

Carbon Calculator v1.6.1

Beaw Field S36C Location: 60.512272 -1.077311

Peel NRE

Core input data

Input data	Expected value	Minimum value	Maximum value	Source of data
Windfarm characteristics				
Dimensions				
No. of turbines	17	17	17	.
Duration of consent (years)	40	40	40	.
Performance				
Power rating of 1 turbine (MW)	3.4	3.4	3.4	.
Capacity factor	46.3	41.7	50.9	.
Backup				
Fraction of output to backup (%)	5	5	5	.
Additional emissions due to reduced thermal efficiency of the reserve generation (%)	10	10	10	Fixed
Total CO ₂ emission from turbine life (tCO ₂ MW ⁻¹) (eg. manufacture, construction, decommissioning)	Calculate wrt installed capacity	Calculate wrt installed capacity	Calculate wrt installed capacity	
Characteristics of peatland before windfarm development				
Type of peatland	Acid bog	Acid bog	Acid bog	.
Average annual air temperature at site (°C)	7.63	7.45	7.8	.
Average depth of peat at site (m)	1.25	1.21	1.28	.
C Content of dry peat (% by weight)	55.5	49	62	.
Average extent of drainage around drainage features at site (m)	10	5	20	.
Average water table depth at site (m)	0.3	0.27	0.45	.
Dry soil bulk density (g cm ⁻³)	0.3	0.2	0.3	.
Characteristics of bog plants				
Time required for regeneration of bog plants after restoration (years)	5	3	10	.
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha ⁻¹ yr ⁻¹)	0.25	0.12	0.31	.
Forestry Plantation Characteristics				
Area of forestry plantation to be felled (ha)	0	0	0	.
Average rate of carbon sequestration in timber (tC ha ⁻¹ yr ⁻¹)	0	0	0	.
Counterfactual emission factors				
Coal-fired plant emission factor (t CO ₂ MWh ⁻¹)	0.92	0.92	0.92	
Grid-mix emission factor (t CO ₂ MWh ⁻¹)	0.25358	0.25358	0.25358	
Fossil fuel-mix emission factor (t CO ₂ MWh ⁻¹)	0.45	0.45	0.45	
Borrow pits				
Number of borrow pits	4	4	4	.

Input data	Expected value	Minimum value	Maximum value	Source of data
Average length of pits (m)	175	175	175	.
Average width of pits (m)	100	100	100	.
Average depth of peat removed from pit (m)	0.89	0.8	0.98	.
Foundations and hard-standing area associated with each turbine				
Average length of turbine foundations (m)	0	0	0	.
Average width of turbine foundations (m)	0	0	0	.
Average depth of peat removed from turbine foundations(m)	0	0	0	.
Average length of hard-standing (m)	0	0	0	.
Average width of hard-standing (m)	0	0	0	.
Average depth of peat removed from hard-standing (m)	0	0	0	.
Volume of concrete used in construction of the ENTIRE windfarm				
Volume of concrete (m ³)	0	0	0	.
Access tracks				
Total length of access track (m)	10484	10483	10485	.
Existing track length (m)	0	0	0	.
Length of access track that is floating road (m)	0	0	0	.
Floating road width (m)	0	0	0	.
Floating road depth (m)	0	0	0	.
Length of floating road that is drained (m)	0	0	0	.
Average depth of drains associated with floating roads (m)	0	0	0	.
Length of access track that is excavated road (m)	10484	10483	10485	.
Excavated road width (m)	5.5	5.5	5.5	.
Average depth of peat excavated for road (m)	0.86	0.77	0.95	.
Length of access track that is rock filled road (m)	0	0	0	.
Rock filled road width (m)	0	0	0	.
Rock filled road depth (m)	0	0	0	.
Length of rock filled road that is drained (m)	0	0	0	.
Average depth of drains associated with rock filled roads (m)	0	0	0	.
Cable trenches				
Length of any cable trench on peat that does not follow access tracks and is lined with a permeable medium (eg. sand) (m)	0	0	0	.
Average depth of peat cut for cable trenches (m)	0	0	0	.
Additional peat excavated (not already accounted for above)				
Volume of additional peat excavated (m ³)	5313	4782	5844	.
Area of additional peat excavated (m ²)	9620	8658	10582	.
Peat Landslide Hazard				
Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments	negligible	negligible	negligible	Fixed
Improvement of C sequestration at site by blocking drains, restoration of habitat etc				
Improvement of degraded bog				

Input data	Expected value	Minimum value	Maximum value	Source of data
Area of degraded bog to be improved (ha)	500	300	700	.
Water table depth in degraded bog before improvement (m)	0.3	0.27	0.33	.
Water table depth in degraded bog after improvement (m)	0.1	0.09	0.11	.
Time required for hydrology and habitat of bog to return to its previous state on improvement (years)	5	3	10	.
Period of time when effectiveness of the improvement in degraded bog can be guaranteed (years)	20	15	22	.
Improvement of felled plantation land				
Area of felled plantation to be improved (ha)	0	0	0	.
Water table depth in felled area before improvement (m)	0	0	0	.
Water table depth in felled area after improvement (m)	0	0	0	.
Time required for hydrology and habitat of felled plantation to return to its previous state on improvement (years)	2	2	2	..
Period of time when effectiveness of the improvement in felled plantation can be guaranteed (years)	2	2	2	.
Restoration of peat removed from borrow pits				
Area of borrow pits to be restored (ha)	4.13	4.13	4.13	.
Depth of water table in borrow pit before restoration with respect to the restored surface (m)	0.5	0.5	0.5	.
Depth of water table in borrow pit after restoration with respect to the restored surface (m)	0.2	0.19	0.21	.
Time required for hydrology and habitat of borrow pit to return to its previous state on restoration (years)	5	3	10	.
Period of time when effectiveness of the restoration of peat removed from borrow pits can be guaranteed (years)	20	15	22	.
Early removal of drainage from foundations and hardstanding				
Water table depth around foundations and hardstanding before restoration (m)	0.5	0.5	0.5	.
Water table depth around foundations and hardstanding after restoration (m)	0.25	0.24	0.26	.
Time to completion of backfilling, removal of any surface drains, and full restoration of the hydrology (years)	5	3	5	.
Restoration of site after decommissioning				
Will the hydrology of the site be restored on decommissioning?	Yes	Yes	Yes	.
Will you attempt to block any gullies that have formed due to the windfarm?	Yes	Yes	Yes	.
Will you attempt to block all artificial ditches and facilitate rewetting?	n/a	n/a	n/a	.
Will the habitat of the site be restored on decommissioning?	Yes	Yes	Yes	.

Input data	Expected value	Minimum value	Maximum value	Source of data
Will you control grazing on degraded areas?	Yes	Yes	Yes	.
Will you manage areas to favour reintroduction of species	Yes	Yes	Yes	.
Methodology				
Choice of methodology for calculating emission factors	Site specific (required for planning applications)			

Forestry input data

N/A

Construction input data

Input data	Expected value	Minimum value	Maximum value	Source of data
Area 1				
Number of turbines in this area	17	17	17	.
Turbine foundations				
Depth of hole dug when constructing foundations (m)	3.7	3.7	3.7	.
Aproximate geometric shape of whole dug when constructing foundations	Rectangular	Rectangular	Rectangular	.
Length at surface	20	20	20	
Width at surface	20	20	20	
Length at bottom	20	20	20	
Width at bottom	20	20	20	
Hardstanding				
Depth of hole dug when constructing hardstanding (m)	2	2	2	.
Aproximate geometric shape of whole dug when constructing hardstanding	Rectangular	Rectangular	Rectangular	..
Length at surface	55	55	55	
Width at surface	63	63	63	
Length at bottom	55	55	55	
Width at bottom	63	63	63	
Piling				
Is piling used?	No	No	No	.
Volume of Concrete				
Volume of concrete used (m ³) in the entire area	12920	12920	12920	.