Inputs

Appendix 6.2 – Carbon Calculator Outputs

APPENDIX 6.1

Carbon Calculator Inputs

Carbon Calculator Inputs	Info added to carbon calcs
No. of Turbines	11
Duration of consent	35
Power rating of 1 turbine (MW)	4.8
Capacity factor	35
average annual air temp	9.2
average depth of peat at site (m)	1.39
average extent of drainage around drainage features at site	n/a
average water table depth (m)	1
area of forestry to be felled (ha)	28.4
no. of borrow pits	0
average length of borrow pits (m)	n/a
average width of borrow pits (m)	n/a
average depth of peat removed from pit (m)	n/a
average length of turbine foundation (m)	20.4
average width of turbine foundation (m)	20.4
average depth of peat removed from turbine foundations (m)	0.84
average length of hard standing (m)	189
average width of hard standing (m)	58.2
average depth of peat removed from hard-standing (m)	0.74
Volume of concrete (m3) used in construction of wind farm	15,000
total length of access track (m)	10,621
Existing track length (m)	951
length of access track that is floating road (m)	9129
Floating road width (m)	5
floating road depth (m)	0
Length of floating road that is drained (m)	9129
Average depth of drains associated with floating roads (m)	0.4
Length of access track that is excavated road (m)	541
Excavated road width (m)	5
Average depth of peat excavated for road (m)	n/a
Length of access track that is rock filled road (m)	n/a
Rock filled road width (m)	n/a
Rock filled road depth (m)	n/a
Length of rock filled road that is drained (m)	n/a

Carbon Calculator Inputs	Info added to carbon calcs
Average depth of drains associated with rock filled roads (m)	n/a
Total length of access track (m) (existing+to be upgraded +existing tracks with no upgrading	10621
Length of any cable trench on peat that does not follow access tracks and is lined awith a permeable medium eg. sand (m)	0
Average dpeth of peat cut for cable trenches (m)	0.8
Volume of additional peat excavated (m3)	18,000
Area of additional peat excavated (m2)	0

APPENDIX 6.2

Carbon Calculator Outputs

Results

PAYBACK TIME AND CO_2 EMISSIONS

Note: The carbon payback time of the windfarm is calculated by comparing the loss of C from the site due to windfarm development with the carbon-savings achieved by the windfarm while displacing electricity generated from coal-fired capacity or grid-mix.

	Exp.	*Min.*	*Max.*
1. Windfarm CO_2 emission saving over…			
…coal-fired electricity generation ($tCO_2\ yr^{-1}$)	162209	162209	162209
…grid-mix of electricity generation ($tCO_2\ yr^{-1}$)	37217	32377	48565
…fossil fuel - mix of electricity generation ($tCO_2\ yr^{-1}$)	69934	69934	69934
Energy output from windfarm over lifetime (MWh)	5665968	4047120	5665968
Total CO_2 losses due to wind farm (t CO_2 eq.)			
2. Losses due to turbine life (eg. manufacture, construction, decomissioning)	49879	47983	52091
3. Losses due to backup	34967	24977	34967
4. Losses due to reduced carbon fixing potential	317	219	618
5. Losses from soil organic matter	43068	8201	49933
6. Losses due to DOC & POC leaching	0	0	1063
7. Losses due to felling forestry	13122	6601	13861
Total losses of carbon dioxide	141353	87980	152534
8. Total CO_2 gains due to improvement of site (t CO_2 eq.)			
8a. Change in emissions due to improvement of degraded bogs	0	0	0
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	0	0	0
8d. Change in emissions due to removal of drainage from foundations & hardstanding	0	0	0
Total change in emissions due to improvements	0	0	0