

US Wind – OCS Air Permit Application

SAMPLE CALCULATION FOR CABLE LAY VESSEL DURING INTERARRAY CABLE CONSTRUCTION

Vessel Information (Table A-6):

Propulsion Engine Size = 3 x 1,750 kW = 5,250 kW total

Emission Factor for NO_x (g/kW-hr) = 10.55¹

Engine Load Factors:

Transit= 0.83²

Maneuvering = 0.20³

Vessel Speed in Transit Within 25 NM of OCS Source – 14.0 knots

Round Trip Distance Traveled – 50 NM

Number of Round Trips – 12

Number of days Operating within WDA – 130.3

Number of Daily Operating Hours Maneuvering – 24 hours

WTGs Constructed Year 1 – 21

WTGs Constructed Year 2 – 55

WTGs Constructed Year 3 – 45

Operating Hours Calculation – Year 1 – 3 Total

Number of Operating Hours – Transit

= (Round Trip Distance x # of Days of Operation) / Vessel Speed in Transit within 25 NM of OCS Sources

= (50 NM x 12 days) / 14.0 knots = **43 hours**

Number of Operating Hours – Maneuvering

= (Number of Daily Operating Hours Maneuvering x Assumed # of Days of Operation)

= 24 hr/day x 130 days = **3,127 hours**

¹ Default NO_x emission factors for Category 1 and Category 2 engines (age is unknown) are based on the worst case of either the Tier 1 or Tier 2 values in the 2022 EPA guidance document, "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions," EPA-420-B-22-011, April 2022 as provided in Table H.1 for NO_x.

² 2014 USEPA Commercial Marine Vessels – 2014 EPA Estimates – Section 2.2 – Engine Operating Loads https://gaftp.epa.gov/air/nei/2014/doc/2014v2_supportingdata/rail_cmvc/MVv2_2EPAMethodsReference_20180209.pdf and 2009 USEPA Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories <https://www.epa.gov/sites/default/files/2016-06/documents/2009-port-inventory-guidance.pdf>.

³ Section 2.2 of 2014 National Emission Inventory for Commercial Marine Vessel Activity https://gaftp.epa.gov/air/nei/2014/doc/2014v2_supportingdata/rail_cmvc/MVv2_2EPAMethodsReference_20180209.pdf and 2022 USEPA Port Emission Inventory Guidance – Table 3.11.

Hourly NOx Emissions – Transit

$$\begin{aligned} &= \text{Engine Size (kW)} \times \text{Load Factor} \times \text{Emission Factor (g/kW-hr)} \times (\text{Grams to lb Conversion})^4 \\ &= 5,250 \text{ kW} \times 0.83 \times 10.55 \text{ (g/kW-hr)} \times (1 \text{ lb}/453.6 \text{ g}) \\ &= \mathbf{101.35 \text{ lb/hr}} \end{aligned}$$

Hourly NOx Emissions – Maneuvering

$$\begin{aligned} &= \text{Engine Size (kW)} \times \text{Load Factor} \times \text{Emission Factor (g/kW-hr)} \times (\text{Grams to lb Conversion})^4 \\ &= 5,250 \text{ kW} \times 0.20 \times 10.55 \text{ (g/kW-hr)} \times (1 \text{ lb}/453.6 \text{ g}) \\ &= \mathbf{24.42 \text{ lb/hr}} \end{aligned}$$

Annual NOx Emissions – Transit (Table A-13)

$$\begin{aligned} &= \text{Hourly Emissions in Transit} \times \text{Hours in Transit} \times (\text{lb to ton Conversion}) \\ &= 101.35 \text{ lb/hr} \times 43 \text{ hours} \times (1 \text{ ton}/2000 \text{ lb}) \\ &= \mathbf{2.18 \text{ tons}} \end{aligned}$$

Hourly NOx Emissions – Maneuvering (Table A-13)

$$\begin{aligned} &= \text{Hourly Emissions while Maneuvering} \times \text{Hours Maneuvering} \times (\text{lb to ton Conversion}) \\ &= 24.42 \text{ lb/hr} \times 3,127 \text{ hours} \times (1 \text{ ton}/2000 \text{ lb}) \\ &= \mathbf{38.18 \text{ tons}} \end{aligned}$$

Total NOx Emissions

$$\begin{aligned} &= \text{NOx Emissions in Transit} + \text{NOx Emissions while Maneuvering} \\ &= 2.18 \text{ tons} + 38.18 \text{ tons} \\ &= \mathbf{40.36 \text{ tons}} \end{aligned}$$

⁴ 2022 USEPA Port Emission Inventory Guidance – Equation 3.1
<https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1014J1S.pdf>

Year 1 NOx Emissions (Table A-20)

$$= \text{Total NOx Emissions} * (\text{Year 1 WTGs Constructed}) / (\text{Total WTGs Constructed})$$

$$= 40.36 \text{ tons } (21/121)$$

$$= \mathbf{7.00 \text{ tons}}$$

Year 2 NOx Emissions (Table A-27)

$$= \text{Total NOx Emissions} * (\text{Year 1 WTGs Constructed}) / (\text{Total WTGs Constructed})$$

$$= 40.36 \text{ tons } (55/121)$$

$$= \mathbf{18.35 \text{ tons}}$$

Year 3 NOx Emissions (Table A-34)

$$= \text{Total NOx Emissions} * (\text{Year 1 WTGs Constructed}) / (\text{Total WTGs Constructed})$$

$$= 40.36 \text{ tons } (45/121)$$

$$= \mathbf{15.01 \text{ tons}}$$

Table A-1
US Wind
Maryland Offshore Wind Project
Annual Air Emissions - Construction and Operation

Year	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (lb/year)	HAPs (ton/year)	H ₂ SO ₄	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)	CO2e (ton/year)	WTGs Constructed	WTGs Operational
Construction Year 1	254.34	5.09	55.95	7.47	7.21	1.14	0.001	0.57	0.05	16,485.8	0.11	0.78	16,720.4	21	0
Operation Year 1	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.0	0.00	0.00	0.00	0.0		
Year 1 Total	254.34	5.09	55.95	7.47	7.21	1.14	0.001	0.57	0.05	16,485.8	0.11	0.78	16,720.4		
Construction Year 2	624.06	12.18	134.57	18.33	17.68	2.68	0.002	1.36	0.12	39,802.3	0.25	1.91	40,376.7	55	21
Operation Year 2	4.42	0.36	4.18	0.12	0.12	0.01	0.0000	0.03	0.001	1,210.0	0.02	0.06	1,227.0		
Year 2 Total	628.48	12.54	138.74	18.46	17.81	2.70	0.002	1.39	0.12	41,012.3	0.27	1.96	41,603.7		
Construction Year 3	510.64	9.99	110.52	15.00	14.47	2.20	0.002	1.12	0.10	32,654.4	0.21	1.56	33,124.7	45	76
Operation Year 3	16.00	1.29	15.12	0.45	0.45	0.05	0.0001	0.11	0.002	4,379.1	0.06	0.20	4,440.6		
Year 3 Total	526.64	11.27	125.64	15.46	14.92	2.25	0.002	1.23	0.10	37,033.5	0.27	1.76	37,565.3		
Operation	25.47	2.05	24.07	0.72	0.71	0.08	0.000	0.18	0.003	6,972.0	0.10	0.32	7,070.0	0	121

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.

Table A-3
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Installation - Short-Term Emissions

Vessel Information												Operation and Emission Factors																									
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)					
OCS Air Permit Emissions During Construction																																					
WTG Installation																																					
WTG installation jack-up vessel	Jack-up installation vessel	WV1T1	Main Engine - In Transit	3	3,800	11,400	0.83	50	5	250	Sparrows Point	12	400	21	24	0	21	4	9	8	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03					
		WV1M1	Main Engine - Maneuvering		3,800	11,400	0	50	5	250		12		21	4	9	8	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03								
		WV1AT1	Auxiliary Engines - Transit		2,880	2,880	0.43	50	5	250		12		21	4	9	8	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03								
		WV1AM1	Auxiliary Engines - Maneuvering		2,880	2,880	0.43	50	5	250		12		21	4	9	8	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03								
Tug to transport WTG 1	Tug	WV2T1	Main Engine - In Transit	2	2,540	5,080	0.5	50	58	2,900	Sparrows Point	13.9	87	209	24	0	209	36	95	78	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV2M1	Main Engine - Maneuvering		2,540	5,080	0.2	50	58	2,900		13.9		209	24	2,088	2088	362	949	777	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV2AT1	Auxiliary Engines - Transit		199	199	0.43	50	58	2,900		13.9		209	24	2,088	2088	362	949	777	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
		WV2AM1	Auxiliary Engines - Maneuvering		199	199	0.43	50	58	2,900		13.9		209	24	2,088	2088	362	949	777	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
Tug to transport WTG 2	Tug	WV3T1	Main Engine - In Transit	2	2,540	5,080	0.5	50	56	2,800	Sparrows Point	13.9	84	201	24	0	201	35	92	75	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV3M1	Main Engine - Maneuvering		2,540	5,080	0.2	50	56	2,800		13.9		201	24	2,016	2016	350	916	750	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV3AT1	Auxiliary Engines - Transit		199	199	0.43	50	56	2,800		13.9		201	24	2,016	2016	350	916	750	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
		WV3AM1	Auxiliary Engines - Maneuvering		199	199	0.43	50	56	2,800		13.9		201	24	2,016	2016	350	916	750	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
Tug to support WTG Installation / maneuvering offshore	Tug	WV4T1	Main Engine - In Transit	2	2,540	5,080	0.5	50	16	800	Sparrows Point	13.9	400	58	24	0	58	10	26	21	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV4M1	Main Engine - Maneuvering		2,540	5,080	0.2	50	16	800		13.9		58	24	9,600	9600	1666	4364	3570	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		WV4AT1	Auxiliary Engines - Transit		199	199	0.43	50	16	800		13.9		58	24	9,600	9600	1666	4364	3570	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
		WV4AM1	Auxiliary Engines - Maneuvering		199	199	0.43	50	16	800		13.9		58	24	9,600	9600	1666	4364	3570	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-4
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Commissioning - Short-Term Emissions

Vessel Information											Operation and Emission Factors																										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)					
OCS Air Permit Emissions During Construction																																					
WTG Commissioning																																					
Crew transfer vessel 1	Crew transfer vessel	CV1T1	Main Engine - In Transit	2	749	1,498	0.45	33	363	11,815	Ocean City	25		473		0	473	82	215	176	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03					
		CV1M1	Main Engine - Maneuvering		749	1,498	0.2							373		12	4,476	4476	777	2035	1665	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03				
		CV1AT1	Auxiliary Engines - Transit		20	40	0.43	33	363	11,815				25		473		0	473	82	215	176	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03			
Crew transfer vessel 2	Crew transfer vessel	CV1AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43				Ocean City		373	473	12	4,476	4476	777	2035	1665	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
		CV2T1	Main Engine - In Transit	2	749	1,498	0.45	33	359	11,685			25		467		0	467	81	212	174	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03				
		CV2M1	Main Engine - Maneuvering		749	1,498	0.2							369		12	4,428	4428	768	2013	1647	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03				
CV2AT1	Auxiliary Engines - Transit	20	40		0.43	33	359	11,685			25		467		0	467	81	212	174	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03						
Crew transfer vessel 3 per GE	Crew transfer vessel	CV2AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43				Ocean City		369	467	12	4,428	4428	768	2013	1647	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					
		CV3T1	Main Engine - In Transit	2	749	1,498	0.45	33	210	6,835			25		273		0	273	47	124	102	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03				
		CV3M1	Main Engine - Maneuvering		749	1,498	0.2							220		12	2,640	2640	458	1200	982	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03				
CV3AT1	Auxiliary Engines - Transit	20	40		0.43	33	210	6,835			25		273		0	273	47	124	102	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03						
		CV3AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43				Ocean City		220	273	12	2,640	2640	458	1200	982	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03					

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-5
 US Wind, Inc. - Maryland Offshore Wind Project
 OSS Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information					Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project Centroid	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	Operation and Emission Factors									
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	NOx (g/kWh)															VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)
OCS Air Permit Emissions During Construction																																
OSS Installation																																
OSS installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.83	50	4	200	Sparrows Point	14	28	14	24	0	14	2	6	5	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV1M1	Main Engine - Maneuvering		4,500	22,500	0.10							672	672	117	305	250	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03		
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.43	50	4	200		14	28	14	24	0	14	2	6	5	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	0.43							672	672	117	305	250	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
Assisting tug for OSS jacket and topside install	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.50	50	4	200	Sparrows Point	13.9	28	14	24	0	14	2	7	5	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV2M1	Main Engine - Maneuvering		2,540	5,080	0.20							672	672	117	305	250	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
		OV2AT1	Auxiliary Engines - Transit		199	199	0.43	50	4	200		13.9	28	14	24	0	14	2	7	5	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	0.43							672	672	117	305	250	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03		
OSS Jacket and piles transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.5	50	4	200	Sparrows Point	13.9	20	14	24	0	14	2	7	5	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV3M1	Main Engine - Maneuvering		2,540	5,080	0.2							480	480	83	218	179	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
		OV3AT1	Auxiliary Engines - Transit		199	199	0.43	50	4	200		13.9	20	14	24	0	14	2	7	5	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	0.43							480	480	83	218	179	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03		
OSS Jacket Install Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.45	50	4	200	Sparrows Point	13.9	8	14	12	0	14	2	7	5	13M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.2							96	96	17	44	36	13M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.43	50	4	200		13.9	8	14	12	0	14	2	7	5	13A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	0.43							96	96	17	44	36	13A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	1	2,500	2,500	0.45	50	4	200	Sparrows Point	13.9	8	14	12	0	14	2	7	5	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV5M1	Main Engine - Maneuvering		2,500	2,500	0.2							96	96	17	44	36	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
		OV5AT1	Auxiliary Engines - Transit		199	199	0.43	50	4	200		13.9	8	14	12	0	14	2	7	5	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	0.43							96	96	17	44	36	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03		
OSS Topside Transport (assume separate from jacket/piles)	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.5	50	4	200	Sparrows Point	13.9	8	14	24	0	14	2	7	5	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.2							192	192	33	87	71	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
		OV6AT1	Auxiliary Engines - Transit		199	199	0.43	50	4	200		13.9	8	14	24	0	14	2	7	5	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	0.43							192	192	33	87	71	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03		
Refueling operations to OSS and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.83	50	36	1,800	Norfolk	25	72	72	24	0	72	12	33	27	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
		OV7M1	Main Engine - Maneuvering		749	1,498	0.2							1,728	1,728	300	785	643	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03		
		OV7AT1	Auxiliary Engines - Transit		20	40	0.43	50	36	1,800		25	72	72	24	0	72	12	33	27	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	0.43							1,728	1,728	300	785	643	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03		
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.83	50	4	200	Sparrows Point	6	540	33	1	0	33	6	15	12	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0							540	540	94	245	201	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03		
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.43	50	4	200		6	540	33	1	0	33	6	15	12	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	0.43							540	540	94	245	201	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03		
OSS emergency generators	150 kW standard diesel generator	OD1	Engine	4	150	600	1.00	N/A	N/A	N/A	N/A	365	0	24	1000	8760	1000	1000	1000	T4	0.40	0.19	3.50	0.03	0.03	0.01	0.00	0.02	739.60	0.03	0.01	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-6
US Wind, Inc. - Maryland Offshore Wind Project
Inter-Array Cable Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information							Homeport During Project	Operation and Emission Factors																					
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)		Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)	
OCS Air Permit Emissions During Construction																																	
Inter-Array Cable Installation																																	
Array cable transport, pre-lay survey, lay and pull	Cable lay vessel		IV1T1	Main Engine - In Transit	4	1,750	5,250	0.83	50	12	600	Sparrows Point	14		43		0	43	7	19	16	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV1M1	Main Engine - Maneuvering		1,750	5,250	0.2						130		24	3,127	3127	543	1421	1163	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.43	50	12	600			14		43	0	43	7	19	16	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	0.43						130		24	3,127	3127	543	1421	1163	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
Pre-lay grapnel run	Multipurpose offshore support vessel		IV2T1	Main Engine - In Transit	1	1611	1611	0.83	50	3	150	Sparrows Point	10		15		0	15	3	7	6	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV2M1	Main Engine - Maneuvering		1611	1611	0.2						23		12	274	274	47	124	102	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV2AT1	Auxiliary Engines - Transit		123	246	0.43	50	3	150			10		15	0	15	3	7	6	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
			IV2AM1	Auxiliary Engines - Maneuvering		123	246	0.43						23		12	274	274	47	124	102	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Crew transfer vessel 1	Crew transfer vessel		IV3T1	Main Engine - In Transit	2	749	1,498	0.45	33	300	9,764	Ocean City	25		391		0	391	68	178	145	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV3M1	Main Engine - Maneuvering		749	1,498	0.2						300		12	3,600	3600	625	1636	1339	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV3AT1	Auxiliary Engines - Transit		20	40	0.43	33	300	9,764			25		391	0	391	68	178	145	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
			IV3AM1	Auxiliary Engines - Maneuvering		20	40	0.43						300		12	3,600	3600	625	1636	1339	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Crew transfer vessel 2	Crew transfer vessel		IV4T1	Main Engine - In Transit	2	749	1,498	0.45	33	300	9,764	Ocean City	25		391		0	391	68	178	145	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV4M1	Main Engine - Maneuvering		749	1,498	0.2						300		12	3,600	3600	625	1636	1339	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV4AT1	Auxiliary Engines - Transit		20	40	0.43	33	300	9,764			25		391	0	391	68	178	145	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
			IV4AM1	Auxiliary Engines - Maneuvering		20	40	0.43						300		12	3,600	3600	625	1636	1339	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Trenching vessel	Purpose-built offshore construction/ROV/survey vessel		IV5T1	Main Engine - In Transit	6	3,000	15,000	0.83	50	3	150	Sparrows Point	10		15		0	15	3	7	6	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV5M1	Main Engine - Maneuvering		3,000	15,000	0.2						130		24	3,120	3120	541	1418	1160	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV5AT1	Auxiliary Engines - Transit		3,000	3,000	0.43	50	3	150			10		15	0	15	3	7	6	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
			IV5AM1	Auxiliary Engines - Maneuvering		3,000	3,000	0.43						130		24	3,120	3120	541	1418	1160	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
Guard vessel	Crew transfer vessel		IV6T1	Main Engine - In Transit	2	749	1,498	0.45	33	10	325	Ocean City	13.5		24		0	24	4	11	9	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV6M1	Main Engine - Maneuvering		749	1,498	0.2						30		24	720	720	125	327	268	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
			IV6AT1	Auxiliary Engines - Transit		20	40	0.43	33	10	325			13.5		24	0	24	4	11	9	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
			IV6AM1	Auxiliary Engines - Maneuvering		20	40	0.43						30		24	720	720	125	327	268	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
EF Reference corresponds to emission factors in Table A-40.

Table A-7
 US Wind, Inc. - Maryland Offshore Wind Project
 Offshore Export Cable Installation - Short-Term Emissions

Vessel Information												Operation and Emission Factors																									
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project Centroid	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)					
OCS Air Permit Emissions During Construction																																					
Offshore Export Cable Installation																																					
Offshore export cable pre-lay survey, trenching, cable lay and pull	Cable lay vessel	ECV1T1	Main Engine - In Transit	4	1,750	5,250	0.83	50	4	200	Sparrows Point	14		14	24	0	14	2	6	5	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		ECV1M1	Main Engine - Maneuvering		1,750	5,250	0.2									120		14	24	2,880	2880	500	1309	1071	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.43	50	4	200						14		14	2	6	5	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03				
		ECV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	0.43	50	4	200						120		14	24	2,880	2880	500	1309	1071	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
Pre-lay grapple run & pre-lay survey; post lay survey after completion	Multipurpose offshore support vessel	ECV2T1	Main Engine - In Transit	1	1,611	1,611	0.83	50	6	300	Sparrows Point	10		30	24	0	30	5	14	11	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		ECV2M1	Main Engine - Maneuvering		1,611	1,611	0.2									40		30	24	960	960	167	436	357	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV2AT1	Auxiliary Engines - Transit		123	246	0.43	50	6	300						10		30	24	0	30	5	14	11	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV2AM1	Auxiliary Engines - Maneuvering		123	246	0.43	50	6	300						40		30	24	960	960	167	436	357	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
Trenching vessel	Purpose built offshore construction/survey vessel	ECV3T1	Main Engine - In Transit	6	3,000	15,000	0.83	50	3	150	Sparrows Point	10		15	24	0	15	3	7	6	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		ECV3M1	Main Engine - Maneuvering		3,000	15,000	0.2									120		15	24	2,880	2880	500	1309	1071	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV3AT1	Auxiliary Engines - Transit		3,000	3,000	0.43	50	3	150						10		15	24	0	15	3	7	6	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV3AM1	Auxiliary Engines - Maneuvering		3,000	3,000	0.43	50	3	150						120		15	24	2,880	2880	500	1309	1071	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
HDD pull in lift vessel	Jack-up vessel	ECV4T1	Main Engine - In Transit	2	2,350	4,700	0.83	50	4	200	Leesburg, NJ	6		33	12	0	33	6	15	12	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03					
		ECV4M1	Main Engine - Maneuvering		2,350	4,700	0									56		33	12	672	672	117	305	250	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03	
		ECV4AT1	Auxiliary Engines - Transit		1,000	2,000	0.43	50	4	200						6		33	12	0	33	6	15	12	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV4AM1	Auxiliary Engines - Maneuvering		1,000	2,000	0.43	50	4	200						56		33	12	672	672	117	305	250	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
Diving support for HDD pull in	Research / Survey	ECV5T1	Main Engine - In Transit	2	392	784	0.83	50	4	200	Leesburg, NJ	15	0	13	0	0	13	2	6	5	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		ECV5M1	Main Engine - Maneuvering		392	784	0.2									56		13	0	0	13	2	6	5	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV5AT1	Auxiliary Engines - Transit		135	270	0.43	50	4	200						15	0	13	0	0	13	2	6	5	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03	
		ECV5AM1	Auxiliary Engines - Maneuvering		135	270	0.43	50	4	200						56		13	0	0	13	2	6	5	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03	
HDD pull in support vessel	Multipurpose offshore support vessel	ECV6T1	Main Engine - In Transit	1	1,611	1,611	0.83	50	56	2,800	Lewes, DE	15	0	187	0	0	187	32	85	69	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03					
		ECV6M1	Main Engine - Maneuvering		1,611	1,611	0.2									56		187	0	0	187	32	85	69	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV6AT1	Auxiliary Engines - Transit		123	246	0.43	50	56	2,800						15	0	187	0	0	187	32	85	69	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	
		ECV6AM1	Auxiliary Engines - Maneuvering		123	246	0.43	50	56	2,800						56		187	0	0	187	32	85	69	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-8
US Wind, Inc. - Maryland Offshore Wind Project
Met Tower Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information						Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project Centroid	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	EF Reference (see Table A-40)	Operation and Emission Factors											
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips												Total Distance Traveled (nautical miles)	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)
Met Tower Installation Air Permit Emissions During Construction																																
Met Tower Installation																																
Met Tower installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.83	50	1	50	Sparrows Point	14	7	4	24	168	168	168	0	0	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV1M1	Main Engine - Maneuvering		4,500	22,500	0.00														7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.43	50	1	50		14	7	4	24	168	168	168	0	0	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	0.43														7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
Assisting tug	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.83	50	1	50	Sparrows Point	13.9	7	4	24	168	168	168	0	0	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV2M1	Main Engine - Maneuvering		2,540	5,080	0.20														11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV2AT1	Auxiliary Engines - Transit		199	199	0.43	50	1	50		13.9	7	4	24	168	168	168	0	0	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	0.43														11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Met Tower PilesTransport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.50	50	1	50	Sparrows Point	13.9	5	4	24	120	120	120	0	0	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV3M1	Main Engine - Maneuvering		2,540	5,080	0.20														11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV3AT1	Auxiliary Engines - Transit		199	199	0.43	50	1	50		13.9	5	4	24	120	120	120	0	0	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	0.43														11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.45	50	1	50	Sparrows Point	13.9	2	4	12	24	24	24	0	0	13M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.20														13M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.43	50	1	50		13.9	2	4	12	24	24	24	0	0	13A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	0.43														13A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	2	2,540	2,500	0.45	50	1	50	Sparrows Point	13.9	2	4	12	24	24	24	0	0	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV5M1	Main Engine - Maneuvering		2,540	2,500	0.20														8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV5AT1	Auxiliary Engines - Transit		199	199	0.43	50	1	50		13.9	2	4	12	24	24	24	0	0	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	0.43														8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Met Tower Topside Transport	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.50	50	1	50	Sparrows Point	13.9	2	4	24	48	48	48	0	0	11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.20														11M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV6AT1	Auxiliary Engines - Transit		199	199	0.43	50	1	50		13.9	2	4	24	48	48	48	0	0	11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	0.43														11A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Refueling operations to Met Tower and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.83	50	9	450	Norfolk	25	18	18	24	432	432	432	0	0	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
		OV7M1	Main Engine - Maneuvering		749	1,498	0.20														4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03
		OV7AT1	Auxiliary Engines - Transit		20	40	0.43	50	9	450		25	18	18	24	432	432	432	0	0	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	0.43														4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.83	50	1	50	Sparrows Point	6	135	8	1	135	135	135	0	0	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.20														7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.43	50	1	50		6	135	8	1	135	135	135	0	0	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	0.43														7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description. EF Reference corresponds to emission factors in Table A-40.

Table A-10
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information								Homeport During Project	Operation and Short-Term Emissions																				
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)		Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	
DCS Air Permit Emissions During Construction																																	
WTG Installation																																	
WTG installation jack-up vessel	Jack-up installation vessel	WV1T1	Main Engine - In Transit	3	3,800	11,400	L07	0.83	50	5	250	Sparrows Point	12	21	0	21	4	9	8	275.35	11.06	22.95	3.96	3.55	8.36E+00	4.43E-04	9.68E-01	13709.68	2.09E-01	6.05E-01			
		WV1M1	Main Engine - Maneuvering		3,800	11,400	L01	0							12	400	24	9,600	9600	1666	4364	3570	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		WV1AT1	Auxiliary Engines - Transit		2,880	2,880	L10	0.43	50	5	250					12	21	0	21	4	9	8	28.80	0.38	6.77	0.85	0.82	1.69E-02	1.02E-04	4.83E-02	1855.06	7.37E-03	9.06E-02
		WV1AM1	Auxiliary Engines - Maneuvering		2,880	2,880	L10	0.43								400	24	9,600	9600	1666	4364	3570	28.80	0.38	6.77	0.85	0.82	1.69E-02	1.02E-04	4.83E-02	1855.06	7.37E-03	9.06E-02
Tug to transport WTG 1	Tug	WV2T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	58	2,900	Sparrows Point	13.9	209	0	209	36	95	78	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01			
		WV2M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2							87	24	2,088	2,088	362	949	777	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		WV2AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50	58	2,900					13.9	209	0	209	36	95	78	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		WV2AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43							87	24	2,088	2,088	362	949	777	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Tug to transport WTG 2	Tug	WV3T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	56	2,800	Sparrows Point	13.9	201	0	201	35	92	75	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01			
		WV3M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2							84	24	2,016	2,016	350	916	750	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		WV3AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50	56	2,800					13.9	201	0	201	35	92	75	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		WV3AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43							84	24	2,016	2,016	350	916	750	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Tug to support WTG Installation / maneuvering offshore	Tug	WV4T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	16	800	Sparrows Point	13.9	58	0	58	10	26	21	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01			
		WV4M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2							400	24	9,600	9600	1666	4364	3570	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		WV4AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50	16	800					13.9	58	0	58	10	26	21	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		WV4AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43							400	24	9,600	9600	1666	4364	3570	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-11
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Commissioning - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information								Homeport During Project	Operation and Short-Term Emissions																			
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)		Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)
OCS Air Permit Emissions During Construction																																
WTG Commissioning																																
Crew transfer vessel 1	Crew transfer vessel	CV1T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	363	11,815	Ocean City	25	373	473	12	4,476	4476	777	2035	1665	6.47	0.28	1.19	0.28	0.28	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02
		CV1M1	Main Engine - Maneuvering		749	1,498	L09	0.2						25	373	473	12	4,476	4476	777	2035	1665	6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03
		CV1AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	363	11,815	Ocean City	25	373	473	12	4,476	4476	777	2035	1665	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		CV1AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						25	373	473	12	4,476	4476	777	2035	1665	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04
Crew transfer vessel 2	Crew transfer vessel	CV2T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	359	11,685	Ocean City	25	369	467	12	4,428	4428	768	2013	1647	6.47	0.28	1.19	0.28	0.28	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02
		CV2M1	Main Engine - Maneuvering		749	1,498	L09	0.2						25	369	467	12	4,428	4428	768	2013	1647	6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03
		CV2AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	359	11,685	Ocean City	25	369	467	12	4,428	4428	768	2013	1647	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		CV2AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						25	369	467	12	4,428	4428	768	2013	1647	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04
Crew transfer vessel 3 per GE	Crew transfer vessel	CV3T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	210	6,835	Ocean City	25	220	273	12	2,640	2640	458	1200	982	6.47	0.28	1.19	0.28	0.28	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02
		CV3M1	Main Engine - Maneuvering		749	1,498	L09	0.2						25	220	273	12	2,640	2640	458	1200	982	6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03
		CV3AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	210	6,835	Ocean City	25	220	273	12	2,640	2640	458	1200	982	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		CV3AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						25	220	273	12	2,640	2640	458	1200	982	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-12
 US Wind, Inc. - Maryland Offshore Wind Project
 OSS Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information							Operation and Short-Term Emissions																					
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project Centroid	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)
OCS Air Permit Emissions During Construction																																
OSS Installation																																
OSS installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	L07	0.83	50	4	200	Sparrows Point	14	28	14	24	0	14	2	6	5	543.45	21.82	45.29	7.82	7.00	1.65E+01	8.75E-04	1.91E+00	27058.58	4.12E-01	1.19E+00
		OV1M1	Main Engine - Maneuvering		4,500	22,500	L15	0.10					14	28	14	24	672	672	117	305	250	65.48	2.63	5.46	0.94	0.84	1.99E+00	1.05E-04	2.30E-01	3260.07	4.96E-02	1.44E-01
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	L10	0.43	50				14	28	14	24	0	14	2	6	5	45.00	0.60	10.58	1.32	1.28	2.64E-02	1.60E-04	7.55E-02	2898.53	1.15E-02	1.42E-01
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	L10	0.43					14	28	14	24	672	672	117	305	250	45.00	0.60	10.58	1.32	1.28	2.64E-02	1.60E-04	7.55E-02	2898.53	1.15E-02	1.42E-01
Assisting tug for OSS Jacket and topside Install	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	4	200	Sparrows Point	13.9	28	14	24	0	14	2	7	5	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01
		OV2M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2				13.9	28	14	24	672	672	117	305	250	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV2AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50				13.9	28	14	24	0	14	2	7	5	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43					13.9	28	14	24	672	672	117	305	250	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
OSS Jacket and piles Transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	4	200	Sparrows Point	13.9	20	14	24	0	14	2	7	5	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01
		OV3M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2				13.9	20	14	24	480	480	83	218	179	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV3AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50				13.9	20	14	24	0	14	2	7	5	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43					13.9	20	14	24	480	480	83	218	179	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
OSS Jacket Install Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	L02	0.45	50	4	200	Sparrows Point	13.9	8	14	12	0	14	2	7	5	69.29	0.92	16.29	2.04	1.97	4.07E-02	2.46E-04	1.16E-01	4462.39	1.77E-02	2.18E-01
		OV4M1	Main Engine - Maneuvering		3,310	6,620	L09	0.2				13.9	8	14	12	96	96	17	44	36	30.79	0.41	7.24	0.90	0.88	1.81E-02	1.09E-04	5.16E-02	1983.29	7.88E-03	9.69E-02	
		OV4AT1	Auxiliary Engines - Transit		499	1497	L02	0.43	50				13.9	8	14	12	0	14	2	7	5	14.97	0.20	3.52	0.44	0.43	8.80E-03	5.32E-05	2.51E-02	964.25	3.83E-03	4.71E-02
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	L02	0.43					13.9	8	14	12	96	96	17	44	36	14.97	0.20	3.52	0.44	0.43	8.80E-03	5.32E-05	2.51E-02	964.25	3.83E-03	4.71E-02
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	1	2,500	2,500	L02	0.45	50	4	200	Sparrows Point	13.9	8	14	12	0	14	2	7	5	26.17	0.35	6.15	0.77	0.74	1.54E-02	9.30E-05	4.39E-02	1685.19	6.70E-03	8.23E-02
		OV5M1	Main Engine - Maneuvering		2,500	2,500	L09	0.2				13.9	8	14	12	96	96	17	44	36	11.63	0.15	2.73	0.34	0.33	6.83E-03	4.13E-05	1.95E-02	748.97	2.98E-03	3.66E-02	
		OV5AT1	Auxiliary Engines - Transit		199	199	L02	0.43	50				13.9	8	14	12	0	14	2	7	5	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	L02	0.43					13.9	8	14	12	96	96	17	44	36	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
OSS Topside Transport (assume separate from Jacket/piles)	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	4	200	Sparrows Point	13.9	8	14	24	0	14	2	7	5	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01
		OV6M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2				13.9	8	14	24	192	192	33	87	71	23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV6AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50				13.9	8	14	24	0	14	2	7	5	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43					13.9	8	14	24	192	192	33	87	71	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
Refueling operations to OSS and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	L08	0.83	50	36	1,800	Norfolk	25	72	72	24	0	72	12	33	27	26.86	1.18	4.93	1.18	1.15	1.70E-02	1.44E-04	1.20E-01	1862.46	2.25E-02	9.10E-02
		OV7M1	Main Engine - Maneuvering		749	1,498	L09	0.2				25	72	72	24	1,728	1,728	300	785	643	6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02	
		OV7AT1	Auxiliary Engines - Transit		20	40	L10	0.43	50				25	72	72	24	0	72	12	33	27	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	L10	0.43					25	72	72	24	1,728	1,728	300	785	643	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	L08	0.83	50	4	200	Sparrows Point	6	540	33	1	0	33	6	15	12	113.52	4.56	9.46	1.63	1.46	3.45E+00	1.83E-04	3.99E-01	5652.24	8.60E-02	2.49E-01
		OV8M1	Main Engine - Maneuvering		2,350	4,700	L01	0				6	540	33	1	540	540	94	245	201	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	L10	0.43	50				6	540	33	1	0	33	6	15	12	20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	L10	0.43					6	540	33	1	540	540	94	245	201	20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
OSS emergency generators	150 kW standard diesel generator	OD1	Engine	4	150	600	Full Load	1.00	N/A	N/A	N/A	N/A	365	0	24	1000	8760	1000	1000	1000	0.40	0.19	3.50	0.03	0.03	6.80E-03	0.00E+00	1.76E-02	739.60	3.00E-02	6.00E-03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-13
 US Wind, Inc. - Maryland Offshore Wind Project
 Inter-Array Cable Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information								Homeport During Project	Operation and Short-Term Emissions																				
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)		Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	
OCS Air Permit Emissions During Construction																																	
Inter-Array Cable Installation																																	
Array cable transport, pre-lay survey, lay and pull	Cable lay vessel	IV1T1	Main Engine - In Transit	4	1,750	5,250	L08	0.83	50	12	600	Sparrows Point	14		43	0	43	7	19	16	101.35	1.34	23.82	2.98	2.88	5.95E-02	3.60E-04	1.70E-01	6527.32	2.59E-02	3.19E-01		
		IV1M1	Main Engine - Maneuvering		1,750	5,250	L09	0.2						130			24	3,127	3127	543	1421	1163	24.42	0.32	5.74	0.72	0.69	1.44E-02	8.68E-05	4.09E-02	1572.85	6.25E-03	7.69E-02
		IV1AT1	Auxiliary Engines - Transit		1,750	1,750	L10	0.43	50	12	600		14		43	0	43	7	19	16	17.50	0.23	4.11	0.51	0.50	1.03E-02	6.22E-05	2.93E-02	1127.21	4.48E-03	5.51E-02		
		IV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	L10	0.43						130			24	3,127	3127	543	1421	1163	17.50	0.23	4.11	0.51	0.50	1.03E-02	6.22E-05	2.93E-02	1127.21	4.48E-03	5.51E-02
Pre-lay grapnel run	Multipurpose offshore support vessel	IV2T1	Main Engine - In Transit	1	1611	1611	L08	0.83	50	3	150	Sparrows Point	10		15	0	15	3	7	6	31.10	0.41	7.31	0.91	0.88	1.83E-02	1.11E-04	5.21E-02	2002.95	7.96E-03	9.79E-02		
		IV2M1	Main Engine - Maneuvering		1611	1611	L09	0.2						23			12	274	274	47	124	102	7.49	0.10	1.76	0.22	0.21	4.40E-03	2.66E-05	1.26E-02	482.64	1.92E-03	2.36E-02
		IV2AT1	Auxiliary Engines - Transit		123	246	L10	0.43	50	6	300		10		30	0	30	5	14	11	2.29	0.10	0.47	0.17	0.17	1.45E-03	2.07E-05	1.16E-02	158.45	1.91E-03	7.74E-03		
		IV2AM1	Auxiliary Engines - Maneuvering		123	246	L10	0.43						23			12	274	274	47	124	102	2.29	0.10	0.47	0.17	0.17	1.45E-03	2.07E-05	1.16E-02	158.45	1.91E-03	7.74E-03
Crew transfer vessel 1	Crew transfer vessel	IV3T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	300	9,764	Ocean City	25		391	0	391	68	178	145	14.56	0.64	2.68	0.64	0.62	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02		
		IV3M1	Main Engine - Maneuvering		749	1,498	L09	0.2						300			12	3,600	3600	625	1636	1339	6.47	0.28	1.19	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02	
		IV3AT1	Auxiliary Engines - Transit		20	40	L02	0.43	33	300	9,764		25		391	0	391	68	178	145	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03		
		IV3AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						300			12	3,600	3600	625	1636	1339	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
Crew transfer vessel 2	Crew transfer vessel	IV4T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	300	9,764	Ocean City	25		391	0	391	68	178	145	14.56	0.64	2.68	0.64	0.62	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02		
		IV4M1	Main Engine - Maneuvering		749	1,498	L09	0.2						300			12	3,600	3600	625	1636	1339	6.47	0.28	1.19	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02	
		IV4AT1	Auxiliary Engines - Transit		20	40	L02	0.43	33	300	9,764		25		391	0	391	68	178	145	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03		
		IV4AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						300			12	3,600	3600	625	1636	1339	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
Trenching vessel	Purpose-built offshore construction/ROV/survey vessel	IV5T1	Main Engine - In Transit	6	3,000	15,000	L08	0.83	50	3	150	Sparrows Point	10		15	0	15	3	7	6	289.57	3.84	68.07	8.51	8.23	1.70E-01	1.03E-03	4.85E-01	18649.47	7.41E-02	9.11E-01		
		IV5M1	Main Engine - Maneuvering		3,000	15,000	L09	0.2						130			24	3,120	3120	541	1418	1160	69.78	0.93	16.40	2.05	1.98	4.10E-02	2.48E-04	1.17E-01	4493.85	1.79E-02	2.20E-01
		IV5AT1	Auxiliary Engines - Transit		3,000	3,000	L10	0.43	50	3	150		10		15	0	15	3	7	6	30.00	0.40	7.05	0.88	0.85	1.76E-02	1.07E-04	5.03E-02	1932.36	7.68E-03	9.44E-02		
		IV5AM1	Auxiliary Engines - Maneuvering		3,000	3,000	L10	0.43						130			24	3,120	3120	541	1418	1160	30.00	0.40	7.05	0.88	0.85	1.76E-02	1.07E-04	5.03E-02	1932.36	7.68E-03	9.44E-02
Guard vessel	Crew transfer vessel	IV6T1	Main Engine - In Transit	2	749	1,498	L02	0.45	33	10	325	Ocean City	13.5		24	0	24	4	11	9	14.56	0.64	2.68	0.64	0.62	9.21E-03	7.80E-05	6.49E-02	1009.77	1.22E-02	4.93E-02		
		IV6M1	Main Engine - Maneuvering		749	1,498	L09	0.2						30			24	720	720	125	327	268	6.47	0.28	1.19	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02	
		IV6AT1	Auxiliary Engines - Transit		20	40	L02	0.43	33	10	325		13.5		24	0	24	4	11	9	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03		
		IV6AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43						30			24	720	720	125	327	268	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-14
 US Wind, Inc. - Maryland Offshore Wind Project
 Offshore Export Cable Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information							Homeport During Project	Operation and Short-Term Emissions																						
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips		Total Distance Traveled (nautical miles)	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)		
OCS Air Permit Emissions During Construction																																		
Offshore Export Cable Installation																																		
Offshore export cable pre-lay survey, trenching, cable lay and pull	Cable lay vessel	ECV1T1	Main Engine - In Transit	4	1,750	5,250	L08	0.83	50	4	200	Sparrows Point	14	120	14	24	0	14	2	6	5	101.35	1.34	23.82	2.98	2.88	5.96E-02	3.60E-04	1.70E-01	6527.32	2.59E-02	3.19E-01		
		ECV1M1	Main Engine - Maneuvering		1,750	5,250	L09	0.2						14	120	14	24	2,880	2880	500	1309	1071	24.42	0.32	5.74	0.72	0.69	1.44E-02	8.68E-05	4.09E-02	1572.85	6.25E-03	7.69E-02	
		ECV1AT1	Auxiliary Engines - Transit		1,750	1,750	L10	0.43	50		4	200			14	120	14	24	0	14	2	6	5	17.50	0.23	4.11	0.51	0.50	1.03E-02	6.22E-05	2.93E-02	1127.21	4.48E-03	5.51E-02
		ECV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	L10	0.43							14	120	14	24	2,880	2880	500	1309	1071	17.50	0.23	4.11	0.51	0.50	1.03E-02	6.22E-05	2.93E-02	1127.21	4.48E-03	5.51E-02
Pre-lay grapnel run & pre-lay survey; post lay survey after completion	Multipurpose offshore support vessel	ECV2T1	Main Engine - In Transit	1	1,611	1,611	L08	0.83	50	6	300	Sparrows Point	10	40	30	24	0	30	5	14	11	31.10	0.41	7.31	0.91	0.88	1.83E-02	1.11E-04	5.21E-02	2002.95	7.96E-03	9.79E-02		
		ECV2M1	Main Engine - Maneuvering		1,611	1,611	L09	0.2						10	40	30	24	960	960	167	436	357	7.49	0.10	1.76	0.22	0.21	4.40E-03	2.66E-05	1.26E-02	482.64	1.92E-03	2.36E-02	
		ECV2AT1	Auxiliary Engines - Transit		123	246	L10	0.43	50		6	300			10	40	30	24	0	30	5	14	11	2.46	0.03	0.58	0.07	0.07	1.45E-03	8.75E-06	4.12E-03	158.45	6.30E-04	7.74E-03
		ECV2AM1	Auxiliary Engines - Maneuvering		123	246	L10	0.43							10	40	30	24	960	960	167	436	357	2.46	0.03	0.58	0.07	0.07	1.45E-03	8.75E-06	4.12E-03	158.45	6.30E-04	7.74E-03
Trenching vessel	Purpose built offshore construction/survey vessel	ECV3T1	Main Engine - In Transit	6	3,000	15,000	L08	0.83	50	3	150	Sparrows Point	10	120	15	24	0	15	3	7	6	289.57	3.84	68.07	8.51	8.23	1.70E-01	1.03E-03	4.85E-01	18649.47	7.41E-02	9.11E-01		
		ECV3M1	Main Engine - Maneuvering		3,000	15,000	L09	0.2						10	120	15	24	2,880	2880	500	1309	1071	69.78	0.93	16.40	2.05	1.98	4.10E-02	2.48E-04	1.17E-01	4493.85	1.79E-02	2.20E-01	
		ECV3AT1	Auxiliary Engines - Transit		3,000	3,000	L10	0.43	50		3	150			10	120	15	24	0	15	3	7	6	30.00	0.40	7.05	0.88	0.85	1.76E-02	1.07E-04	5.03E-02	1932.36	7.68E-03	9.44E-02
		ECV3AM1	Auxiliary Engines - Maneuvering		3,000	3,000	L10	0.43							10	120	15	24	2,880	2880	500	1309	1071	30.00	0.40	7.05	0.88	0.85	1.76E-02	1.07E-04	5.03E-02	1932.36	7.68E-03	9.44E-02
HDD pull in lift vessel	Jack-up vessel	ECV4T1	Main Engine - In Transit	2	2,350	4,700	L08	0.83	50	4	200	Leesburg, NJ	6	56	33	12	0	33	6	15	12	113.52	4.56	9.46	1.63	1.46	3.45E+00	1.83E-04	3.99E-01	5652.24	8.60E-02	2.49E-01		
		ECV4M1	Main Engine - Maneuvering		2,350	4,700	L01	0.00						6	56	33	12	672	672	117	305	250	0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		ECV4AT1	Auxiliary Engines - Transit		1,000	2,000	L10	0.43	50		4	200			6	56	33	12	0	33	6	15	12	20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
		ECV4AM1	Auxiliary Engines - Maneuvering		1,000	2,000	L10	0.43							6	56	33	12	672	672	117	305	250	20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
Diving support for HDD pull in	Research / Survey	ECV5T1	Main Engine - In Transit	2	392	784	L08	0.83	50	4	200	Leesburg, NJ	15	56	13	0	0	13	2	6	5	15.13	0.20	3.56	0.44	0.43	8.89E-03	5.38E-05	2.54E-02	974.75	3.87E-03	4.76E-02		
		ECV5M1	Main Engine - Maneuvering		392	784	L09	0.2						15	56	13	0	0	13	2	6	5	2.51	0.11	0.51	0.19	0.18	2.14E-03	1.30E-05	6.11E-03	234.88	9.33E-04	1.15E-02	
		ECV5AT1	Auxiliary Engines - Transit		135	270	L10	0.43	50		4	200			15	56	13	0	0	13	2	6	5	2.51	0.11	0.51	0.19	0.18	2.14E-03	1.30E-05	6.11E-03	234.88	9.33E-04	1.15E-02
		ECV5AM1	Auxiliary Engines - Maneuvering		135	270	L10	0.43							15	56	13	0	0	13	2	6	5	2.51	0.11	0.51	0.19	0.18	2.14E-03	1.30E-05	6.11E-03	234.88	9.33E-04	1.15E-02
HDD pull in support vessel	Multipurpose offshore support vessel	ECV6T1	Main Engine - In Transit	1	1,611	1,611	L08	0.83	50	56	2,800	Lewes, DE	15	56	187	0	0	187	32	85	69	31.10	0.41	7.31	0.91	0.88	1.83E-02	1.11E-04	5.21E-02	2002.95	7.96E-03	9.79E-02		
		ECV6M1	Main Engine - Maneuvering		1,611	1,611	L09	0.2						15	56	187	0	0	187	32	85	69	7.49	0.10	1.76	0.22	0.21	4.40E-03	2.66E-05	1.26E-02	482.64	1.92E-03	2.36E-02	
		ECV6AT1	Auxiliary Engines - Transit		123	246	L10	0.43	50		56	2,800			15	56	187	0	0	187	32	85	69	2.46	0.03	0.58	0.07	0.07	1.45E-03	8.75E-06	4.12E-03	158.45	6.30E-04	7.74E-03
		ECV6AM1	Auxiliary Engines - Maneuvering		123	246	L10	0.43							15	56	187	0	0	187	32	85	69	2.46	0.03	0.58	0.07	0.07	1.45E-03	8.75E-06	4.12E-03	158.45	6.30E-04	7.74E-03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-15
 US Wind, Inc. - Maryland Offshore Wind Project
 Met Tower Installation - Short-Term Emissions

Activity	Representative Vessel Type	AERMOD ID	Engine Type	Vessel Information						Homeport During Project	Operation and Short-Term Emissions																						
				Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	LF Reference (see Table A-40)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)		Number of Round Trips	Total Distance Traveled (nautical miles)	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project Centroid	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Operating Hours	Operating Hours Year 1	Operating Hours Year 2	Operating Hours Year 3	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)	
Met Tower Installation Air Permit Emissions During Construction																																	
Met Tower Installation																																	
Met Tower installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	L08	0.83	50	1	50	Sparrows Point	14		4	24	168	168	168	0	0	0	543.45	21.82	45.29	7.82	7.00	1.65E+01	8.75E-04	1.91E+00	27058.58	4.12E-01	1.19E+00
		OV1M1	Main Engine - Maneuvering		4,500	22,500	L01	0.00					7									0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00		
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	L10	0.43	50	1	50		14		4	24	168	168	168	0	0	0	45.00	0.60	10.58	1.32	1.28	2.64E-02	1.60E-04	7.55E-02	2898.53	1.15E-02	1.42E-01
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	L10	0.43	50	1	50		7									45.00	0.60	10.58	1.32	1.28	2.64E-02	1.60E-04	7.55E-02	2898.53	1.15E-02	1.42E-01	
Assisting tug	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	L08	0.83	50	1	50	Sparrows Point	13.9		4	24	168	168	168	0	0	0	98.07	1.30	23.05	2.88	2.79	5.76E-02	3.49E-04	1.64E-01	6315.96	2.51E-02	3.09E-01
		OV2M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2					7									23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV2AT1	Auxiliary Engines - Transit		199	199	L10	0.43	50	1	50		13.9		4	24	168	168	168	0	0	0	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	L10	0.43	50	1	50		7									1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Met Tower Piles Transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	1	50	Sparrows Point	13.9		4	24	120	120	120	0	0	0	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01
		OV3M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2					5									23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV3AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50	1	50		13.9		4	24	120	120	120	0	0	0	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43	50	1	50		5									1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	L02	0.45	50	1	50	Sparrows Point	13.9		4	24	24	24	24	0	0	0	69.29	0.92	16.29	2.04	1.97	4.07E-02	2.46E-04	1.16E-01	4462.39	1.77E-02	2.18E-01
		OV4M1	Main Engine - Maneuvering		3,310	6,620	L09	0.2					2									30.79	0.41	7.24	0.90	0.88	1.81E-02	1.09E-04	5.16E-02	1983.29	7.88E-03	9.69E-02	
		OV4AT1	Auxiliary Engines - Transit		499	1497	L02	0.43	50	1	50		13.9		4	24	24	24	24	0	0	0	14.97	0.20	3.52	0.44	0.43	8.80E-03	5.32E-05	2.51E-02	964.25	3.83E-03	4.71E-02
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	L02	0.43	50	1	50		2									14.97	0.20	3.52	0.44	0.43	8.80E-03	5.32E-05	2.51E-02	964.25	3.83E-03	4.71E-02	
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	2	2,540	2,500	L02	0.45	50	1	50	Sparrows Point	13.9		4	24	24	24	24	0	0	0	26.17	0.35	6.15	0.77	0.74	1.54E-02	9.30E-05	4.39E-02	1685.19	6.70E-03	8.23E-02
		OV5M1	Main Engine - Maneuvering		2,540	2,500	L09	0.2					2									11.63	0.15	2.73	0.34	0.33	6.83E-03	4.13E-05	1.95E-02	748.97	2.98E-03	3.66E-02	
		OV5AT1	Auxiliary Engines - Transit		199	199	L02	0.43	50	1	50		13.9		4	24	24	24	24	0	0	0	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	L02	0.43	50	1	50		2									1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Met Tower Topside Transport	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	L13	0.5	50	1	50	Sparrows Point	13.9		4	24	48	48	48	0	0	0	59.08	0.78	13.89	1.74	1.68	3.47E-02	2.10E-04	9.90E-02	3804.79	1.51E-02	1.86E-01
		OV6M1	Main Engine - Maneuvering		2,540	5,080	L09	0.2					2									23.63	0.31	5.55	0.69	0.67	1.39E-02	8.40E-05	3.96E-02	1521.92	6.05E-03	7.44E-02	
		OV6AT1	Auxiliary Engines - Transit		199	199	L13	0.43	50	1	50		13.9		4	24	48	48	48	0	0	0	1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	L13	0.43	50	1	50		2									1.85	0.08	0.38	0.14	0.13	1.17E-03	1.67E-05	9.40E-03	128.18	1.55E-03	6.26E-03	
Refueling operations to Met Tower and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	L08	0.83	50	9	450	Norfolk	25		18	24	432	432	432	0	0	0	26.86	1.18	4.93	1.18	1.15	1.70E-02	1.44E-04	1.20E-01	1862.46	2.25E-02	9.10E-02
		OV7M1	Main Engine - Maneuvering		749	1,498	L09	0.2					18									6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	2.88E-02	2.19E-02	
		OV7AT1	Auxiliary Engines - Transit		20	40	L10	0.43	50	9	450		25		18	24	432	432	432	0	0	0	0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	L10	0.43	50	9	450		18									0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03	
0.00																																	
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	L08	0.83	50	1	50	Sparrows Point	6		8	1	135	135	135	0	0	0	113.52	4.56	9.46	1.63	1.46	3.45E+00	1.83E-04	3.99E-01	5652.24	8.60E-02	2.49E-01
		OV8M1	Main Engine - Maneuvering		2,350	4,700	L09	0.2					135									27.35	1.10	2.28	0.39	0.35	8.31E-01	4.40E-05	9.61E-02	1361.98	2.07E-02	6.01E-02	
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	L10	0.43	50	1	50		6		8	1	135	135	135	0	0	0	20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	L10	0.43	50	1	50		135									20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-16
 US Wind, Inc. - Maryland Offshore Wind Project
 Foundation Installation - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Scour Protection Installation																	
Scour protection installation vessel	Fallpipe vessel	FV1T1	Main Engine - In Transit	3	4,500	13,500	0.81	1.08E-02	0.19	2.39E-02	2.31E-02	4.78E-04	2.89E-06	1.36E-03	52.39	2.08E-04	2.56E-03
		FV1M1	Main Engine - Maneuvering		4,500	13,500	12.16	1.61E-01	2.86	3.57E-01	3.46E-01	7.15E-03	4.32E-05	2.04E-02	783.36	3.11E-03	3.83E-02
		FV1AT1	Auxiliary Engines - Transit		492	492	0.02	2.04E-04	0.00	4.51E-04	4.37E-04	9.03E-06	5.46E-08	2.58E-05	0.99	3.93E-06	4.83E-05
		FV1AM1	Auxiliary Engines - Maneuvering	2	1200	1200	2.32	3.08E-02	0.55	6.83E-02	6.61E-02	1.37E-03	8.26E-06	3.90E-03	149.71	5.95E-04	7.31E-03
Foundation Installation																	
Foundation installation vessel	Heavy lift vessel	FV2T1	Main Engine - In Transit	6	4,500	22,500	0.67	2.71E-02	0.06	9.70E-03	8.68E-03	2.05E-02	1.08E-06	2.37E-03	33.54	5.10E-04	1.48E-03
		FV2M1	Main Engine - Maneuvering		4,500	22,500	23.32	9.36E-01	1.94	3.36E-01	3.00E-01	7.08E-01	3.75E-05	8.20E-02	1161.02	1.77E-02	5.12E-02
		FV2AT1	Auxiliary Engines - Transit		4500	4500	0.06	7.40E-04	0.01	1.64E-03	1.59E-03	3.28E-05	1.98E-07	9.35E-05	3.59	1.43E-05	1.76E-04
		FV2AM1	Auxiliary Engines - Maneuvering		4500	4500	16.03	4.56E-01	3.77	4.71E-01	4.56E-01	9.42E-03	5.70E-05	2.69E-02	1032.26	4.10E-03	5.04E-02
Tug for assisting foundation installation 1 -- Offshore	Tug	FV3T1	Main Engine - In Transit	2	2,540	5,080	0.17	2.20E-03	0.04	4.88E-03	4.72E-03	9.75E-05	5.90E-07	2.78E-04	10.69	4.25E-05	5.22E-04
		FV3M1	Main Engine - Maneuvering		2,540	5,080	4.21	5.58E-02	0.99	1.24E-01	1.20E-01	2.47E-03	1.50E-05	7.05E-03	271.00	1.08E-03	1.32E-02
		FV3AT1	Auxiliary Engines - Transit		199	199	0.01	2.28E-04	0.00	3.87E-04	3.76E-04	3.29E-06	4.70E-08	2.64E-05	1.76E-05		
		FV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.33	1.44E-02	0.07	2.45E-02	2.38E-02	2.08E-04	2.98E-06	1.67E-03	22.82	2.75E-04
Foundation transport tug 1	Tug	FV4T1	Main Engine - In Transit	2	2,540	5,080	0.39	5.14E-03	0.09	1.14E-02	1.10E-02	2.28E-04	1.38E-06	6.49E-04	24.94	9.91E-05	1.22E-03
		FV4M1	Main Engine - Maneuvering		2,540	5,080	1.16	1.54E-02	0.27	3.42E-02	3.31E-02	6.83E-04	4.13E-06	1.95E-03	74.88	2.98E-04	3.66E-03
		FV4AT1	Auxiliary Engines - Transit		199	199	0.01	5.32E-04	0.00	9.03E-04	8.78E-04	7.67E-06	1.10E-07	6.16E-05	0.84	1.01E-05	4.11E-05
		FV4AM1	Auxiliary Engines - Maneuvering		1	199	199	0.09	3.99E-03	0.02	6.78E-03	6.59E-03	5.75E-05	8.24E-07	4.62E-04	6.31	7.61E-05
Foundation transport tug 2	Tug	FV5T1	Main Engine - In Transit	2	2,540	5,080	0.37	4.89E-03	0.09	1.08E-02	1.05E-02	2.17E-04	1.31E-06	6.18E-04	23.75	9.44E-05	1.16E-03
		FV5M1	Main Engine - Maneuvering		2,540	5,080	1.11	1.47E-02	0.26	3.25E-02	3.15E-02	6.51E-04	3.94E-06	1.86E-03	71.32	2.83E-04	3.48E-03
		FV5AT1	Auxiliary Engines - Transit		199	199	0.01	5.06E-04	0.00	8.60E-04	8.36E-04	7.30E-06	1.05E-07	5.87E-05	0.80	9.66E-06	3.91E-05
		FV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.09	3.80E-03	0.02	7.85E-03	7.85E-03	5.48E-05	7.85E-07	4.40E-04	6.01	7.25E-05
Foundation transport tug 3	Tug	FV6T1	Main Engine - In Transit	2	2,540	5,080	0.31	4.16E-03	0.07	9.21E-03	8.91E-03	1.84E-04	1.11E-06	5.26E-04	20.19	8.02E-05	9.87E-04
		FV6M1	Main Engine - Maneuvering		2,540	5,080	0.94	1.25E-02	0.22	2.77E-02	2.68E-02	5.53E-04	3.35E-06	1.58E-03	60.62	2.41E-04	2.96E-03
		FV6AT1	Auxiliary Engines - Transit		199	199	0.01	4.30E-04	0.00	7.31E-04	7.11E-04	6.21E-06	8.88E-08	4.99E-05	0.68	8.21E-06	3.32E-05
		FV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.07	3.23E-03	0.02	5.49E-03	5.33E-03	4.66E-05	6.67E-07	3.74E-04	5.11	6.16E-05
Crew transfer vessel 1	Crew transfer vessel	FV7T1	Main Engine - In Transit	2	749	1,498	0.09	4.12E-03	0.02	4.12E-03	4.02E-03	5.93E-05	5.02E-07	4.18E-04	6.50	7.85E-05	3.18E-04
		FV7M1	Main Engine - Maneuvering		749	1,498	0.32	1.40E-02	0.06	1.40E-02	1.37E-02	2.03E-04	1.72E-06	1.43E-03	22.20	2.68E-04	1.08E-03
		FV7AT1	Auxiliary Engines - Transit		20	40	0.00	1.05E-04	0.00	1.78E-04	1.73E-04	1.51E-06	2.17E-08	1.22E-05	0.17	2.00E-06	8.11E-06
		FV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.02	8.06E-04	0.00	1.37E-03	1.33E-03	1.16E-05	1.66E-07	9.34E-05	1.27	1.54E-05
Noise mitigation vessel	OSV	FV8T1	Main Engine - In Transit	3	3,310	6,620	0.27	3.59E-03	0.06	7.95E-03	7.69E-03	1.59E-04	9.62E-07	4.54E-04	17.43	6.92E-05	8.51E-04
		FV8M1	Main Engine - Maneuvering		3,310	6,620	2.74	3.64E-02	0.64	8.06E-02	7.80E-02	1.61E-03	9.75E-06	4.60E-03	176.58	7.02E-04	8.63E-03
		FV8AT1	Auxiliary Engines - Transit		499	1,497	0.06	7.76E-04	0.01	1.72E-03	1.66E-03	3.44E-05	2.08E-07	9.80E-05	3.77	1.50E-05	1.84E-04
		FV8AM1	Auxiliary Engines - Maneuvering		499	1,497	1.33	1.77E-02	0.31	3.92E-02	3.79E-02	7.83E-04	4.74E-06	2.23E-03	85.85	3.41E-04	4.19E-03
Acoustic monitoring - buoy support vessel	OSV	FV9T1	Main Engine - In Transit	2	2,540	5,080	0.13	1.76E-03	0.03	3.90E-03	3.78E-03	7.80E-05	4.72E-07	2.23E-04	8.55	3.40E-05	4.18E-04
		FV9M1	Main Engine - Maneuvering		2,540	5,080	2.10	2.79E-02	0.49	6.18E-02	5.98E-02	1.24E-03	7.48E-06	3.53E-03	135.50	5.38E-04	6.62E-03
		FV9AT1	Auxiliary Engines - Transit		199	199	0.00	2.03E-04	0.00	3.44E-04	3.34E-04	2.92E-06	4.18E-08	2.35E-05	0.32	3.86E-06	1.56E-05
		FV9AM1	Auxiliary Engines - Maneuvering		1	199	199	0.16	7.22E-03	0.03	1.23E-02	1.19E-02	1.04E-04	1.49E-06	8.37E-04	11.41	1.38E-04
Marine mammal observation 1	Crew transfer vessel	FV10T1	Main Engine - In Transit	2	749	1,498	0.47	2.06E-02	0.09	2.06E-02	2.01E-02	2.97E-04	2.51E-06	2.09E-03	32.51	3.92E-04	1.59E-03
		FV10M1	Main Engine - Maneuvering		749	1,498	0.38	1.69E-02	0.07	1.69E-02	1.65E-02	2.43E-04	2.43E-04	1.71E-03	26.64	3.21E-04	1.30E-03
		FV10AT1	Auxiliary Engines - Transit		20	40	0.01	5.25E-04	0.00	8.91E-04	8.67E-04	7.57E-06	1.08E-07	6.08E-05	0.83	1.00E-05	4.05E-05
		FV10AM1	Auxiliary Engines - Maneuvering		2	20	40	0.02	9.68E-04	0.00	1.64E-03	1.60E-03	1.40E-05	2.00E-07	1.12E-04	1.53	1.85E-05
Environmental monitoring	Crew transfer vessel	FV11T1	Main Engine - In Transit	2	749	1,498	0.47	2.06E-02	0.09	2.06E-02	2.01E-02	2.97E-04	2.51E-06	2.09E-03	32.51	3.92E-04	1.59E-03
		FV11M1	Main Engine - Maneuvering		749	1,498	0.38	1.69E-02	0.07	1.69E-02	1.65E-02	2.43E-04	2.06E-06	1.71E-03	26.64	3.21E-04	1.30E-03
		FV11AT1	Auxiliary Engines - Transit		20	40	0.01	5.25E-04	0.00	8.91E-04	8.67E-04	7.57E-06	1.08E-07	6.08E-05	0.83	1.00E-05	4.05E-05
		FV11AM1	Auxiliary Engines - Maneuvering		2	20	40	0.02	9.68E-04	0.00	1.64E-03	1.60E-03	1.40E-05	2.00E-07	1.12E-04	1.53	1.85E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-17
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Installation - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Installation																	
WTG installation jack-up vessel	Jack-up installation vessel	WV1T1	Main Engine - In Transit	3	3,800	11,400	0.50	2.00E-02	0.04	7.17E-03	6.41E-03	1.51E-02	8.01E-07	1.75E-03	24.79	3.77E-04	1.09E-03
		WV1M1	Main Engine - Maneuvering		3,800	11,400	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00
		WV1AT1	Auxiliary Engines - Transit	1	2,880	2,880	0.05	6.91E-04	0.01	1.53E-03	1.48E-03	3.06E-05	1.85E-07	8.73E-05	3.35	1.33E-05	1.64E-04
		WV1AM1	Auxiliary Engines - Maneuvering		2,880	2,880	23.99	3.18E-01	5.64	7.05E-01	6.82E-01	1.41E-02	8.53E-05	4.02E-02	1545.37	6.14E-03	7.55E-02
Tug to transport WTG 1	Tug	WV2T1	Main Engine - In Transit	2	2,540	5,080	1.07	1.42E-02	0.25	3.14E-02	3.04E-02	6.29E-04	3.80E-06	1.79E-03	68.88	2.74E-04	3.37E-03
		WV2M1	Main Engine - Maneuvering		2,540	5,080	4.28	5.68E-02	1.01	1.26E-01	1.22E-01	2.52E-03	1.52E-05	7.18E-03	275.76	1.10E-03	1.35E-02
		WV2AT1	Auxiliary Engines - Transit	1	199	199	0.03	1.47E-03	0.01	2.49E-03	2.42E-03	2.12E-05	3.03E-07	1.70E-04	2.32	2.80E-05	1.13E-04
		WV2AM1	Auxiliary Engines - Maneuvering		199	199	0.33	1.47E-02	0.07	2.50E-02	2.43E-02	2.12E-04	3.03E-06	1.70E-03	23.22	2.80E-04	1.13E-03
Tug to transport WTG 2	Tug	WV3T1	Main Engine - In Transit	2	2,540	5,080	1.03	1.37E-02	0.24	3.03E-02	2.94E-02	6.07E-04	3.67E-06	1.73E-03	66.51	2.64E-04	3.25E-03
		WV3M1	Main Engine - Maneuvering		2,540	5,080	4.13	5.49E-02	0.97	1.21E-01	1.18E-01	2.43E-03	1.47E-05	6.93E-03	266.25	1.06E-03	1.30E-02
		WV3AT1	Auxiliary Engines - Transit	1	199	199	0.03	1.42E-03	0.01	2.41E-03	2.34E-03	2.04E-05	2.93E-07	1.64E-04	2.24	2.70E-05	1.09E-04
		WV3AM1	Auxiliary Engines - Maneuvering		199	199	0.32	1.42E-02	0.07	2.41E-02	2.34E-02	2.05E-04	2.93E-06	1.64E-03	22.42	2.71E-04	1.10E-03
Tug to support WTG Installation / maneuvering offshore	Tug	WV4T1	Main Engine - In Transit	2	2,540	5,080	0.30	3.92E-03	0.07	8.67E-03	8.39E-03	1.73E-04	1.05E-06	4.95E-04	19.00	7.55E-05	9.28E-04
		WV4M1	Main Engine - Maneuvering		2,540	5,080	19.69	2.61E-01	4.63	5.78E-01	5.60E-01	1.16E-02	7.00E-05	3.30E-02	1267.84	5.04E-03	6.19E-02
		WV4AT1	Auxiliary Engines - Transit	1	199	199	0.01	4.05E-04	0.00	6.88E-04	6.69E-04	5.84E-06	8.36E-08	4.69E-05	0.64	7.73E-06	3.13E-05
		WV4AM1	Auxiliary Engines - Maneuvering		199	199	1.54	6.76E-02	0.31	1.15E-01	1.12E-01	9.74E-04	1.39E-05	7.83E-03	106.78	1.29E-03	5.22E-03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-18
US Wind, Inc. - Maryland Offshore Wind Project
WTG Commissioning - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Commissioning																	
Crew transfer vessel 1	Crew transfer vessel	CV1T1	Main Engine - In Transit	2	749	1,498	0.60	2.62E-02	0.11	2.62E-02	2.56E-02	3.78E-04	3.20E-06	2.66E-03	41.41	5.00E-04	2.02E-03
		CV1M1	Main Engine - Maneuvering		749	1,498	2.51	1.10E-01	0.46	1.10E-01	1.08E-01	1.59E-03	1.35E-05	1.12E-02	174.31	2.10E-03	8.52E-03
		CV1AT1	Auxiliary Engines - Transit	2	20	40	0.02	6.69E-04	0.00	1.14E-03	1.10E-03	9.64E-06	1.38E-07	7.75E-05	1.06	1.28E-05	5.16E-05
		CV1AM1	Auxiliary Engines - Maneuvering		20	40	0.14	6.33E-03	0.03	1.08E-02	1.05E-02	9.13E-05	1.31E-06	7.34E-04	10.01	1.21E-04	4.89E-04
Crew transfer vessel 2	Crew transfer vessel	CV2T1	Main Engine - In Transit	2	749	1,498	0.59	2.59E-02	0.11	2.59E-02	2.53E-02	3.74E-04	3.16E-06	2.63E-03	40.95	4.94E-04	2.00E-03
		CV2M1	Main Engine - Maneuvering		749	1,498	2.49	1.09E-01	0.46	1.09E-01	1.07E-01	1.57E-03	1.33E-05	1.11E-02	172.44	2.08E-03	8.43E-03
		CV2AT1	Auxiliary Engines - Transit	2	20	40	0.02	6.61E-04	0.00	1.12E-03	1.09E-03	9.54E-06	1.36E-07	7.66E-05	1.04	1.26E-05	5.11E-05
		CV2AM1	Auxiliary Engines - Maneuvering		20	40	0.14	6.27E-03	0.03	1.06E-02	1.03E-02	9.03E-05	1.29E-06	7.26E-04	9.90	1.19E-04	4.84E-04
Crew transfer vessel 3 per GE	Crew transfer vessel	CV3T1	Main Engine - In Transit	2	749	1,498	0.35	1.52E-02	0.06	1.52E-02	1.48E-02	2.19E-04	1.85E-06	1.54E-03	23.96	2.89E-04	1.17E-03
		CV3M1	Main Engine - Maneuvering		749	1,498	1.48	6.51E-02	0.27	6.51E-02	6.36E-02	9.38E-04	7.94E-06	6.60E-03	102.81	1.24E-03	5.02E-03
		CV3AT1	Auxiliary Engines - Transit	2	20	40	0.01	3.87E-04	0.00	6.57E-04	6.39E-04	5.58E-06	7.98E-08	4.48E-05	0.61	7.38E-06	2.99E-05
		CV3AM1	Auxiliary Engines - Maneuvering		20	40	0.09	3.74E-03	0.02	6.34E-03	6.17E-03	5.39E-05	7.71E-07	4.33E-04	5.90	7.12E-05	2.88E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-19
US Wind, Inc. - Maryland Offshore Wind Project
OSS Installation - Annual Emissions - Year 1

Vessel Information							Year 1											
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)	
OCS Air Permit Emissions During Construction																		
OSS Installation																		
OSS installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.67	2.71E-02	0.06	9.70E-03	8.68E-03	2.05E-02	1.08E-06	2.37E-03	33.54	5.10E-04	1.48E-03	
		OV1M1	Main Engine - Maneuvering		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.06	7.40E-04	0.01	1.64E-03	1.59E-03	3.28E-05	1.98E-07	9.35E-05	3.59	1.43E-05	1.76E-04	
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	2.62	3.48E-02	0.62	7.71E-02	7.46E-02	1.54E-03	9.33E-06	4.40E-03	169.03	6.72E-04	8.26E-03	
Assisting tug for OSS Jacket and topside install	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.07	9.79E-04	0.02	2.17E-03	2.10E-03	4.33E-05	2.62E-07	1.24E-04	4.75	1.89E-05	2.32E-04	
		OV2M1	Main Engine - Maneuvering		2,540	5,080	1.38	1.83E-02	0.32	4.05E-02	3.92E-02	8.10E-04	4.90E-06	2.31E-03	88.75	3.53E-04	4.34E-03	
		OV2AT1	Auxiliary Engines - Transit		199	199	0.00	1.01E-04	0.00	1.72E-04	1.67E-04	1.46E-06	2.09E-08	1.17E-05	0.16	1.93E-06	7.82E-06	
		OV2AM1	Auxiliary Engines - Maneuvering		1	199	199	0.11	4.73E-03	0.02	8.03E-03	7.81E-03	6.82E-05	9.76E-07	5.48E-04	7.47	9.02E-05	3.65E-04
OSS Jacket and piles Transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.07	9.79E-04	0.02	2.17E-03	2.10E-03	4.33E-05	2.62E-07	1.24E-04	4.75	1.89E-05	2.32E-04	
		OV3M1	Main Engine - Maneuvering		2,540	5,080	0.98	1.31E-02	0.23	2.89E-02	2.80E-02	5.78E-04	3.50E-06	1.65E-03	63.39	2.52E-04	3.10E-03	
		OV3AT1	Auxiliary Engines - Transit		199	199	0.00	1.01E-04	0.00	1.72E-04	1.67E-04	1.46E-06	2.09E-08	1.17E-05	0.16	1.93E-06	7.82E-06	
		OV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.08	3.38E-03	0.02	5.74E-03	5.58E-03	4.87E-05	6.97E-07	3.92E-04	5.34	6.44E-05	2.61E-04
OSS Jacket Install Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.09	1.15E-03	0.02	2.54E-03	2.46E-03	5.08E-05	3.08E-07	1.45E-04	5.57	2.21E-05	2.72E-04	
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.26	3.40E-03	0.06	7.54E-03	7.29E-03	1.51E-04	9.12E-07	4.30E-04	16.52	6.57E-05	8.07E-04	
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.02	2.48E-04	0.00	5.49E-04	5.32E-04	1.10E-05	6.64E-08	3.13E-05	1.20	4.78E-06	5.88E-05	
		OV4AM1	Auxiliary Engines - Maneuvering		3	499	1497	0.12	1.66E-03	0.03	3.66E-03	3.55E-03	7.33E-05	4.43E-07	2.09E-04	8.03	3.19E-05	3.92E-04
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	1	2,500	2,500	0.03	4.34E-04	0.01	9.60E-04	9.29E-04	1.92E-05	1.16E-07	5.48E-05	2.10	8.36E-06	1.03E-04	
		OV5M1	Main Engine - Maneuvering		2,500	2,500	0.10	1.29E-03	0.02	2.85E-03	2.75E-03	5.69E-05	3.44E-07	1.62E-04	6.24	2.48E-05	3.05E-04	
		OV5AT1	Auxiliary Engines - Transit		199	199	0.00	1.01E-04	0.00	1.72E-04	1.67E-04	1.46E-06	2.09E-08	1.17E-05	0.16	1.93E-06	7.82E-06	
		OV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.02	6.76E-04	0.00	1.15E-03	1.12E-03	9.74E-06	1.39E-07	7.83E-05	1.07	1.29E-05	5.22E-05
OSS Topside Transport (assume separate from Jacket/piles)	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.07	9.79E-04	0.02	2.17E-03	2.10E-03	4.33E-05	2.62E-07	1.24E-04	4.75	1.89E-05	2.32E-04	
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.39	5.22E-03	0.09	1.16E-02	1.12E-02	2.31E-04	1.40E-06	6.60E-04	25.36	1.01E-04	1.24E-03	
		OV6AT1	Auxiliary Engines - Transit		199	199	0.00	1.01E-04	0.00	1.72E-04	1.67E-04	1.46E-06	2.09E-08	1.17E-05	0.16	1.93E-06	7.82E-06	
		OV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.03	1.35E-03	0.01	2.29E-03	2.23E-03	1.95E-05	2.79E-07	1.57E-04	2.14	2.58E-05	1.04E-04
Refueling operations to OSS and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.17	7.36E-03	0.03	7.36E-03	7.19E-03	1.06E-04	8.99E-07	7.47E-04	11.64	1.40E-04	5.69E-04	
		OV7M1	Main Engine - Maneuvering		749	1,498	0.97	4.26E-02	0.18	4.26E-02	4.16E-02	6.14E-04	5.20E-06	4.32E-03	67.30	8.12E-04	3.29E-03	
		OV7AT1	Auxiliary Engines - Transit		20	40	0.00	1.02E-04	0.00	1.73E-04	1.68E-04	1.47E-06	2.10E-08	1.18E-05	0.16	1.94E-06	7.87E-06	
		OV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.06	2.44E-03	0.01	4.15E-03	4.04E-03	3.53E-05	5.05E-07	2.83E-04	3.86	4.66E-05	1.89E-04
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.33	1.32E-02	0.03	4.73E-03	4.23E-03	9.97E-03	5.29E-07	1.15E-03	16.35	2.49E-04	7.21E-04	
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.06	7.68E-04	0.01	1.70E-03	1.65E-03	3.40E-05	2.06E-07	9.70E-05	3.73	1.48E-05	1.82E-04	
		OV8AM1	Auxiliary Engines - Maneuvering		2	1,000	2,000	0.94	1.24E-02	0.22	2.75E-02	2.67E-02	5.51E-04	3.33E-06	1.57E-03	60.37	2.40E-04	2.95E-03
OSS emergency generators	150 kW standard diesel generator	OD1	Engine	4	150	600	0.26	1.26E-01	2.31	1.98E-02	1.98E-02	4.50E-03	0.00E+00	1.16E-02	489.15	1.98E-02	3.97E-03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-20
US Wind, Inc. - Maryland Offshore Wind Project
Inter-Array Cable Installation - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Inter-Array Cable Installation																	
Array cable transport, pre-lay survey, lay and pull	Cable lay vessel	IV1T1	Main Engine - In Transit	4	1,750	5,250	0.38	5.00E-03	0.09	1.11E-02	1.07E-02	2.22E-04	1.34E-06	6.32E-04	24.28	9.65E-05	1.19E-03
		IV1M1	Main Engine - Maneuvering		1,750	5,250	6.63	8.79E-02	1.56	1.95E-01	1.88E-01	3.89E-03	2.36E-05	1.11E-02	426.77	1.70E-03	2.09E-02
		IV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.07	8.64E-04	0.02	1.91E-03	1.85E-03	3.83E-05	2.31E-07	1.09E-04	4.19	1.67E-05	2.05E-04
		IV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	4.75	6.30E-02	1.12	1.40E-01	1.35E-01	2.79E-03	1.69E-05	7.96E-03	305.86	1.22E-03	1.49E-02
Pre-lay grapnel run	Multipurpose offshore support vessel	IV2T1	Main Engine - In Transit	1	1611	1611	0.04	5.37E-04	0.01	1.19E-03	1.15E-03	2.38E-05	1.44E-07	6.79E-05	2.61	1.04E-05	1.27E-04
		IV2M1	Main Engine - Maneuvering		1611	1611	0.18	2.36E-03	0.04	5.23E-03	5.06E-03	1.05E-04	6.32E-07	2.98E-04	11.46	4.55E-05	5.60E-04
		IV2AT1	Auxiliary Engines - Transit		123	246	0.00	1.31E-04	0.00	2.22E-04	2.16E-04	1.88E-06	2.69E-08	1.51E-05	0.21	2.49E-06	1.01E-05
		IV2AM1	Auxiliary Engines - Maneuvering		2	123	246	0.05	2.38E-03	0.01	4.04E-03	3.93E-03	3.43E-05	4.91E-07	2.76E-04	3.76	4.54E-05
Crew transfer vessel 1	Crew transfer vessel	IV3T1	Main Engine - In Transit	2	749	1,498	0.49	2.17E-02	0.09	2.17E-02	2.12E-02	3.12E-04	2.64E-06	2.20E-03	34.22	4.13E-04	1.67E-03
		IV3M1	Main Engine - Maneuvering		749	1,498	2.02	8.87E-02	0.37	8.87E-02	8.67E-02	1.28E-03	1.08E-05	9.01E-03	140.20	1.69E-03	6.85E-03
		IV3AT1	Auxiliary Engines - Transit		20	40	0.01	5.53E-04	0.00	9.38E-04	9.12E-04	7.97E-06	1.14E-07	6.40E-05	0.87	1.05E-05	4.27E-05
		IV3AM1	Auxiliary Engines - Maneuvering		20	40	0.12	5.09E-03	0.02	8.65E-03	8.41E-03	7.34E-05	1.05E-06	5.90E-04	8.05	9.71E-05	3.93E-04
Crew transfer vessel 2	Crew transfer vessel	IV4T1	Main Engine - In Transit	2	749	1,498	0.49	2.17E-02	0.09	2.17E-02	2.12E-02	3.12E-04	2.64E-06	2.20E-03	34.22	4.13E-04	1.67E-03
		IV4M1	Main Engine - Maneuvering		749	1,498	2.02	8.87E-02	0.37	8.87E-02	8.67E-02	1.28E-03	1.08E-05	9.01E-03	140.20	1.69E-03	6.85E-03
		IV4AT1	Auxiliary Engines - Transit		20	40	0.01	5.53E-04	0.00	9.38E-04	9.12E-04	7.97E-06	1.14E-07	6.40E-05	0.87	1.05E-05	4.27E-05
		IV4AM1	Auxiliary Engines - Maneuvering		20	40	0.12	5.09E-03	0.02	8.65E-03	8.41E-03	7.34E-05	1.05E-06	5.90E-04	8.05	9.71E-05	3.93E-04
Trenching vessel	Purpose-built offshore construction/ROV/survey vessel	IV5T1	Main Engine - In Transit	6	3,000	15,000	0.38	5.00E-03	0.09	1.11E-02	1.07E-02	2.22E-04	1.34E-06	6.32E-04	24.28	9.65E-05	1.19E-03
		IV5M1	Main Engine - Maneuvering		3,000	15,000	18.89	2.51E-01	4.44	5.55E-01	5.37E-01	1.11E-02	6.71E-05	3.17E-02	1216.68	4.83E-03	5.94E-02
		IV5AT1	Auxiliary Engines - Transit		3,000	3,000	0.04	5.18E-04	0.01	1.15E-03	1.11E-03	2.30E-05	1.39E-07	6.55E-05	2.52	9.99E-06	1.23E-04
		IV5AM1	Auxiliary Engines - Maneuvering		3,000	3,000	8.12	1.08E-01	1.91	2.39E-01	2.31E-01	4.77E-03	2.89E-05	1.36E-02	523.17	2.08E-03	2.56E-02
Guard vessel	Crew transfer vessel	IV6T1	Main Engine - In Transit	2	749	1,498	0.03	1.34E-03	0.01	1.34E-03	1.31E-03	1.93E-05	1.63E-07	1.36E-04	2.11	2.55E-05	1.03E-04
		IV6M1	Main Engine - Maneuvering		749	1,498	0.40	1.77E-02	0.07	1.77E-02	1.73E-02	2.56E-04	2.17E-06	1.80E-03	28.04	3.38E-04	1.37E-03
		IV6AT1	Auxiliary Engines - Transit		20	40	0.00	3.41E-05	0.00	5.79E-05	5.63E-05	4.92E-07	7.04E-09	3.95E-06	0.05	6.51E-07	2.63E-06
		IV6AM1	Auxiliary Engines - Maneuvering		2	20	40	0.02	1.02E-03	0.00	1.73E-03	1.68E-03	1.47E-05	2.10E-07	1.18E-04	1.61	1.94E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-21
US Wind, Inc. - Maryland Offshore Wind Project
Offshore Export Cable Installation - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Offshore Export Cable Installation																	
Offshore export cable pre-lay survey, trenching, cable lay and pull	Cable lay vessel	ECV1T1	Main Engine - In Transit	4	1,750	5,250	0.13	1.67E-03	0.03	3.69E-03	3.57E-03	7.38E-05	4.47E-07	2.11E-04	8.09	3.22E-05	3.95E-04
		ECV1M1	Main Engine - Maneuvering		1,750	5,250	6.10	8.10E-02	1.43	1.79E-01	1.74E-01	3.59E-03	2.17E-05	1.02E-02	393.08	1.56E-03	1.92E-02
		ECV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.02	2.88E-04	0.01	6.38E-04	6.17E-04	1.28E-05	7.71E-08	3.64E-05	1.40	5.55E-06	6.83E-05
		ECV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	4.37	5.80E-02	1.03	1.29E-01	1.24E-01	2.57E-03	1.55E-05	7.33E-03	281.71	1.12E-03	1.38E-02
Pre-lay grapnel run & pre-lay survey; post lay survey after completion	Multipurpose offshore support vessel	ECV2T1	Main Engine - In Transit	1	1,611	1,611	0.08	1.07E-03	0.02	2.38E-03	2.30E-03	4.76E-05	2.88E-07	1.36E-04	5.21	2.07E-05	2.55E-04
		ECV2M1	Main Engine - Maneuvering		1,611	1,611	0.62	8.28E-03	0.15	1.83E-02	1.78E-02	3.67E-04	2.22E-06	1.05E-03	40.21	1.60E-04	1.96E-03
		ECV2AT1	Auxiliary Engines - Transit		123	246	0.01	8.50E-05	0.00	1.88E-04	1.82E-04	3.76E-06	2.28E-08	1.07E-05	0.41	1.64E-06	2.02E-05
Trenching vessel	Purpose built offshore construction/survey vessel	ECV2AM1	Auxiliary Engines - Maneuvering	2	123	246	0.20	2.72E-03	0.05	6.02E-03	5.83E-03	1.20E-04	7.29E-07	3.44E-04	13.20	5.25E-05	6.45E-04
		ECV3T1	Main Engine - In Transit		3,000	15,000	0.38	5.00E-03	0.09	1.11E-02	1.07E-02	2.22E-04	1.34E-06	6.32E-04	24.28	9.65E-05	1.19E-03
		ECV3M1	Main Engine - Maneuvering		3,000	15,000	17.44	2.31E-01	4.10	5.12E-01	4.96E-01	1.02E-02	6.20E-05	2.92E-02	1123.09	4.46E-03	5.49E-02
		ECV3AT1	Auxiliary Engines - Transit		3,000	3,000	0.04	5.18E-04	0.01	1.15E-03	1.11E-03	2.30E-05	1.39E-07	6.55E-05	2.52	9.99E-06	1.23E-04
HDD pull in lift vessel	Jack-up vessel	ECV3AM1	Auxiliary Engines - Maneuvering	6	3,000	3,000	7.50	9.95E-02	1.76	2.20E-01	2.13E-01	4.41E-03	2.67E-05	1.26E-02	482.93	1.92E-03	2.36E-02
		ECV4T1	Main Engine - In Transit		2,350	4,700	0.33	1.32E-02	0.03	4.73E-03	4.23E-03	9.97E-03	5.29E-07	1.15E-03	16.35	2.49E-04	7.21E-04
		ECV4M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		ECV4AT1	Auxiliary Engines - Transit		1,000	2,000	0.06	7.68E-04	0.01	1.70E-03	1.65E-03	3.40E-05	2.06E-07	9.70E-05	3.73	1.48E-05	1.82E-04
Diving support for HDD pull in	Research / Survey	ECV4AM1	Auxiliary Engines - Maneuvering	2	1,000	2,000	1.17	1.55E-02	0.27	3.43E-02	3.32E-02	6.85E-04	4.15E-06	1.96E-03	75.12	2.99E-04	3.67E-03
		ECV5T1	Main Engine - In Transit		392	784	0.02	2.32E-04	0.00	5.15E-04	4.98E-04	1.03E-05	6.22E-08	2.94E-05	1.13	4.48E-06	5.51E-05
		ECV5M1	Main Engine - Maneuvering		392	784	0.21	2.82E-03	0.05	6.25E-03	6.05E-03	1.25E-04	7.56E-07	3.57E-04	13.70	5.44E-05	6.69E-04
		ECV5AT1	Auxiliary Engines - Transit		135	270	0.00	1.27E-04	0.00	2.16E-04	2.10E-04	1.84E-06	2.63E-08	1.48E-05	0.20	2.43E-06	9.83E-06
HDD pull in support vessel	Multipurpose offshore support vessel	ECV5AM1	Auxiliary Engines - Maneuvering	2	135	270	0.15	6.42E-03	0.03	1.09E-02	1.06E-02	9.25E-05	1.32E-06	7.44E-04	10.14	1.22E-04	4.96E-04
		ECV6T1	Main Engine - In Transit		1,611	1,611	0.50	6.68E-03	0.12	1.48E-02	1.43E-02	2.96E-04	1.79E-06	8.45E-04	32.44	1.29E-04	1.59E-03
		ECV6M1	Main Engine - Maneuvering		1,611	1,611	0.44	5.80E-03	0.10	1.28E-02	1.24E-02	2.57E-04	1.55E-06	7.33E-04	28.14	1.12E-04	1.38E-03
		ECV6AT1	Auxiliary Engines - Transit		123	246	0.04	5.29E-04	0.01	1.17E-03	1.13E-03	2.34E-05	1.42E-07	6.68E-05	2.57	1.02E-05	1.25E-04
		ECV6AM1	Auxiliary Engines - Maneuvering	2	123	246	0.14	1.90E-03	0.03	4.22E-03	4.08E-03	8.43E-05	5.10E-07	2.41E-04	9.24	3.67E-05	4.51E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-22
US Wind, Inc. - Maryland Offshore Wind Project
Met Tower Installation - Annual Emissions - Year 1

Vessel Information							Year 1										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
Met Tower Installation Air Permit Emissions During Construction																	
Met Tower Installation																	
Met Tower installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.97	3.90E-02	0.08	1.40E-02	1.25E-02	2.95E-02	1.56E-06	3.41E-03	48.32	7.35E-04	2.13E-03
		OV1M1	Main Engine - Maneuvering		4,500	22,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.08	1.07E-03	0.02	2.36E-03	2.29E-03	4.72E-05	2.86E-07	1.35E-04	5.18	2.06E-05	2.53E-04
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	3.78	5.02E-02	0.89	1.11E-01	1.08E-01	2.22E-03	1.34E-05	6.34E-03	243.48	9.68E-04	1.19E-02
Assisting tug	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.18	2.34E-03	0.04	5.18E-03	5.02E-03	1.04E-04	6.27E-07	2.96E-04	11.36	4.51E-05	5.55E-04
		OV2M1	Main Engine - Maneuvering		2,540	5,080	1.98	2.63E-02	0.47	5.83E-02	5.64E-02	1.17E-03	7.06E-06	3.33E-03	127.84	5.08E-04	6.25E-03
		OV2AT1	Auxiliary Engines - Transit		199	199	0.00	1.46E-04	0.00	2.48E-04	2.41E-04	2.10E-06	3.01E-08	1.69E-05	0.23	2.78E-06	1.13E-05
		OV2AM1	Auxiliary Engines - Maneuvering		1	199	199	0.16	6.81E-03	0.03	1.16E-02	1.13E-02	9.82E-05	1.41E-06	7.90E-04	10.77	1.30E-04
Met Tower PilesTransport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.11	1.41E-03	0.02	3.12E-03	3.02E-03	6.24E-05	3.78E-07	1.78E-04	6.84	2.72E-05	3.34E-04
		OV3M1	Main Engine - Maneuvering		2,540	5,080	1.42	1.88E-02	0.33	4.17E-02	4.03E-02	8.33E-04	5.04E-06	2.38E-03	91.32	3.63E-04	4.46E-03
		OV3AT1	Auxiliary Engines - Transit		199	199	0.00	1.46E-04	0.00	2.48E-04	2.41E-04	2.10E-06	3.01E-08	1.69E-05	0.23	2.78E-06	1.13E-05
		OV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.11	4.87E-03	0.02	8.26E-03	8.04E-03	7.02E-05	1.00E-06	5.64E-04	7.69	9.28E-05
Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.12	1.65E-03	0.03	3.66E-03	3.54E-03	7.32E-05	4.43E-07	2.09E-04	8.03	3.19E-05	3.92E-04
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.37	4.90E-03	0.09	1.09E-02	1.05E-02	2.17E-04	1.31E-06	6.20E-04	23.80	9.46E-05	1.16E-03
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.03	3.57E-04	0.01	7.91E-04	7.66E-04	1.58E-05	9.57E-08	4.51E-05	1.73	6.89E-06	8.47E-05
		OV4AM1	Auxiliary Engines - Maneuvering		3	499	1497	0.18	2.38E-03	0.04	5.28E-03	5.11E-03	1.06E-04	6.39E-07	3.01E-04	11.57	4.60E-05
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	2	2,540	2,500	0.05	6.25E-04	0.01	1.38E-03	1.34E-03	2.77E-05	1.67E-07	7.89E-05	3.03	1.20E-05	1.48E-04
		OV5M1	Main Engine - Maneuvering		2,540	2,500	0.14	1.85E-03	0.03	4.10E-03	3.97E-03	8.20E-05	4.96E-07	2.34E-04	8.99	3.57E-05	4.39E-04
		OV5AT1	Auxiliary Engines - Transit		199	199	0.00	1.46E-04	0.00	2.48E-04	2.41E-04	2.10E-06	3.01E-08	1.69E-05	0.23	2.78E-06	1.13E-05
		OV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.02	9.73E-04	0.00	1.65E-03	1.61E-03	1.40E-05	2.01E-07	1.13E-04	1.54	1.86E-05
Met Tower Topside Transport	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.11	1.41E-03	0.02	3.12E-03	3.02E-03	6.24E-05	3.78E-07	1.78E-04	6.84	2.72E-05	3.34E-04
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.57	7.53E-03	0.13	1.67E-02	1.61E-02	3.33E-04	2.02E-06	9.51E-04	36.53	1.45E-04	1.78E-03
		OV6AT1	Auxiliary Engines - Transit		199	199	0.00	1.46E-04	0.00	2.48E-04	2.41E-04	2.10E-06	3.01E-08	1.69E-05	0.23	2.78E-06	1.13E-05
		OV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.04	1.95E-03	0.01	3.31E-03	3.21E-03	2.81E-05	4.02E-07	2.26E-04	3.08	3.71E-05
Refueling operations to Met Tower and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.24	1.06E-02	0.04	1.06E-02	1.04E-02	1.53E-04	1.30E-06	1.08E-03	16.76	2.02E-04	8.19E-04
		OV7M1	Main Engine - Maneuvering		749	1,498	1.40	6.13E-02	0.26	6.13E-02	5.99E-02	8.85E-04	7.49E-06	6.23E-03	96.94	1.17E-03	4.74E-03
		OV7AT1	Auxiliary Engines - Transit		20	40	0.00	1.47E-04	0.00	2.49E-04	2.42E-04	2.12E-06	3.03E-08	1.70E-05	0.23	2.80E-06	1.13E-05
		OV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.08	3.52E-03	0.02	5.98E-03	5.82E-03	5.08E-05	7.27E-07	4.08E-04	5.57	6.72E-05
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.47	1.90E-02	0.04	6.81E-03	6.09E-03	1.44E-02	7.61E-07	1.66E-03	23.55	3.58E-04	1.04E-03
		OV8M1	Main Engine - Maneuvering		2,350	4,700	1.85	7.41E-02	0.15	2.66E-02	2.38E-02	5.61E-02	2.97E-06	6.49E-03	91.93	1.40E-03	4.06E-03
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.08	1.11E-03	0.02	2.45E-03	2.37E-03	4.90E-05	2.96E-07	1.40E-04	5.37	2.13E-05	2.62E-04
		OV8AM1	Auxiliary Engines - Maneuvering		2	1,000	2,000	1.35	1.79E-02	0.32	3.97E-02	3.84E-02	7.93E-04	4.80E-06	2.26E-03	86.96	3.46E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-23
 US Wind, Inc. - Maryland Offshore Wind Project
 Foundation Installation - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Scour Protection Installation																	
Scour protection installation vessel	Fallpipe vessel	FV1T1	Main Engine - In Transit	3	4,500	13,500	2.13	2.83E-02	0.50	6.26E-02	6.06E-02	1.25E-03	7.57E-06	3.57E-03	137.22	5.45E-04	6.70E-03
		FV1M1	Main Engine - Maneuvering		4,500	13,500	31.86	4.23E-01	7.49	9.36E-01	9.06E-01	1.87E-02	1.13E-04	5.34E-02	2051.65	8.15E-03	1.00E-01
		FV1AT1	Auxiliary Engines - Transit		492	492	0.04	5.34E-04	0.01	1.18E-03	1.14E-03	2.36E-05	1.43E-07	6.74E-05	2.59	1.03E-05	1.27E-04
		FV1AM1	Auxiliary Engines - Maneuvering	2	1200	1200	6.09	8.08E-02	1.43	1.79E-01	1.73E-01	3.58E-03	2.16E-05	1.02E-02	392.09	1.56E-03	1.92E-02
Foundation Installation																	
Foundation installation vessel	Heavy lift vessel	FV2T1	Main Engine - In Transit	6	4,500	22,500	1.76	7.08E-02	0.15	2.54E-02	2.27E-02	5.36E-02	2.84E-06	6.20E-03	87.85	1.34E-03	3.88E-03
		FV2M1	Main Engine - Maneuvering		4,500	22,500	61.07	2.45E+00	5.09	8.79E-01	7.87E-01	1.85E+00	9.83E-05	2.15E-01	3040.76	4.63E-02	1.34E-01
		FV2AT1	Auxiliary Engines - Transit		4500	4500	0.15	1.94E-03	0.03	4.29E-03	4.16E-03	8.59E-05	5.19E-07	2.45E-04	9.41	3.74E-05	4.60E-04
		FV2AM1	Auxiliary Engines - Maneuvering		4500	4500	41.98	1.19E-01	9.87	1.49E+00	1.19E+00	2.47E-02	1.49E-04	7.04E-02	2703.54	1.07E-02	1.32E-01
Tug for assisting foundation installation 1 -- Offshore	Tug	FV3T1	Main Engine - In Transit	2	2,540	5,080	0.43	5.77E-03	0.10	1.28E-02	1.24E-02	2.55E-04	1.55E-06	7.29E-04	27.99	1.11E-04	1.37E-03
		FV3M1	Main Engine - Maneuvering		2,540	5,080	11.02	1.46E-01	2.59	3.24E-01	3.13E-01	6.48E-03	3.92E-05	1.85E-02	709.77	2.82E-03	3.47E-02
		FV3AT1	Auxiliary Engines - Transit		199	199	0.01	5.97E-04	0.00	1.01E-03	9.85E-04	8.61E-06	1.23E-07	6.92E-05	0.94	1.14E-05	4.61E-05
		FV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.86	3.78E-02	0.18	6.42E-02	6.25E-02	5.45E-04	7.81E-06	4.38E-03	59.78	7.21E-04
Foundation transport tug 1	Tug	FV4T1	Main Engine - In Transit	2	2,540	5,080	1.01	1.35E-02	0.24	2.98E-02	2.88E-02	5.96E-04	3.61E-06	1.70E-03	65.32	2.60E-04	3.19E-03
		FV4M1	Main Engine - Maneuvering		2,540	5,080	3.05	4.04E-02	0.72	8.95E-02	8.66E-02	1.79E-03	1.08E-05	5.11E-03	196.12	7.79E-04	9.58E-03
		FV4AT1	Auxiliary Engines - Transit		199	199	0.03	1.39E-03	0.01	2.36E-03	2.30E-03	2.01E-05	2.87E-07	1.61E-04	2.20	2.66E-05	1.08E-04
		FV4AM1	Auxiliary Engines - Maneuvering		1	199	199	0.24	1.05E-02	0.05	1.77E-02	1.73E-02	1.51E-04	2.16E-06	1.21E-03	16.52	1.99E-04
Foundation transport tug 2	Tug	FV5T1	Main Engine - In Transit	2	2,540	5,080	0.97	1.28E-02	0.23	2.84E-02	2.75E-02	5.68E-04	3.43E-06	1.62E-03	62.21	2.47E-04	3.04E-03
		FV5M1	Main Engine - Maneuvering		2,540	5,080	2.90	3.85E-02	0.68	8.52E-02	8.25E-02	1.70E-03	1.03E-05	4.86E-03	186.78	7.42E-04	9.13E-03
		FV5AT1	Auxiliary Engines - Transit		199	199	0.03	1.33E-03	0.01	2.25E-03	2.19E-03	1.91E-05	2.74E-07	1.54E-04	2.10	2.53E-05	1.02E-04
		FV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.23	9.96E-03	0.05	2.05E-02	1.64E-02	1.44E-04	2.05E-06	1.15E-03	15.73	1.90E-04
Foundation transport tug 3	Tug	FV6T1	Main Engine - In Transit	2	2,540	5,080	0.82	1.09E-02	0.19	2.41E-02	2.33E-02	4.83E-04	2.92E-06	1.38E-03	52.88	2.10E-04	2.58E-03
		FV6M1	Main Engine - Maneuvering		2,540	5,080	2.47	3.27E-02	0.58	7.24E-02	7.01E-02	1.45E-03	8.76E-06	4.13E-03	158.76	6.31E-04	7.76E-03
		FV6AT1	Auxiliary Engines - Transit		199	199	0.03	1.13E-03	0.01	1.91E-03	1.86E-03	1.63E-05	2.33E-07	1.31E-04	1.78	2.15E-05	8.70E-05
		FV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.19	8.46E-03	0.04	1.44E-02	1.40E-02	1.22E-04	1.75E-06	9.80E-04	13.37	1.61E-04
Crew transfer vessel 1	Crew transfer vessel	FV7T1	Main Engine - In Transit	2	749	1,498	0.25	1.08E-02	0.05	1.08E-02	1.05E-02	1.55E-04	1.32E-06	1.09E-03	17.03	2.06E-04	8.32E-04
		FV7M1	Main Engine - Maneuvering		749	1,498	0.84	3.68E-02	0.15	3.68E-02	3.59E-02	5.30E-04	4.49E-06	3.73E-03	58.14	7.02E-04	2.84E-03
		FV7AT1	Auxiliary Engines - Transit		20	40	0.01	2.75E-04	0.00	4.67E-04	4.54E-04	3.97E-06	5.68E-08	3.19E-05	0.43	5.24E-06	2.12E-05
		FV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.05	2.11E-03	0.01	3.59E-03	3.49E-03	3.05E-05	4.36E-07	2.45E-04	3.34	4.03E-05
Noise mitigation vessel	OSV	FV8T1	Main Engine - In Transit	3	3,310	6,620	0.71	9.40E-03	0.17	2.08E-02	2.02E-02	4.16E-04	2.52E-06	1.19E-03	45.64	1.81E-04	2.23E-03
		FV8M1	Main Engine - Maneuvering		3,310	6,620	7.18	9.53E-02	1.69	2.11E-01	2.04E-01	4.22E-03	2.55E-05	1.20E-02	462.47	1.84E-03	2.26E-02
		FV8AT1	Auxiliary Engines - Transit		499	1,497	0.15	2.03E-03	0.04	4.50E-03	4.35E-03	9.00E-05	5.44E-07	2.57E-04	9.86	3.92E-05	4.82E-04
		FV8AM1	Auxiliary Engines - Maneuvering		499	1,497	3.49	4.63E-02	0.82	1.03E-01	9.93E-02	2.05E-03	1.24E-05	5.85E-03	224.84	8.93E-04	1.10E-02
Acoustic monitoring - buoy support vessel	OSV	FV9T1	Main Engine - In Transit	2	2,540	5,080	0.35	4.61E-03	0.08	1.02E-02	9.89E-03	2.04E-04	1.24E-06	5.83E-04	22.40	8.90E-05	1.09E-03
		FV9M1	Main Engine - Maneuvering		2,540	5,080	5.51	7.31E-02	1.30	1.62E-01	1.57E-01	3.24E-03	1.96E-05	9.24E-03	354.88	1.41E-03	1.73E-02
		FV9AT1	Auxiliary Engines - Transit		199	199	0.01	5.31E-04	0.00	9.01E-04	8.76E-04	7.65E-06	1.09E-07	6.15E-05	0.84	1.01E-05	4.10E-05
		FV9AM1	Auxiliary Engines - Maneuvering		1	199	199	0.43	1.89E-02	0.09	3.21E-02	3.12E-02	2.73E-04	3.90E-06	2.19E-03	29.89	3.61E-04
Marine mammal observation 1	Crew transfer vessel	FV10T1	Main Engine - In Transit	2	749	1,498	1.23	5.39E-02	0.23	5.39E-02	5.26E-02	7.77E-04	6.58E-06	5.47E-03	85.15	1.03E-03	4.16E-03
		FV10M1	Main Engine - Maneuvering		749	1,498	1.01	4.42E-02	0.18	4.42E-02	4.31E-02	6.37E-04	5.39E-06	4.48E-03	69.77	8.42E-04	3.41E-03
		FV10AT1	Auxiliary Engines - Transit		20	40	0.03	1.37E-03	0.01	2.33E-03	2.27E-03	1.98E-05	2.84E-07	1.59E-04	2.17	2.62E-05	1.06E-04
		FV10AM1	Auxiliary Engines - Maneuvering		2	20	40	0.06	2.53E-03	0.01	4.30E-03	4.19E-03	3.65E-05	5.23E-07	2.94E-04	4.01	4.83E-05
Environmental monitoring	Crew transfer vessel	FV11T1	Main Engine - In Transit	2	749	1,498	1.23	5.39E-02	0.23	5.39E-02	5.26E-02	7.77E-04	6.58E-06	5.47E-03	85.15	1.03E-03	4.16E-03
		FV11M1	Main Engine - Maneuvering		749	1,498	1.01	4.42E-02	0.18	4.42E-02	4.31E-02	6.37E-04	5.39E-06	4.48E-03	69.77	8.42E-04	3.41E-03
		FV11AT1	Auxiliary Engines - Transit		20	40	0.03	1.37E-03	0.01	2.33E-03	2.27E-03	1.98E-05	2.84E-07	1.59E-04	2.17	2.62E-05	1.06E-04
		FV11AM1	Auxiliary Engines - Maneuvering		2	20	40	0.06	2.53E-03	0.01	4.30E-03	4.19E-03	3.65E-05	5.23E-07	2.94E-04	4.01	4.83E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-24
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Installation - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Installation																	
WTG installation jack-up vessel	Jack-up installation vessel	WV1T1	Main Engine - In Transit	3	3,800	11,400	1.30	5.23E-02	0.11	1.88E-02	1.68E-02	3.96E-02	2.10E-06	4.58E-03	64.91	9.88E-04	2.86E-03
		WV1M1	Main Engine - Maneuvering		3,800	11,400	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00
		WV1AT1	Auxiliary Engines - Transit	1	2,880	2,880	0.14	1.81E-03	0.03	4.01E-03	3.88E-03	8.01E-05	4.85E-07	2.29E-04	8.78	3.49E-05	4.29E-04
		WV1AM1	Auxiliary Engines - Maneuvering		2,880	2,880	62.84	8.34E-01	14.77	1.85E+00	1.79E+00	3.69E-02	2.23E-04	1.05E-01	4047.41	1.61E-02	1.98E-01
Tug to transport WTG 1	Tug	WV2T1	Main Engine - In Transit	2	2,540	5,080	2.80	3.72E-02	0.66	8.23E-02	7.97E-02	1.65E-03	9.96E-06	4.70E-03	180.41	7.17E-04	8.82E-03
		WV2M1	Main Engine - Maneuvering		2,540	5,080	11.21	1.49E-01	2.64	3.30E-01	3.19E-01	6.59E-03	3.99E-05	1.88E-02	722.22	2.87E-03	3.53E-02
		WV2AT1	Auxiliary Engines - Transit	1	199	199	0.09	3.85E-03	0.02	6.53E-03	6.35E-03	5.55E-05	7.94E-07	4.46E-04	6.08	7.33E-05	2.97E-04
		WV2AM1	Auxiliary Engines - Maneuvering		199	199	0.88	3.85E-02	0.18	6.54E-02	6.36E-02	5.55E-04	7.95E-06	4.46E-03	60.83	7.34E-04	2.97E-03
Tug to transport WTG 2	Tug	WV3T1	Main Engine - In Transit	2	2,540	5,080	2.70	3.59E-02	0.64	7.95E-02	7.69E-02	1.59E-03	9.61E-06	4.53E-03	174.19	6.92E-04	8.51E-03
		WV3M1	Main Engine - Maneuvering		2,540	5,080	10.83	1.44E-01	2.55	3.18E-01	3.08E-01	6.36E-03	3.85E-05	1.82E-02	697.31	2.77E-03	3.41E-02
		WV3AT1	Auxiliary Engines - Transit	1	199	199	0.08	3.71E-03	0.02	6.30E-03	6.13E-03	5.35E-05	7.66E-07	4.30E-04	5.87	7.08E-05	2.87E-04
		WV3AM1	Auxiliary Engines - Maneuvering		199	199	0.85	3.72E-02	0.17	6.31E-02	6.14E-02	5.36E-04	7.67E-06	4.31E-03	58.73	7.09E-04	2.87E-03
Tug to support WTG Installation / maneuvering offshore	Tug	WV4T1	Main Engine - In Transit	2	2,540	5,080	0.77	1.03E-02	0.18	2.27E-02	2.20E-02	4.54E-04	2.75E-06	1.30E-03	49.77	1.98E-04	2.43E-03
		WV4M1	Main Engine - Maneuvering		2,540	5,080	51.56	6.84E-01	12.12	1.51E+00	1.47E+00	3.03E-02	1.83E-04	8.64E-02	3320.55	1.32E-02	1.62E-01
		WV4AT1	Auxiliary Engines - Transit	1	199	199	0.02	1.06E-03	0.00	1.80E-03	1.75E-03	1.53E-05	2.19E-07	1.23E-04	1.68	2.02E-05	8.19E-05
		WV4AM1	Auxiliary Engines - Maneuvering		199	199	4.03	1.77E-01	0.82	3.00E-01	2.92E-01	2.55E-03	3.65E-05	2.05E-02	279.66	3.38E-03	1.37E-02

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-25
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Commissioning - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Commissioning																	
Crew transfer vessel 1	Crew transfer vessel	CV1T1	Main Engine - In Transit	2	749	1,498	1.56	6.86E-02	0.29	6.86E-02	6.70E-02	9.90E-04	8.38E-06	6.97E-03	108.46	1.31E-03	5.30E-03
		CV1M1	Main Engine - Maneuvering		749	1,498	6.58	2.89E-01	1.21	2.89E-01	2.82E-01	4.17E-03	3.53E-05	2.93E-02	456.54	5.51E-03	2.23E-02
		CV1AT1	Auxiliary Engines - Transit	2	20	40	0.04	1.75E-03	0.01	2.97E-03	2.89E-03	2.53E-05	3.61E-07	2.03E-04	2.77	3.34E-05	1.35E-04
		CV1AM1	Auxiliary Engines - Maneuvering		20	40	0.38	1.66E-02	0.08	2.82E-02	2.74E-02	2.39E-04	3.42E-06	1.92E-03	26.21	3.16E-04	1.28E-03
Crew transfer vessel 2	Crew transfer vessel	CV2T1	Main Engine - In Transit	2	749	1,498	1.55	6.79E-02	0.28	6.79E-02	6.63E-02	9.79E-04	8.29E-06	6.89E-03	107.26	1.29E-03	5.24E-03
		CV2M1	Main Engine - Maneuvering		749	1,498	6.51	2.86E-01	1.20	2.86E-01	2.79E-01	4.12E-03	3.49E-05	2.90E-02	451.64	5.45E-03	2.21E-02
		CV2AT1	Auxiliary Engines - Transit	2	20	40	0.04	1.73E-03	0.01	2.94E-03	2.86E-03	2.50E-05	3.57E-07	2.01E-04	2.74	3.30E-05	1.34E-04
		CV2AM1	Auxiliary Engines - Maneuvering		20	40	0.37	1.64E-02	0.08	2.79E-02	2.71E-02	2.37E-04	3.39E-06	1.90E-03	25.93	3.13E-04	1.27E-03
Crew transfer vessel 3 per GE	Crew transfer vessel	CV3T1	Main Engine - In Transit	2	749	1,498	0.90	3.97E-02	0.17	3.97E-02	3.88E-02	5.73E-04	4.85E-06	4.03E-03	62.74	7.57E-04	3.07E-03
		CV3M1	Main Engine - Maneuvering		749	1,498	3.88	1.70E-01	0.71	1.70E-01	1.66E-01	2.46E-03	2.08E-05	1.73E-02	269.27	3.25E-03	1.32E-02
		CV3AT1	Auxiliary Engines - Transit	2	20	40	0.02	1.01E-03	0.00	1.72E-03	1.67E-03	1.46E-05	2.09E-07	1.17E-04	1.60	1.93E-05	7.82E-05
		CV3AM1	Auxiliary Engines - Maneuvering		20	40	0.22	9.78E-03	0.05	1.66E-02	1.62E-02	1.41E-04	2.02E-06	1.13E-03	15.46	1.87E-04	7.55E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-26
US Wind, Inc. - Maryland Offshore Wind Project
OSS Installation - Annual Emissions - Year 2

Vessel Information							Year 2											
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)	
OCS Air Permit Emissions During Construction																		
OSS Installation																		
OSS installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	1.76	7.08E-02	0.15	2.54E-02	2.27E-02	5.36E-02	2.84E-06	6.20E-03	87.85	1.34E-03	3.88E-03	
		OV1M1	Main Engine - Maneuvering		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.15	1.94E-03	0.03	4.29E-03	4.16E-03	8.59E-05	5.19E-07	2.45E-04	9.41	3.74E-05	4.60E-04	
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	6.87	9.12E-02	1.62	2.02E-01	1.95E-01	4.04E-03	2.44E-05	1.15E-02	442.69	1.76E-03	2.16E-02	
Assisting tug for OSS Jacket and topside install	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.19	2.56E-03	0.05	5.68E-03	5.49E-03	1.14E-04	6.87E-07	3.24E-04	12.44	4.94E-05	6.08E-04	
		OV2M1	Main Engine - Maneuvering		2,540	5,080	3.61	4.79E-02	0.85	1.06E-01	1.03E-01	2.12E-03	1.28E-05	6.05E-03	232.44	9.24E-04	1.14E-02	
		OV2AT1	Auxiliary Engines - Transit		199	199	0.01	2.65E-04	0.00	4.50E-04	4.38E-04	3.82E-06	5.47E-08	3.07E-05	0.42	5.06E-06	2.05E-05	
		OV2AM1	Auxiliary Engines - Maneuvering		1	199	199	0.28	1.24E-02	0.06	2.10E-02	2.05E-02	1.79E-04	2.56E-06	1.44E-03	19.58	2.36E-04	9.57E-04
OSS Jacket and piles Transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.19	2.56E-03	0.05	5.68E-03	5.49E-03	1.14E-04	6.87E-07	3.24E-04	12.44	4.94E-05	6.08E-04	
		OV3M1	Main Engine - Maneuvering		2,540	5,080	2.58	3.42E-02	0.61	7.57E-02	7.33E-02	1.51E-03	9.16E-06	4.32E-03	166.03	6.60E-04	8.11E-03	
		OV3AT1	Auxiliary Engines - Transit		199	199	0.01	2.65E-04	0.00	4.50E-04	4.38E-04	3.82E-06	5.47E-08	3.07E-05	0.42	5.06E-06	2.05E-05	
		OV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.20	8.85E-03	0.04	1.50E-02	1.46E-02	1.28E-04	1.83E-06	1.03E-03	13.98	1.69E-04	6.83E-04
OSS Jacket Install Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.23	3.01E-03	0.05	6.66E-03	6.44E-03	1.33E-04	8.05E-07	3.80E-04	14.59	5.80E-05	7.13E-04	
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.67	8.92E-03	0.16	1.97E-02	1.91E-02	3.95E-04	2.39E-06	1.13E-03	43.27	1.72E-04	2.11E-03	
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.05	6.50E-04	0.01	1.44E-03	1.39E-03	2.88E-05	1.74E-07	8.21E-05	3.15	1.25E-05	1.54E-04	
		OV4AM1	Auxiliary Engines - Maneuvering		3	499	1497	0.33	4.33E-03	0.08	9.60E-03	9.29E-03	1.92E-04	1.16E-06	5.48E-04	21.04	8.36E-05	1.03E-03
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	1	2,500	2,500	0.09	1.14E-03	0.02	2.51E-03	2.43E-03	5.03E-05	3.04E-07	1.43E-04	5.51	2.19E-05	2.69E-04	
		OV5M1	Main Engine - Maneuvering		2,500	2,500	0.25	3.37E-03	0.06	7.46E-03	7.22E-03	1.49E-04	9.02E-07	4.25E-04	16.34	6.49E-05	7.98E-04	
		OV5AT1	Auxiliary Engines - Transit		199	199	0.01	2.65E-04	0.00	4.50E-04	4.38E-04	3.82E-06	5.47E-08	3.07E-05	0.42	5.06E-06	2.05E-05	
		OV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.04	1.77E-03	0.01	3.00E-03	2.92E-03	2.55E-05	3.65E-07	2.05E-04	2.80	3.38E-05	1.37E-04
OSS Topside Transport (assume separate from Jacket/piles)	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.19	2.56E-03	0.05	5.68E-03	5.49E-03	1.14E-04	6.87E-07	3.24E-04	12.44	4.94E-05	6.08E-04	
		OV6M1	Main Engine - Maneuvering		2,540	5,080	1.03	1.37E-02	0.24	3.03E-02	2.93E-02	6.06E-04	3.67E-06	1.73E-03	66.41	2.64E-04	3.24E-03	
		OV6AT1	Auxiliary Engines - Transit		199	199	0.01	2.65E-04	0.00	4.50E-04	4.38E-04	3.82E-06	5.47E-08	3.07E-05	0.42	5.06E-06	2.05E-05	
		OV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.08	3.54E-03	0.02	6.01E-03	5.84E-03	5.10E-05	7.31E-07	4.10E-04	5.59	6.75E-05	2.73E-04
Refueling operations to OSS and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.44	1.93E-02	0.08	1.93E-02	1.88E-02	2.78E-04	2.35E-06	1.96E-03	30.48	3.68E-04	1.49E-03	
		OV7M1	Main Engine - Maneuvering		749	1,498	2.54	1.12E-01	0.47	1.12E-01	1.09E-01	1.61E-03	1.36E-05	1.13E-02	176.25	2.13E-03	8.61E-03	
		OV7AT1	Auxiliary Engines - Transit		20	40	0.01	2.67E-04	0.00	4.53E-04	4.41E-04	3.85E-06	5.51E-08	3.09E-05	0.42	5.09E-06	2.06E-05	
		OV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.15	6.40E-03	0.03	1.09E-02	1.06E-02	9.23E-05	1.32E-06	7.42E-04	10.12	1.22E-04	4.94E-04
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.86	3.45E-02	0.07	1.24E-02	1.11E-02	2.61E-02	1.38E-06	3.02E-03	42.82	6.52E-04	1.89E-03	
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00		
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.15	2.01E-03	0.04	4.45E-03	4.31E-03	8.91E-05	5.39E-07	2.54E-04	9.76	3.88E-05	4.77E-04	
		OV8AM1	Auxiliary Engines - Maneuvering		2	1,000	2,000	2.45	3.26E-02	0.58	7.21E-02	6.98E-02	1.44E-03	8.73E-06	4.12E-03	158.10	6.28E-04	7.73E-03
OSS emergency generators	150 kW standard diesel generator	OD1	Engine	4	150	600	0.26	1.26E-01	2.31	1.98E-02	1.98E-02	4.50E-03	0.00E+00	1.16E-02	489.15	1.98E-02	3.97E-03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-27
 US Wind, Inc. - Maryland Offshore Wind Project
 Inter-Array Cable Installation - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Inter-Array Cable Installation																	
Array cable transport, pre-lay survey, lay and pull	Cable lay vessel	IV1T1	Main Engine - In Transit	4	1,750	5,250	0.99	1.31E-02	0.23	2.90E-02	2.81E-02	5.80E-04	3.51E-06	1.66E-03	63.58	2.53E-04	3.11E-03
		IV1M1	Main Engine - Maneuvering		1,750	5,250	17.35	2.30E-01	4.08	5.10E-01	4.94E-01	1.02E-02	6.17E-05	2.91E-02	1117.74	4.44E-03	5.46E-02
		IV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.17	2.26E-03	0.04	5.01E-03	4.85E-03	1.00E-04	6.06E-07	2.86E-04	10.98	4.36E-05	5.36E-04
		IV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	12.44	1.65E-01	2.92	3.65E-01	3.54E-01	7.31E-03	4.42E-05	2.09E-02	801.05	3.18E-03	3.91E-02
Pre-lay grapnel run	Multipurpose offshore support vessel	IV2T1	Main Engine - In Transit	1	1611	1611	0.11	1.41E-03	0.02	3.12E-03	3.01E-03	6.23E-05	3.77E-07	1.78E-04	6.83	2.71E-05	3.34E-04
		IV2M1	Main Engine - Maneuvering		1611	1611	0.47	6.18E-03	0.11	1.37E-02	1.33E-02	2.74E-04	1.66E-06	7.81E-04	30.01	1.19E-04	1.47E-03
		IV2AT1	Auxiliary Engines - Transit		123	246	0.01	3.42E-04	0.00	5.80E-04	5.64E-04	4.93E-06	7.06E-08	3.96E-05	0.54	6.52E-06	2.64E-05
		IV2AM1	Auxiliary Engines - Maneuvering		2	123	246	0.14	6.24E-03	0.03	1.06E-02	1.03E-02	8.99E-05	1.29E-06	7.22E-04	9.85	1.19E-04
Crew transfer vessel 1	Crew transfer vessel	IV3T1	Main Engine - In Transit	2	749	1,498	1.29	5.67E-02	0.24	5.67E-02	5.54E-02	8.18E-04	6.93E-06	5.76E-03	89.63	1.08E-03	4.38E-03
		IV3M1	Main Engine - Maneuvering		749	1,498	5.30	2.32E-01	0.97	2.32E-01	2.27E-01	3.35E-03	2.84E-05	2.36E-02	367.19	4.43E-03	1.79E-02
		IV3AT1	Auxiliary Engines - Transit		20	40	0.03	1.45E-03	0.01	2.46E-03	2.39E-03	2.09E-05	2.99E-07	1.68E-04	2.29	2.76E-05	1.12E-04
		IV3AM1	Auxiliary Engines - Maneuvering		20	40	0.30	1.33E-02	0.06	2.26E-02	2.20E-02	1.92E-04	2.75E-06	1.55E-03	21.08	2.54E-04	1.03E-03
Crew transfer vessel 2	Crew transfer vessel	IV4T1	Main Engine - In Transit	2	749	1,498	1.29	5.67E-02	0.24	5.67E-02	5.54E-02	8.18E-04	6.93E-06	5.76E-03	89.63	1.08E-03	4.38E-03
		IV4M1	Main Engine - Maneuvering		749	1,498	5.30	2.32E-01	0.97	2.32E-01	2.27E-01	3.35E-03	2.84E-05	2.36E-02	367.19	4.43E-03	1.79E-02
		IV4AT1	Auxiliary Engines - Transit		20	40	0.03	1.45E-03	0.01	2.46E-03	2.39E-03	2.09E-05	2.99E-07	1.68E-04	2.29	2.76E-05	1.12E-04
		IV4AM1	Auxiliary Engines - Maneuvering		20	40	0.30	1.33E-02	0.06	2.26E-02	2.20E-02	1.92E-04	2.75E-06	1.55E-03	21.08	2.54E-04	1.03E-03
Trenching vessel	Purpose-built offshore construction/ROV/survey vessel	IV5T1	Main Engine - In Transit	6	3,000	15,000	0.99	1.31E-02	0.23	2.90E-02	2.81E-02	5.80E-04	3.51E-06	1.66E-03	63.58	2.53E-04	3.11E-03
		IV5M1	Main Engine - Maneuvering		3,000	15,000	49.48	6.57E-01	11.63	1.45E+00	1.41E+00	2.91E-02	1.76E-04	8.30E-02	3186.55	1.27E-02	1.56E-01
		IV5AT1	Auxiliary Engines - Transit		3,000	3,000	0.10	1.36E-03	0.02	3.01E-03	2.91E-03	6.01E-05	3.64E-07	1.71E-04	6.59	2.62E-05	3.22E-04
		IV5AM1	Auxiliary Engines - Maneuvering		3,000	3,000	21.28	2.82E-01	5.00	6.25E-01	6.05E-01	1.25E-02	7.56E-05	3.57E-02	1370.22	5.44E-03	6.70E-02
Guard vessel	Crew transfer vessel	IV6T1	Main Engine - In Transit	2	749	1,498	0.08	3.50E-03	0.01	3.50E-03	3.42E-03	5.05E-05	4.28E-07	3.55E-04	5.53	6.68E-05	2.70E-04
		IV6M1	Main Engine - Maneuvering		749	1,498	1.06	4.65E-02	0.19	4.65E-02	4.54E-02	6.70E-04	5.67E-06	4.72E-03	73.44	8.86E-04	3.59E-03
		IV6AT1	Auxiliary Engines - Transit		20	40	0.00	8.93E-05	0.00	1.52E-04	1.48E-04	1.29E-06	1.84E-08	1.04E-05	0.14	1.70E-06	6.90E-06
		IV6AM1	Auxiliary Engines - Maneuvering		2	20	40	0.06	2.67E-03	0.01	4.53E-03	4.41E-03	3.85E-05	5.51E-07	3.09E-04	4.22	5.09E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-28
 US Wind, Inc. - Maryland Offshore Wind Project
 Offshore Export Cable Installation - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Offshore Export Cable Installation																	
Offshore export cable pre-lay survey, trenching, cable lay and pull	Cable lay vessel	ECV1T1	Main Engine - In Transit	4	1,750	5,250	0.33	4.37E-03	0.08	9.67E-03	9.36E-03	1.93E-04	1.17E-06	5.52E-04	21.19	8.42E-05	1.04E-03
		ECV1M1	Main Engine - Maneuvering		1,750	5,250	15.98	2.12E-01	3.76	4.70E-01	4.55E-01	9.39E-03	5.68E-05	2.68E-02	1029.50	4.09E-03	5.03E-02
		ECV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.06	7.54E-04	0.01	1.67E-03	1.62E-03	3.34E-05	2.02E-07	9.53E-05	3.66	1.45E-05	1.79E-04
		ECV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	11.46	1.52E-01	2.69	3.37E-01	3.26E-01	6.73E-03	4.07E-05	1.92E-02	737.81	2.93E-03	3.61E-02
Pre-lay grapnel run & pre-lay survey; post lay survey after completion	Multipurpose offshore support vessel	ECV2T1	Main Engine - In Transit	1	1,611	1,611	0.21	2.81E-03	0.05	6.23E-03	6.03E-03	1.25E-04	7.54E-07	3.56E-04	13.66	5.43E-05	6.67E-04
		ECV2M1	Main Engine - Maneuvering		1,611	1,611	1.64	2.17E-02	0.38	4.80E-02	4.65E-02	9.61E-04	5.81E-06	2.74E-03	105.30	4.18E-04	5.15E-03
		ECV2AT1	Auxiliary Engines - Transit		123	246	0.02	2.23E-04	0.00	4.93E-04	4.77E-04	9.86E-06	5.96E-08	2.81E-05	1.08	4.29E-06	5.28E-05
Trenching vessel	Purpose built offshore construction/survey vessel	ECV2AM1	Auxiliary Engines - Maneuvering	2	123	246	0.54	7.12E-03	0.13	1.58E-02	1.53E-02	3.15E-04	1.91E-06	9.00E-04	34.57	1.37E-04	1.69E-03
		ECV3T1	Main Engine - In Transit		3,000	15,000	0.99	1.31E-02	0.23	2.90E-02	2.81E-02	5.80E-04	3.51E-06	1.66E-03	63.58	2.53E-04	3.11E-03
		ECV3M1	Main Engine - Maneuvering		3,000	15,000	45.67	6.06E-01	10.74	1.34E+00	1.30E+00	2.68E-02	1.62E-04	7.66E-02	2941.43	1.17E-02	1.44E-01
		ECV3AT1	Auxiliary Engines - Transit		3,000	3,000	0.10	1.36E-03	0.02	3.01E-03	2.91E-03	6.01E-05	3.64E-07	1.71E-04	6.59	2.62E-05	3.22E-04
HDD pull in lift vessel	Jack-up vessel	ECV3AM1	Auxiliary Engines - Maneuvering	6	3,000	3,000	19.64	2.61E-01	4.62	5.77E-01	5.58E-01	1.15E-02	6.98E-05	3.29E-02	1264.81	5.03E-03	6.18E-02
		ECV4T1	Main Engine - In Transit		2,350	4,700	0.86	3.45E-02	0.07	1.24E-02	1.11E-02	2.61E-02	1.38E-06	3.02E-03	42.82	6.52E-04	1.89E-03
		ECV4M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		ECV4AT1	Auxiliary Engines - Transit		1,000	2,000	0.15	2.01E-03	0.04	4.45E-03	4.31E-03	8.91E-05	5.39E-07	2.54E-04	9.76	3.88E-05	4.77E-04
Diving support for HDD pull in	Research / Survey	ECV4AM1	Auxiliary Engines - Maneuvering	2	1,000	2,000	3.05	4.05E-02	0.72	8.98E-02	8.69E-02	1.80E-03	1.09E-05	5.12E-03	196.75	7.82E-04	9.61E-03
		ECV5T1	Main Engine - In Transit		392	784	0.05	6.09E-04	0.01	1.35E-03	1.30E-03	2.70E-05	1.63E-07	7.69E-05	2.95	1.17E-05	1.44E-04
		ECV5M1	Main Engine - Maneuvering		392	784	0.56	7.39E-03	0.13	1.64E-02	1.58E-02	3.27E-04	1.98E-06	9.34E-04	35.87	1.43E-04	1.75E-03
		ECV5AT1	Auxiliary Engines - Transit		135	270	0.01	3.34E-04	0.00	5.66E-04	5.51E-04	4.81E-06	6.88E-08	3.86E-05	0.53	6.36E-06	2.58E-05
HDD pull in support vessel	Multipurpose offshore support vessel	ECV5AM1	Auxiliary Engines - Maneuvering	2	135	270	0.38	1.68E-02	0.08	2.85E-02	2.78E-02	2.42E-04	3.47E-06	1.95E-03	26.56	3.21E-04	1.30E-03
		ECV6T1	Main Engine - In Transit		1,611	1,611	1.32	1.75E-02	0.31	3.88E-02	3.75E-02	7.75E-04	4.69E-06	2.21E-03	84.97	3.38E-04	4.15E-03
		ECV6M1	Main Engine - Maneuvering		1,611	1,611	1.14	1.52E-02	0.27	3.36E-02	3.25E-02	6.73E-04	4.07E-06	1.92E-03	73.71	2.93E-04	3.60E-03
		ECV6AT1	Auxiliary Engines - Transit		123	246	0.10	1.39E-03	0.02	3.07E-03	2.97E-03	6.13E-05	3.71E-07	1.75E-04	6.72	2.67E-05	3.28E-04
		ECV6AM1	Auxiliary Engines - Maneuvering	2	123	246	0.38	4.99E-03	0.09	1.10E-02	1.07E-02	2.21E-04	1.34E-06	6.30E-04	24.20	9.62E-05	1.18E-03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-29
US Wind, Inc. - Maryland Offshore Wind Project
Met Tower Installation - Annual Emissions - Year 2

Vessel Information							Year 2										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
Met Tower Installation Air Permit Emissions During Construction																	
Met Tower Installation																	
Met Tower installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1M1	Main Engine - Maneuvering		4,500	22,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Assisting tug	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV2M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV2AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Met Tower PilesTransport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV3M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV3AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	2	2,540	2,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5M1	Main Engine - Maneuvering		2,540	2,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Met Tower Topside Transport	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV6AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Refueling operations to Met Tower and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7M1	Main Engine - Maneuvering		749	1,498	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7AT1	Auxiliary Engines - Transit		20	40	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-30
US Wind, Inc. - Maryland Offshore Wind Project
Foundation Installation - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Scour Protection Installation																	
Scour protection installation vessel	Fallpipe vessel	FV1T1	Main Engine - In Transit	3	4,500	13,500	1.74	2.31E-02	0.41	5.12E-02	4.96E-02	1.02E-03	6.20E-06	2.92E-03	112.27	4.46E-04	5.49E-03
		FV1M1	Main Engine - Maneuvering		4,500	13,500	26.06	3.46E-01	6.13	7.66E-01	7.41E-01	1.53E-02	9.26E-05	4.37E-02	1678.62	6.67E-03	8.20E-02
		FV1AT1	Auxiliary Engines - Transit		492	492	0.03	4.37E-04	0.01	9.67E-04	9.36E-04	1.93E-05	1.17E-07	5.52E-05	2.12	8.42E-06	1.04E-04
		FV1AM1	Auxiliary Engines - Maneuvering	2	1200	1200	4.98	6.61E-02	1.17	1.46E-01	1.42E-01	2.93E-03	1.77E-05	8.35E-03	320.80	1.27E-03	1.57E-02
Foundation Installation																	
Foundation installation vessel	Heavy lift vessel	FV2T1	Main Engine - In Transit	6	4,500	22,500	1.44	5.80E-02	0.12	2.08E-02	1.86E-02	4.38E-02	2.32E-06	5.07E-03	71.88	1.09E-03	3.17E-03
		FV2M1	Main Engine - Maneuvering		4,500	22,500	49.97	2.01E+00	4.16	7.19E-01	6.44E-01	1.52E+00	8.04E-05	1.76E-01	2487.89	3.79E-02	1.10E-01
		FV2AT1	Auxiliary Engines - Transit		4500	4500	0.12	1.59E-03	0.03	3.51E-03	3.40E-03	7.03E-05	4.25E-07	2.00E-04	7.70	3.06E-05	3.76E-04
		FV2AM1	Auxiliary Engines - Maneuvering		4500	4500	34.35	4.56E-01	8.07	1.01E+00	9.77E-01	2.02E-02	1.22E-04	5.76E-03	2211.99	8.79E-03	1.08E-01
Tug for assisting foundation installation 1 -- Offshore	Tug	FV3T1	Main Engine - In Transit	2	2,540	5,080	0.36	4.72E-03	0.08	1.05E-02	1.01E-02	2.09E-04	1.26E-06	5.96E-04	22.90	9.10E-05	1.12E-03
		FV3M1	Main Engine - Maneuvering		2,540	5,080	9.02	1.20E-01	2.12	2.65E-01	2.56E-01	5.30E-03	3.20E-05	1.51E-02	580.72	2.31E-03	2.84E-02
		FV3AT1	Auxiliary Engines - Transit		199	199	0.01	4.88E-04	0.00	1.01E-04	8.06E-04	7.04E-06	1.01E-07	5.66E-05	0.77	9.31E-06	3.77E-05
		FV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.71	3.10E-02	0.14	5.25E-02	5.11E-02	4.46E-04	6.39E-06	3.59E-03	48.91	5.90E-04
Foundation transport tug 1	Tug	FV4T1	Main Engine - In Transit	2	2,540	5,080	0.83	1.10E-02	0.20	2.44E-02	2.36E-02	4.88E-04	2.95E-06	1.39E-03	53.44	2.12E-04	2.61E-03
		FV4M1	Main Engine - Maneuvering		2,540	5,080	2.49	3.31E-02	0.59	7.32E-02	7.08E-02	1.46E-03	8.86E-06	4.18E-03	160.46	6.38E-04	7.84E-03
		FV4AT1	Auxiliary Engines - Transit		199	199	0.03	1.14E-03	0.01	1.93E-03	1.88E-03	1.64E-05	2.35E-07	1.32E-04	1.80	2.17E-05	8.80E-05
		FV4AM1	Auxiliary Engines - Maneuvering		1	199	199	0.19	8.55E-03	0.04	1.45E-02	1.41E-02	1.23E-04	1.77E-06	9.91E-04	13.51	1.63E-04
Foundation transport tug 2	Tug	FV5T1	Main Engine - In Transit	2	2,540	5,080	0.79	1.05E-02	0.19	2.32E-02	2.25E-02	4.64E-04	2.81E-06	1.33E-03	50.90	2.02E-04	2.49E-03
		FV5M1	Main Engine - Maneuvering		2,540	5,080	2.37	3.15E-02	0.56	6.97E-02	6.75E-02	1.39E-03	8.43E-06	3.98E-03	152.82	6.07E-04	7.47E-03
		FV5AT1	Auxiliary Engines - Transit		199	199	0.02	1.09E-03	0.01	1.84E-03	1.79E-03	1.56E-05	2.24E-07	1.26E-04	1.71	2.07E-05	8.38E-05
		FV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.19	8.15E-03	0.04	1.38E-02	1.34E-02	1.17E-04	1.68E-06	9.44E-04	12.87	1.55E-04
Foundation transport tug 3	Tug	FV6T1	Main Engine - In Transit	2	2,540	5,080	0.67	8.91E-03	0.16	1.97E-02	1.91E-02	3.95E-04	2.39E-06	1.13E-03	43.26	1.72E-04	2.11E-03
		FV6M1	Main Engine - Maneuvering		2,540	5,080	2.02	2.68E-02	0.47	5.93E-02	5.74E-02	1.19E-03	7.17E-06	3.38E-03	129.90	5.16E-04	6.35E-03
		FV6AT1	Auxiliary Engines - Transit		199	199	0.02	9.22E-04	0.00	1.57E-03	1.52E-03	1.33E-05	1.90E-07	1.07E-04	1.46	1.76E-05	7.12E-05
		FV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.16	6.92E-03	0.03	1.18E-02	1.14E-02	9.98E-05	1.43E-06	8.02E-04	10.94	1.32E-04
Crew transfer vessel 1	Crew transfer vessel	FV7T1	Main Engine - In Transit	2	749	1,498	0.20	8.82E-03	0.04	8.82E-03	8.61E-03	1.27E-04	1.08E-06	8.95E-04	13.93	1.68E-04	6.81E-04
		FV7M1	Main Engine - Maneuvering		749	1,498	0.69	3.01E-02	0.13	3.01E-02	2.94E-02	4.34E-04	3.68E-06	3.06E-03	47.57	5.74E-04	2.32E-03
		FV7AT1	Auxiliary Engines - Transit		20	40	0.01	2.25E-04	0.00	3.82E-04	3.72E-04	3.24E-06	4.64E-08	2.61E-05	0.36	4.29E-06	1.74E-05
		FV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.04	1.73E-03	0.01	2.93E-03	2.85E-03	2.49E-05	3.57E-07	2.00E-04	2.73	3.30E-05
Noise mitigation vessel	OSV	FV8T1	Main Engine - In Transit	3	3,310	6,620	0.58	7.69E-03	0.14	1.70E-02	1.65E-02	3.41E-04	2.06E-06	9.72E-04	37.34	1.48E-04	1.82E-03
		FV8M1	Main Engine - Maneuvering		3,310	6,620	5.88	7.80E-02	1.38	1.73E-01	1.67E-01	3.45E-03	2.09E-05	9.85E-03	378.38	1.50E-03	1.85E-02
		FV8AT1	Auxiliary Engines - Transit		499	1,497	0.13	1.66E-03	0.03	3.68E-03	3.56E-03	7.36E-05	4.45E-07	2.10E-04	8.07	3.21E-05	3.94E-04
		FV8AM1	Auxiliary Engines - Maneuvering		499	1,497	2.86	3.79E-02	0.67	8.39E-02	8.12E-02	1.68E-03	1.02E-05	4.79E-03	183.96	7.31E-04	8.99E-03
Acoustic monitoring - buoy support vessel	OSV	FV9T1	Main Engine - In Transit	2	2,540	5,080	0.28	3.78E-03	0.07	8.36E-03	8.09E-03	1.67E-04	1.01E-06	4.77E-04	18.32	7.28E-05	8.95E-04
		FV9M1	Main Engine - Maneuvering		2,540	5,080	4.51	5.98E-02	1.06	1.32E-01	1.28E-01	2.65E-03	1.60E-05	7.56E-03	290.36	1.15E-03	1.42E-02
		FV9AT1	Auxiliary Engines - Transit		199	199	0.01	4.34E-04	0.00	7.37E-04	7.17E-04	6.26E-06	8.96E-08	5.03E-05	0.69	8.28E-06	3.35E-05
		FV9AM1	Auxiliary Engines - Maneuvering		1	199	199	0.35	1.55E-02	0.07	2.63E-02	2.56E-02	2.23E-04	3.19E-06	1.79E-03	24.45	2.95E-04
Marine mammal observation 1	Crew transfer vessel	FV10T1	Main Engine - In Transit	2	749	1,498	1.00	4.41E-02	0.18	4.41E-02	4.31E-02	6.36E-04	5.38E-06	4.48E-03	69.67	8.41E-04	3.40E-03
		FV10M1	Main Engine - Maneuvering		749	1,498	0.82	3.61E-02	0.15	3.61E-02	3.53E-02	5.21E-04	4.41E-06	3.67E-03	57.08	6.89E-04	2.79E-03
		FV10AT1	Auxiliary Engines - Transit		20	40	0.03	1.12E-03	0.01	1.91E-03	1.86E-03	1.62E-05	2.32E-07	1.30E-04	1.78	2.15E-05	8.69E-05
		FV10AM1	Auxiliary Engines - Maneuvering		2	20	40	0.05	2.07E-03	0.01	3.52E-03	3.42E-03	2.99E-05	4.28E-07	2.40E-04	3.28	3.95E-05
Environmental monitoring	Crew transfer vessel	FV11T1	Main Engine - In Transit	2	749	1,498	1.00	4.41E-02	0.18	4.41E-02	4.31E-02	6.36E-04	5.38E-06	4.48E-03	69.67	8.41E-04	3.40E-03
		FV11M1	Main Engine - Maneuvering		749	1,498	0.82	3.61E-02	0.15	3.61E-02	3.53E-02	5.21E-04	4.41E-06	3.67E-03	57.08	6.89E-04	2.79E-03
		FV11AT1	Auxiliary Engines - Transit		20	40	0.03	1.12E-03	0.01	1.91E-03	1.86E-03	1.62E-05	2.32E-07	1.30E-04	1.78	2.15E-05	8.69E-05
		FV11AM1	Auxiliary Engines - Maneuvering		2	20	40	0.05	2.07E-03	0.01	3.52E-03	3.42E-03	2.99E-05	4.28E-07	2.40E-04	3.28	3.95E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-31
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Installation - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Installation																	
WTG installation jack-up vessel	Jack-up installation vessel	WV1T1	Main Engine - In Transit	3	3,800	11,400	1.07	4.28E-02	0.09	1.54E-02	1.37E-02	3.24E-02	1.72E-06	3.75E-03	53.11	8.08E-04	2.34E-03
		WV1M1	Main Engine - Maneuvering		3,800	11,400	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00
		WV1AT1	Auxiliary Engines - Transit	1	2,880	2,880	0.11	1.48E-03	0.03	3.28E-03	3.17E-03	6.56E-05	3.97E-07	1.87E-04	7.19	2.86E-05	3.51E-04
		WV1AM1	Auxiliary Engines - Maneuvering		2,880	2,880	51.42	6.82E-01	12.09	1.51E+00	1.46E+00	3.02E-02	1.83E-04	8.62E-02	3311.51	1.32E-02	1.62E-01
Tug to transport WTG 1	Tug	WV2T1	Main Engine - In Transit	2	2,540	5,080	2.29	3.04E-02	0.54	6.73E-02	6.52E-02	1.35E-03	8.15E-06	3.84E-03	147.61	5.87E-04	7.21E-03
		WV2M1	Main Engine - Maneuvering		2,540	5,080	9.17	1.22E-01	2.16	2.70E-01	2.61E-01	5.39E-03	3.26E-05	1.54E-02	590.91	2.35E-03	2.89E-02
		WV2AT1	Auxiliary Engines - Transit	1	199	199	0.07	3.15E-03	0.01	5.34E-03	5.20E-03	4.54E-05	6.50E-07	3.65E-04	4.97	6.00E-05	2.43E-04
		WV2AM1	Auxiliary Engines - Maneuvering		199	199	0.72	3.15E-02	0.15	5.35E-02	5.20E-02	4.54E-04	6.50E-06	3.65E-03	49.77	6.01E-04	2.43E-03
Tug to transport WTG 2	Tug	WV3T1	Main Engine - In Transit	2	2,540	5,080	2.21	2.94E-02	0.52	6.50E-02	6.29E-02	1.30E-03	7.87E-06	3.71E-03	142.52	5.66E-04	6.96E-03
		WV3M1	Main Engine - Maneuvering		2,540	5,080	8.86	1.18E-01	2.08	2.60E-01	2.52E-01	5.21E-03	3.15E-05	1.49E-02	570.53	2.27E-03	2.79E-02
		WV3AT1	Auxiliary Engines - Transit	1	199	199	0.07	3.04E-03	0.01	5.16E-03	5.02E-03	4.38E-05	6.27E-07	3.52E-04	4.80	5.79E-05	2.35E-04
		WV3AM1	Auxiliary Engines - Maneuvering		199	199	0.69	3.04E-02	0.14	5.16E-02	5.02E-02	4.38E-04	6.28E-06	3.52E-03	48.05	5.80E-04	2.35E-03
Tug to support WTG Installation / maneuvering offshore	Tug	WV4T1	Main Engine - In Transit	2	2,540	5,080	0.63	8.39E-03	0.15	1.86E-02	1.80E-02	3.72E-04	2.25E-06	1.06E-03	40.72	1.62E-04	1.99E-03
		WV4M1	Main Engine - Maneuvering		2,540	5,080	42.18	5.60E-01	9.92	1.24E+00	1.20E+00	2.48E-02	1.50E-04	7.07E-02	2716.81	1.08E-02	1.33E-01
		WV4AT1	Auxiliary Engines - Transit	1	199	199	0.02	8.68E-04	0.00	1.47E-03	1.43E-03	1.25E-05	1.79E-07	1.01E-04	1.37	1.66E-05	6.70E-05
		WV4AM1	Auxiliary Engines - Maneuvering		199	199	3.30	1.45E-01	0.67	2.46E-01	2.39E-01	2.09E-03	2.99E-05	1.68E-02	228.82	2.76E-03	1.12E-02

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-32
 US Wind, Inc. - Maryland Offshore Wind Project
 WTG Commissioning - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
WTG Commissioning																	
Crew transfer vessel 1	Crew transfer vessel	CV1T1	Main Engine - In Transit	2	749	1,498	1.28	5.62E-02	0.24	5.62E-02	5.49E-02	8.10E-04	6.86E-06	5.70E-03	88.74	1.07E-03	4.34E-03
		CV1M1	Main Engine - Maneuvering		749	1,498	5.39	2.36E-01	0.99	2.36E-01	2.31E-01	3.41E-03	2.89E-05	2.40E-02	373.53	4.51E-03	1.83E-02
		CV1AT1	Auxiliary Engines - Transit	2	20	40	0.03	1.43E-03	0.01	2.43E-03	2.37E-03	2.07E-05	2.96E-07	1.66E-04	2.26	2.73E-05	1.11E-04
		CV1AM1	Auxiliary Engines - Maneuvering		20	40	0.31	1.36E-02	0.06	2.30E-02	2.24E-02	1.96E-04	2.80E-06	1.57E-03	21.44	2.59E-04	1.05E-03
Crew transfer vessel 2	Crew transfer vessel	CV2T1	Main Engine - In Transit	2	749	1,498	1.27	5.55E-02	0.23	5.55E-02	5.42E-02	8.01E-04	6.78E-06	5.64E-03	87.76	1.06E-03	4.29E-03
		CV2M1	Main Engine - Maneuvering		749	1,498	5.33	2.34E-01	0.98	2.34E-01	2.28E-01	3.37E-03	2.86E-05	2.37E-02	369.52	4.46E-03	1.81E-02
		CV2AT1	Auxiliary Engines - Transit	2	20	40	0.03	1.42E-03	0.01	2.41E-03	2.34E-03	2.04E-05	2.92E-07	1.64E-04	2.24	2.70E-05	1.09E-04
		CV2AM1	Auxiliary Engines - Maneuvering		20	40	0.31	1.34E-02	0.06	2.28E-02	2.22E-02	1.94E-04	2.77E-06	1.56E-03	21.21	2.56E-04	1.04E-03
Crew transfer vessel 3 per GE	Crew transfer vessel	CV3T1	Main Engine - In Transit	2	749	1,498	0.74	3.25E-02	0.14	3.25E-02	3.17E-02	4.68E-04	3.97E-06	3.30E-03	51.34	6.20E-04	2.51E-03
		CV3M1	Main Engine - Maneuvering		749	1,498	3.18	1.39E-01	0.58	1.39E-01	1.36E-01	2.01E-03	1.70E-05	1.42E-02	220.31	2.66E-03	1.08E-02
		CV3AT1	Auxiliary Engines - Transit	2	20	40	0.02	8.29E-04	0.00	1.41E-03	1.37E-03	1.20E-05	1.71E-07	9.60E-05	1.31	1.58E-05	6.40E-05
		CV3AM1	Auxiliary Engines - Maneuvering		20	40	0.18	8.00E-03	0.04	1.36E-02	1.32E-02	1.15E-04	1.65E-06	9.27E-04	12.65	1.53E-04	6.18E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-33
US Wind, Inc. - Maryland Offshore Wind Project
OSS Installation - Annual Emissions - Year 3

Vessel Information							Year 3											
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)	
OCS Air Permit Emissions During Construction																		
OSS Installation																		
OSS installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	1.44	5.80E-02	0.12	2.08E-02	1.86E-02	4.38E-02	2.32E-06	5.07E-03	71.88	1.09E-03	3.17E-03	
		OV1M1	Main Engine - Maneuvering		#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.12	1.59E-03	0.03	3.51E-03	3.40E-03	7.03E-05	4.25E-07	2.00E-04	7.70	3.06E-05	3.76E-04	
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	5.62	7.46E-02	1.32	1.65E-01	1.60E-01	3.30E-03	2.00E-05	9.43E-03	362.20	1.44E-03	1.77E-02	
Assisting tug for OSS Jacket and topside install	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.16	2.10E-03	0.04	4.64E-03	4.49E-03	9.29E-05	5.62E-07	2.65E-04	10.18	4.05E-05	4.97E-04	
		OV2M1	Main Engine - Maneuvering		2,540	5,080	2.95	3.92E-02	0.69	8.68E-02	8.40E-02	1.74E-03	1.05E-05	4.95E-03	190.18	7.56E-04	9.29E-03	
		OV2AT1	Auxiliary Engines - Transit		199	199	0.00	2.17E-04	0.00	3.68E-04	3.58E-04	3.13E-06	4.48E-08	2.51E-05	0.34	4.14E-06	1.68E-05	
		OV2AM1	Auxiliary Engines - Maneuvering		1	199	199	0.23	1.01E-02	0.05	1.72E-02	1.67E-02	1.46E-04	2.09E-06	1.17E-03	16.02	1.93E-04	7.83E-04
OSS Jacket and piles Transport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.16	2.10E-03	0.04	4.64E-03	4.49E-03	9.29E-05	5.62E-07	2.65E-04	10.18	4.05E-05	4.97E-04	
		OV3M1	Main Engine - Maneuvering		2,540	5,080	2.11	2.80E-02	0.50	6.20E-02	6.00E-02	1.24E-03	7.50E-06	3.54E-03	135.84	5.40E-04	6.64E-03	
		OV3AT1	Auxiliary Engines - Transit		199	199	0.00	2.17E-04	0.00	3.68E-04	3.58E-04	3.13E-06	4.48E-08	2.51E-05	0.34	4.14E-06	1.68E-05	
		OV3AM1	Auxiliary Engines - Maneuvering		1	199	199	0.17	7.24E-03	0.03	1.23E-02	1.20E-02	1.04E-04	1.49E-06	8.39E-04	11.44	1.38E-04	5.59E-04
OSS Jacket Install Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.19	2.46E-03	0.04	5.45E-03	5.27E-03	1.09E-04	6.59E-07	3.11E-04	11.94	4.74E-05	5.83E-04	
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.55	7.29E-03	0.13	1.62E-02	1.56E-02	3.23E-04	1.95E-06	9.22E-04	35.40	1.41E-04	1.73E-03	
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.04	5.32E-04	0.01	1.18E-03	1.14E-03	2.35E-05	1.42E-07	6.72E-05	2.58	1.03E-05	1.26E-04	
		OV4AM1	Auxiliary Engines - Maneuvering		3	499	1497	0.27	3.55E-03	0.06	7.85E-03	7.60E-03	1.57E-04	9.50E-07	4.48E-04	17.21	6.84E-05	8.41E-04
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	1	2,500	2,500	0.07	9.29E-04	0.02	2.06E-03	1.99E-03	4.11E-05	2.49E-07	1.17E-04	4.51	1.79E-05	2.20E-04	
		OV5M1	Main Engine - Maneuvering		2,500	2,500	0.21	2.75E-03	0.05	6.10E-03	5.90E-03	1.22E-04	7.38E-07	3.48E-04	13.37	5.31E-05	6.53E-04	
		OV5AT1	Auxiliary Engines - Transit		199	199	0.00	2.17E-04	0.00	3.68E-04	3.58E-04	3.13E-06	4.48E-08	2.51E-05	0.34	4.14E-06	1.68E-05	
		OV5AM1	Auxiliary Engines - Maneuvering		1	199	199	0.03	1.45E-03	0.01	2.46E-03	2.39E-03	2.09E-05	2.99E-07	1.68E-04	2.29	2.76E-05	1.12E-04
OSS Topside Transport (assume separate from Jacket/piles)	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.16	2.10E-03	0.04	4.64E-03	4.49E-03	9.29E-05	5.62E-07	2.65E-04	10.18	4.05E-05	4.97E-04	
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.84	1.12E-02	0.20	2.48E-02	2.40E-02	4.96E-04	3.00E-06	1.41E-03	54.34	2.16E-04	2.65E-03	
		OV6AT1	Auxiliary Engines - Transit		199	199	0.00	2.17E-04	0.00	3.68E-04	3.58E-04	3.13E-06	4.48E-08	2.51E-05	0.34	4.14E-06	1.68E-05	
		OV6AM1	Auxiliary Engines - Maneuvering		1	199	199	0.07	2.90E-03	0.01	4.92E-03	4.78E-03	4.18E-05	5.98E-07	3.36E-04	4.58	5.52E-05	2.24E-04
Refueling operations to OSS and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.36	1.58E-02	0.07	1.58E-02	1.54E-02	2.28E-04	1.93E-06	1.60E-03	24.94	3.01E-04	1.22E-03	
		OV7M1	Main Engine - Maneuvering		749	1,498	2.08	9.13E-02	0.38	9.13E-02	8.91E-02	1.32E-03	1.11E-05	9.26E-03	144.20	1.74E-03	7.05E-03	
		OV7AT1	Auxiliary Engines - Transit		20	40	0.00	2.18E-04	0.00	3.71E-04	3.60E-04	3.15E-06	4.51E-08	2.53E-05	0.34	4.16E-06	1.69E-05	
		OV7AM1	Auxiliary Engines - Maneuvering		2	20	40	0.12	5.24E-03	0.02	8.89E-03	8.65E-03	7.55E-05	1.08E-06	6.07E-04	8.28	9.99E-05	4.05E-04
LOB																		
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.70	2.83E-02	0.06	1.01E-02	9.06E-03	2.14E-02	1.13E-06	2.47E-03	35.03	5.33E-04	1.55E-03	
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00	0.00E+00	
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.12	1.65E-03	0.03	3.64E-03	3.53E-03	7.29E-05	4.41E-07	2.08E-04	7.98	3.17E-05	3.90E-04	
		OV8AM1	Auxiliary Engines - Maneuvering		2	1,000	2,000	2.01	2.67E-02	0.47	5.90E-02	5.71E-02	1.18E-03	7.14E-06	3.37E-03	129.36	5.14E-04	6.32E-03
OSS emergency generators	150 kW standard diesel generator	OD1	Engine	4	150	600	0.26	1.26E-01	2.31	1.98E-02	1.98E-02	4.50E-03	0.00E+00	1.16E-02	489.15	1.98E-02	3.97E-03	

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-34
US Wind, Inc. - Maryland Offshore Wind Project
Inter-Array Cable Installation - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Inter-Array Cable Installation																	
Array cable transport, pre-lay survey, lay and pull	Cable lay vessel	IV1T1	Main Engine - In Transit	4	1,750	5,250	0.81	1.07E-02	0.19	2.37E-02	2.30E-02	4.75E-04	2.87E-06	1.35E-03	52.02	2.07E-04	2.54E-03
		IV1M1	Main Engine - Maneuvering		1,750	5,250	14.20	1.88E-01	3.34	4.17E-01	4.04E-01	8.34E-03	5.05E-05	2.38E-02	914.52	3.63E-03	4.47E-02
		IV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.14	1.85E-03	0.03	4.10E-03	3.97E-03	8.20E-05	4.96E-07	2.34E-04	8.98	3.57E-05	4.39E-04
		IV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	10.18	1.35E-01	2.39	2.99E-01	2.89E-01	5.98E-03	3.62E-05	1.71E-02	655.40	2.60E-03	3.20E-02
Pre-lay grapnel run	Multipurpose offshore support vessel	IV2T1	Main Engine - In Transit	1	1611	1611	0.09	1.15E-03	0.02	2.55E-03	2.47E-03	5.10E-05	3.08E-07	1.45E-04	5.59	2.22E-05	2.73E-04
		IV2M1	Main Engine - Maneuvering		1611	1611	0.38	5.06E-03	0.09	1.12E-02	1.08E-02	2.24E-04	1.36E-06	6.39E-04	24.55	9.76E-05	1.20E-03
		IV2AT1	Auxiliary Engines - Transit		123	246	0.01	2.80E-04	0.00	4.75E-04	4.62E-04	4.03E-06	5.77E-08	3.24E-05	0.44	5.33E-06	2.16E-05
		IV2AM1	Auxiliary Engines - Maneuvering		2	123	246	0.12	5.10E-03	0.02	8.66E-03	8.42E-03	7.36E-05	1.05E-06	5.91E-04	8.06	9.73E-05
Crew transfer vessel 1	Crew transfer vessel	IV3T1	Main Engine - In Transit	2	749	1,498	1.06	4.64E-02	0.19	4.64E-02	4.53E-02	6.69E-04	5.67E-06	4.71E-03	73.34	8.85E-04	3.58E-03
		IV3M1	Main Engine - Maneuvering		749	1,498	4.33	1.90E-01	0.80	1.90E-01	1.86E-01	2.74E-03	2.32E-05	1.93E-02	300.43	3.63E-03	1.47E-02
		IV3AT1	Auxiliary Engines - Transit		20	40	0.03	1.18E-03	0.01	2.01E-03	1.96E-03	1.71E-05	2.44E-07	1.37E-04	1.87	2.26E-05	9.14E-05
		IV3AM1	Auxiliary Engines - Maneuvering		20	40	0.25	1.09E-02	0.05	1.85E-02	1.80E-02	1.57E-04	2.25E-06	1.26E-03	17.25	2.08E-04	8.43E-04
Crew transfer vessel 2	Crew transfer vessel	IV4T1	Main Engine - In Transit	2	749	1,498	1.06	4.64E-02	0.19	4.64E-02	4.53E-02	6.69E-04	5.67E-06	4.71E-03	73.34	8.85E-04	3.58E-03
		IV4M1	Main Engine - Maneuvering		749	1,498	4.33	1.90E-01	0.80	1.90E-01	1.86E-01	2.74E-03	2.32E-05	1.93E-02	300.43	3.63E-03	1.47E-02
		IV4AT1	Auxiliary Engines - Transit		20	40	0.03	1.18E-03	0.01	2.01E-03	1.96E-03	1.71E-05	2.44E-07	1.37E-04	1.87	2.26E-05	9.14E-05
		IV4AM1	Auxiliary Engines - Maneuvering		20	40	0.25	1.09E-02	0.05	1.85E-02	1.80E-02	1.57E-04	2.25E-06	1.26E-03	17.25	2.08E-04	8.43E-04
Trenching vessel	Purpose-built offshore construction/ROV/survey vessel	IV5T1	Main Engine - In Transit	6	3,000	15,000	0.81	1.07E-02	0.19	2.37E-02	2.30E-02	4.75E-04	2.87E-06	1.35E-03	52.02	2.07E-04	2.54E-03
		IV5M1	Main Engine - Maneuvering		3,000	15,000	40.48	5.37E-01	9.52	1.19E+00	1.15E+00	2.38E-02	1.44E-04	6.79E-02	2607.18	1.04E-02	1.27E-01
		IV5AT1	Auxiliary Engines - Transit		3,000	3,000	0.08	1.11E-03	0.02	2.46E-03	2.38E-03	4.92E-05	2.97E-07	1.40E-04	5.39	2.14E-05	2.63E-04
		IV5AM1	Auxiliary Engines - Maneuvering		3,000	3,000	17.41	2.31E-01	4.09	5.11E-01	4.95E-01	1.02E-02	6.19E-05	2.92E-02	1121.09	4.45E-03	5.48E-02
Guard vessel	Crew transfer vessel	IV6T1	Main Engine - In Transit	2	749	1,498	0.07	2.86E-03	0.01	2.86E-03	2.80E-03	4.13E-05	3.50E-07	2.91E-04	4.53	5.46E-05	2.21E-04
		IV6M1	Main Engine - Maneuvering		749	1,498	0.87	3.80E-02	0.16	3.80E-02	3.71E-02	5.48E-04	4.64E-06	3.86E-03	60.09	7.25E-04	2.94E-03
		IV6AT1	Auxiliary Engines - Transit		20	40	0.00	7.31E-05	0.00	1.24E-04	1.21E-04	1.05E-06	1.51E-08	8.47E-06	0.12	1.39E-06	5.64E-06
		IV6AM1	Auxiliary Engines - Maneuvering		2	20	40	0.05	2.18E-03	0.01	3.71E-03	3.60E-03	3.15E-05	4.51E-07	2.53E-04	3.45	4.16E-05

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-35
 US Wind, Inc. - Maryland Offshore Wind Project
 Offshore Export Cable Installation - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
OCS Air Permit Emissions During Construction																	
Offshore Export Cable Installation																	
Offshore export cable pre-lay survey, trenching, cable lay and pull	Cable lay vessel	ECV1T1	Main Engine - In Transit	4	1,750	5,250	0.27	3.57E-03	0.06	7.91E-03	7.66E-03	1.58E-04	9.57E-07	4.51E-04	17.34	6.89E-05	8.47E-04
		ECV1M1	Main Engine - Maneuvering		1,750	5,250	13.08	1.74E-01	3.07	3.84E-01	3.72E-01	7.69E-03	4.65E-05	2.19E-02	842.32	3.35E-03	4.12E-02
		ECV1AT1	Auxiliary Engines - Transit		1,750	1,750	0.05	6.17E-04	0.01	1.37E-03	1.32E-03	2.73E-05	1.65E-07	7.79E-05	2.99	1.19E-05	1.46E-04
		ECV1AM1	Auxiliary Engines - Maneuvering		1,750	1,750	9.37	1.24E-01	2.20	2.75E-01	2.67E-01	5.51E-03	3.33E-05	1.57E-02	603.66	2.40E-03	2.95E-02
Pre-lay grapnel run & pre-lay survey; post lay survey after completion	Multipurpose offshore support vessel	ECV2T1	Main Engine - In Transit	1	1,611	1,611	0.17	2.30E-03	0.04	5.10E-03	4.93E-03	1.02E-04	6.17E-07	2.91E-04	11.17	4.44E-05	5.46E-04
		ECV2M1	Main Engine - Maneuvering		1,611	1,611	1.34	1.78E-02	0.31	3.93E-02	3.80E-02	7.86E-04	4.76E-06	2.24E-03	86.16	3.42E-04	4.21E-03
		ECV2AT1	Auxiliary Engines - Transit		123	246	0.01	1.82E-04	0.00	4.03E-04	3.90E-04	8.07E-06	4.88E-08	2.30E-05	0.88	3.51E-06	4.32E-05
Trenching vessel	Purpose built offshore construction/survey vessel	ECV2AM1	Auxiliary Engines - Maneuvering	2	123	246	0.44	5.83E-03	0.10	1.29E-02	1.25E-02	2.58E-04	1.56E-06	7.36E-04	28.29	1.12E-04	1.38E-03
		ECV3T1	Main Engine - In Transit		3,000	15,000	0.81	1.07E-02	0.19	2.37E-02	2.30E-02	4.75E-04	2.87E-06	1.35E-03	52.02	2.07E-04	2.54E-03
		ECV3M1	Main Engine - Maneuvering		3,000	15,000	37.37	4.96E-01	8.78	1.10E+00	1.06E+00	2.20E-02	1.33E-04	6.26E-02	2406.62	9.56E-03	1.18E-01
		ECV3AT1	Auxiliary Engines - Transit		3,000	3,000	0.08	1.11E-03	0.02	2.46E-03	2.38E-03	4.92E-05	2.97E-07	1.40E-04	5.39	2.14E-05	2.63E-04
HDD pull in lift vessel	Jack-up vessel	ECV3AM1	Auxiliary Engines - Maneuvering	6	3,000	3,000	16.07	2.13E-01	3.78	4.72E-01	4.57E-01	9.44E-03	5.71E-05	2.69E-02	1034.85	4.11E-03	5.06E-02
		ECV4T1	Main Engine - In Transit		2,350	4,700	0.70	2.83E-02	0.06	1.01E-02	9.06E-03	2.14E-02	1.13E-06	2.47E-03	35.03	5.33E-04	1.55E-03
		ECV4M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		ECV4AT1	Auxiliary Engines - Transit		1,000	2,000	0.12	1.65E-03	0.03	3.64E-03	3.53E-03	7.29E-05	4.41E-07	2.08E-04	7.98	3.17E-05	3.90E-04
Diving support for HDD pull in	Research / Survey	ECV4AM1	Auxiliary Engines - Maneuvering	2	1,000	2,000	2.50	3.32E-02	0.59	7.34E-02	7.11E-02	1.47E-03	8.88E-06	4.19E-03	160.98	6.40E-04	7.87E-03
		ECV5T1	Main Engine - In Transit		392	784	0.04	4.98E-04	0.01	1.10E-03	1.07E-03	2.21E-05	1.33E-07	6.29E-05	2.42	9.60E-06	1.18E-04
		ECV5M1	Main Engine - Maneuvering		392	784	0.46	6.05E-03	0.11	1.34E-02	1.30E-02	2.68E-04	1.62E-06	7.64E-04	29.35	1.17E-04	1.43E-03
		ECV5AT1	Auxiliary Engines - Transit		135	270	0.01	2.73E-04	0.00	4.63E-04	4.51E-04	3.93E-06	5.63E-08	3.16E-05	0.43	5.20E-06	2.11E-05
HDD pull in support vessel	Multipurpose offshore support vessel	ECV5AM1	Auxiliary Engines - Maneuvering	2	135	270	0.31	1.38E-02	0.06	2.33E-02	2.27E-02	1.98E-04	2.84E-06	1.59E-03	21.73	2.62E-04	1.06E-03
		ECV6T1	Main Engine - In Transit		1,611	1,611	1.08	1.43E-02	0.25	3.17E-02	3.07E-02	6.34E-04	3.84E-06	1.81E-03	69.52	2.76E-04	3.40E-03
		ECV6M1	Main Engine - Maneuvering		1,611	1,611	0.94	1.24E-02	0.22	2.75E-02	2.66E-02	5.50E-04	3.33E-06	1.57E-03	60.31	2.40E-04	2.95E-03
		ECV6AT1	Auxiliary Engines - Transit		123	246	0.09	1.13E-03	0.02	2.51E-03	2.43E-03	5.02E-05	3.04E-07	1.43E-04	5.50	2.19E-05	2.69E-04
		ECV6AM1	Auxiliary Engines - Maneuvering	2	123	246	0.31	4.08E-03	0.07	9.03E-03	8.74E-03	1.81E-04	1.09E-06	5.15E-04	19.80	7.87E-05	9.67E-04

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-36
 US Wind, Inc. - Maryland Offshore Wind Project
 Met Tower Installation - Annual Emissions - Year 3

Vessel Information							Year 3										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)
Met Tower Installation Air Permit Emissions During Construction																	
Met Tower Installation																	
Met Tower installation	Heavy lift vessel	OV1T1	Main Engine - In Transit	6	4,500	22,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1M1	Main Engine - Maneuvering		4,500	22,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1AT1	Auxiliary Engines - Transit		4,500	4,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV1AM1	Auxiliary Engines - Maneuvering		4,500	4,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Assisting tug	Tug	OV2T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV2M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	
		OV2AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV2AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Met Tower PilesTransport	Tug	OV3T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV3M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV3AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV3AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Noise Mitigation Vessel	OSV	OV4T1	Main Engine - In Transit	2	3,310	6,620	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV4M1	Main Engine - Maneuvering		3,310	6,620	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV4AT1	Auxiliary Engines - Transit		499	1497	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV4AM1	Auxiliary Engines - Maneuvering		499	1497	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Acoustic monitoring buoy maint	OSV	OV5T1	Main Engine - In Transit	2	2,540	2,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5M1	Main Engine - Maneuvering		2,540	2,500	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV5AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Met Tower Topside Transport	Tug	OV6T1	Main Engine - In Transit	2	2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV6M1	Main Engine - Maneuvering		2,540	5,080	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV6AT1	Auxiliary Engines - Transit		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV6AM1	Auxiliary Engines - Maneuvering		199	199	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Refueling operations to Met Tower and resupply to Hotel vessel	OSV	OV7T1	Main Engine - In Transit	2	749	1,498	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7M1	Main Engine - Maneuvering		749	1,498	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7AT1	Auxiliary Engines - Transit		20	40	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV7AM1	Auxiliary Engines - Maneuvering		20	40	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Crew Hotel Vessel	Jack-up vessel	OV8T1	Main Engine - In Transit	2	2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8M1	Main Engine - Maneuvering		2,350	4,700	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8AT1	Auxiliary Engines - Transit		1,000	2,000	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OV8AM1	Auxiliary Engines - Maneuvering		1,000	2,000	0.00	0.00E+00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 Annual emissions based on short-term emissions and hours of operation provided in Table A-2 through A-15.

Table A-37
 US Wind, Inc. - Maryland Offshore Wind Project
 Operations and Maintenance - Short-Term Emissions

Vessel Information														Operation and Emission Factors																			
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Load Factor Reference	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	Assumed Vessel Speed (knots)	Days Operating within the WDA	Hours in Transit within 25 miles of Project	Operating Hours per Day at WDA	Total Non-Transit Operating Hours	Total Annual Operating Hours	EF Reference	NOx (g/kWh)	VOC (g/kWh)	CO (g/kWh)	PM10 (g/kWh)	PM2.5 (g/kWh)	SO2 (g/kWh)	Pb (g/kWh)	HAPs (g/kWh)	CO2 (g/kWh)	CH4 (g/kWh)	N2O (g/kWh)			
OCS Air Permit Emissions During Operations																																	
Scour Protection Repairs																																	
Scour protection repair	Fallpipe vessel	OMV1T1	Main Engine - In Transit	3	4,500	13,500	L08	0.83	50	1	50	Sparrows Point	13.5	0	4	24	0	4	3M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03			
		OMV1M1	Main Engine - Maneuvering		4,500	13,500	L09	0.2																									
		OMV2AT1	Auxiliary Engines - Transit	2	492	492	L10	0.43	50	1	50	Sparrows Point	13.5	0	4	24	0	4	3A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03			
		OMV1AM1	Auxiliary Engines - Maneuvering		1200	1200	L10	0.43																									
OSS O&M																																	
Refueling operations to OSS	Crew transfer vessel	OMV2T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	20	651	Ocean City	25	1	26	12	10	10	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03			
		OMV2M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV2AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	20	651	Ocean City	25	1	26	12	10	10	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03			
		OMV2AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
WTG Inspection/ Maintenance /Repairs																																	
Main repair vessel	Jack-up vessel	OMV3T1	Main Engine - In Transit	2	2,350	4,700	L07	0.83	50	1	50	Sparrows Point	6	9	8	12	109	109	7M	13.20	0.53	1.10	0.19	0.17	0.40	2.13E-05	0.05	657.23	0.010	0.03			
		OMV3M1	Main Engine - Maneuvering		2,350	4,700	L01	0																									
		OMV3AT1	Auxiliary Engines - Transit	2	1,000	2,000	L10	0.43	50	1	50	Sparrows Point	6	9	8	12	109	109	7A	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03			
		OMV3AM1	Auxiliary Engines - Maneuvering		1,000	2,000	L10	0.43																									
Ad hoc survey work and cable survey/inspections	Multi-role survey vessel	OMV4T1	Main Engine - In Transit	2	392	784	L08	0.83	50	8	400	Sparrows Point	18	3	22	12	38	38	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03			
		OMV4M1	Main Engine - Maneuvering		392	784	L09	0.2																									
		OMV4AT1	Auxiliary Engines - Transit	2	135	270	L10	0.43	50	8	400	Sparrows Point	18	3	22	12	38	38	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03			
		OMV4AM1	Auxiliary Engines - Maneuvering		135	270	L10	0.43																									
Cable Inspection/Repairs																																	
Cable burial repair	Multi-role survey vessel	OMV5T1	Main Engine - In Transit	2	392	784	L08	0.83	50	5	250	Sparrows Point	18	2	14	24	48	48	8M	10.55	0.14	2.48	0.31	0.30	0.01	3.75E-05	0.02	679.47	0.003	0.03			
		OMV5M1	Main Engine - Maneuvering		392	784	L09	0.2																									
		OMV5AT1	Auxiliary Engines - Transit	2	135	270	L10	0.43	50	5	250	Sparrows Point	18	2	14	24	48	48	8A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03			
		OMV5AM1	Auxiliary Engines - Maneuvering		135	270	L10	0.43																									
Daily O&M and Miscellaneous																																	
Daily crew transfer vessel	Crew transfer vessel #1	OMV6T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12M	1.80	0.19	2.30	0.04	0.04	0.01	5.00E-06	0.02	679.47	0.008	0.03			
		OMV6M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV6AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12A	5.80	0.14	2.48	0.15	0.15	0.01	1.88E-05	0.01	679.47	0.008	0.03			
		OMV6AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
Daily crew transfer vessel	Crew transfer vessel #2	OMV7T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12M	1.80	0.19	2.30	0.04	0.04	0.01	5.00E-06	0.02	679.47	0.008	0.03			
		OMV7M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV7AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12A	5.80	0.14	2.48	0.15	0.15	0.01	1.88E-05	0.01	679.47	0.008	0.03			
		OMV7AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
Daily crew transfer vessel	Crew transfer vessel #3	OMV8T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12M	1.80	0.19	2.30	0.04	0.04	0.01	5.00E-06	0.02	679.47	0.008	0.03			
		OMV8M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV8AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12A	5.80	0.14	2.48	0.15	0.15	0.01	1.88E-05	0.01	679.47	0.008	0.03			
		OMV8AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
Daily crew transfer vessel	Crew transfer vessel #4	OMV9T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12M	1.80	0.19	2.30	0.04	0.04	0.01	5.00E-06	0.02	679.47	0.008	0.03			
		OMV9M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV9AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	365	11,880	Ocean City	25	365	475	12	4,380	4380	12A	5.80	0.14	2.48	0.15	0.15	0.01	1.88E-05	0.01	679.47	0.008	0.03			
		OMV9AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
Environmental monitoring Vessel	Sportfisher	OMV10T1	Main Engine - In Transit	2	749	1,498	L08	0.83	33	100	3,255	Ocean City	10	4	325	12	48	48	4M	9.80	0.43	1.80	0.43	0.42	0.01	5.25E-05	0.04	679.47	0.008	0.03			
		OMV10M1	Main Engine - Maneuvering		749	1,498	L09	0.2																									
		OMV10AT1	Auxiliary Engines - Transit	2	20	40	L02	0.43	33	100	3,255	Ocean City	10	4	325	12	48	48	4A	9.80	0.43	2.00	0.73	0.71	0.01	8.88E-05	0.05	679.47	0.008	0.03			
		OMV10AM1	Auxiliary Engines - Maneuvering		20	40	L02	0.43																									
Electrical Service	150 kW standard diesel	OMD1	Engine	4	150	600	Full Load	1.00	N/A	N/A	N/A	N/A	365	0	24	1,000	1000	T4	0.40	0.19	3.50	0.03	0.03	0.01	0.00	0.02	739.60	0.03	0.01				

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

Table A-38
 US Wind, Inc. - Maryland Offshore Wind Project
 Operations and Maintenance - Short-Term Emissions

Vessel Information												Short-Term Emissions										
Activity	Representative Vessel Type	AERMOD ID	Engine Type	Number of Engines	Individual Equipment Size (kW)	Total Equipment Size (kW)	Engine Load Factor (%)	Distance per Round Trip (nautical miles)	Number of Round Trips	Total Distance Traveled (nautical miles)	Homeport During Project	NOx (lb/hr)	VOC (lb/hr)	CO (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)	SO2 (lb/hr)	Pb (lb/hr)	HAPs (lb/hr)	CO2 (lb/hr)	CH4 (lb/hr)	N2O (lb/hr)
OCS Air Permit Emissions During Operations																						
Scour Protection Repairs																						
Scour protection repair	Fallpipe vessel	OMV1T1	Main Engine - In Transit	3	4,500	13,500	0.83	50	1	50	Sparrows Point	260.61	3.46	61.26	7.66	7.41	1.53E-01	9.26E-04	4.37E-01	16784.53	6.67E-02	8.20E-01
		OMV1M1	Main Engine - Maneuvering		4,500	13,500	0.2					62.80	0.83	14.76	1.85	1.79	3.69E-02	2.23E-04	1.05E-01	4044.46	1.61E-02	1.98E-01
		OMV1AT1	Auxiliary Engines - Transit	2	492	492	0.43	50	1	50		4.92	0.07	1.16	0.14	0.14	2.89E-03	1.75E-05	8.25E-03	316.91	1.26E-03	1.55E-02
		OMV1AM1	Auxiliary Engines - Maneuvering	2	1200	1200	0.43	12.00	0.16	2.82		0.35	0.34	7.05E-03	4.37E-05	2.01E-02	772.94	3.07E-03	3.78E-02			
OSS O&M																						
Refueling operations to OSS	Crew transfer vessel	OMV2T1	Main Engine - In Transit	2	749	1,498	0.83	33	20	651	Ocean City	26.86	1.18	4.93	1.18	1.15	1.70E-02	1.44E-04	1.20E-01	1862.46	2.25E-02	9.10E-02
		OMV2M1	Main Engine - Maneuvering		749	1,498	0.2					6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02
		OMV2AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	20	651		0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		OMV2AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.37	0.02	0.08		0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03			
WTG Inspection/ Maintenance /Repairs																						
Main repair vessel	Jack-up vessel	OMV3T1	Main Engine - In Transit	2	2,350	4,700	0.83	50	1	50	Sparrows Point	113.52	4.56	9.46	1.63	1.46	3.45E+00	1.83E-04	3.99E-01	5652.24	8.60E-02	2.49E-01
		OMV3M1	Main Engine - Maneuvering		2,350	4,700	0					0.00	0.00	0.00	0.00	0.00	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
		OMV3AT1	Auxiliary Engines - Transit	2	1,000	2,000	0.43	50	1	50		20.00	0.27	4.70	0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02
		OMV3AM1	Auxiliary Engines - Maneuvering	2	1,000	2,000	0.43	20.00	0.27	4.70		0.59	0.57	1.18E-02	7.11E-05	3.35E-02	1288.24	5.12E-03	6.29E-02			
Ad hoc survey workand cable survey/inspections	Multi-role survey vessel	OMV4T1	Main Engine - In Transit	2	392	784	0.83	50	8	400	Sparrows Point	15.13	0.20	3.56	0.44	0.43	8.89E-03	5.38E-05	2.54E-02	974.75	3.87E-03	4.76E-02
		OMV4M1	Main Engine - Maneuvering		392	784	0.2					3.65	0.05	0.86	0.11	0.10	1.14E-03	1.30E-05	6.11E-03	234.88	9.33E-04	1.15E-02
		OMV4AT1	Auxiliary Engines - Transit	2	135	270	0.43	50	8	400		2.51	0.11	0.51	0.19	0.18	1.59E-03	2.27E-05	1.28E-02	173.91	2.10E-03	8.50E-03
		OMV4AM1	Auxiliary Engines - Maneuvering	2	135	270	0.43	2.51	0.11	0.51		0.19	0.18	1.59E-03	2.27E-05	1.28E-02	173.91	2.10E-03	8.50E-03			
Cable Inspection/Repairs																						
Cable burial repair	Multi-role survey vessel	OMV5T1	Main Engine - In Transit	2	392	784	0.83	50	5	250	Sparrows Point	15.13	0.20	3.56	0.44	0.43	8.89E-03	5.38E-05	2.54E-02	974.75	3.87E-03	4.76E-02
		OMV5M1	Main Engine - Maneuvering		392	784	0.2					3.65	0.05	0.86	0.11	0.10	1.14E-03	1.30E-05	6.11E-03	234.88	9.33E-04	1.15E-02
		OMV5AT1	Auxiliary Engines - Transit	2	135	270	0.43	50	5	250		2.51	0.11	0.51	0.19	0.18	1.59E-03	2.27E-05	1.28E-02	173.91	2.10E-03	8.50E-03
		OMV5AM1	Auxiliary Engines - Maneuvering	2	135	270	0.43	2.51	0.11	0.51		0.19	0.18	1.59E-03	2.27E-05	1.28E-02	173.91	2.10E-03	8.50E-03			
Daily O&M and Miscellaneous																						
Daily crew transfer vessel	Crew transfer vessel #1	OMV6T1	Main Engine - In Transit	2	749	1,498	0.83	33	365	11,880	Ocean City	4.93	0.52	6.30	0.11	0.11	1.64E-02	1.37E-05	4.44E-02	1862.46	2.25E-02	9.10E-02
		OMV6M1	Main Engine - Maneuvering		749	1,498	0.2					1.19	0.13	1.52	0.03	0.03	3.96E-03	3.30E-06	1.07E-02	448.79	5.42E-03	2.19E-02
		OMV6AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	365	11,880		0.22	0.01	0.09	0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03
		OMV6AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.22	0.01	0.09		0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03			
Daily crew transfer vessel	Crew transfer vessel #2	OMV7T1	Main Engine - In Transit	2	749	1,498	0.83	33	365	11,880	Ocean City	4.93	0.52	6.30	0.11	0.11	1.64E-02	1.37E-05	4.44E-02	1862.46	2.25E-02	9.10E-02
		OMV7M1	Main Engine - Maneuvering		749	1,498	0.2					1.19	0.13	1.52	0.03	0.03	3.96E-03	3.30E-06	1.07E-02	448.79	5.42E-03	2.19E-02
		OMV7AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	365	11,880		0.22	0.01	0.09	0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03
		OMV7AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.22	0.01	0.09		0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03			
Daily crew transfer vessel	Crew transfer vessel #3	OMV8T1	Main Engine - In Transit	2	749	1,498	0.83	33	365	11,880	Ocean City	4.93	0.52	6.30	0.11	0.11	1.64E-02	1.37E-05	4.44E-02	1862.46	2.25E-02	9.10E-02
		OMV8M1	Main Engine - Maneuvering		749	1,498	0.2					1.19	0.13	1.52	0.03	0.03	3.96E-03	3.30E-06	1.07E-02	448.79	5.42E-03	2.19E-02
		OMV8AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	365	11,880		0.22	0.01	0.09	0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03
		OMV8AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.22	0.01	0.09		0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03			
Daily crew transfer vessel	Crew transfer vessel #4	OMV9T1	Main Engine - In Transit	2	749	1,498	0.83	33	365	11,880	Ocean City	4.93	0.52	6.30	0.11	0.11	1.64E-02	1.37E-05	4.44E-02	1862.46	2.25E-02	9.10E-02
		OMV9M1	Main Engine - Maneuvering		749	1,498	0.2					1.19	0.13	1.52	0.03	0.03	3.96E-03	3.30E-06	1.07E-02	448.79	5.42E-03	2.19E-02
		OMV9AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	365	11,880		0.22	0.01	0.09	0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03
		OMV9AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.22	0.01	0.09		0.01	0.01	2.28E-04	7.11E-07	5.50E-04	25.76	3.11E-04	1.26E-03			
Environmental monitoring Vessel	Sportfisher	OMV10T1	Main Engine - In Transit	2	749	1,498	0.83	33	100	3,255	Ocean City	26.86	1.18	4.93	1.18	1.15	1.70E-02	1.44E-04	1.20E-01	1862.46	2.25E-02	9.10E-02
		OMV10M1	Main Engine - Maneuvering		749	1,498	0.2					6.47	0.28	1.19	0.28	0.28	4.10E-03	3.47E-05	2.88E-02	448.79	5.42E-03	2.19E-02
		OMV10AT1	Auxiliary Engines - Transit	2	20	40	0.43	33	100	3,255		0.37	0.02	0.08	0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03
		OMV10AM1	Auxiliary Engines - Maneuvering	2	20	40	0.43	0.37	0.02	0.08		0.03	0.03	2.35E-04	3.37E-06	1.89E-03	25.76	3.11E-04	1.26E-03			
Electrical Service	150 kW standard diesel	OMD1	Engine	4	150	600	1.00	N/A	N/A	N/A	N/A	0.53	0.25	4.63	0.04	0.04	8.99E-03	0.00E+00	2.33E-02	978.31	3.97E-02	7.94E-03

Note: Refer to OCS Air Permit Application Section 2 for more detailed analysis and description.
 EF Reference corresponds to emission factors in Table A-40.

**Table A-40 US Wind, Inc. - Maryland Offshore Wind Project
Emission Factors**

EF Ref	Vessel Type	Engine type	Emission Factors (g/kWh)										Sources	
			NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4		N2O
1M	Anchor Handling Tugs	Main	13.2	0.53	1.10	0.19	0.17	0.4008	2.13E-05	0.046	657.23	0.01	0.029	EPA default, Cat 3, pre-1999 (propulsion)
1A		Auxiliary	9.8	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
2M	Barge	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
2A		Auxiliary	9.80	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
3M	Cable Laying	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
3A		Auxiliary	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
4M	Secondary Crew	Main	9.8	0.43	1.80	0.43	0.42	0.0062	5.25E-05	0.044	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (propulsion)
4A		Auxiliary	9.8	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
5M	Dredging	Main	13.2	0.53	1.10	0.19	0.17	0.4008	2.13E-05	0.046	657.23	0.01	0.029	EPA default, Cat 3, pre-1999 (propulsion)
5A		Auxiliary	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
6M	Ice Breaker	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
6A		Auxiliary	9.8	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.57	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (all)
7M	Jackup	Main	13.2	0.53	1.10	0.19	0.17	0.4008	2.13E-05	0.046	657.23	0.01	0.029	EPA default, Cat 3, pre-1999 (propulsion)
7A		Auxiliary	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
8M	Research / Survey	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
8A		Auxiliary	9.80	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
9M	Shuttle Tanker	Main	10.55	0.14	2.48	0.31	0.30	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
9A		Auxiliary	9.8	0.14	2.48	0.32	0.31	0.0062	3.88E-05	0.018	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
10M	Supply Ship	Main	10.55	0.14	2.48	0.31	0.30	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, cat 2, Tier 1/2 (all)
10A		Auxiliary	9.8	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
11M	Tug	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
11A		Auxiliary	9.80	0.43	2.00	0.73	0.71	0.0062	8.88E-05	0.050	679.47	0.0082	0.0332	EPA default, Cat 1, Tier 1/2 (auxiliary)
12M	Primary Crew ^[3]	Main	1.80	0.19	2.30	0.04	0.04	0.006	5.00E-06	0.016	679.47	0.0082	0.0332	EPA Tier 4 - Cat 1/Cat 2 (propulsion)
12A		Auxiliary	5.80	0.14	2.48	0.15	0.15	0.006	1.88E-05	0.014	679.47	0.0082	0.0332	EPA Tier 4 - Cat 1/Cat 2 (auxiliary)
13M	Noise Mitigation	Main	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)
13A		Auxiliary	10.55	0.14	2.48	0.31	0.3	0.0062	3.75E-05	0.018	679.47	0.0027	0.0332	EPA default, Cat 2, Tier 1/2 (all)

[1] Default emission factors for NOx, VOC, CO, PM10, PM2.5, SO2, CO2, and CH4 from Category 1 and Category 2 engines (age is unknown) are based on the worst case of either the Tier 1 or Tier 2 values in the following sections of the 2022 EPA guidance document, "Ports Emissions Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions," EPA-420-B-22-011, April 2022:

Table H.1 for NOx; Table H.2 for PM10 and PM2.5; Table H.4 for VOC and CH4; Table H.5 for CO; Table H.7 for SO2 and CO2; and Equation 4.3 for N2O.

[2] Emission factors for Category 3 engines are based on the values for 1999 and earlier engines in the following sections of the 2022 EPA guidance:

Table 3.5 for NOx; Equation 3.3 for PM10; Table 3.8 for VOC, CO, and CH4; Equation 3.4 for CO2; Equation 3.5 for SO2; and Table 3.9 for N2O.

Brake specific fuel consumption (BSFC) for Category 3 engines is from Table 3.6 of the 2022 EPA guidance.

PM2.5 for Category 3 engines is assumed to be 92% of the PM10 value, based on section 3.5.3 of the 2022 EPA guidance.

[3] The NO, VOC, PM10, and PM2.5 emission factors correspond to Tier 4 emission standard in 40 CFR Part 1042.101 that this vessel type may be certified by the manufacturer as meeting per the LAER assessment.

[4] All PM is assumed to less than 10 µm in diameter; therefore, PM emission factor is equivalent to PM 10 emission factor. For Category 1 and 2 engines, PM2.5 is estimated to be 97 % of PM10, per section 4.5.3 of the 2022 EPA guidance; for Category 3 engines, PM2.5 is assumed to be 92% of PM10, per section 3.5.3 of the 2022 EPA guidance.

[5] SO2 emission factors assume a fuel sulfur content of: 0.0015 percent by weight for Category 1 and 2 engines (Table H.7 of 2022 EPA guidance); and 0.1 percent by weight for Category 3 engines (Equation 3.5 of 2022 EPA guidance).

Default Harbor Craft Propulsion and Auxiliary Engine Load Factors

LF Code	Ship Type	Propulsion Engine Load Factor	Aux Engine Load Factor	Source
L01	Barge	0	0.43	a
L02	Crew and Supply	0.45	0.43	a
L03	Excursion	0.42	0.43	a
L04	Fishing (C1/C2)	0.52	0.43	a
L05	Government	0.45	0.43	a
L06	Harbor	0.42	0.43	a
L07	Main Propulsion (C1/C2/C3)	0.83		b
L08	Main Propulsion Transit	0.83		b
L09	Main Propulsion - Manuevering	0.2		b
L10	Miscellaneous (C1/C2/C3)	0.52	0.43	a
L11	Pilot	0.51	0.43	a
L12	Towboat/Pushboat	0.68	0.43	a
L13	Tugboat	0.5	0.43	a
L14	Work Boat	0.45	0.43	a
L15	Heavy Lift Vessel - Manuevering	0.10		c

Source: a) Port Emissions 2022 Guidance Table 4.4

b) https://gaftp.epa.gov/air/nei/2014/doc/2014v2_supportingdata/rail_cmvcmvv2_2EPAMethodsReference_20180209.pdf

c) Based on estimates of heavy lift vessel manuevering load factor from:

Atlantic Shores Offshore Wind Project 1 - OCS Air Permit Application - June 2024

US Wind
Maryland Offshore Wind Project
Annual Air Emissions - Construction and Operation
Net Change in Emissions between BOEM and USEPA Ports Inventory Guidance

Year	Emission Calculations Basis	NOx (ton/year)	VOC (ton/year)	CO (ton/year)	PM10 (ton/year)	PM2.5 (ton/year)	SO2 (ton/year)	Pb (ton/year)	HAPs (ton/year)	H ₂ SO ₄	CO2 (ton/year)	CH4 (ton/year)	N2O (ton/year)	CO2e (ton/year)
Construction Year 1 Total	BOEM	248.95	4.48	60.44	8.10	7.85	0.79	0.001	0.53	0.04	16,517.0	0.12	0.78	16,751.1
	USEPA Ports Inventory	254.34	5.09	55.95	7.47	7.21	1.14	0.001	0.57	0.05	16,485.8	0.11	0.78	16,720.4
	Net Change	5.39	0.62	-4.49	-0.63	-0.64	0.35	0.00	0.04	0.02	-31.21	0.00	0.00	-30.65
Construction Year 2 Total	BOEM	615.58	11.25	149.48	20.04	19.43	2.00	0.003	1.33	0.09	41,083.8	0.27	1.95	41,673.3
	USEPA Ports Inventory	628.48	12.54	138.74	18.46	17.81	2.70	0.002	1.39	0.12	41,012.3	0.27	1.96	41,603.7
	Net Change	12.90	1.28	-10.74	-1.58	-1.62	0.69	0.00	0.07	0.03	-71.52	-0.01	0.01	-69.56
Construction Year 3 Total	BOEM	515.88	10.15	134.56	16.72	16.22	1.68	0.003	1.18	0.08	36,946.5	0.26	1.75	37,473.2
	USEPA Ports Inventory	526.64	11.27	125.64	15.46	14.92	2.25	0.002	1.23	0.10	37,033.5	0.27	1.76	37,565.3
	Net Change	10.76	1.12	-8.92	-1.26	-1.30	0.57	0.00	0.05	0.03	87.00	0.01	0.02	92.10
Operation	BOEM	25.05	1.89	24.34	0.66	0.65	0.07	0.000	0.18	0.003	6,672.6	0.06	0.30	6,763.4
	USEPA Ports Inventory	25.47	2.05	24.07	0.72	0.71	0.08	0.000	0.18	0.003	6,972.0	0.10	0.32	7,070.0
	Net Change	0.42	0.16	-0.28	0.06	0.06	0.01	0.00	0.00	0.00	299.35	0.04	0.02	306.53