Appendix B: GHG Calculations	# of Turbines:	25		

Turbine Fabrication

Parameter	Value	Unit	Comments	Source
Total Turbine Weight	702.4	tonnes/turbine	Based on weights provided in : Stantec Decomissioning plan, May 2025, extrapolated to 118m hub height	rpt_
Steel	624.4	tonnes/turbine		
Fiberglass	43.5	tonnes/turbine	Based on turbine composition material breakdown by mass for the Delta400 turbine, LCA of Nordex turbines, 2024	LCA_Report_-_EPD_of_a_Nordex_wind_farm_with_Delta4000_N163-6.X_turbines_(confidential data in Annex B).pdf
Polymers	26.7	tonnes/turbine		
Aluminium	4.2	tonnes/turbine		
Copper	3.5	tonnes/turbine		

Emission Factors

Parameter	Value	Unit	Comments	Source
general steel	2.57	TCO2e/T	source: Inventory of Carbon and Energy v4.1	ICE Educational: Download Confirmation Page - Circular Ecology
fiberglas	3.00	TCO2e/T	source: Carbon footprint and embodied energy of a wind turbine blade—a case study, 2021	2021MORINICarbonfootprintandembodiedenergyofawindturbinebladeacasestudy.pdf
Polymers	7.92	TCO2e/T	source: Inventory of Carbon and Energy v4.1	ICE Educational: Download Confirmation Page - Circular Ecology
Aluminium	13.06	TCO2e/T	source: Inventory of Carbon and Energy v4.1	ICE Educational: Download Confirmation Page - Circular Ecology
Copper	2.71	TCO2e/T	source: Inventory of Carbon and Energy v4.1	ICE Educational: Download Confirmation Page - Circular Ecology
Emissions	43385.04652	TCO2e	(B5*B10)+(B6*B11)*16	

Turbine Transportation

Parameter	Value	Unit	Comments	Source
heavy duty truck (diesel)	1	ea		
distance travelled	142,500	km	from Fuqing China and Kuantan Malaysia to dockside and Sheet Harbour to wind turbine laydown areas (all components) #turbines*19*235 *****	
freight weight	37.0	tonnes	estimate of each component, (B5 + B6) tonnes/19 components per WT	
Marine Cargo and Containers (diesel)				
distance travelled	518,238	km	from Quanzhou China and Kuantan Malaysia to Sheet Harbour NS (includes # WT) 20729.5*#wt *****	www.oceanlook.net/map
freight weight	702.4	tonnes	B5	

Emission Factors

Parameter	Value	Unit	Comments	Source
heavy duty truck (diesel)	130.8	g CO2e/T.km	Freight emissions for calculating GHGs from freight shipment(GHG Genius v5.2c)	
conversion factor	0.000001	T CO2e/T.km	1 g = 0.000001 tonnes	
Emissions	689.04	T CO2e		
Marine Cargo and Containers (diesel)	15.1	g CO2e/T.km	Freight emissions for calculating GHGs from freight shipment(GHG Genius v5.2c), Excel: Transport, cell X229	
conversion factor	0.000001	T CO2e/T.km	1 g = 0.000001 tonnes	
Emissions	5,496.43	T CO2e	B28*B29*B36*B37	
Total WT Transportation Emissions	6185.467083	T CO2e	B23+B26	

Concrete Foundation

Parameter	Value	Unit	Comments	Source

Appendix B: GHG Calculations	# of Turbines:		25	
			based on a volume of 888 m3 per WT pad and density of 2.4	E0004109735 3 CC01 EN Foundations Delta4000 | PDF | Foundation (Engineering) | Civil Engineering
Concrete Production Quantity	2259	tonne/per WT	T/m3 source Nordex	
Concrete transport	16.8	T	16.8 tonnes /truck	
Concrete truck	134	truckloads/ per WT		
Distance travelled (freight)	55	km	based on one way trip from concrete batch plant (Amherst, NS) to each WT pad	
Distance travelled (no freight)	55	km	based on one way trip from each WT pad to concrete batch plant (Amherst, NS)	
steel rebar quantity	170.0	tonne	The foundation for the turbine is approximatly 93% concrete by weight, the remianing mass is composed of steel rebar, pipe and screws. source: Nordex	LCA_Report_-_EPD_of_a_Nordex_wind_farm_with_Delta4000_N163-6.X_turbines_(confidential data in Annex B).pdf
rebar transport	21.25	T	21.25 tonnes /truck	
rebar truck	8	trucks per WT		
Distance travelled (freight)	200	km	based on a one way trip from the rebar supplier in Dartmouth to each WT pad	
Distance travelled (no freight)	200	km	based on a one way trip from each WT pad to rebar supplier, in Dartmouth	

Emission Factors

Parameter	Value	Unit	Comments	Source
concrete production	300	g CO2e/kg		
general steel	2.57	TCO2e/T	source: Inventory of Carbon and Energy v2.0 for a mixture of steel types	
concrete truck (freight)	130.8	g CO2e/T.km	Freight emissions for calculating GHGs from freight shipment(GHG Genius v5.2c)	
concrete truck (no freight)	1,203	g CO2e/km	Emissions for calculating GHGs where the volume of fuel consumed is unknown but the distance travelled is known source: GHGenius v5.2d	
steel or wood truck (freight)	130.8	g CO2e/T.km	Freight emissions for calculating GHGs from freight shipment(GHG Genius v5.2d)	
steel truck (no freight)	1,203	g CO2e/km	Emissions for calculating GHGs where the volume of fuel consumed is unknown but the distance travelled is known source: GHGenius v5.2d	
conversion factor	0.000001	T CO2e/T.km	1 g = 0.000001 tonnes	
concrete production emissions	16,939.29	T CO2e	B43*1000*B56*B62*C1	
steel production emissions	10,922.50	T CO2e	B48*B57*C1	
Concrete truck (freight) emissions	406.20	t CO2e	B44*B45*B46*B58*B62*C1	
Concrete truck (no freight) emissions	222.38	T CO2e	B45*B47*B59*B62*C1	
steel truck (freight) emissions	111.18	T CO2e	B49*B50*B51*B60*B62*C1	
steel truck (no freight) emissions	48.12	T CO2e	B50*B52*B61*B62*C1	
Total WT Foundation Emissions	28,649.67	T CO2e	B63+B64+B65+B66+B67+B68	
Total Emissions Turbines and Bases	78,220.18	T CO2e	B20+B39+B69	

Electrical Infrastructure

Parameter	Value	Unit	Comments	Source
substation transformers steel	35.68	tonnes	typical for a 63 MVA transformer source ABB.com	declarationStarTrafo63.PDF
substation transformers copper	18.36	tonnes	typical for a 63 MVA transformer source ABB.com	declarationStarTrafo63.PDF
substation transformers oil	20	tonnes	typical for a 63 MVA transformer source ABB.com	declarationStarTrafo63.PDF

Appendix B: GHG Calculations	# of Turbines:	25	
			based on a volume of 6.7 m3 per pad and density of 2.4 T/m3
substation transformer pad concrete	16.1	tonnes	source ABB.com
substation transformer pad rebar	1.1	tonnes	based on an average steel content per pad of 7% rebar
copper carbon intensity	2.71	TCO2E/T	source: Inventory of Carbon and Energy v4.1
mineral oil carbon intensity	0.00189	TCO2e/litre	source: BEES carbon footprint calculator
mineral oil density	830	kg/1000 litres	source: Wikipedia
			circuit breakers , relays, switches, cabling, supports, lighting, lightning protection, fencing, control building, transmission
remaining substation steel	272	tonnes	bus, pad rebar
remaining substation concrete	56.4	tonnes	remaining equipment and building pads
aluminum carbon intensity	13.06	TCO2E/T	source: carbonchain.com for aluminum produced in Canada.
			circuit breakers , relays, switches, cabling, supports, lighting,
switching station steel	272	tonnes	lightning protection, fencing, pad rebar
switching station concrete	56.4	tonnes	equipment pads
			typical for a 33m high freestanding steel lattice design (4
230 kv transmission tower steel	20	tonnes	assumed)
freestanding tower concrete	512	tonnes	4m2 x 2m deep (typ for 4 per tower) (2 towers assumed)
			total cable length estimate is 169 km for 5 circuits. 75 km at
34.5 kv acsr distribution cable steel	29.8	tonnes	163 kg/km and 25 km at 228 kg/km steel
34.5 kv acsr distribution cable			total cable length estimate is 169 km for 5 circuits. 75 km at
aluminum	139.5	tonnes	1119 kg/km and 25 km at 1553 kg/km aluminum
			total cable length estimate is for 2x 4.6 km transmission lines
			(3 cables in 1 line) in parallel with a 10% allowance 233 kg/km
230 kv acsr transmission cable steel	7.1	tonnes	steel
			total cable length estimate is for 2x 4.6 km transmission lines
230 kv acsr transmission cable			(3 cables in 1 line) in parallel with a 10% allowance 1556
aluminum	47.2	tonnes	kg/km aluminum
steel production emissions	1784.7	T CO2e	((B75*2)+(B79*2)+B83+B86+(B88*2)+B90+B92)*B57
Concrete production emissions	197.1	T CO2e	((B78*2)+B84+B87+B89)*B56/1000
Copper production emissions	99.5112	T CO2e	B76*B80*2
Mineral oil production emissions	91.08	T CO2e	((B77*1000)/B82)*B81*2*1000
aluminum production emissions	2438.609041	T CO2e	(B93+B95)*B85
			Assume all metal components are shipped by truck from
metal truck loads	41	ea	Dartmouth 200 km each way, max load 25 T
			assume all mineral oil is shipped by truck from Dartmouth 200
mineral oil loads	2	ea	km each way, max load 25 T
concrete truck loads	39	ea	((B78*3)+B84+B87+B90+B91)/B44
metal truck (freight) emissions	26.50	T CO2e	B51*B60*B62*25*B100
metal truck (no freight) emissions	9.75	T CO2e	B52*B61*B62*B100
oil truck (freight) emissions	1.57	T CO2e	B51*B60*B62*25*B101
oil truck (no freight) emissions	0.58	T CO2e	B52*B61*B62*B101
Concrete truck (freight) emissions	4.73	T CO2e	B44*B46*B58*B62*B102
Concrete truck (no freight) emissions	2.59	T CO2e	B47*B59*B62*B102
Total Emissions Electrical Infrastructure	4,656.7	T CO2e	B94+B95+B96+B97+B98+B103+B104+B105+B106+B107+B108
Total emissions	82,876.9	T CO2e	B71+B109