FEHILY TIMONEY

APPENDIX 6.1

Carbon Calculator Inputs
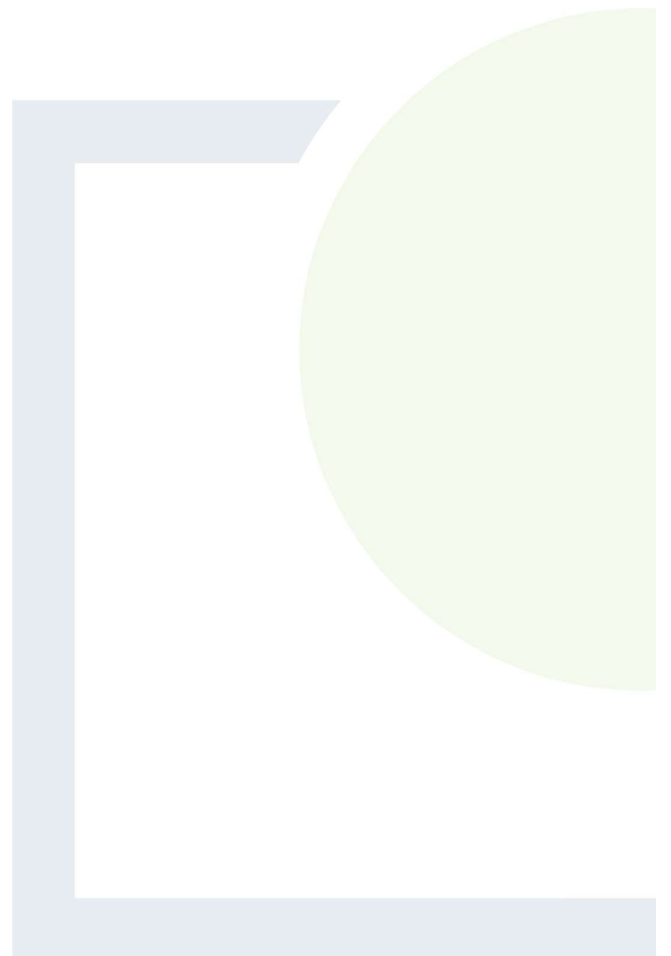
Carbon Calculator Inputs	Value	Explanation
Windfarm characteristics:		
No. of Turbines	20	
Duration of consent	35	
Power rating of 1 turbine (MW)	5.9and 6.6	Calculator ran twice for high and low ranges
Capacity factor	35%	
Backup - fraction of output to back up (%)	5%	
Backup - Additional emissions due to reduced thermal efficiency of the reserve generation (%)	10 (fixed)	Provided by model
CO_2 emissions from turbine life (tCO_2/MW)	Calculate wrt installed capacity	
Characteristics of peatland before windfarm development:		
Type of peatland	Acid Bog	
average annual air temp	10.1	Taken from Air and Climate chapter
average depth of peat at site (m)	0.6	Depth varies 0-3m, average used
C Content of dry peat (% by weight)	19%	19% is at the low range will go. Overall the C content will not be as high as a peat bog.
Average extent of drainage around drainage features at site (m)	0.50	Don't have info. Worst case taken
average water table depth at site (m)	1	Calculator values range between 0 and 1; water table is deeper than 1m
Dry soil bulk density (g cm-3)	0.3 g cm-3	the calculator only goes as high as 0.3m.
Characteristics of bog plants:		
Time required for regeneration of bog plants after restoration (years)	30	Life time of restoration - 30 is as high as the calculator goes.
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha-1 yr-1)	0.25	0.25 tC ha-1 yr-1 is the value given by SNH guidance (not a sensitive input).
Forestry Plantation Characteristics:		
area of forestry to be felled (ha)	88ha	
Average rate of carbon sequestration in timber (tC ha-1 yr-1)	3.6	This is dependent on the yield class of the forestry. Carbon sequestered for yield class 16 m3 ha-1 y-1 = 3.6 tC ha-1 yr-1

Counterfactual emission factors:		
Fossil fuel-mix emission factor (t CO_2 MWh-1)	0.366	Not used in calculator but supplied by Coillte 118 x 365 x 24 x 0.35 x 0.366 = avoided losses
Borrow pits (if any):		
no. of borrow pits	3	
average length of borrow pits (m)	100m	
average width of borrow pits (m)	100m	
average depth of peat removed from pit (m)	0.5	Peat depth of 0.3 in the two west pits and 0.9 in the north pit 0.3+0.3+0.9/3 = 0.5
Foundations and hard-standing area associated with each turbine:		
Method used to calculate CO_2 loss from foundations and hard-standing	Rectangular with vertical walls	22 diameter
Average length of turbine foundations (m)	19.5	19.5m x 19.5m square is same area as 22m diameter circle
Average width of turbine foundations (m)	19.5	
average depth of peat excavated when constructing foundations (m)	0.4	Average under total turbines
Approximate geometric shape	Circular	
Average length of hard-standing (m)	75	
Average width of hard-standing (m)	40	
Average depth of peat excavated when constructing hardstandings (m)	0.4	Average under total turbines
Volume of concrete used in construction of the ENTIRE windfarm		
Volume of concrete used (m3)	15236	As per traffic calcs: concrete for turbine foundations 15197.6, substation building 38.34, 15197.6 + 38.34 = 15,236m3
Access tracks:		
Existing track length (m)	11900	
length of access track that is floating road (m)	2750	Actual length 2750m
Floating road width (m)	5	
floating road depth (m)	1*	
Length of floating road that is drained (m)	1000	
Average depth of drains associated with floating roads (m)	0.5m	Average (check Coom)

Length of access track that is excavated road (m)	6550	Total minus floating roads (1.5)
Excavated road width (m)	5	
Average depth of peat excavated for road (m)	0.6	Depth varies 0-3m, average used
Length of access track that is rock filled road (m)	6550	same s excavated roads length
Rock filled road width (m)	5	
Rock filled road depth (m)	0.5	
Length of rock filled road that is drained (m)	6550	= same as length of road
Average depth of drains associated with rock filled roads (m)	0.3	Swale depth
total length of access track (m)	25500	
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	Cable will follow internal access tracks peat removal counted above
Average depth of peat cut for cable trenches (m)	0	
Additional peat excavated (not already accounted above):		
Volume of additional peat excavated (m3)	14220	Below total area (23700) x average depth of peat (0.6) = 4740 =
Area of additional peat excavated (m2)	23700	Substation 15000m2, compound 1 5000m2, compound 2 3500m2, met mast 2no. 100m2
Peat landslide Hazard	negligible	
Improvement of C sequestration at site by blocking drains, restoration of habitat, etc.		
Area of degraded bog to be improved (ha)	0	None
Water table depth in degraded bog before improvement (m)	1	N/A
Water table depth in degraded bog after improvement (m)	1	N/A