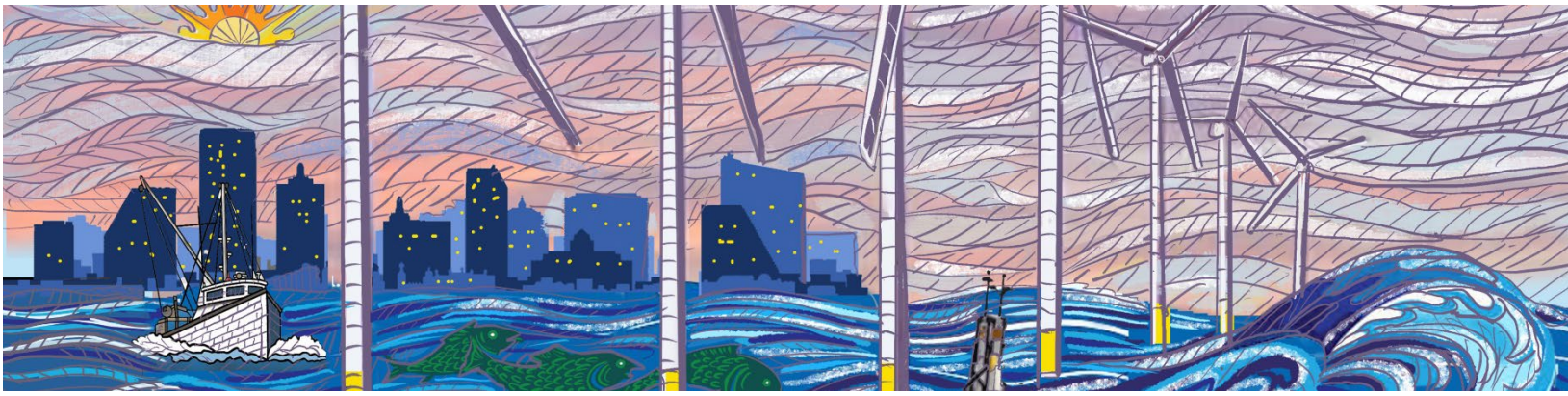

Appendix II-C

Air Emissions Calculation Methodology

May 2024

Air Emissions Calculation Methodology

Atlantic Shores Offshore Wind

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Revised December 2023

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Appendix II-C – Air Emissions Calculation Methodology

This Appendix presents a description of how the air emissions of the Project, as reported in Section 3.1, were calculated, including all assumptions used in preparing estimates of direct emissions. Emissions are predominantly from internal combustion engines[1], and are quantified using a three-step process:

1. Detailed plans for each Project activity.

2. Load factors.

3. Emission factors.

Air emissions are broadly calculated as the product of: engine rated capacity; hours operating; load factor; and emission factor.

Plans for each Project activity

Construction activities are based on the strategies developed by Offshore Construction Associates (OCA) in close association with ASOW. The construction strategy presented is based on monopile and transition piece (MP/TP) installation, with heavy vessels primarily using the New Jersey Wind Port (NJWP). Crew Transfer Vessels (CTVs) will use the port of Atlantic City, and (weather permitting) some crew transfers will use helicopters. Helicopter use is conservatively not included in the emissions totals because any helicopter trip would avoid a marine vessel trip, and on-the-whole would reduce air emissions. Offshore construction also includes fuel bunkering which involves a tug and barge combination making trips to port once a month to load up on fuel for the offshore vessels rather than having each individual vessel make a trip into port for refueling as needed. Offshore construction also includes stationary generators on the OSS for commissioning activities with engine emissions based on Marine Tier 3 engine standards. Miscellaneous activities during offshore construction include emissions of volatile organic compounds (VOC) from the evaporation of marine paint and fuel. Fuel evaporation is based on a fuel evaporation factor of 0.014 lb/Mgal of fuel consumed

[1] Helicopters and certain other vessels may be powered by turbines instead of engines, but the calculation methodology is unchanged.

per AP-42 Chapter 5.2 Table 5.2-5. Marine paint evaporation is assumed as 5 lb/gal of marine paint with 300 gallons of marine paint used.

Onshore construction estimates include cable landings, horizontal directional drilling, duct bank installation, substation installation, material handling at ports, and worker commute activity; equipment sizes and operating days/hours are from Epsilon experience with cable landings, onshore facility construction, and onshore linear construction projects, reviewed by ASOW.

Operation & Maintenance (O&M) activities are based on the logistical concept developed by PEAK Wind in close coordination with ASOW, and includes all vessels, helicopters, generators, and construction equipment that are expected to be used during the Project's operation. PEAK Wind and Atlantic Shores jointly developed model inputs with the goal of making practical conservative assumptions about the wind farm characteristics that most impact operations activity. Atlantic Shores provided Geographic Information Systems (GIS) files that offered a basis for the transit time and distance calculations used in PEAK Wind's models. The presented logistical concepts are based on the primary use of CTVs, or based on use of a dedicated Service Operations Vessel (SOV), supported by CTVs. Again, helicopters could be used but would decrease total air emissions so are conservatively excluded from the calculations. Lighter vessels would use the port of Atlantic City, and heavier support and repair vessels would use the NJWP.

Operations estimates include routine and non-routine operations. Some repairs use a jack-up vessel; for these operations, PEAK Wind has modeled the use of an existing European vessel to start, followed by a new-construction US-flagged vessel when available.

Operations and maintenance emissions estimations also included miscellaneous activities. The two miscellaneous activities that were included in the calculations are the operation of generators on the OSS and the loss of sulfur hexafluoride (SF_6) from the OSS switchgear. The generators are calculated using Marine Tier III engine emissions factors and an assumed operating time of each of the 4 engines operating at 75% load for 24 hours per year. The loss of SF_6 from the switchgear is conservatively based on 0.5% loss of the initial charge of SF_6 every year of operation with an initial charge of 1,500 kg of SF_6 to each of the OSS switchgears.

For all calculations, OCA, PEAK Wind, and ASOW worked with Epsilon to develop consistent calculations for vessel sizes, vessel engine sizes and types, days and hours/day of activity, and number of transits to appropriate ports. Engines powering equipment, and onshore vehicles and equipment, were calculated similarly.

Load Factors

Engines do not operate at full power all the time, but instead vary their power output to provide the mechanical energy needed to perform the engine's task. The amount of energy used by each engine while doing work, expressed as a fraction of the maximum capacity. Load factors use published factors from the Bureau of Ocean Energy Management (BOEM) and EPA factors. The load factor for O&M SOV operation was provided by PEAK Wind based on experience with prior projects.

Emission Factors

The air emissions of CO2 and SO2 are a direct function of the carbon and sulfur in the fuel and are calculated based on EPA factors or mass balances as appropriate. Emissions of NOx and PM2.5 are calculated taking into account engine size, operation, and controls as described above to minimize and mitigate emissions. Emission rates are from regulatory limits (which depend on engine size, age, and operation) and published BOEM and EPA factors.

Other estimates and assumptions are per the attached spreadsheets and the following bulleted list.

Construction Assumptions:

- Onshore
    - Assumed average of 15 miles per commute trip per https://www.bts.gov/bts/sites/rita.dot.gov.bts/files/publications/omnistats/volume_03_issue_04/pdf/entire.pdf
    - Assumed fleetwide average mpg of 22.3 mpg from https://www.bts.gov/content/average-fuel-efficiency-us-passenger-cars-and-light-trucks
    - Assumed 10 ppm sulfur in gasoline starting in 2017 per https://www.epa.gov/gasoline-standards/gasoline-sulfur
    - GHG Emissions based on fuel content in Tables C-1 and C-2 of 40 CFR 98

    - Gasoline density assumed as 6.17 lb/gal per sds range of 0.7-0.78 specific gravity. The average would be 0.74 times water density of 8.34 lb/gal = 6.17 lb/gal https://www.hess.com/docs/us-safety-data-sheets/gasoline-all-grades.pdf?sfvrsn=2
    - Emission factors for commuting vehicles are assumed as 2018 light duty vehicles from Table 4-43 of "Estimated U.S. Average Vehicle emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel" at https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and
    - Emission factors for construction equipment engines are assumed as the best available engine tier from 40 CFR 1039 for the appropriate engine size range
        - NOx emissions are conservatively assumed as 100% of NMHC + NOx
        - VOC emissions are assumed as 12% of NMHC + NOx based on ratio of HC to NOX+HC for engine tiers that have both values split out separately
    - Global Warming Potentials for GHG compounds are from Table A-1 of 40 CFR 98
    - Project split based on each of the two projects (Project 1 and Project 2) requiring one full onshore buildout (50% of the total PDE case)
- Offshore
    - Emission factors for vessels are BOEM Default factors
    - Load factors are BOEM Default load factors for main engines and auxiliary engines
    - SOV Load factors are based on sample vessel data
    - Fuel use factors are from "Current Methodologies and Best Practices in Preparing Port Emission Inventories" April 2009, Table 2-9: Emission Factors for OGV Main Engines, Table 2-16: Auxiliary Engine Emission Factors
        - Cat 1&2 marine engines are calculated based on the BOEM CO2 emission rate and fuel information such as Marine Diesel Fuel Density of 7.10 lb/gal, higher heating value of 0.138 MMBtu/gal, and CO2 emission factor in kg/MMBtu from 40 CFR 98 Table C-1.
    - Global Warming Potentials for GHG compounds are from Table A-1 of 40 CFR 98
    - Non-Vessel Equipment engines (hammer engine, motion compensation, etc.) are assumed to meet the best available engine tier from 40 CFR 1039 for the appropriate engine size range
        - NOx emissions are conservatively assumed as 100% of NMHC + NOx
        - VOC emissions are assumed as 12% of NMHC + NOx based on ratio of HC to NOX+HC for engine tiers that have both values split out separately
    - Air Compressor engines for bubble curtain are assumed to be IMO Stage III B compliant
    - OSS and WTG Commissioning generators are assumed as Marine Tier III engines from 40 CFR 1042
    - OSS Installation trips include foundation and topside

- OSS install non-US tugs get a single trip to site from Europe, and don't touch US ports
- Scour protection just goes out once – no resupply trips
- Barge master engine is assumed as 500 kw
- All vessels transiting at 10 knots except CTVs (29 knots) and foundation install barges/tugs which have case specific speeds from model (3 and 7 knots for the 2 cases)
- Vessels with several large engines listed as only engines were assumed that all but 1 were main engine and 1 was auxiliary engine
- Barges are assumed as having no main engine (Tugs do transit)
- Vessels that are large work vessels are assumed to have 1 trip out to site and then sit out there for duration of project activity
- All vessel engines are assumed as Category 1&2 except jackup and heavy lift vessels are assumed to use Category 3 engines
- NJWP is used for all non-CTV vessels going to a US Port
- Vessels assumed as operating on maneuvering load factor for 24 hr/day for operating days spent in WDA
- Paint VOC
  - 5 lb/gal, 100 gallons per year, 3 year construction, 2000 lb/ton = 0.75 ton
- Fuel Evaporation
  - 0.014 lb/1000 gallon distillate fuel #2 per AP-42 Chapter 5.2 Table 5.2-5
- Project split for Project 1 and Project 2 are scaled based on relative size of project compared to overall PDE case.
- Each project calculation conservatively includes the overlap area.

<u>O&M Assumptions:</u>

- General for Total PDE
  - SF6 loss from switchgear
    - 1500 kg SF6 charge per OSS, 0.5% loss per year, 22,800 GWP
      - 0.5% loss based on IEC standard cited in EPA document here: https://www.epa.gov/sites/production/files/2016-02/documents/leakrates_circuitbreakers.pdf
  - Environmental Monitoring Campaign
    - Once a month trip with 8 hour in WTA time using a CTV
  - SOV Campaign
    - Year 5 for 90 days – assume 90 days over 30 years, 1 trip over 30 years, SOV load factors
  - Seabed Survey
    - Assumed to be minimal and covered under normal routine CTV/SOV campaigns

- Project split for Project 1 and Project 2 are scaled based on relative size of project compared to overall PDE case.
- Each project calculation conservatively includes the overlap area.

National and State Ambient Air Quality Standards

The nation's first Federal efforts at controlling air pollution began in 1963 with passage of the Clean Air Act (CAA). Four amendments followed in 1967, 1970, 1977, and 1990. The CAA was enacted by Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the CAA, EPA promulgated NAAQS for six criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead (Pb). The NAAQS are listed in Table II-C-1.

The NAAQS presented in Table II-C-1 specify concentration levels for various averaging times. The NAAQS includes both "primary" and "secondary" standards. The primary standards are intended to protect human health; whereas, the secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation.

Table II-C-1 National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS ($\mu g/m^3$)	
		Primary	Secondary
NO_2	Annual [1]	100	Same
	1-Hr [2]	188	None
SO_2	3-Hr [3]	None	1300
	1-Hr [4]	196	None
$PM_{2.5}$	Annual [1]	12	15
	24-Hr [5]	35	Same
PM_{10}	24-Hr [3][6]	150	Same
CO	8-Hr [3]	10,000	Same
	1-Hr [3]	40,000	Same
Ozone	8-Hr [7]	147	Same
Pb	3-month [1]	0.15	Same

[1] Not to be exceeded.
[2] 98th percentile of one-hour daily maximum concentrations, averaged over three years.
[3] Not to be exceeded more than once per year.
[4] 99th percentile of one-hour daily maximum concentrations, averaged over three years.
[5] 98th percentile, averaged over three years.
[6] Not to be exceeded more than once per year on average over three years.
[7] Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.
Source: http://www.epa.gov/ttn/naaqs/criteria.html

The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

Attainment Status

Section 107 of the 1977 CAA Amendment requires that the EPA publish a list of the geographic areas in compliance with the NAAQS, and those areas not in compliance with the NAAQS. Areas not in NAAQS compliance are deemed non-attainment areas. Areas that have insufficient data to make a determination are deemed unclassified and are treated as being attainment areas until proven otherwise. An area's designation is based on the data collected by the state monitoring network on a pollutant-by-pollutant basis.

Title 40 CFR 81 presents all the attainment designations for each of the states. This information is consolidated in EPA's "Green Book" which breaks the information down by state, county, area, and pollutant. There are currently no attainment designations made for the 1-hour NO_2 NAAQS. The attainment status of each port's county is presented in the table at the end of this appendix alongside a table that provides the approximate maximum emissions and fuel consumption in each region.

Total Emissions																
Activity Group	Fuel Consumption (gal)	Emissions (tons)														
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	4,992,914.2	664.5	17.2	227.6	20.7	20.1	1.5	0.00	1.8	0.07	57,435.1	1.0	2.0	25.0	599.0	58,059.2
Offshore Substation Installation (OSS)	560,474.8	82.8	1.8	24.9	2.6	2.5	0.2	0.00	0.2	0.01	6,507.1	0.1	0.3	2.2	76.0	6,585.4
Scour Protection	1,028,760.7	171.5	3.9	40.7	6.0	5.8	1.1	0.00	0.6	0.05	11,403.5	0.1	0.6	1.8	165.0	11,570.3
Inter Array Cable Installation	1,193,952.0	198.3	4.6	46.8	7.0	6.7	1.4	0.00	0.6	0.06	13,226.2	0.1	0.6	2.1	191.4	13,419.7
WTG Installation	7,528,737.1	1,429.7	20.1	323.8	43.4	42.1	2.0	0.01	3.1	0.09	89,494.5	0.6	4.3	13.8	1,278.2	90,786.5
Export Cable Installation	4,717,787.2	792.0	16.2	190.6	27.1	26.3	3.9	0.00	2.3	0.18	52,512.6	0.3	2.5	8.2	756.5	53,277.2
Fuel Bunkering	554,115.0	77.3	2.4	24.2	2.8	2.7	0.2	0.00	0.2	0.01	6,228.1	0.1	0.2	2.4	69.7	6,300.2
Commissioning Generators	149,185.7	13.0	1.6	11.5	0.2	0.2	0.0	0.00	0.0	0.00	1,702.8	0.1	0.0	1.7	4.1	1,708.6
Miscellaneous	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	20,725,926.8	3,429.1	68.7	890.1	109.8	106.5	10.3	0.01	8.9	0.47	238,509.9	2.3	10.5	57.2	3,140.0	241,707.1

Vessel Emissions																
Activity Group	Fuel Consumption (gal)	Emissions (tons)														
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	3,351,386.2	593.4	9.5	138.9	19.2	18.6	1.3	0.00	1.4	0.06	38,699.2	0.2	1.9	6.0	553.7	39,259.0
Offshore Substation Installation (OSS)	434,847.7	77.4	1.2	18.1	2.5	2.4	0.2	0.00	0.2	0.01	5,073.3	0.0	0.2	0.8	72.6	5,146.6
Scour Protection	1,028,760.7	171.5	3.9	40.7	6.0	5.8	1.1	0.00	0.6	0.05	11,403.5	0.1	0.6	1.8	165.0	11,570.3
Inter Array Cable Installation	1,193,952.0	198.3	4.6	46.8	7.0	6.7	1.4	0.00	0.6	0.06	13,226.2	0.1	0.6	2.1	191.4	13,419.7
WTG Installation	7,528,737.1	1,429.7	20.1	323.8	43.4	42.1	2.0	0.01	3.1	0.09	89,494.5	0.6	4.3	13.8	1,278.2	90,786.5
Export Cable Installation	4,717,787.2	792.0	16.2	190.6	27.1	26.3	3.9	0.00	2.3	0.18	52,512.6	0.3	2.5	8.2	756.5	53,277.2
Fuel Bunkering	410,115.0	68.4	1.3	16.4	2.3	2.3	0.2	0.00	0.2	0.01	4,584.5	0.0	0.2	0.7	65.8	4,651.0
Commissioning Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	18,665,585.9	3,330.6	56.9	775.4	107.6	104.2	10.1	0.01	8.4	0.46	214,993.8	1.3	10.3	33.4	3,083.1	218,110.3

Non-Vessel Emissions																
Activity Group	Fuel Consumption (gal)	Emissions (tons)														
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	1,641,528.0	71.1	7.6	88.7	1.4	1.4	0.2	0.00	0.4	0.01	18,735.9	0.8	0.2	19.0	45.3	18,800.2
Offshore Substation Installation (OSS)	125,627.1	5.4	0.6	6.8	0.1	0.1	0.0	0.00	0.0	0.00	1,433.9	0.1	0.0	1.5	3.5	1,438.8
Scour Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Inter Array Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
WTG Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Export Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Bunkering	144,000.0	8.9	1.1	7.8	0.4	0.4	0.0	0.00	0.0	0.00	1,643.6	0.1	0.0	1.7	4.0	1,649.2
Commissioning Generators	149,185.7	13.0	1.6	11.5	0.2	0.2	0.0	0.00	0.0	0.00	1,702.8	0.1	0.0	1.7	4.1	1,708.6
Miscellaneous	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.00	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	2,060,340.9	98.5	11.8	114.7	2.2	2.2	0.2	0.00	0.5	0.01	23,516.1	1.0	0.2	23.8	56.9	23,596.8
Engines Only B02	2,060,340.9	98.5	10.9	114.7	2.2	2.2	0.2	0.00	0.5	0.01	23,516.1	1.0	0.2	23.8	56.9	23,596.8

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Construction																	
Foundation Installation (FOU) B02																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	2	250	1,000	10	100	0	0	0	100	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	294	24	7,056	7,056	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		2	250	1,000	10	100	0	0	0	100	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	294	24	7,056	7,056	7A
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	294	24	7,056	7,056	11M
		Auxiliary Engine (Transit)	0	5,530	0	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	11A
		Auxiliary Engine (Maneuvering)	0	5,530	0	1 & 2 auxiliary		0	91	0	10	0	294	24	7,056	7,056	11A
Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	50	91	9,124	7	1,303	0	0	0	1,303	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	294	24	7,056	7,056	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		50	91	9,124	7	1,303	0	0	0	1,303	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	294	24	7,056	7,056	2A
Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	50	91	9,124	7	1,303	0	0	0	1,303	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	294	24	7,056	7,056	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		50	91	9,124	7	1,303	0	0	0	1,303	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	294	24	7,056	7,056	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	50	91	9,124	7	1,303	0	0	0	1,303	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	294	24	7,056	7,056	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		50	91	9,124	7	1,303	0	0	0	1,303	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	294	24	7,056	7,056	11A
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	50	91	9,124	7	1,303	0	0	0	1,303	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	294	24	7,056	7,056	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		50	91	9,124	7	1,303	0	0	0	1,303	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	294	24	7,056	7,056	11A
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	169	17	5,874	29	206	0	0	0	206	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	294	24	7,056	7,056	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		169	17	5,874	29	206	0	0	0	206	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	294	24	7,056	7,056	4A
Bubble Curtain Power	Air Compressor	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	294	8	2,352	2,352	16
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	294	8	2,352	2,352	18
Offshore Substation Installation (OSS)																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	2	250	1,000	10	100	0	0	0	100	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	18	24	432	432	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		2	250	1,000	10	100	0	0	0	100	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	18	24	432	432	7A
	Bubble Curtain Support Vessel	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	18	24	432	432	11M
		Auxiliary Engine (Transit)	0	0	0	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	11A
		Auxiliary Engine (Maneuvering)	0	0	0	1 & 2 auxiliary		0	91	0	10	0	18	24	432	432	11A
Transport Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	10	24	240	240	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	2A
Transport Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	10	24	240	240	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	2A
Transport Barge 3	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	10	24	240	240	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	2A
Transport Barge 4	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	10	24	240	240	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	10	24	240	240	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	11A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	10	24	240	240	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	11A
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	10	24	240	240	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	11A
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	6	91	1,095	10	109	0	0	0	109	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	10	24	240	240	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		6	91	1,095	10	109	0	0	0	109	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	10	24	240	240	11A
	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	14	17	487	29	17	0	0	0	17	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	56	24	1,344	1,344	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		14	17	487	29	17	0	0	0	17	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	56	24	1,344	1,344	4A
	Bubble Curtain Power	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	18	10	180	180	16
	Hydraulic Hammer Power	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	18	10	180	180	18
Scour Protection																	
	Fall Pipe Vessel	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	92	24	2,208	2,208	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	92	24	2,208	2,208	3A
	US Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	58	24	1,392	1,392	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	58	24	1,392	1,392	5A
Inter Array Cable Installation																	
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	250	0	10	0	220	24	5,280	5,280	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	250	0	10	0	220	24	5,280	5,280	3A
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	250	0	10	0	138	24	3,307	3,307	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	250	0	10	0	138	24	3,307	3,307	3A
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	2	641	1,283	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	250	0	10	0	144	24	3,453	3,453	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	250	0	10	0	144	24	3,453	3,453	5A
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	21	24	507	507	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	21	24	507	507	11A
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	21	24	507	507	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	21	24	507	507	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	3	24	67	67	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	3	24	67	67	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
WTG Installation																	
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main	NJWP	2	91	365	10	36	0	0	0	36	7M
		Main Engine (Maneuvering)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main		0	91	0	10	0	517	24	12,410	12,410	7M
		Auxiliary Engine (Transit)	1	2,650	2,650	3 Auxiliary		2	91	365	10	36	0	0	0	36	7A
		Auxiliary Engine (Maneuvering)	1	2,650	2,650	3 Auxiliary		0	91	0	10	0	517	24	12,410	12,410	7A
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	100	91	18,249	10	1,825	0	0	0	1,825	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	238	24	5,723	5,723	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		100	91	18,249	10	1,825	0	0	0	1,825	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	238	24	5,723	5,723	7A
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	100	91	18,249	10	1,825	0	0	0	1,825	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	238	24	5,723	5,723	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		100	91	18,249	10	1,825	0	0	0	1,825	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	238	24	5,723	5,723	7A
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	130	17	4,519	29	159	0	0	0	159	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	517	24	12,410	12,410	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		130	17	4,519	29	159	0	0	0	159	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	517	24	12,410	12,410	4A
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	91	0	10	0	517	24	12,410	12,410	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	91	0	10	0	517	24	12,410	12,410	3A
Export Cable Installation																	
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	348	24	8,352	8,352	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	348	24	8,352	8,352	3A
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	348	24	8,352	8,352	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	348	24	8,352	8,352	3A
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	3M
		Main Engine (Maneuvering)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main		0	91	0	10	0	70	24	1,680	1,680	3M
		Auxiliary Engine (Transit)	2	994	1,988	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	3A
		Auxiliary Engine (Maneuvering)	2	994	1,988	1 & 2 auxiliary		0	91	0	10	0	70	24	1,680	1,680	3A
TSHD	Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	253	24	6,072	6,072	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	253	24	6,072	6,072	5A
AHTS	Tug	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	103	24	2,472	2,472	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	103	24	2,472	2,472	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	2	250	1,000	10	100	0	0	0	100	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	6	24	144	144	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		2	250	1,000	10	100	0	0	0	100	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	6	24	144	144	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Fuel Bunkering																	
Towing Tug	Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	24	91	4,380	10	438	0	0	0	438	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	168	24	4,032	4,032	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		24	91	4,380	10	438	0	0	0	438	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	168	24	4,032	4,032	11A
Barge	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	24	91	4,380	10	438	0	0	0	438	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	168	24	4,032	4,032	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		24	91	4,380	10	438	0	0	0	438	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	168	24	4,032	4,032	2A
Motion Compensation	Motion Compensation	Motion Compensation Engine	1	500	500	Tier 3 Non-Road	NJWP	0	91	0	0	0	168	24	4,032	4,032	17
Commissioning Generators																	
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	8	500	4,000	Marine Tier 3	N/A	0	0	0	0	0	56	12	672	672	31
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	1	240	240	Marine Tier 3	N/A	0	0	0	0	0	517	12	6,205	6,205	32
Miscellaneous																	
Marine Paint	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	N/A	N/A	N/A
Fuel Evaporation	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	N/A	N/A	N/A

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Construction																			
Foundation Installation (FOU) B02																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	119,006	22.90	0.32	5.25	0.71	0.69	0.03	0.00	0.05	0.0014	1,477.70	0.01	0.07	0.23	21.10	1,499.02
		Main Engine (Maneuvering)	0.10	1,011,698	194.72	2.72	44.65	6.02	5.82	0.25	0.00	0.42	0.01	12,562.19	0.08	0.60	1.94	179.34	12,743.48
		Auxiliary Engine (Transit)	0.56	4,188	0.79	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.00	44.41	0.00	0.00	0.01	0.63	45.05
		Auxiliary Engine (Maneuvering)	0.56	295,532	55.84	0.68	11.99	1.55	1.50	0.03	0.00	0.11	0.00	3,133.88	0.02	0.15	0.48	44.66	3,179.03
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	0.83	21,278	3.52	0.07	0.85	0.12	0.12	0.01	0.00	0.01	0.00	237.71	0.00	0.01	0.04	3.41	241.16
		Main Engine (Maneuvering)	0.10	495,618	81.89	1.55	19.70	2.84	2.75	0.28	0.00	0.23	0.01	5,537.00	0.03	0.27	0.86	79.47	5,617.33
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	1,780	0.39	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.00	20.02	0.00	0.00	0.00	0.29	20.31
		Auxiliary Engine (Maneuvering)	0.43	9,635	2.10	0.02	0.41	0.05	0.05	0.00	0.00	0.00	0.00	108.40	0.00	0.01	0.02	1.54	109.96
Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	1,780	0.39	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.00	20.02	0.00	0.00	0.00	0.29	20.31
		Auxiliary Engine (Maneuvering)	0.43	9,635	2.10	0.02	0.41	0.05	0.05	0.00	0.00	0.00	0.00	108.40	0.00	0.01	0.02	1.54	109.96
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	346,970	57.33	1.08	13.79	1.99	1.93	0.20	0.00	0.16	0.01	3,876.31	0.02	0.19	0.60	55.63	3,932.55
		Main Engine (Maneuvering)	0.10	226,294	37.39	0.71	8.99	1.30	1.26	0.13	0.00	0.10	0.01	2,528.14	0.02	0.12	0.39	36.28	2,564.81
		Auxiliary Engine (Transit)	0.43	8,401	1.47	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.00	94.51	0.00	0.00	0.01	1.35	95.87
		Auxiliary Engine (Maneuvering)	0.43	45,475	7.97	0.11	1.96	0.25	0.24	0.00	0.00	0.02	0.00	511.63	0.00	0.02	0.08	7.29	519.00
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	346,970	57.33	1.08	13.79	1.99	1.93	0.20	0.00	0.16	0.01	3,876.31	0.02	0.19	0.60	55.63	3,932.55
		Main Engine (Maneuvering)	0.10	226,294	37.39	0.71	8.99	1.30	1.26	0.13	0.00	0.10	0.01	2,528.14	0.02	0.12	0.39	36.28	2,564.81
		Auxiliary Engine (Transit)	0.43	8,401	1.47	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.00	94.51	0.00	0.00	0.01	1.35	95.87
		Auxiliary Engine (Maneuvering)	0.43	45,475	7.97	0.11	1.96	0.25	0.24	0.00	0.00	0.02	0.00	511.63	0.00	0.02	0.08	7.29	519.00
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	22,685	3.60	0.06	0.91	0.12	0.12	0.00	0.00	0.01	0.00	255.21	0.00	0.01	0.04	3.64	258.89
		Main Engine (Maneuvering)	0.10	93,565	14.86	0.23	3.74	0.50	0.49	0.01	0.00	0.04	0.00	1,052.61	0.01	0.05	0.16	15.00	1,067.77
		Auxiliary Engine (Transit)	0.43	304	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.42	0.00	0.00	0.00	0.05	3.47
		Auxiliary Engine (Maneuvering)	0.43	10,405	1.88	0.03	0.45	0.06	0.06	0.00	0.00	0.00	0.00	117.07	0.00	0.01	0.02	1.67	118.75
Bubble Curtain Power	Air Compressor	Air Compressor	1.00	1,340,640	41.38	3.93	72.41	0.52	0.52	0.14	0.00	0.36	0.01	15,301.68	0.62	0.12	15.52	36.99	15,354.19
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	1.00	300,888	29.72	3.68	16.25	0.93	0.93	0.03	0.00	0.03	0.00	3,434.25	0.14	0.03	3.48	8.30	3,446.03
Offshore Substation Installation (OSS)																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	119,006	22.90	0.32	5.25	0.71	0.69	0.03	0.00	0.05	0.0014	1,477.70	0.01	0.07	0.23	21.10	1,499.02
		Main Engine (Maneuvering)	0.10	61,941	11.92	0.17	2.73	0.37	0.36	0.02	0.00	0.03	0.0007	769.11	0.00	0.04	0.12	10.98	780.21
		Auxiliary Engine (Transit)	0.56	4,188	0.79	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.0000	44.41	0.00	0.00	0.01	0.63	45.05
		Auxiliary Engine (Maneuvering)	0.56	18,094	3.42	0.04	0.73	0.09	0.09	0.00	0.00	0.01	0.0001	191.87	0.00	0.01	0.03	2.73	194.63
	Bubble Curtain Support Vessel	Main Engine (Transit)	0.83	21,278	3.52	0.07	0.85	0.12	0.12	0.01	0.00	0.01	0.0006	237.71	0.00	0.01	0.04	3.41	241.16
		Main Engine (Maneuvering)	0.10	30,344	5.01	0.09	1.21	0.17	0.17	0.02	0.00	0.01	0.0008	339.00	0.00	0.02	0.05	4.87	343.92
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Transport Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	150	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.68	0.00	0.00	0.00	0.02	1.71
		Auxiliary Engine (Maneuvering)	0.43	328	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.69	0.00	0.00	0.00	0.05	3.74
Transport Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	150	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.68	0.00	0.00	0.00	0.02	1.71
		Auxiliary Engine (Maneuvering)	0.43	328	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.69	0.00	0.00	0.00	0.05	3.74
Transport Barge 3	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	150	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.68	0.00	0.00	0.00	0.02	1.71
		Auxiliary Engine (Maneuvering)	0.43	328	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.69	0.00	0.00	0.00	0.05	3.74
Transport Barge 4	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	150	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.68	0.00	0.00	0.00	0.02	1.71
		Auxiliary Engine (Maneuvering)	0.43	328	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.69	0.00	0.00	0.00	0.05	3.74
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	29,145	4.82	0.09	1.16	0.17	0.16	0.02	0.00	0.01	0.0008	325.61	0.00	0.02	0.05	4.67	330.33
		Main Engine (Maneuvering)	0.10	7,697	1.27	0.02	0.31	0.04	0.04	0.00	0.00	0.00	0.0002	85.99	0.00	0.00	0.01	1.23	87.24
		Auxiliary Engine (Transit)	0.43	706	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	7.94	0.00	0.00	0.00	0.11	8.05
		Auxiliary Engine (Maneuvering)	0.43	1,547	0.27	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	17.40	0.00	0.00	0.00	0.25	17.65

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	29,145	4.82	0.09	1.16	0.17	0.16	0.02	0.00	0.01	0.0008	325.61	0.00	0.02	0.05	4.67	330.33
		Main Engine (Maneuvering)	0.10	7,697	1.27	0.02	0.31	0.04	0.04	0.00	0.00	0.00	0.0002	85.99	0.00	0.00	0.01	1.23	87.24
		Auxiliary Engine (Transit)	0.43	706	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	7.94	0.00	0.00	0.00	0.11	8.05
		Auxiliary Engine (Maneuvering)	0.43	1,547	0.27	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	17.40	0.00	0.00	0.00	0.25	17.65
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	0.83	29,145	4.82	0.09	1.16	0.17	0.16	0.02	0.00	0.01	0.0008	325.61	0.00	0.02	0.05	4.67	330.33
		Main Engine (Maneuvering)	0.10	7,697	1.27	0.02	0.31	0.04	0.04	0.00	0.00	0.00	0.0002	85.99	0.00	0.00	0.01	1.23	87.24
		Auxiliary Engine (Transit)	0.43	706	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	7.94	0.00	0.00	0.00	0.11	8.05
		Auxiliary Engine (Maneuvering)	0.43	1,547	0.27	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	17.40	0.00	0.00	0.00	0.25	17.65
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	0.83	29,145	4.82	0.09	1.16	0.17	0.16	0.02	0.00	0.01	0.0008	325.61	0.00	0.02	0.05	4.67	330.33
		Main Engine (Maneuvering)	0.10	7,697	1.27	0.02	0.31	0.04	0.04	0.00	0.00	0.00	0.0002	85.99	0.00	0.00	0.01	1.23	87.24
		Auxiliary Engine (Transit)	0.43	706	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	7.94	0.00	0.00	0.00	0.11	8.05
		Auxiliary Engine (Maneuvering)	0.43	1,547	0.27	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	17.40	0.00	0.00	0.00	0.25	17.65
	Crew Transfer Vessel	Main Engine (Transit)	0.83	1,879	0.30	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	21.14	0.00	0.00	0.00	0.30	21.45
		Main Engine (Maneuvering)	0.10	17,822	2.83	0.04	0.71	0.10	0.09	0.00	0.00	0.01	0.0001	200.50	0.00	0.01	0.03	2.86	203.39
		Auxiliary Engine (Transit)	0.43	25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.28	0.00	0.00	0.00	0.00	0.29
		Auxiliary Engine (Maneuvering)	0.43	1,982	0.36	0.00	0.09	0.01	0.01	0.00	0.00	0.00	0.0000	22.30	0.00	0.00	0.00	0.32	22.62
	Bubble Curtain Power	Air Compressor	1.00	102,600	3.17	0.30	5.54	0.04	0.04	0.01	0.00	0.03	0.0005	1,171.05	0.05	0.01	1.19	2.83	1,175.07
	Hydraulic Hammer Power	Hammer Engine	1.00	23,027	2.27	0.28	1.24	0.07	0.07	0.00	0.00	0.00	0.0001	262.83	0.01	0.00	0.27	0.64	263.73
Scour Protection																			
	Fall Pipe Vessel	Main Engine (Transit)	0.83	112,804	18.58	0.49	4.31	0.67	0.65	0.17	0.00	0.07	0.0076	1,243.32	0.01	0.06	0.20	18.09	1,261.60
		Main Engine (Maneuvering)	0.20	600,172	98.86	2.60	22.92	3.54	3.44	0.89	0.00	0.36	0.0407	6,615.07	0.04	0.32	1.04	96.23	6,712.35
		Auxiliary Engine (Transit)	0.56	10,492	1.80	0.03	0.45	0.06	0.06	0.00	0.00	0.00	0.0001	118.04	0.00	0.01	0.02	1.68	119.74
		Auxiliary Engine (Maneuvering)	0.56	231,655	39.77	0.56	9.97	1.29	1.25	0.02	0.00	0.09	0.0011	2,606.29	0.02	0.12	0.40	37.14	2,643.83
	US Dredger	Main Engine (Transit)	0.83	2,468	0.41	0.01	0.09	0.02	0.01	0.00	0.00	0.00	0.0002	27.01	0.00	0.00	0.00	0.40	27.41
		Main Engine (Maneuvering)	0.20	22,677	3.78	0.11	0.84	0.14	0.13	0.04	0.00	0.01	0.0020	248.22	0.00	0.01	0.04	3.64	251.89
		Auxiliary Engine (Transit)	0.56	1,239	0.21	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	13.94	0.00	0.00	0.00	0.20	14.14
		Auxiliary Engine (Maneuvering)	0.56	47,254	8.08	0.11	2.03	0.26	0.25	0.00	0.00	0.02	0.0002	531.64	0.00	0.03	0.08	7.58	539.30
Inter Array Cable Installation																			
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	0.83	38,374	6.32	0.17	1.47	0.23	0.22	0.06	0.00	0.02	0.0026	422.96	0.00	0.02	0.07	6.15	429.18
		Main Engine (Maneuvering)	0.20	488,234	80.42	2.12	18.64	2.88	2.80	0.72	0.00	0.29	0.0331	5,381.30	0.03	0.26	0.85	78.28	5,460.43
		Auxiliary Engine (Transit)	0.43	601	0.10	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.76	0.00	0.00	0.00	0.10	6.86
		Auxiliary Engine (Maneuvering)	0.43	31,722	5.45	0.08	1.37	0.18	0.17	0.00	0.00	0.01	0.0002	356.89	0.00	0.02	0.06	5.09	362.03
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	0.16	4,877	0.80	0.02	0.19	0.03	0.03	0.01	0.00	0.00	0.0003	53.76	0.00	0.00	0.01	0.78	54.55
		Main Engine (Maneuvering)	0.10	104,983	17.29	0.46	4.01	0.62	0.60	0.15	0.00	0.06	0.0071	1,157.12	0.01	0.06	0.18	16.83	1,174.13
		Auxiliary Engine (Transit)	0.16	813	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	9.15	0.00	0.00	0.00	0.13	9.28
		Auxiliary Engine (Maneuvering)	0.10	17,497	3.00	0.04	0.75	0.10	0.09	0.00	0.00	0.01	0.0001	196.86	0.00	0.01	0.03	2.81	199.69
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	0.83	6,761	1.13	0.03	0.25	0.04	0.04	0.01	0.00	0.00	0.0006	74.00	0.00	0.00	0.01	1.08	75.10
		Main Engine (Maneuvering)	0.20	56,259	9.37	0.27	2.08	0.35	0.33	0.11	0.00	0.04	0.0050	615.79	0.00	0.03	0.10	9.02	624.91
		Auxiliary Engine (Transit)	0.56	3,395	0.58	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0000	38.19	0.00	0.00	0.01	0.54	38.74
		Auxiliary Engine (Maneuvering)	0.56	117,229	20.04	0.28	5.05	0.65	0.63	0.01	0.00	0.04	0.0006	1,318.91	0.01	0.06	0.20	18.80	1,337.91
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	0.83	17,315	2.86	0.05	0.69	0.10	0.10	0.01	0.00	0.01	0.0005	193.44	0.00	0.01	0.03	2.78	196.24
		Main Engine (Maneuvering)	0.20	57,920	9.57	0.18	2.30	0.33	0.32	0.03	0.00	0.03	0.0015	647.08	0.00	0.03	0.10	9.29	656.46
		Auxiliary Engine (Transit)	0.43	817	0.14	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.0000	9.20	0.00	0.00	0.00	0.13	9.33
		Auxiliary Engine (Maneuvering)	0.43	11,346	1.99	0.03	0.49	0.06	0.06	0.00	0.00	0.00	0.0001	127.65	0.00	0.01	0.02	1.82	129.49
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	0.83	17,315	2.86	0.05	0.69	0.10	0.10	0.01	0.00	0.01	0.0005	193.44	0.00	0.01	0.03	2.78	196.24
		Main Engine (Maneuvering)	0.20	57,920	9.57	0.18	2.30	0.33	0.32	0.03	0.00	0.03	0.0015	647.08	0.00	0.03	0.10	9.29	656.46
		Auxiliary Engine (Transit)	0.43	817	0.14	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.0000	9.20	0.00	0.00	0.00	0.13	9.33
		Auxiliary Engine (Maneuvering)	0.43	11,346	1.99	0.03	0.49	0.06	0.06	0.00	0.00	0.00	0.0001	127.65	0.00	0.01	0.02	1.82	129.49
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	112,804	18.58	0.49	4.31	0.67	0.65	0.17	0.00	0.07	0.0076	1,243.32	0.01	0.06	0.20	18.09	1,261.60
		Main Engine (Maneuvering)	0.20	18,121	2.98	0.08	0.69	0.11	0.10	0.03	0.00	0.01	0.0012	199.73	0.00	0.01	0.03	2.91	202.67
		Auxiliary Engine (Transit)	0.56	10,492	1.80	0.03	0.45	0.06	0.06	0.00	0.00	0.00	0.0001	118.04	0.00	0.01	0.02	1.68	119.74
		Auxiliary Engine (Maneuvering)	0.56	6,994	1.20	0.02	0.30	0.04	0.04	0.00	0.00	0.00	0.0000	78.69	0.00	0.00	0.01	1.12	79.83

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
WTG Installation																			
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	0.83	38,440	7.40	0.10	1.70	0.23	0.22	0.01	0.00	0.02	0.0004	477.30	0.00	0.02	0.07	6.81	484.19
		Main Engine (Maneuvering)	0.20	3,149,526	606.18	8.46	139.00	18.74	18.13	0.79	0.00	1.31	0.0361	39,107.47	0.24	1.87	6.04	558.32	39,671.83
		Auxiliary Engine (Transit)	0.43	2,802	0.53	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.0000	29.72	0.00	0.00	0.00	0.42	30.14
		Auxiliary Engine (Maneuvering)	0.43	952,844	180.04	2.18	38.66	4.99	4.83	0.09	0.00	0.34	0.0043	10,104.14	0.06	0.48	1.56	144.00	10,249.70
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	0.83	435,034	83.73	1.17	19.20	2.59	2.50	0.11	0.00	0.18	0.0050	5,401.79	0.03	0.26	0.83	77.12	5,479.74
		Main Engine (Maneuvering)	0.20	328,773	63.28	0.88	14.51	1.96	1.89	0.08	0.00	0.14	0.0038	4,082.36	0.03	0.20	0.63	58.28	4,141.27
		Auxiliary Engine (Transit)	0.43	124,586	24.98	0.30	5.36	0.69	0.67	0.01	0.00	0.05	0.0006	1,401.68	0.01	0.07	0.22	19.98	1,421.87
		Auxiliary Engine (Maneuvering)	0.43	390,742	78.33	0.95	16.82	2.17	2.10	0.04	0.00	0.15	0.0019	4,396.13	0.03	0.21	0.68	62.65	4,459.46
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	0.83	435,034	83.73	1.17	19.20	2.59	2.50	0.11	0.00	0.18	0.0050	5,401.79	0.03	0.26	0.83	77.12	5,479.74
		Main Engine (Maneuvering)	0.20	328,773	63.28	0.88	14.51	1.96	1.89	0.08	0.00	0.14	0.0038	4,082.36	0.03	0.20	0.63	58.28	4,141.27
		Auxiliary Engine (Transit)	0.43	124,586	24.98	0.30	5.36	0.69	0.67	0.01	0.00	0.05	0.0006	1,401.68	0.01	0.07	0.22	19.98	1,421.87
		Auxiliary Engine (Maneuvering)	0.43	390,742	78.33	0.95	16.82	2.17	2.10	0.04	0.00	0.15	0.0019	4,396.13	0.03	0.21	0.68	62.65	4,459.46
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	0.83	17,450	2.77	0.04	0.70	0.09	0.09	0.00	0.00	0.01	0.0001	196.31	0.00	0.01	0.03	2.80	199.14
		Main Engine (Maneuvering)	0.20	329,122	52.27	0.80	13.14	1.77	1.71	0.03	0.00	0.12	0.0016	3,702.63	0.02	0.18	0.57	52.77	3,755.97
		Auxiliary Engine (Transit)	0.43	234	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	2.63	0.00	0.00	0.00	0.04	2.67
		Auxiliary Engine (Maneuvering)	0.43	18,301	3.30	0.04	0.79	0.10	0.10	0.00	0.00	0.01	0.0001	205.90	0.00	0.01	0.03	2.93	208.86
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	0.16	1,780	0.29	0.01	0.07	0.01	0.01	0.00	0.00	0.00	0.0001	19.62	0.00	0.00	0.00	0.29	19.91
		Main Engine (Maneuvering)	0.10	394,004	64.90	1.71	15.05	2.33	2.26	0.58	0.00	0.23	0.0267	4,342.70	0.03	0.21	0.68	63.18	4,406.56
		Auxiliary Engine (Transit)	0.16	297	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.34	0.00	0.00	0.00	0.05	3.39
		Auxiliary Engine (Maneuvering)	0.10	65,667	11.27	0.16	2.83	0.36	0.35	0.01	0.00	0.02	0.0003	738.81	0.00	0.04	0.11	10.53	749.45
Export Cable Installation																			
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	0.83	17,211	2.83	0.07	0.66	0.10	0.10	0.03	0.00	0.01	0.0012	189.69	0.00	0.01	0.03	2.76	192.48
		Main Engine (Maneuvering)	0.20	949,035	156.32	4.12	36.24	5.60	5.44	1.40	0.00	0.57	0.0643	10,460.23	0.07	0.51	1.65	152.17	10,614.04
		Auxiliary Engine (Transit)	0.56	3,634	0.62	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.0000	40.89	0.00	0.00	0.01	0.58	41.48
		Auxiliary Engine (Maneuvering)	0.56	831,706	142.77	2.02	35.80	4.62	4.48	0.09	0.00	0.32	0.0040	9,357.28	0.06	0.45	1.44	133.36	9,492.09
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	0.83	17,211	2.83	0.07	0.66	0.10	0.10	0.03	0.00	0.01	0.0012	189.69	0.00	0.01	0.03	2.76	192.48
		Main Engine (Maneuvering)	0.20	949,035	156.32	4.12	36.24	5.60	5.44	1.40	0.00	0.57	0.0643	10,460.23	0.07	0.51	1.65	152.17	10,614.04
		Auxiliary Engine (Transit)	0.56	3,634	0.62	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.0000	40.89	0.00	0.00	0.01	0.58	41.48
		Auxiliary Engine (Maneuvering)	0.56	831,706	142.77	2.02	35.80	4.62	4.48	0.09	0.00	0.32	0.0040	9,357.28	0.06	0.45	1.44	133.36	9,492.09
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	0.83	12,478	2.06	0.05	0.48	0.07	0.07	0.02	0.00	0.01	0.0008	137.53	0.00	0.01	0.02	2.00	139.55
		Main Engine (Maneuvering)	0.20	138,404	22.80	0.60	5.28	0.82	0.79	0.20	0.00	0.08	0.0094	1,525.48	0.01	0.07	0.24	22.19	1,547.92
		Auxiliary Engine (Transit)	0.56	2,580	0.44	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.0000	29.03	0.00	0.00	0.00	0.41	29.45
		Auxiliary Engine (Maneuvering)	0.56	118,781	20.39	0.29	5.11	0.66	0.64	0.01	0.00	0.05	0.0006	1,336.37	0.01	0.06	0.21	19.05	1,355.62
TSHD	Dredger	Main Engine (Transit)	0.83	2,468	0.41	0.01	0.09	0.02	0.01	0.00	0.00	0.00	0.0002	27.01	0.00	0.00	0.00	0.40	27.41
		Main Engine (Maneuvering)	0.20	98,921	16.48	0.48	3.66	0.62	0.58	0.19	0.00	0.06	0.0088	1,082.75	0.01	0.05	0.17	15.86	1,098.78
		Auxiliary Engine (Transit)	0.56	1,239	0.21	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	13.94	0.00	0.00	0.00	0.20	14.14
		Auxiliary Engine (Maneuvering)	0.56	206,123	35.24	0.50	8.87	1.14	1.11	0.02	0.00	0.08	0.0010	2,319.03	0.01	0.11	0.36	33.05	2,352.44
AHTS	Tug	Main Engine (Transit)	0.83	17,315	2.86	0.05	0.69	0.10	0.10	0.01	0.00	0.01	0.0005	193.44	0.00	0.01	0.03	2.78	196.24
		Main Engine (Maneuvering)	0.20	282,588	46.69	0.88	11.23	1.62	1.57	0.16	0.00	0.13	0.0074	3,157.05	0.02	0.15	0.49	45.31	3,202.85
		Auxiliary Engine (Transit)	0.43	817	0.14	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.0000	9.20	0.00	0.00	0.00	0.13	9.33
		Auxiliary Engine (Maneuvering)	0.43	55,356	9.70	0.13	2.38	0.31	0.30	0.01	0.00	0.02	0.0003	622.79	0.00	0.03	0.10	8.88	631.77
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	112,804	18.58	0.49	4.31	0.67	0.65	0.17	0.00	0.07	0.0076	1,243.32	0.01	0.06	0.20	18.09	1,261.60
		Main Engine (Maneuvering)	0.20	39,142	6.45	0.17	1.49	0.23	0.22	0.06	0.00	0.02	0.0027	431.42	0.00	0.02	0.07	6.28	437.76
		Auxiliary Engine (Transit)	0.56	10,492	1.80	0.03	0.45	0.06	0.06	0.00	0.00	0.00	0.0001	118.04	0.00	0.01	0.02	1.68	119.74
		Auxiliary Engine (Maneuvering)	0.56	15,108	2.59	0.04	0.65	0.08	0.08	0.00	0.00	0.01	0.0001	169.98	0.00	0.01	0.03	2.42	172.42

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Fuel Bunkering																			
Towing Tug	Tug	Main Engine (Transit)	0.83	116,582	19.26	0.36	4.63	0.67	0.65	0.07	0.00	0.05	0.0031	1,302.44	0.01	0.06	0.20	18.69	1,321.34
		Main Engine (Maneuvering)	0.20	258,621	42.73	0.81	10.28	1.48	1.44	0.15	0.00	0.12	0.0068	2,889.30	0.02	0.14	0.45	41.47	2,931.21
		Auxiliary Engine (Transit)	0.43	2,823	0.49	0.01	0.12	0.02	0.02	0.00	0.00	0.00	0.0000	31.76	0.00	0.00	0.00	0.45	32.21
		Auxiliary Engine (Maneuvering)	0.43	25,986	4.56	0.06	1.12	0.14	0.14	0.00	0.00	0.01	0.0001	292.36	0.00	0.01	0.05	4.17	296.57
Barge	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	598	0.13	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.73	0.00	0.00	0.00	0.10	6.82
		Auxiliary Engine (Maneuvering)	0.43	5,505	1.20	0.01	0.24	0.03	0.03	0.00	0.00	0.00	0.0000	61.94	0.00	0.00	0.01	0.88	62.83
Motion Compensation	Motion Compensation	Motion Compensation Engine	1.00	144,000	8.89	1.10	7.78	0.44	0.44	0.02	0.00	0.02	0.0007	1,643.57	0.07	0.01	1.67	3.97	1,649.21
Commissioning Generators																			
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	96,000	8.59	1.03	7.41	0.15	0.14	0.01	0.00	0.03	0.00	1,095.72	0.04	0.01	1.11	2.65	1,099.48
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	53,186	4.43	0.53	4.10	0.10	0.10	0.01	0.00	0.01	0.00	607.05	0.02	0.00	0.62	1.47	609.13
Miscellaneous																			
Marine Paint	N/A	N/A	N/A	N/A	N/A	0.75	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
Fuel Evaporation	N/A	N/A	N/A	N/A	N/A	0.23	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

Total Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	3,370,306.2	447.1	11.6	153.7	13.9	13.5	1.0	0.002	1.2	38,752.2	0.7	1.4	17.0	402.9	39,172.1
Offshore Substation Installation (OSS)	280,237.4	41.4	0.9	12.5	1.3	1.3	0.1	0.000	0.1	3,253.6	0.0	0.1	1.1	38.0	3,292.7
Scour Protection	681,350.4	113.6	2.6	27.0	4.0	3.8	0.7	0.000	0.4	7,553.6	0.0	0.4	1.2	109.2	7,664.0
Inter Array Cable Installation	786,571.5	130.7	3.0	30.9	4.6	4.4	0.9	0.001	0.4	8,715.5	0.1	0.4	1.4	126.1	8,843.0
WTG Installation	5,083,172.5	972.4	13.7	220.3	29.5	28.6	1.4	0.004	2.1	60,864.6	0.4	2.9	9.4	869.3	61,743.3
Export Cable Installation	2,361,137.0	396.4	8.1	95.4	13.6	13.1	1.9	0.002	1.2	26,281.4	0.2	1.3	4.1	378.6	26,664.0
Fuel Bunkering	379,578.1	53.0	1.6	16.6	1.9	1.9	0.2	0.000	0.1	4,266.1	0.1	0.2	1.6	47.9	4,315.6
Commissioning Generators	60,205.7	5.2	0.6	4.6	0.1	0.1	0.0	0.000	0.0	687.2	0.0	0.0	0.7	1.7	689.5
Miscellaneous	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	13,002,558.7	2,159.8	43.0	560.8	68.9	66.8	6.2	0.009	5.6	150,374.1	1.5	6.6	36.4	1,973.8	152,384.3

Vessel Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	2,253,620.5	398.7	6.4	93.4	12.9	12.5	0.9	0.002	1.0	26,006.6	0.2	1.2	4.0	372.1	26,382.8
Offshore Substation Installation (OSS)	217,423.9	38.7	0.6	9.1	1.3	1.2	0.1	0.000	0.1	2,536.6	0.0	0.1	0.4	36.3	2,573.3
Scour Protection	681,350.4	113.6	2.6	27.0	4.0	3.8	0.7	0.000	0.4	7,553.6	0.0	0.4	1.2	109.2	7,664.0
Inter Array Cable Installation	786,571.5	130.7	3.0	30.9	4.6	4.4	0.9	0.001	0.4	8,715.5	0.1	0.4	1.4	126.1	8,843.0
WTG Installation	5,083,172.5	972.4	13.7	220.3	29.5	28.6	1.4	0.004	2.1	60,864.6	0.4	2.9	9.4	869.3	61,743.3
Export Cable Installation	2,361,137.0	396.4	8.1	95.4	13.6	13.1	1.9	0.002	1.2	26,281.4	0.2	1.3	4.1	378.6	26,664.0
Fuel Bunkering	281,863.8	47.0	0.9	11.3	1.6	1.6	0.2	0.000	0.1	3,150.8	0.0	0.2	0.5	45.2	3,196.5
Commissioning Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	11,665,139.5	2,097.5	35.3	487.2	67.5	65.3	6.0	0.009	5.2	135,109.2	0.8	6.5	21.0	1,936.9	137,067.0

Non-Vessel Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	1,116,685.7	48.4	5.2	60.3	1.0	1.0	0.1	0.00	0.3	12,745.5	0.5	0.1	12.9	30.8	12,789.3
Offshore Substation Installation (OSS)	62,813.6	2.7	0.3	3.4	0.1	0.1	0.0	0.00	0.0	716.9	0.0	0.0	0.7	1.7	719.4
Scour Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inter Array Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WTG Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Export Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Bunkering	97,714.3	6.0	0.7	5.3	0.3	0.3	0.0	0.00	0.0	1,115.3	0.0	0.0	1.1	2.7	1,119.1
Commissioning Generators	60,205.7	5.2	0.6	4.6	0.1	0.1	0.0	0.00	0.0	687.2	0.0	0.0	0.7	1.7	689.5
Miscellaneous	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	1,337,419.3	62.3	7.7	73.6	1.4	1.4	0.1	0.00	0.3	15,264.9	0.6	0.1	15.5	36.9	15,317.3
Engines Only B02		62.3	6.8	73.6	1.4	1.4	0.1	0.00	0.3	15,264.9	0.6	0.1	15.5	36.9	15,317.3

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Construction																	
Foundation Installation (FOU) B02																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	1	250	500	10	50	0	0	0	50	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	200	24	4,800	4,800	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		1	250	500	10	50	0	0	0	50	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	200	24	4,800	4,800	7A
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	200	24	4,800	4,800	11M
		Auxiliary Engine (Transit)	0	0	0	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	0	0	0	1 & 2 auxiliary		0	91	0	10	0	200	24	4,800	4,800	11A
Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	34	91	6,204	7	886	0	0	0	886	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	200	24	4,800	4,800	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		34	91	6,204	7	886	0	0	0	886	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	200	24	4,800	4,800	2A
Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	34	91	6,204	7	886	0	0	0	886	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	200	24	4,800	4,800	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		34	91	6,204	7	886	0	0	0	886	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	200	24	4,800	4,800	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	34	91	6,204	7	886	0	0	0	886	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	200	24	4,800	4,800	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		34	91	6,204	7	886	0	0	0	886	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	200	24	4,800	4,800	11A
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	34	91	6,204	7	886	0	0	0	886	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	200	24	4,800	4,800	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		34	91	6,204	7	886	0	0	0	886	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	200	24	4,800	4,800	11A
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	115	17	3,997	29	140	0	0	0	140	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	200	24	4,800	4,800	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		115	17	3,997	29	140	0	0	0	140	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	200	24	4,800	4,800	4A
Bubble Curtain Power	Air Compressor	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	200	8	1,600	1,600	16
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	200	8	1,600	1,600	18
Offshore Substation Installation (OSS)																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	1	250	500	10	50	0	0	0	50	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	9	24	216	216	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		1	250	500	10	50	0	0	0	50	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	9	24	216	216	7A
	Bubble Curtain Support Vessel	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	9	24	216	216	11M
		Auxiliary Engine (Transit)	0	0	0	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	0	0	0	1 & 2 auxiliary		0	91	0	10	0	9	24	216	216	11A
Transport Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 3	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 4	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	7	17	243	29	9	0	0	0	9	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	28	24	672	672	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		7	17	243	29	9	0	0	0	9	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	28	24	672	672	4A
	Bubble Curtain Power	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	9	10	90	90	16
	Hydraulic Hammer Power	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	9	10	90	90	18
Scour Protection																	
	Fall Pipe Vessel	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	63	24	1,512	1,512	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	63	24	1,512	1,512	3A
	US Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	40	24	960	960	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	40	24	960	960	5A
Inter Array Cable Installation																	
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	250	0	10	0	150	24	3,600	3,600	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	250	0	10	0	150	24	3,600	3,600	3A
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	250	0	10	0	94	24	2,256	2,256	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	250	0	10	0	94	24	2,256	2,256	3A
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	2	641	1,283	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	250	0	10	0	98	24	2,352	2,352	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	250	0	10	0	98	24	2,352	2,352	5A
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	15	24	360	360	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	15	24	360	360	11A
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	15	24	360	360	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	15	24	360	360	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	2	24	48	48	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	2	24	48	48	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
WTG Installation																	
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main	NJWP	1	91	182	10	18	0	0	0	18	7M
		Main Engine (Maneuvering)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main		0	91	0	10	0	352	24	8,448	8,448	7M
		Auxiliary Engine (Transit)	1	2,650	2,650	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	7A
		Auxiliary Engine (Maneuvering)	1	2,650	2,650	1 & 2 auxiliary		0	91	0	10	0	352	24	8,448	8,448	7A
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	68	91	12,409	10	1,241	0	0	0	1,241	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	163	24	3,912	3,912	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		68	91	12,409	10	1,241	0	0	0	1,241	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	163	24	3,912	3,912	7A
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	68	91	12,409	10	1,241	0	0	0	1,241	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	163	24	3,912	3,912	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		68	91	12,409	10	1,241	0	0	0	1,241	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	163	24	3,912	3,912	7A
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	89	17	3,094	29	109	0	0	0	109	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	352	24	8,448	8,448	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		89	17	3,094	29	109	0	0	0	109	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	352	24	8,448	8,448	4A
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	91	0	10	0	352	24	8,448	8,448	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	91	0	10	0	352	24	8,448	8,448	3A
Export Cable Installation																	
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	174	24	4,176	4,176	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	174	24	4,176	4,176	3A
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	174	24	4,176	4,176	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	174	24	4,176	4,176	3A
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main		0	91	0	10	0	35	24	840	840	3M
		Auxiliary Engine (Transit)	2	994	1,988	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	994	1,988	1 & 2 auxiliary		0	91	0	10	0	35	24	840	840	3A
TSHD	Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	127	24	3,048	3,048	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	127	24	3,048	3,048	5A
AHTS	Tug	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	52	24	1,248	1,248	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	52	24	1,248	1,248	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	3	24	72	72	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Fuel Bunkering																	
Towing Tug	Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	17	91	3,102	10	310	0	0	0	310	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	114	24	2,736	2,736	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		17	91	3,102	10	310	0	0	0	310	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	114	24	2,736	2,736	11A
Barge	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	17	91	3,102	10	310	0	0	0	310	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	114	24	2,736	2,736	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		17	91	3,102	10	310	0	0	0	310	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	114	24	2,736	2,736	2A
Motion Compensation	Motion Compensation	Motion Compensation Engine	1	500	500	Tier 3 Non-Road	NJWP	0	91	0	0	0	114	24	2,736	2,736	17
Commissioning Generators																	
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Tier 4 Non-Road	N/A	0	0	0	0	0	28	12	336	336	31
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	1	240	240	Tier 4 Non-Road	N/A	0	0	0	0	0	352	12	4,224	4,224	32
Miscellaneous																	
Marine Paint	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	N/A	N/A	N/A
Fuel Evaporation	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	N/A	N/A	N/A

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Construction																			
Foundation Installation (FOU) B02																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	59,503	11.45	0.16	2.63	0.35	0.34	0.01	0.00	0.02	0.0007	738.85	0.00	0.04	0.11	10.55	749.51
		Main Engine (Maneuvering)	0.10	688,230	132.46	1.85	30.38	4.09	3.96	0.17	0.00	0.29	0.0079	8,545.71	0.05	0.41	1.32	122.00	8,669.03
		Auxiliary Engine (Transit)	0.56	2,094	0.40	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	22.21	0.00	0.00	0.00	0.32	22.53
		Auxiliary Engine (Maneuvering)	0.56	201,043	37.99	0.46	8.16	1.05	1.02	0.02	0.00	0.07	0.0009	2,131.89	0.01	0.10	0.33	30.38	2,162.61
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	0.83	10,639	1.76	0.03	0.42	0.06	0.06	0.01	0.00	0.00	0.0003	118.86	0.00	0.01	0.02	1.71	120.58
		Main Engine (Maneuvering)	0.10	337,155	55.71	1.05	13.40	1.93	1.87	0.19	0.00	0.15	0.0089	3,766.67	0.02	0.18	0.59	54.06	3,821.31
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	1,210	0.26	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	13.62	0.00	0.00	0.00	0.19	13.81
		Auxiliary Engine (Maneuvering)	0.43	6,554	1.43	0.02	0.28	0.04	0.04	0.00	0.00	0.00	0.0000	73.74	0.00	0.00	0.01	1.05	74.80
Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	1,210	0.26	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	13.62	0.00	0.00	0.00	0.19	13.81
		Auxiliary Engine (Maneuvering)	0.43	6,554	1.43	0.02	0.28	0.04	0.04	0.00	0.00	0.00	0.0000	73.74	0.00	0.00	0.01	1.05	74.80
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	235,939	38.99	0.74	9.38	1.35	1.31	0.14	0.00	0.11	0.0062	2,635.89	0.02	0.13	0.41	37.83	2,674.13
		Main Engine (Maneuvering)	0.10	153,941	25.44	0.48	6.12	0.88	0.86	0.09	0.00	0.07	0.0041	1,719.82	0.01	0.08	0.27	24.68	1,744.77
		Auxiliary Engine (Transit)	0.43	5,712	1.00	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.0000	64.27	0.00	0.00	0.01	0.92	65.19
		Auxiliary Engine (Maneuvering)	0.43	30,935	5.42	0.08	1.33	0.17	0.17	0.00	0.00	0.01	0.0001	348.04	0.00	0.02	0.05	4.96	353.06
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	235,939	38.99	0.74	9.38	1.35	1.31	0.14	0.00	0.11	0.0062	2,635.89	0.02	0.13	0.41	37.83	2,674.13
		Main Engine (Maneuvering)	0.10	153,941	25.44	0.48	6.12	0.88	0.86	0.09	0.00	0.07	0.0041	1,719.82	0.01	0.08	0.27	24.68	1,744.77
		Auxiliary Engine (Transit)	0.43	5,712	1.00	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.0000	64.27	0.00	0.00	0.01	0.92	65.19
		Auxiliary Engine (Maneuvering)	0.43	30,935	5.42	0.08	1.33	0.17	0.17	0.00	0.00	0.01	0.0001	348.04	0.00	0.02	0.05	4.96	353.06
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	15,437	2.45	0.04	0.62	0.08	0.08	0.00	0.00	0.01	0.0001	173.66	0.00	0.01	0.03	2.48	176.17
		Main Engine (Maneuvering)	0.10	63,650	10.11	0.15	2.54	0.34	0.33	0.01	0.00	0.02	0.0003	716.06	0.00	0.03	0.11	10.21	726.38
		Auxiliary Engine (Transit)	0.43	207	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	2.33	0.00	0.00	0.00	0.03	2.36
		Auxiliary Engine (Maneuvering)	0.43	7,078	1.28	0.02	0.30	0.04	0.04	0.00	0.00	0.00	0.0000	79.64	0.00	0.00	0.01	1.13	80.78
Bubble Curtain Power	Air Compressor	Air Compressor	1.00	912,000	28.15	2.67	49.26	0.35	0.35	0.10	0.00	0.25	0.0044	10,409.31	0.42	0.08	10.56	25.16	10,445.03
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	1.00	204,686	20.22	2.50	11.06	0.63	0.63	0.02	0.00	0.02	0.0010	2,336.22	0.09	0.02	2.37	5.65	2,344.24
Offshore Substation Installation (OSS)																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	59,503	11.45	0.16	2.63	0.35	0.34	0.01	0.00	0.02	0.0007	738.85	0.00	0.04	0.11	10.55	749.51
		Main Engine (Maneuvering)	0.10	30,970	5.96	0.08	1.37	0.18	0.18	0.01	0.00	0.01	0.0004	384.56	0.00	0.02	0.06	5.49	390.11
		Auxiliary Engine (Transit)	0.56	2,094	0.40	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	22.21	0.00	0.00	0.00	0.32	22.53
		Auxiliary Engine (Maneuvering)	0.56	9,047	1.71	0.02	0.37	0.05	0.05	0.00	0.00	0.00	0.0000	95.94	0.00	0.00	0.01	1.37	97.32
	Bubble Curtain Support Vessel	Main Engine (Transit)	0.83	10,639	1.76	0.03	0.42	0.06	0.06	0.01	0.00	0.00	0.0003	118.86	0.00	0.01	0.02	1.71	120.58
		Main Engine (Maneuvering)	0.10	15,172	2.51	0.05	0.60	0.09	0.08	0.01	0.00	0.01	0.0004	169.50	0.00	0.01	0.03	2.43	171.96
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Transport Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 3	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 4	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
	Crew Transfer Vessel	Main Engine (Transit)	0.83	940	0.15	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.0000	10.57	0.00	0.00	0.00	0.15	10.72
		Main Engine (Maneuvering)	0.10	8,911	1.42	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.0000	100.25	0.00	0.00	0.02	1.43	101.69
		Auxiliary Engine (Transit)	0.43	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.14	0.00	0.00	0.00	0.00	0.14
		Auxiliary Engine (Maneuvering)	0.43	991	0.18	0.00	0.04	0.01	0.01	0.00	0.00	0.00	0.0000	11.15	0.00	0.00	0.00	0.16	11.31
	Bubble Curtain Power	Air Compressor	1.00	51,300	1.58	0.15	2.77	0.02	0.02	0.01	0.00	0.01	0.0002	585.52	0.02	0.00	0.59	1.42	587.53
	Hydraulic Hammer Power	Hammer Engine	1.00	11,514	1.14	0.14	0.62	0.04	0.04	0.00	0.00	0.00	0.0001	131.41	0.01	0.00	0.13	0.32	131.86
Scour Protection																			
	Fall Pipe Vessel	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	410,987	67.70	1.78	15.69	2.43	2.35	0.61	0.00	0.24	0.0279	4,529.89	0.03	0.22	0.71	65.90	4,596.50
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	158,633	27.23	0.39	6.83	0.88	0.85	0.02	0.00	0.06	0.0008	1,784.74	0.01	0.09	0.28	25.44	1,810.45
	US Dredger	Main Engine (Transit)	0.83	1,234	0.21	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.0001	13.50	0.00	0.00	0.00	0.20	13.70
		Main Engine (Maneuvering)	0.20	15,640	2.61	0.08	0.58	0.10	0.09	0.03	0.00	0.01	0.0014	171.19	0.00	0.01	0.03	2.51	173.72
		Auxiliary Engine (Transit)	0.56	619	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.97	0.00	0.00	0.00	0.10	7.07
		Auxiliary Engine (Maneuvering)	0.56	32,589	5.57	0.08	1.40	0.18	0.18	0.00	0.00	0.01	0.0002	366.65	0.00	0.02	0.06	5.23	371.93
Inter Array Cable Installation																			
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	0.83	19,187	3.16	0.08	0.73	0.11	0.11	0.03	0.00	0.01	0.0013	211.48	0.00	0.01	0.03	3.08	214.59
		Main Engine (Maneuvering)	0.20	332,887	54.83	1.44	12.71	1.96	1.91	0.49	0.00	0.20	0.0226	3,669.07	0.02	0.18	0.58	53.38	3,723.02
		Auxiliary Engine (Transit)	0.56	391	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.40	0.00	0.00	0.00	0.06	4.46
		Auxiliary Engine (Maneuvering)	0.56	28,167	4.84	0.07	1.21	0.16	0.15	0.00	0.00	0.01	0.0001	316.90	0.00	0.02	0.05	4.52	321.47
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	0.16	2,439	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.0002	26.88	0.00	0.00	0.00	0.39	27.27
		Main Engine (Maneuvering)	0.10	71,626	11.80	0.31	2.74	0.42	0.41	0.11	0.00	0.04	0.0049	789.45	0.00	0.04	0.12	11.48	801.06
		Auxiliary Engine (Transit)	0.16	406	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.57	0.00	0.00	0.00	0.07	4.64
		Auxiliary Engine (Maneuvering)	0.10	11,938	2.05	0.03	0.51	0.07	0.06	0.00	0.00	0.00	0.0001	134.31	0.00	0.01	0.02	1.91	136.24
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	0.83	3,380	0.56	0.02	0.12	0.02	0.02	0.01	0.00	0.00	0.0003	37.00	0.00	0.00	0.01	0.54	37.55
		Main Engine (Maneuvering)	0.20	38,317	6.38	0.19	1.42	0.24	0.23	0.07	0.00	0.03	0.0034	419.40	0.00	0.02	0.07	6.14	425.61
		Auxiliary Engine (Transit)	0.56	1,697	0.29	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	19.10	0.00	0.00	0.00	0.27	19.37
		Auxiliary Engine (Maneuvering)	0.56	79,842	13.65	0.19	3.44	0.44	0.43	0.01	0.00	0.03	0.0004	898.28	0.01	0.04	0.14	12.80	911.22
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	41,154	6.80	0.13	1.64	0.24	0.23	0.02	0.00	0.02	0.0011	459.76	0.00	0.02	0.07	6.60	466.43
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	8,062	1.41	0.02	0.35	0.04	0.04	0.00	0.00	0.00	0.0000	90.70	0.00	0.00	0.01	1.29	92.00
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	41,154	6.80	0.13	1.64	0.24	0.23	0.02	0.00	0.02	0.0011	459.76	0.00	0.02	0.07	6.60	466.43
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	8,062	1.41	0.02	0.35	0.04	0.04	0.00	0.00	0.00	0.0000	90.70	0.00	0.00	0.01	1.29	92.00
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	13,047	2.15	0.06	0.50	0.08	0.07	0.02	0.00	0.01	0.0009	143.81	0.00	0.01	0.02	2.09	145.92
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	5,036	0.86	0.01	0.22	0.03	0.03	0.00	0.00	0.00	0.0000	56.66	0.00	0.00	0.01	0.81	57.47

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
WTG Installation																			
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	0.83	19,220	3.70	0.05	0.85	0.11	0.11	0.00	0.00	0.01	0.0002	238.65	0.00	0.01	0.04	3.41	242.09
		Main Engine (Maneuvering)	0.20	2,144,012	412.65	5.76	94.63	12.75	12.34	0.53	0.00	0.89	0.0246	26,622.07	0.16	1.28	4.11	380.07	27,006.25
		Auxiliary Engine (Transit)	0.43	1,321	0.26	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.0000	14.86	0.00	0.00	0.00	0.21	15.07
		Auxiliary Engine (Maneuvering)	0.43	611,366	122.56	1.49	26.32	3.40	3.29	0.06	0.00	0.23	0.0029	6,878.31	0.04	0.33	1.06	98.03	6,977.40
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	0.83	295,823	56.94	0.79	13.06	1.76	1.70	0.07	0.00	0.12	0.0034	3,673.22	0.02	0.18	0.57	52.44	3,726.22
		Main Engine (Maneuvering)	0.20	224,722	43.25	0.60	9.92	1.34	1.29	0.06	0.00	0.09	0.0026	2,790.37	0.02	0.13	0.43	39.84	2,830.63
		Auxiliary Engine (Transit)	0.43	84,718	16.98	0.21	3.65	0.47	0.46	0.01	0.00	0.03	0.0004	953.14	0.01	0.05	0.15	13.58	966.87
		Auxiliary Engine (Maneuvering)	0.43	267,079	53.54	0.65	11.50	1.48	1.44	0.03	0.00	0.10	0.0013	3,004.83	0.02	0.14	0.46	42.82	3,048.12
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	0.83	295,823	56.94	0.79	13.06	1.76	1.70	0.07	0.00	0.12	0.0034	3,673.22	0.02	0.18	0.57	52.44	3,726.22
		Main Engine (Maneuvering)	0.20	224,722	43.25	0.60	9.92	1.34	1.29	0.06	0.00	0.09	0.0026	2,790.37	0.02	0.13	0.43	39.84	2,830.63
		Auxiliary Engine (Transit)	0.43	84,718	16.98	0.21	3.65	0.47	0.46	0.01	0.00	0.03	0.0004	953.14	0.01	0.05	0.15	13.58	966.87
		Auxiliary Engine (Maneuvering)	0.43	267,079	53.54	0.65	11.50	1.48	1.44	0.03	0.00	0.10	0.0013	3,004.83	0.02	0.14	0.46	42.82	3,048.12
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	0.83	11,947	1.90	0.03	0.48	0.06	0.06	0.00	0.00	0.00	0.0001	134.40	0.00	0.01	0.02	1.92	136.34
		Main Engine (Maneuvering)	0.20	224,047	35.58	0.54	8.94	1.21	1.17	0.02	0.00	0.08	0.0011	2,520.53	0.02	0.12	0.39	35.92	2,556.85
		Auxiliary Engine (Transit)	0.43	160	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.80	0.00	0.00	0.00	0.03	1.83
		Auxiliary Engine (Maneuvering)	0.43	12,458	2.25	0.03	0.54	0.07	0.07	0.00	0.00	0.00	0.0001	140.16	0.00	0.01	0.02	2.00	142.18
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	0.16	890	0.15	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.0001	9.81	0.00	0.00	0.00	0.14	9.95
		Main Engine (Maneuvering)	0.10	268,215	44.18	1.16	10.24	1.58	1.54	0.40	0.00	0.16	0.0182	2,956.25	0.02	0.14	0.47	43.01	2,999.73
		Auxiliary Engine (Transit)	0.16	148	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.67	0.00	0.00	0.00	0.02	1.69
		Auxiliary Engine (Maneuvering)	0.10	44,702	7.67	0.11	1.92	0.25	0.24	0.00	0.00	0.02	0.0002	502.94	0.00	0.02	0.08	7.17	510.18
Export Cable Installation																			
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	0.83	8,605	1.42	0.04	0.33	0.05	0.05	0.01	0.00	0.01	0.0006	94.85	0.00	0.00	0.01	1.38	96.24
		Main Engine (Maneuvering)	0.20	474,518	78.16	2.06	18.12	2.80	2.72	0.70	0.00	0.28	0.0322	5,230.11	0.03	0.26	0.82	76.09	5,307.02
		Auxiliary Engine (Transit)	0.56	1,817	0.31	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	20.44	0.00	0.00	0.00	0.29	20.74
		Auxiliary Engine (Maneuvering)	0.56	415,853	71.39	1.01	17.90	2.31	2.24	0.04	0.00	0.16	0.0020	4,678.64	0.03	0.22	0.72	66.68	4,746.04
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	0.83	8,605	1.42	0.04	0.33	0.05	0.05	0.01	0.00	0.01	0.0006	94.85	0.00	0.00	0.01	1.38	96.24
		Main Engine (Maneuvering)	0.20	474,518	78.16	2.06	18.12	2.80	2.72	0.70	0.00	0.28	0.0322	5,230.11	0.03	0.26	0.82	76.09	5,307.02
		Auxiliary Engine (Transit)	0.56	1,817	0.31	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	20.44	0.00	0.00	0.00	0.29	20.74
		Auxiliary Engine (Maneuvering)	0.56	415,853	71.39	1.01	17.90	2.31	2.24	0.04	0.00	0.16	0.0020	4,678.64	0.03	0.22	0.72	66.68	4,746.04
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	0.83	6,239	1.03	0.03	0.24	0.04	0.04	0.01	0.00	0.00	0.0004	68.77	0.00	0.00	0.01	1.00	69.78
		Main Engine (Maneuvering)	0.20	69,202	11.40	0.30	2.64	0.41	0.40	0.10	0.00	0.04	0.0047	762.74	0.00	0.04	0.12	11.10	773.96
		Auxiliary Engine (Transit)	0.56	1,290	0.22	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.0000	14.52	0.00	0.00	0.00	0.21	14.73
		Auxiliary Engine (Maneuvering)	0.56	59,390	10.19	0.14	2.56	0.33	0.32	0.01	0.00	0.02	0.0003	668.19	0.00	0.03	0.10	9.52	677.81
TSHD	Dredger	Main Engine (Transit)	0.83	1,234	0.21	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.0001	13.50	0.00	0.00	0.00	0.20	13.70
		Main Engine (Maneuvering)	0.20	49,656	8.27	0.24	1.84	0.31	0.29	0.10	0.00	0.03	0.0044	543.51	0.00	0.03	0.09	7.96	551.56
		Auxiliary Engine (Transit)	0.56	619	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.97	0.00	0.00	0.00	0.10	7.07
		Auxiliary Engine (Maneuvering)	0.56	103,469	17.69	0.25	4.45	0.57	0.56	0.01	0.00	0.04	0.0005	1,164.10	0.01	0.06	0.18	16.59	1,180.87
AHTS	Tug	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	142,666	23.57	0.45	5.67	0.82	0.79	0.08	0.00	0.07	0.0038	1,593.85	0.01	0.08	0.25	22.88	1,616.97
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	27,947	4.90	0.07	1.20	0.16	0.15	0.00	0.00	0.01	0.0001	314.42	0.00	0.02	0.05	4.48	318.95
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	19,571	3.22	0.08	0.75	0.12	0.11	0.03	0.00	0.01	0.0013	215.71	0.00	0.01	0.03	3.14	218.88
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	7,554	1.30	0.02	0.33	0.04	0.04	0.00	0.00	0.00	0.0000	84.99	0.00	0.00	0.01	1.21	86.21

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Fuel Bunkering																			
Towing Tug	Tug	Main Engine (Transit)	0.83	82,579	13.65	0.26	3.28	0.47	0.46	0.05	0.00	0.04	0.0022	922.56	0.01	0.04	0.14	13.24	935.95
		Main Engine (Maneuvering)	0.20	175,493	29.00	0.55	6.98	1.01	0.97	0.10	0.00	0.08	0.0046	1,960.60	0.01	0.09	0.30	28.14	1,989.04
		Auxiliary Engine (Transit)	0.43	1,999	0.35	0.00	0.09	0.01	0.01	0.00	0.00	0.00	0.0000	22.49	0.00	0.00	0.00	0.32	22.82
		Auxiliary Engine (Maneuvering)	0.43	17,633	3.09	0.04	0.76	0.10	0.09	0.00	0.00	0.01	0.0001	198.39	0.00	0.01	0.03	2.83	201.24
Barge	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	424	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.77	0.00	0.00	0.00	0.07	4.83
		Auxiliary Engine (Maneuvering)	0.43	3,736	0.82	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.0000	42.03	0.00	0.00	0.01	0.60	42.64
Motion Compensation	Motion Compensation	Motion Compensation Engine	1.00	97,714	6.03	0.75	5.28	0.30	0.30	0.01	0.00	0.01	0.0005	1,115.28	0.05	0.01	1.13	2.70	1,119.11
Commissioning Generators																			
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	24,000	2.15	0.26	1.85	0.04	0.04	0.00	0.00	0.01	0.00	273.93	0.01	0.00	0.28	0.66	274.87
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	36,206	3.02	0.36	2.79	0.07	0.07	0.00	0.00	0.01	0.00	413.24	0.02	0.00	0.42	1.00	414.66
Miscellaneous																			
Marine Paint	N/A	N/A	N/A	N/A	N/A	0.75	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
Fuel Evaporation	N/A	N/A	N/A	N/A	N/A	0.15	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

Total Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	2,383,810.4	317.5	8.2	108.6	9.9	9.6	0.7	0.001	0.9	27,423.2	0.5	1.0	11.9	286.3	27,721.4
Offshore Substation Installation (OSS)	280,237.4	41.4	0.9	12.5	1.3	1.3	0.1	0.000	0.1	3,253.6	0.0	0.1	1.1	38.0	3,292.7
Scour Protection	495,091.4	82.5	1.9	19.6	2.9	2.8	0.5	0.000	0.3	5,487.9	0.0	0.3	0.9	79.4	5,568.1
Inter Array Cable Installation	592,150.5	98.4	2.3	23.2	3.5	3.3	0.7	0.000	0.3	6,561.1	0.0	0.3	1.0	94.9	6,657.1
WTG Installation	3,564,771.6	681.9	9.6	154.5	20.7	20.1	1.0	0.003	1.5	42,686.5	0.3	2.0	6.6	609.7	43,302.8
Export Cable Installation	2,361,137.0	396.4	8.1	95.4	13.6	13.1	1.9	0.002	1.2	26,281.4	0.2	1.3	4.1	378.6	26,664.0
Fuel Bunkering	266,721.5	37.3	1.1	11.6	1.3	1.3	0.1	0.000	0.1	2,997.7	0.0	0.1	1.1	33.7	3,032.5
Commissioning Generators	49,302.9	4.3	0.5	3.8	0.1	0.1	0.0	0.000	0.0	562.7	0.0	0.0	0.6	1.4	564.7
Miscellaneous	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	9,993,222.6	1,659.7	33.5	429.2	53.2	51.6	5.0	0.007	4.3	115,254.0	1.1	5.1	27.3	1,521.9	116,803.3

Vessel Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	1,602,130.4	283.7	4.6	66.4	9.2	8.9	0.6	0.001	0.7	18,501.3	0.1	0.9	2.9	264.7	18,768.9
Offshore Substation Installation (OSS)	217,423.9	38.7	0.6	9.1	1.3	1.2	0.1	0.000	0.1	2,536.6	0.0	0.1	0.4	36.3	2,573.3
Scour Protection	495,091.4	82.5	1.9	19.6	2.9	2.8	0.5	0.000	0.3	5,487.9	0.0	0.3	0.9	79.4	5,568.1
Inter Array Cable Installation	592,150.5	98.4	2.3	23.2	3.5	3.3	0.7	0.000	0.3	6,561.1	0.0	0.3	1.0	94.9	6,657.1
WTG Installation	3,564,771.6	681.9	9.6	154.5	20.7	20.1	1.0	0.003	1.5	42,686.5	0.3	2.0	6.6	609.7	43,302.8
Export Cable Installation	2,361,137.0	396.4	8.1	95.4	13.6	13.1	1.9	0.002	1.2	26,281.4	0.2	1.3	4.1	378.6	26,664.0
Fuel Bunkering	198,150.0	33.0	0.6	7.9	1.1	1.1	0.1	0.000	0.1	2,215.0	0.0	0.1	0.3	31.8	2,247.1
Commissioning Generators	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	9,030,854.8	1,614.6	27.7	376.1	52.2	50.6	4.9	0.007	4.1	104,269.8	0.6	5.0	16.2	1,495.4	105,781.4

Non-Vessel Emissions															
Activity Group	Fuel Consumption (gal)	Emissions (tons)													
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation Installation (FOU) B02	781,680.0	33.9	3.6	42.2	0.7	0.7	0.1	0.00	0.2	8,921.9	0.4	0.1	9.0	21.6	8,952.5
Offshore Substation Installation (OSS)	62,813.6	2.7	0.3	3.4	0.1	0.1	0.0	0.00	0.0	716.9	0.0	0.0	0.7	1.7	719.4
Scour Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inter Array Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WTG Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Export Cable Installation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Bunkering	68,571.4	4.2	0.5	3.7	0.2	0.2	0.0	0.00	0.0	782.7	0.0	0.0	0.8	1.9	785.3
Commissioning Generators	49,302.9	4.3	0.5	3.8	0.1	0.1	0.0	0.00	0.0	562.7	0.0	0.0	0.6	1.4	564.7
Miscellaneous	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total B02	962,367.9	45.1	5.8	53.1	1.0	1.0	0.1	0.00	0.2	10,984.2	0.4	0.1	11.1	26.6	11,021.9
Engines Only B02		45.1	5.0	53.1	1.0	1.0	0.1	0.00	0.2	10,984.2	0.4	0.1	11.1	26.6	11,021.9

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Construction																	
Foundation Installation (FOU) B02																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	1	250	500	10	50	0	0	0	50	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	140	24	3,360	3,360	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		1	250	500	10	50	0	0	0	50	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	140	24	3,360	3,360	7A
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	140	24	3,360	3,360	11M
		Auxiliary Engine (Transit)	0	5,530	0	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	0	5,530	0	1 & 2 auxiliary		0	91	0	10	0	140	24	3,360	3,360	11A
Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	24	91	4,380	7	626	0	0	0	626	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	140	24	3,360	3,360	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		24	91	4,380	7	626	0	0	0	626	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	140	24	3,360	3,360	2A
Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	24	91	4,380	7	626	0	0	0	626	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	7	0	140	24	3,360	3,360	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		24	91	4,380	7	626	0	0	0	626	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	7	0	140	24	3,360	3,360	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	24	91	4,380	7	626	0	0	0	626	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	140	24	3,360	3,360	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		24	91	4,380	7	626	0	0	0	626	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	140	24	3,360	3,360	11A
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	24	91	4,380	7	626	0	0	0	626	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	7	0	140	24	3,360	3,360	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		24	91	4,380	7	626	0	0	0	626	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	7	0	140	24	3,360	3,360	11A
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	81	17	2,815	29	99	0	0	0	99	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	140	24	3,360	3,360	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		81	17	2,815	29	99	0	0	0	99	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	140	24	3,360	3,360	4A
Bubble Curtain Power	Air Compressor	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	140	8	1,120	1,120	16
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	140	8	1,120	1,120	18
Offshore Substation Installation (OSS)																	
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	6	4 x 3840kW 2 x 4800kW	24,960	3 main	Europe	1	250	500	10	50	0	0	0	50	7M
		Main Engine (Maneuvering)	6	4 x 3840kW 2 x 4800kW	24,960	3 main		0	250	0	10	0	9	24	216	216	7M
		Auxiliary Engine (Transit)	1	1,110	1,110	3 Auxiliary		1	250	500	10	50	0	0	0	50	7A
		Auxiliary Engine (Maneuvering)	1	1,110	1,110	3 Auxiliary		0	250	0	10	0	9	24	216	216	7A
	Bubble Curtain Support Vessel	Main Engine (Transit)	2	5,530	11,060	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	5,530	11,060	1 & 2 main		0	91	0	10	0	9	24	216	216	11M
		Auxiliary Engine (Transit)	0	0	0	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	0	0	0	1 & 2 auxiliary		0	91	0	10	0	9	24	216	216	11A
Transport Barge 1	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 2	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 3	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
Transport Barge 4	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	5	24	120	120	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	2A
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	3	91	547	10	55	0	0	0	55	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	5	24	120	120	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		3	91	547	10	55	0	0	0	55	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	5	24	120	120	11A
	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	7	17	243	29	9	0	0	0	9	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	28	24	672	672	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		7	17	243	29	9	0	0	0	9	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	28	24	672	672	4A
	Bubble Curtain Power	Air Compressor	20	399	7,980	Stage III B	N/A	0	0	0	0	0	9	10	90	90	16
	Hydraulic Hammer Power	Hammer Engine	3	597	1,791	Tier 2 Non-Road	N/A	0	0	0	0	0	9	10	90	90	18
Scour Protection																	
	Fall Pipe Vessel	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	44	24	1,056	1,056	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	44	24	1,056	1,056	3A
	US Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	28	24	672	672	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	28	24	672	672	5A
Inter Array Cable Installation																	
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	250	0	10	0	105	24	2,520	2,520	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	250	0	10	0	105	24	2,520	2,520	3A
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	250	0	10	0	66	24	1,584	1,584	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	250	0	10	0	66	24	1,584	1,584	3A
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	2	641	1,283	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	250	0	10	0	69	24	1,656	1,656	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	250	0	10	0	69	24	1,656	1,656	5A
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	11	24	264	264	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	11	24	264	264	11A
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	11	24	264	264	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	11	24	264	264	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	2	24	48	48	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	2	24	48	48	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
WTG Installation																	
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main	NJWP	1	91	182	10	18	0	0	0	18	7M
		Main Engine (Maneuvering)	7	4 x 3,535kW 3 x 2,650kW	22,090	3 main		0	91	0	10	0	246	24	5,904	5,904	7M
		Auxiliary Engine (Transit)	1	2,650	2,650	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	7A
		Auxiliary Engine (Maneuvering)	1	2,650	2,650	1 & 2 auxiliary		0	91	0	10	0	246	24	5,904	5,904	7A
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	48	91	8,759	10	876	0	0	0	876	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	114	24	2,736	2,736	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		48	91	8,759	10	876	0	0	0	876	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	114	24	2,736	2,736	7A
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	2	2,500	5,000	3 main	NJWP	48	91	8,759	10	876	0	0	0	876	7M
		Main Engine (Maneuvering)	2	2,500	5,000	3 main		0	91	0	10	0	114	24	2,736	2,736	7M
		Auxiliary Engine (Transit)	1	2,500	2,500	1 & 2 auxiliary		48	91	8,759	10	876	0	0	0	876	7A
		Auxiliary Engine (Maneuvering)	1	2,500	2,500	1 & 2 auxiliary		0	91	0	10	0	114	24	2,736	2,736	7A
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	62	17	2,155	29	76	0	0	0	76	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	29	0	246	24	5,904	5,904	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		62	17	2,155	29	76	0	0	0	76	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	29	0	246	24	5,904	5,904	4A
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	4	1,200	4,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	1,200	4,800	1 & 2 main		0	91	0	10	0	246	24	5,904	5,904	3M
		Auxiliary Engine (Transit)	1	800	800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	800	800	1 & 2 auxiliary		0	91	0	10	0	246	24	5,904	5,904	3A
Export Cable Installation																	
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	174	24	4,176	4,176	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	174	24	4,176	4,176	3A
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	4	2 x 2560kW 2 x 1913kW	8,946	1 & 2 main		0	91	0	10	0	174	24	4,176	4,176	3M
		Auxiliary Engine (Transit)	2	1,400	2,800	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	1,400	2,800	1 & 2 auxiliary		0	91	0	10	0	174	24	4,176	4,176	3A
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	3	2 x 2350kW 1 x 1786kW	6,486	1 & 2 main		0	91	0	10	0	35	24	840	840	3M
		Auxiliary Engine (Transit)	2	994	1,988	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	2	994	1,988	1 & 2 auxiliary		0	91	0	10	0	35	24	840	840	3A
TSHD	Dredger	Main Engine (Transit)	2	641	1,283	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	5M
		Main Engine (Maneuvering)	2	641	1,283	1 & 2 main		0	91	0	10	0	127	24	3,048	3,048	5M
		Auxiliary Engine (Transit)	1	954	954	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	5A
		Auxiliary Engine (Maneuvering)	1	954	954	1 & 2 auxiliary		0	91	0	10	0	127	24	3,048	3,048	5A
AHTS	Tug	Main Engine (Transit)	2	4,500	9,000	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	11M
		Main Engine (Maneuvering)	2	4,500	9,000	1 & 2 main		0	91	0	10	0	52	24	1,248	1,248	11M
		Auxiliary Engine (Transit)	2	410	820	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	11A
		Auxiliary Engine (Maneuvering)	2	410	820	1 & 2 auxiliary		0	91	0	10	0	52	24	1,248	1,248	11A
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main	Europe	1	250	500	10	50	0	0	0	50	3M
		Main Engine (Maneuvering)	8	4 x 3350kW 4 x 2000kW	21,400	1 & 2 main		0	250	0	10	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	1	2,950	2,950	1 & 2 auxiliary		1	250	500	10	50	0	0	0	50	3A
		Auxiliary Engine (Maneuvering)	1	2,950	2,950	1 & 2 auxiliary		0	250	0	10	0	3	24	72	72	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Trips	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Fuel Bunkering																	
Towing Tug	Tug	Main Engine (Transit)	2	2,525	5,050	1 & 2 main	NJWP	12	91	2,190	10	219	0	0	0	219	11M
		Main Engine (Maneuvering)	2	2,525	5,050	1 & 2 main		0	91	0	10	0	80	24	1,920	1,920	11M
		Auxiliary Engine (Transit)	3	79	236	1 & 2 auxiliary		12	91	2,190	10	219	0	0	0	219	11A
		Auxiliary Engine (Maneuvering)	3	79	236	1 & 2 auxiliary		0	91	0	10	0	80	24	1,920	1,920	11A
Barge	Barge	Main Engine (Transit)	0	0	0	1 & 2 main	NJWP	12	91	2,190	10	219	0	0	0	219	2M
		Main Engine (Maneuvering)	0	0	0	1 & 2 main		0	91	0	10	0	80	24	1,920	1,920	2M
		Auxiliary Engine (Transit)	1	50	50	1 & 2 auxiliary		12	91	2,190	10	219	0	0	0	219	2A
		Auxiliary Engine (Maneuvering)	1	50	50	1 & 2 auxiliary		0	91	0	10	0	80	24	1,920	1,920	2A
Motion Compensation	Motion Compensation	Motion Compensation Engine	1	500	500	Tier 3 Non-Road	NJWP	0	91	0	0	0	80	24	1,920	1,920	17
Commissioning Generators																	
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Tier 4 Non-Road	N/A	0	0	0	0	0	28	12	336	336	31
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	1	240	240	Tier 4 Non-Road	N/A	0	0	0	0	0	246	12	2,952	2,952	32
Miscellaneous																	
Marine Paint	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	N/A	N/A	N/A
Fuel Evaporation	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	N/A	N/A	N/A

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Construction																			
Foundation Installation (FOU) B02																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	59,503	11.45	0.16	2.63	0.35	0.34	0.01	0.00	0.02	0.0007	738.85	0.00	0.04	0.11	10.55	749.51
		Main Engine (Maneuvering)	0.10	481,761	92.72	1.29	21.26	2.87	2.77	0.12	0.00	0.20	0.0055	5,982.00	0.04	0.29	0.92	85.40	6,068.32
		Auxiliary Engine (Transit)	0.56	2,094	0.40	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	22.21	0.00	0.00	0.00	0.32	22.53
		Auxiliary Engine (Maneuvering)	0.56	140,730	26.59	0.32	5.71	0.74	0.71	0.01	0.00	0.05	0.0006	1,492.33	0.01	0.07	0.23	21.27	1,513.82
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	0.83	10,639	1.76	0.03	0.42	0.06	0.06	0.01	0.00	0.00	0.0003	118.86	0.00	0.01	0.02	1.71	120.58
		Main Engine (Maneuvering)	0.10	236,008	39.00	0.74	9.38	1.35	1.31	0.14	0.00	0.11	0.0062	2,636.67	0.02	0.13	0.41	37.84	2,674.92
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	854	0.19	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.0000	9.61	0.00	0.00	0.00	0.14	9.75
		Auxiliary Engine (Maneuvering)	0.43	4,588	1.00	0.01	0.20	0.03	0.02	0.00	0.00	0.00	0.0000	51.62	0.00	0.00	0.01	0.74	52.36
Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	854	0.19	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.0000	9.61	0.00	0.00	0.00	0.14	9.75
		Auxiliary Engine (Maneuvering)	0.43	4,588	1.00	0.01	0.20	0.03	0.02	0.00	0.00	0.00	0.0000	51.62	0.00	0.00	0.01	0.74	52.36
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	166,545	27.52	0.52	6.62	0.95	0.93	0.10	0.00	0.08	0.0044	1,860.63	0.01	0.09	0.29	26.70	1,887.62
		Main Engine (Maneuvering)	0.10	107,759	17.81	0.34	4.28	0.62	0.60	0.06	0.00	0.05	0.0028	1,203.87	0.01	0.06	0.19	17.28	1,221.34
		Auxiliary Engine (Transit)	0.43	4,032	0.71	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.0000	45.37	0.00	0.00	0.01	0.65	46.02
		Auxiliary Engine (Maneuvering)	0.43	21,655	3.80	0.05	0.93	0.12	0.12	0.00	0.00	0.01	0.0001	243.63	0.00	0.01	0.04	3.47	247.14
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	166,545	27.52	0.52	6.62	0.95	0.93	0.10	0.00	0.08	0.0044	1,860.63	0.01	0.09	0.29	26.70	1,887.62
		Main Engine (Maneuvering)	0.10	107,759	17.81	0.34	4.28	0.62	0.60	0.06	0.00	0.05	0.0028	1,203.87	0.01	0.06	0.19	17.28	1,221.34
		Auxiliary Engine (Transit)	0.43	4,032	0.71	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.0000	45.37	0.00	0.00	0.01	0.65	46.02
		Auxiliary Engine (Maneuvering)	0.43	21,655	3.80	0.05	0.93	0.12	0.12	0.00	0.00	0.01	0.0001	243.63	0.00	0.01	0.04	3.47	247.14
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	10,873	1.73	0.03	0.43	0.06	0.06	0.00	0.00	0.00	0.0001	122.32	0.00	0.01	0.02	1.74	124.08
		Main Engine (Maneuvering)	0.10	44,555	7.08	0.11	1.78	0.24	0.23	0.00	0.00	0.02	0.0002	501.24	0.00	0.02	0.08	7.14	508.46
		Auxiliary Engine (Transit)	0.43	146	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.64	0.00	0.00	0.00	0.02	1.66
		Auxiliary Engine (Maneuvering)	0.43	4,955	0.89	0.01	0.21	0.03	0.03	0.00	0.00	0.00	0.0000	55.75	0.00	0.00	0.01	0.79	56.55
Bubble Curtain Power	Air Compressor	Air Compressor	1.00	638,400	19.70	1.87	34.48	0.25	0.25	0.07	0.00	0.17	0.0031	7,286.51	0.30	0.06	7.39	17.62	7,311.52
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	1.00	143,280	14.15	1.75	7.74	0.44	0.44	0.02	0.00	0.02	0.0007	1,635.36	0.07	0.01	1.66	3.95	1,640.97
Offshore Substation Installation (OSS)																			
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	0.83	59,503	11.45	0.16	2.63	0.35	0.34	0.01	0.00	0.02	0.0007	738.85	0.00	0.04	0.11	10.55	749.51
		Main Engine (Maneuvering)	0.10	30,970	5.96	0.08	1.37	0.18	0.18	0.01	0.00	0.01	0.0004	384.56	0.00	0.02	0.06	5.49	390.11
		Auxiliary Engine (Transit)	0.56	2,094	0.40	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	22.21	0.00	0.00	0.00	0.32	22.53
		Auxiliary Engine (Maneuvering)	0.56	9,047	1.71	0.02	0.37	0.05	0.05	0.00	0.00	0.00	0.0000	95.94	0.00	0.00	0.01	1.37	97.32
	Bubble Curtain Support Vessel	Main Engine (Transit)	0.83	10,639	1.76	0.03	0.42	0.06	0.06	0.01	0.00	0.00	0.0003	118.86	0.00	0.01	0.02	1.71	120.58
		Main Engine (Maneuvering)	0.10	15,172	2.51	0.05	0.60	0.09	0.08	0.01	0.00	0.01	0.0004	169.50	0.00	0.01	0.03	2.43	171.96
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Transport Barge 1	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 2	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 3	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 4	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.10	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	75	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.84	0.00	0.00	0.00	0.01	0.85
		Auxiliary Engine (Maneuvering)	0.43	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.84	0.00	0.00	0.00	0.03	1.87
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	0.83	14,573	2.41	0.05	0.58	0.08	0.08	0.01	0.00	0.01	0.0004	162.81	0.00	0.01	0.03	2.34	165.17
		Main Engine (Maneuvering)	0.10	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.0001	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	0.43	353	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	3.97	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	0.43	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	8.70	0.00	0.00	0.00	0.12	8.83
	Crew Transfer Vessel	Main Engine (Transit)	0.83	940	0.15	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.0000	10.57	0.00	0.00	0.00	0.15	10.72
		Main Engine (Maneuvering)	0.10	8,911	1.42	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.0000	100.25	0.00	0.00	0.02	1.43	101.69
		Auxiliary Engine (Transit)	0.43	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.14	0.00	0.00	0.00	0.00	0.14
		Auxiliary Engine (Maneuvering)	0.43	991	0.18	0.00	0.04	0.01	0.01	0.00	0.00	0.00	0.0000	11.15	0.00	0.00	0.00	0.16	11.31
	Bubble Curtain Power	Air Compressor	1.00	51,300	1.58	0.15	2.77	0.02	0.02	0.01	0.00	0.01	0.0002	585.52	0.02	0.00	0.59	1.42	587.53
	Hydraulic Hammer Power	Hammer Engine	1.00	11,514	1.14	0.14	0.62	0.04	0.04	0.00	0.00	0.00	0.0001	131.41	0.01	0.00	0.13	0.32	131.86
Scour Protection																			
	Fall Pipe Vessel	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	287,039	47.28	1.25	10.96	1.69	1.64	0.42	0.00	0.17	0.0195	3,163.73	0.02	0.15	0.50	46.02	3,210.25
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	110,792	19.02	0.27	4.77	0.62	0.60	0.01	0.00	0.04	0.0005	1,246.49	0.01	0.06	0.19	17.76	1,264.44
	US Dredger	Main Engine (Transit)	0.83	1,234	0.21	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.0001	13.50	0.00	0.00	0.00	0.20	13.70
		Main Engine (Maneuvering)	0.20	10,948	1.82	0.05	0.40	0.07	0.06	0.02	0.00	0.01	0.0010	119.83	0.00	0.01	0.02	1.76	121.60
		Auxiliary Engine (Transit)	0.56	619	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.97	0.00	0.00	0.00	0.10	7.07
		Auxiliary Engine (Maneuvering)	0.56	22,812	3.90	0.06	0.98	0.13	0.12	0.00	0.00	0.01	0.0001	256.65	0.00	0.01	0.04	3.66	260.35
Inter Array Cable Installation																			
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	0.83	19,187	3.16	0.08	0.73	0.11	0.11	0.03	0.00	0.01	0.0013	211.48	0.00	0.01	0.03	3.08	214.59
		Main Engine (Maneuvering)	0.20	233,021	38.38	1.01	8.90	1.38	1.33	0.34	0.00	0.14	0.0158	2,568.35	0.02	0.13	0.40	37.36	2,606.11
		Auxiliary Engine (Transit)	0.56	391	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.40	0.00	0.00	0.00	0.06	4.46
		Auxiliary Engine (Maneuvering)	0.56	19,717	3.38	0.05	0.85	0.11	0.11	0.00	0.00	0.01	0.0001	221.83	0.00	0.01	0.03	3.16	225.03
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	0.16	2,439	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.0002	26.88	0.00	0.00	0.00	0.39	27.27
		Main Engine (Maneuvering)	0.10	50,290	8.28	0.22	1.92	0.30	0.29	0.07	0.00	0.03	0.0034	554.30	0.00	0.03	0.09	8.06	562.45
		Auxiliary Engine (Transit)	0.16	406	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.57	0.00	0.00	0.00	0.07	4.64
		Auxiliary Engine (Maneuvering)	0.10	8,382	1.44	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.0000	94.30	0.00	0.00	0.01	1.34	95.66
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	0.83	3,380	0.56	0.02	0.12	0.02	0.02	0.01	0.00	0.00	0.0003	37.00	0.00	0.00	0.01	0.54	37.55
		Main Engine (Maneuvering)	0.20	26,978	4.50	0.13	1.00	0.17	0.16	0.05	0.00	0.02	0.0024	295.29	0.00	0.01	0.05	4.33	299.67
		Auxiliary Engine (Transit)	0.56	1,697	0.29	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.0000	19.10	0.00	0.00	0.00	0.27	19.37
		Auxiliary Engine (Maneuvering)	0.56	56,215	9.61	0.14	2.42	0.31	0.30	0.01	0.00	0.02	0.0003	632.46	0.00	0.03	0.10	9.01	641.58
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	30,179	4.99	0.09	1.20	0.17	0.17	0.02	0.00	0.01	0.0008	337.16	0.00	0.02	0.05	4.84	342.05
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	5,912	1.04	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.0000	66.51	0.00	0.00	0.01	0.95	67.47
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	30,179	4.99	0.09	1.20	0.17	0.17	0.02	0.00	0.01	0.0008	337.16	0.00	0.02	0.05	4.84	342.05
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	5,912	1.04	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.0000	66.51	0.00	0.00	0.01	0.95	67.47
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	13,047	2.15	0.06	0.50	0.08	0.07	0.02	0.00	0.01	0.0009	143.81	0.00	0.01	0.02	2.09	145.92
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	5,036	0.86	0.01	0.22	0.03	0.03	0.00	0.00	0.00	0.0000	56.66	0.00	0.00	0.01	0.81	57.47

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)													
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
WTG Installation																			
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	0.83	19,220	3.70	0.05	0.85	0.11	0.11	0.00	0.00	0.01	0.0002	238.65	0.00	0.01	0.04	3.41	242.09
		Main Engine (Maneuvering)	0.20	1,498,372	288.39	4.03	66.13	8.91	8.63	0.37	0.00	0.62	0.0172	18,605.20	0.12	0.89	2.88	265.62	18,873.69
		Auxiliary Engine (Transit)	0.43	1,321	0.26	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.0000	14.86	0.00	0.00	0.00	0.21	15.07
		Auxiliary Engine (Maneuvering)	0.43	427,261	85.65	1.04	18.39	2.37	2.30	0.04	0.00	0.16	0.0020	4,807.00	0.03	0.23	0.74	68.51	4,876.25
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	0.83	208,816	40.19	0.56	9.22	1.24	1.20	0.05	0.00	0.09	0.0024	2,592.86	0.02	0.12	0.40	37.02	2,630.28
		Main Engine (Maneuvering)	0.20	157,168	30.25	0.42	6.94	0.93	0.90	0.04	0.00	0.07	0.0018	1,951.54	0.01	0.09	0.30	27.86	1,979.71
		Auxiliary Engine (Transit)	0.43	59,801	11.99	0.15	2.57	0.33	0.32	0.01	0.00	0.02	0.0003	672.81	0.00	0.03	0.10	9.59	682.50
		Auxiliary Engine (Maneuvering)	0.43	186,792	37.45	0.45	8.04	1.04	1.01	0.02	0.00	0.07	0.0009	2,101.54	0.01	0.10	0.32	29.95	2,131.82
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	0.83	208,816	40.19	0.56	9.22	1.24	1.20	0.05	0.00	0.09	0.0024	2,592.86	0.02	0.12	0.40	37.02	2,630.28
		Main Engine (Maneuvering)	0.20	157,168	30.25	0.42	6.94	0.93	0.90	0.04	0.00	0.07	0.0018	1,951.54	0.01	0.09	0.30	27.86	1,979.71
		Auxiliary Engine (Transit)	0.43	59,801	11.99	0.15	2.57	0.33	0.32	0.01	0.00	0.02	0.0003	672.81	0.00	0.03	0.10	9.59	682.50
		Auxiliary Engine (Maneuvering)	0.43	186,792	37.45	0.45	8.04	1.04	1.01	0.02	0.00	0.07	0.0009	2,101.54	0.01	0.10	0.32	29.95	2,131.82
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	0.83	8,322	1.32	0.02	0.33	0.04	0.04	0.00	0.00	0.00	0.0000	93.63	0.00	0.00	0.01	1.33	94.98
		Main Engine (Maneuvering)	0.20	156,578	24.87	0.38	6.25	0.84	0.82	0.02	0.00	0.06	0.0007	1,761.51	0.01	0.08	0.27	25.11	1,786.89
		Auxiliary Engine (Transit)	0.43	112	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	1.25	0.00	0.00	0.00	0.02	1.27
		Auxiliary Engine (Maneuvering)	0.43	8,706	1.57	0.02	0.37	0.05	0.05	0.00	0.00	0.00	0.0000	97.95	0.00	0.00	0.02	1.40	99.37
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	0.16	890	0.15	0.00	0.03	0.01	0.01	0.00	0.00	0.00	0.0001	9.81	0.00	0.00	0.00	0.14	9.95
		Main Engine (Maneuvering)	0.10	187,446	30.88	0.81	7.16	1.11	1.07	0.28	0.00	0.11	0.0127	2,066.02	0.01	0.10	0.33	30.06	2,096.40
		Auxiliary Engine (Transit)	0.16	148	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.67	0.00	0.00	0.00	0.02	1.69
		Auxiliary Engine (Maneuvering)	0.10	31,241	5.36	0.08	1.34	0.17	0.17	0.00	0.00	0.01	0.0001	351.48	0.00	0.02	0.05	5.01	356.55
Export Cable Installation																			
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	0.83	8,605	1.42	0.04	0.33	0.05	0.05	0.01	0.00	0.01	0.0006	94.85	0.00	0.00	0.01	1.38	96.24
		Main Engine (Maneuvering)	0.20	474,518	78.16	2.06	18.12	2.80	2.72	0.70	0.00	0.28	0.0322	5,230.11	0.03	0.26	0.82	76.09	5,307.02
		Auxiliary Engine (Transit)	0.56	1,817	0.31	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	20.44	0.00	0.00	0.00	0.29	20.74
		Auxiliary Engine (Maneuvering)	0.56	415,853	71.39	1.01	17.90	2.31	2.24	0.04	0.00	0.16	0.0020	4,678.64	0.03	0.22	0.72	66.68	4,746.04
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	0.83	8,605	1.42	0.04	0.33	0.05	0.05	0.01	0.00	0.01	0.0006	94.85	0.00	0.00	0.01	1.38	96.24
		Main Engine (Maneuvering)	0.20	474,518	78.16	2.06	18.12	2.80	2.72	0.70	0.00	0.28	0.0322	5,230.11	0.03	0.26	0.82	76.09	5,307.02
		Auxiliary Engine (Transit)	0.56	1,817	0.31	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.0000	20.44	0.00	0.00	0.00	0.29	20.74
		Auxiliary Engine (Maneuvering)	0.56	415,853	71.39	1.01	17.90	2.31	2.24	0.04	0.00	0.16	0.0020	4,678.64	0.03	0.22	0.72	66.68	4,746.04
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	0.83	6,239	1.03	0.03	0.24	0.04	0.04	0.01	0.00	0.00	0.0004	68.77	0.00	0.00	0.01	1.00	69.78
		Main Engine (Maneuvering)	0.20	69,202	11.40	0.30	2.64	0.41	0.40	0.10	0.00	0.04	0.0047	762.74	0.00	0.04	0.12	11.10	773.96
		Auxiliary Engine (Transit)	0.56	1,290	0.22	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.0000	14.52	0.00	0.00	0.00	0.21	14.73
		Auxiliary Engine (Maneuvering)	0.56	59,390	10.19	0.14	2.56	0.33	0.32	0.01	0.00	0.02	0.0003	668.19	0.00	0.03	0.10	9.52	677.81
TSHD	Dredger	Main Engine (Transit)	0.83	1,234	0.21	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.0001	13.50	0.00	0.00	0.00	0.20	13.70
		Main Engine (Maneuvering)	0.20	49,656	8.27	0.24	1.84	0.31	0.29	0.10	0.00	0.03	0.0044	543.51	0.00	0.03	0.09	7.96	551.56
		Auxiliary Engine (Transit)	0.56	619	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.0000	6.97	0.00	0.00	0.00	0.10	7.07
		Auxiliary Engine (Maneuvering)	0.56	103,469	17.69	0.25	4.45	0.57	0.56	0.01	0.00	0.04	0.0005	1,164.10	0.01	0.06	0.18	16.59	1,180.87
AHTS	Tug	Main Engine (Transit)	0.83	8,657	1.43	0.03	0.34	0.05	0.05	0.00	0.00	0.00	0.0002	96.72	0.00	0.00	0.02	1.39	98.12
		Main Engine (Maneuvering)	0.20	142,666	23.57	0.45	5.67	0.82	0.79	0.08	0.00	0.07	0.0038	1,593.85	0.01	0.08	0.25	22.88	1,616.97
		Auxiliary Engine (Transit)	0.43	409	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.0000	4.60	0.00	0.00	0.00	0.07	4.66
		Auxiliary Engine (Maneuvering)	0.43	27,947	4.90	0.07	1.20	0.16	0.15	0.00	0.00	0.01	0.0001	314.42	0.00	0.02	0.05	4.48	318.95
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	0.83	56,402	9.29	0.24	2.15	0.33	0.32	0.08	0.00	0.03	0.0038	621.66	0.00	0.03	0.10	9.04	630.80
		Main Engine (Maneuvering)	0.20	19,571	3.22	0.08	0.75	0.12	0.11	0.03	0.00	0.01	0.0013	215.71	0.00	0.01	0.03	3.14	218.88
		Auxiliary Engine (Transit)	0.56	5,246	0.90	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.0000	59.02	0.00	0.00	0.01	0.84	59.87
		Auxiliary Engine (Maneuvering)	0.56	7,554	1.30	0.02	0.33	0.04	0.04	0.00	0.00	0.00	0.0000	84.99	0.00	0.00	0.01	1.21	86.21

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Fuel Bunkering																			
Towing Tug	Tug	Main Engine (Transit)	0.83	58,291	9.63	0.18	2.32	0.33	0.32	0.03	0.00	0.03	0.0015	651.22	0.00	0.03	0.10	9.35	660.67
		Main Engine (Maneuvering)	0.20	123,153	20.35	0.38	4.89	0.71	0.68	0.07	0.00	0.06	0.0032	1,375.86	0.01	0.07	0.21	19.75	1,395.82
		Auxiliary Engine (Transit)	0.43	1,411	0.25	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.0000	15.88	0.00	0.00	0.00	0.23	16.11
		Auxiliary Engine (Maneuvering)	0.43	12,374	2.17	0.03	0.53	0.07	0.07	0.00	0.00	0.00	0.0001	139.22	0.00	0.01	0.02	1.98	141.22
Barge	Barge	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	0.43	299	0.07	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	3.36	0.00	0.00	0.00	0.05	3.41
		Auxiliary Engine (Maneuvering)	0.43	2,622	0.57	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.0000	29.50	0.00	0.00	0.00	0.42	29.92
Motion Compensation	Motion Compensation	Motion Compensation Engine	1.00	68,571	4.23	0.52	3.70	0.21	0.21	0.01	0.00	0.01	0.0003	782.65	0.03	0.01	0.79	1.89	785.34
Commissioning Generators																			
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	24,000	2.15	0.26	1.85	0.04	0.04	0.00	0.00	0.01	0.0001	273.93	0.01	0.00	0.28	0.66	274.87
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	0.50	25,303	2.11	0.25	1.95	0.05	0.05	0.00	0.00	0.01	0.00	288.80	0.01	0.00	0.29	0.70	289.79
Miscellaneous																			
Marine Paint	N/A	N/A	N/A	N/A	N/A	0.75	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
Fuel Evaporation	N/A	N/A	N/A	N/A	N/A	0.11	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

Activity	Representative Vessel Type	Engine Type	OCS Trip Distance (NM)	Percentage OCS	Fuel Consumption (gal)	OCS Emissions (tons)														
						NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Construction																				
Foundation Installation (FOU) B02																				
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	25	10%	5,950	1.15	0.02	0.26	0.04	0.03	0.00	0.00	0.00	0.0001	73.88	0.00	0.00	0.01	1.05	74.95
		Main Engine (Maneuvering)	25	100%	481,761	92.72	1.29	21.26	2.87	2.77	0.12	0.00	0.20	0.0055	5,982.00	0.04	0.29	0.92	85.40	6,068.32
		Auxiliary Engine (Transit)	25	10%	209	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	2.22	0.00	0.00	0.00	0.03	2.25
		Auxiliary Engine (Maneuvering)	25	100%	140,730	26.59	0.32	5.71	0.74	0.71	0.01	0.00	0.05	0.0006	1,492.33	0.01	0.07	0.23	21.27	1,513.82
Bubble Curtain Support Vessel	Tug	Main Engine (Transit)	25	27%	2,915	0.48	0.01	0.12	0.02	0.02	0.00	0.00	0.00	0.0001	32.57	0.00	0.00	0.01	0.47	33.04
		Main Engine (Maneuvering)	25	100%	236,008	39.00	0.74	9.38	1.35	1.31	0.14	0.00	0.11	0.0062	2,636.67	0.02	0.13	0.41	37.84	2,674.92
		Auxiliary Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
Barge 1	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	234	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	2.63	0.00	0.00	0.00	0.04	2.67
		Auxiliary Engine (Maneuvering)	25	100%	4,588	1.00	0.01	0.20	0.03	0.02	0.00	0.00	0.00	0.0000	51.62	0.00	0.00	0.01	0.74	52.36
Barge 2	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	234	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	2.63	0.00	0.00	0.00	0.04	2.67
		Auxiliary Engine (Maneuvering)	25	100%	4,588	1.00	0.01	0.20	0.03	0.02	0.00	0.00	0.00	0.0000	51.62	0.00	0.00	0.01	0.74	52.36
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	25	27%	45,633	7.54	0.14	1.81	0.26	0.25	0.03	0.00	0.02	0.0012	509.80	0.00	0.02	0.08	7.32	517.20
		Main Engine (Maneuvering)	25	100%	107,759	17.81	0.34	4.28	0.62	0.60	0.06	0.00	0.05	0.0028	1,203.87	0.01	0.06	0.19	17.28	1,221.34
		Auxiliary Engine (Transit)	25	27%	1,105	0.19	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	12.43	0.00	0.00	0.00	0.18	12.61
		Auxiliary Engine (Maneuvering)	25	100%	21,655	3.80	0.05	0.93	0.12	0.12	0.00	0.00	0.01	0.0001	243.63	0.00	0.01	0.04	3.47	247.14
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	25	27%	45,633	7.54	0.14	1.81	0.26	0.25	0.03	0.00	0.02	0.0012	509.80	0.00	0.02	0.08	7.32	517.20
		Main Engine (Maneuvering)	25	100%	107,759	17.81	0.34	4.28	0.62	0.60	0.06	0.00	0.05	0.0028	1,203.87	0.01	0.06	0.19	17.28	1,221.34
		Auxiliary Engine (Transit)	25	27%	1,105	0.19	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.0000	12.43	0.00	0.00	0.00	0.18	12.61
		Auxiliary Engine (Maneuvering)	25	100%	21,655	3.80	0.05	0.93	0.12	0.12	0.00	0.00	0.01	0.0001	243.63	0.00	0.01	0.04	3.47	247.14
Crew Transfer / PSO / Noise Monitoring Vessel	Crew Transfer Vessel	Main Engine (Transit)	17	100%	10,873	1.73	0.03	0.43	0.06	0.06	0.00	0.00	0.00	0.0001	122.32	0.00	0.01	0.02	1.74	124.08
		Main Engine (Maneuvering)	17	100%	44,555	7.08	0.11	1.78	0.24	0.23	0.00	0.00	0.02	0.0002	501.24	0.00	0.02	0.08	7.14	508.46
		Auxiliary Engine (Transit)	17	100%	146	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.0000	1.64	0.00	0.00	0.00	0.02	1.66
		Auxiliary Engine (Maneuvering)	17	100%	4,955	0.89	0.01	0.21	0.03	0.03	0.00	0.00	0.00	0.0000	55.75	0.00	0.00	0.01	0.79	56.55
Bubble Curtain Power	Air Compressor	Air Compressor	N/A	100%	638,400	19.70	1.87	34.48	0.25	0.25	0.07	0.00	0.17	0.0031	7,286.51	0.30	0.06	7.39	17.62	7,311.52
Hydraulic Hammer Power	Hydraulic Hammer Engine	Hammer Engine	N/A	100%	143,280	14.15	1.75	7.74	0.44	0.44	0.02	0.00	0.02	0.0007	1,635.36	0.07	0.01	1.66	3.95	1,640.97
Offshore Substation Installation (OSS)																				
Medium HLV	Heavy Lift Vessel	Main Engine (Transit)	25	10%	5,950	1.15	0.02	0.26	0.04	0.03	0.00	0.00	0.00	0.00	73.88	0.00	0.00	0.01	1.05	74.95
		Main Engine (Maneuvering)	25	100%	30,970	5.96	0.08	1.37	0.18	0.18	0.01	0.00	0.01	0.00	384.56	0.00	0.02	0.06	5.49	390.11
		Auxiliary Engine (Transit)	25	10%	209	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0.00	0.03	2.25
		Auxiliary Engine (Maneuvering)	25	100%	9,047	1.71	0.02	0.37	0.05	0.05	0.00	0.00	0.00	0.00	95.94	0.00	0.00	0.01	1.37	97.32
	Bubble Curtain Support Vessel	Main Engine (Transit)	25	27%	2,915	0.48	0.01	0.12	0.02	0.02	0.00	0.00	0.00	0.00	32.57	0.00	0.00	0.01	0.47	33.04
		Main Engine (Maneuvering)	25	100%	15,172	2.51	0.05	0.60	0.09	0.08	0.01	0.00	0.01	0.00	169.50	0.00	0.01	0.03	2.43	171.96
		Auxiliary Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transport Barge 1	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.23
		Auxiliary Engine (Maneuvering)	25	100%	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 2	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.23
		Auxiliary Engine (Maneuvering)	25	100%	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 3	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.23
		Auxiliary Engine (Maneuvering)	25	100%	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	0.00	0.00	0.03	1.87
Transport Barge 4	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00	0.23
		Auxiliary Engine (Maneuvering)	25	100%	164	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.84	0.00	0.00	0.00	0.03	1.87
US Towing Tug 1	US Towing Tug	Main Engine (Transit)	25	27%	3,993	0.66	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	44.61	0.00	0.00	0.01	0.64	45.25
		Main Engine (Maneuvering)	25	100%	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	25	27%	97	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	0.02	1.10
		Auxiliary Engine (Maneuvering)	25	100%	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	0.12	8.83

Activity	Representative Vessel Type	Engine Type	OCS Trip Distance (NM)	Percentage OCS	Fuel Consumption (gal)	OCS Emissions (tons)														
						NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
US Towing Tug 2	US Towing Tug	Main Engine (Transit)	25	27%	3,993	0.66	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	44.61	0.00	0.00	0.01	0.64	45.25
		Main Engine (Maneuvering)	25	100%	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	25	27%	97	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	0.02	1.10
		Auxiliary Engine (Maneuvering)	25	100%	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 3	US Towing Tug	Main Engine (Transit)	25	27%	3,993	0.66	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	44.61	0.00	0.00	0.01	0.64	45.25
		Main Engine (Maneuvering)	25	100%	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	25	27%	97	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	0.02	1.10
		Auxiliary Engine (Maneuvering)	25	100%	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	0.12	8.83
US Towing Tug 4	US Towing Tug	Main Engine (Transit)	25	27%	3,993	0.66	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	44.61	0.00	0.00	0.01	0.64	45.25
		Main Engine (Maneuvering)	25	100%	3,849	0.64	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	43.00	0.00	0.00	0.01	0.62	43.62
		Auxiliary Engine (Transit)	25	27%	97	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.09	0.00	0.00	0.00	0.02	1.10
		Auxiliary Engine (Maneuvering)	25	100%	773	0.14	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	8.70	0.00	0.00	0.00	0.12	8.83
	Crew Transfer Vessel	Main Engine (Transit)	17	100%	940	0.15	0.00	0.04	0.01	0.00	0.00	0.00	0.00	0.00	10.57	0.00	0.00	0.00	0.15	10.72
		Main Engine (Maneuvering)	17	100%	8,911	1.42	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.00	100.25	0.00	0.00	0.02	1.43	101.69
		Auxiliary Engine (Transit)	17	100%	13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.14
		Auxiliary Engine (Maneuvering)	17	100%	991	0.18	0.00	0.04	0.01	0.01	0.00	0.00	0.00	0.00	11.15	0.00	0.00	0.00	0.16	11.31
	Bubble Curtain Power	Air Compressor	N/A	100%	51,300	1.58	0.15	2.77	0.02	0.02	0.01	0.00	0.01	0.00	585.52	0.02	0.00	0.59	1.42	587.53
	Hydraulic Hammer Power	Hammer Engine	N/A	100%	11,514	1.14	0.14	0.62	0.04	0.04	0.00	0.00	0.00	0.00	131.41	0.01	0.00	0.13	0.32	131.86
Scour Protection																				
	Fall Pipe Vessel	Main Engine (Transit)	25	10%	5,640	0.93	0.02	0.22	0.03	0.03	0.01	0.00	0.00	0.00	62.17	0.00	0.00	0.01	0.90	63.08
		Main Engine (Maneuvering)	25	100%	287,039	47.28	1.25	10.96	1.69	1.64	0.42	0.00	0.17	0.02	3,163.73	0.02	0.15	0.50	46.02	3,210.25
		Auxiliary Engine (Transit)	25	10%	525	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	5.90	0.00	0.00	0.00	0.08	5.99
		Auxiliary Engine (Maneuvering)	25	100%	110,792	19.02	0.27	4.77	0.62	0.60	0.01	0.00	0.04	0.00	1,246.49	0.01	0.06	0.19	17.76	1,264.44
	US Dredger	Main Engine (Transit)	25	27%	338	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	0.00	0.05	3.75
		Main Engine (Maneuvering)	25	100%	10,948	1.82	0.05	0.40	0.07	0.06	0.02	0.00	0.01	0.00	119.83	0.00	0.01	0.02	1.76	121.60
		Auxiliary Engine (Transit)	25	27%	170	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.03	1.94
		Auxiliary Engine (Maneuvering)	25	100%	22,812	3.90	0.06	0.98	0.13	0.12	0.00	0.00	0.01	0.00	256.65	0.00	0.01	0.04	3.66	260.35
Inter Array Cable Installation																				
Cable Installation Vessel	Cable Installation Vessel	Main Engine (Transit)	25	10%	1,919	0.32	0.01	0.07	0.01	0.01	0.00	0.00	0.00	0.00	21.15	0.00	0.00	0.00	0.31	21.46
		Main Engine (Maneuvering)	25	100%	233,021	38.38	1.01	8.90	1.38	1.33	0.34	0.00	0.14	0.02	2,568.35	0.02	0.13	0.40	37.36	2,606.11
		Auxiliary Engine (Transit)	25	10%	39	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00	0.01	0.45
		Auxiliary Engine (Maneuvering)	25	100%	19,717	3.38	0.05	0.85	0.11	0.11	0.00	0.00	0.01	0.00	221.83	0.00	0.01	0.03	3.16	225.03
Cable Installation Support Activities	Support Vessel/SOV	Main Engine (Transit)	25	10%	244	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.69	0.00	0.00	0.00	0.04	2.73
		Main Engine (Maneuvering)	25	100%	50,290	8.28	0.22	1.92	0.30	0.29	0.07	0.00	0.03	0.00	554.30	0.00	0.03	0.09	8.06	562.45
		Auxiliary Engine (Transit)	25	10%	41	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.01	0.46
		Auxiliary Engine (Maneuvering)	25	100%	8,382	1.44	0.02	0.36	0.05	0.05	0.00	0.00	0.00	0.00	94.30	0.00	0.00	0.01	1.34	95.66
Sand Wave Clearance	TSHD (Dredger)	Main Engine (Transit)	25	10%	338	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	0.00	0.05	3.75
		Main Engine (Maneuvering)	25	100%	26,978	4.50	0.13	1.00	0.17	0.16	0.05	0.00	0.02	0.00	295.29	0.00	0.01	0.05	4.33	299.67
		Auxiliary Engine (Transit)	25	10%	170	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.03	1.94
		Auxiliary Engine (Maneuvering)	25	100%	56,215	9.61	0.14	2.42	0.31	0.30	0.01	0.00	0.02	0.00	632.46	0.00	0.03	0.10	9.01	641.58
Pre Lay Grapnel Run AHTS 1	AHTS	Main Engine (Transit)	25	27%	2,372	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	26.50	0.00	0.00	0.00	0.38	26.88
		Main Engine (Maneuvering)	25	100%	30,179	4.99	0.09	1.20	0.17	0.17	0.02	0.00	0.01	0.00	337.16	0.00	0.02	0.05	4.84	342.05
		Auxiliary Engine (Transit)	25	27%	112	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.00	0.00	0.00	0.02	1.28
		Auxiliary Engine (Maneuvering)	25	100%	5,912	1.04	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.00	66.51	0.00	0.00	0.01	0.95	67.47
Pre Lay Grapnel Run AHTS 2	AHTS	Main Engine (Transit)	25	27%	2,372	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	26.50	0.00	0.00	0.00	0.38	26.88
		Main Engine (Maneuvering)	25	100%	30,179	4.99	0.09	1.20	0.17	0.17	0.02	0.00	0.01	0.00	337.16	0.00	0.02	0.05	4.84	342.05
		Auxiliary Engine (Transit)	25	27%	112	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.00	0.00	0.00	0.02	1.28
		Auxiliary Engine (Maneuvering)	25	100%	5,912	1.04	0.01	0.25	0.03	0.03	0.00	0.00	0.00	0.00	66.51	0.00	0.00	0.01	0.95	67.47
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	25	10%	5,640	0.93	0.02	0.22	0.03	0.03	0.01	0.00	0.00	0.00	62.17	0.00	0.00	0.01	0.90	63.08
		Main Engine (Maneuvering)	25	100%	13,047	2.15	0.06	0.50	0.08	0.07	0.02	0.00	0.01	0.00	143.81	0.00	0.01	0.02	2.09	145.92
		Auxiliary Engine (Transit)	25	10%	525	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	5.90	0.00	0.00	0.00	0.08	5.99
		Auxiliary Engine (Maneuvering)	25	100%	5,036	0.86	0.01	0.22	0.03	0.03	0.00	0.00	0.00	0.00	56.66	0.00	0.00	0.01	0.81	57.47

Activity	Representative Vessel Type	Engine Type	OCS Trip Distance (NM)	Percentage OCS	Fuel Consumption (gal)	OCS Emissions (tons)														
						NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
WTG Installation																				
WTG Installation Vessel	Jackup Vessel	Main Engine (Transit)	25	27%	5,266	1.01	0.01	0.23	0.03	0.03	0.00	0.00	0.00	0.00	65.39	0.00	0.00	0.01	0.93	66.33
		Main Engine (Maneuvering)	25	100%	1,498,372	288.39	4.03	66.13	8.91	8.63	0.37	0.00	0.62	0.02	18,605.20	0.12	0.89	2.88	265.62	18,873.69
		Auxiliary Engine (Transit)	25	27%	362	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.07	0.00	0.00	0.00	0.06	4.13
		Auxiliary Engine (Maneuvering)	25	100%	427,261	85.65	1.04	18.39	2.37	2.30	0.04	0.00	0.16	0.00	4,807.00	0.03	0.23	0.74	68.51	4,876.25
US Jack Up Feeder 1	Jack up	Main Engine (Transit)	25	27%	57,215	11.01	0.15	2.53	0.34	0.33	0.01	0.00	0.02	0.00	710.43	0.00	0.03	0.11	10.14	720.68
		Main Engine (Maneuvering)	25	100%	157,168	30.25	0.42	6.94	0.93	0.90	0.04	0.00	0.07	0.00	1,951.54	0.01	0.09	0.30	27.86	1,979.71
		Auxiliary Engine (Transit)	25	27%	16,385	3.28	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	184.35	0.00	0.01	0.03	2.63	187.00
		Auxiliary Engine (Maneuvering)	25	100%	186,792	37.45	0.45	8.04	1.04	1.01	0.02	0.00	0.07	0.00	2,101.54	0.01	0.10	0.32	29.95	2,131.82
US Jack Up Feeder 2	Jack up	Main Engine (Transit)	25	27%	57,215	11.01	0.15	2.53	0.34	0.33	0.01	0.00	0.02	0.00	710.43	0.00	0.03	0.11	10.14	720.68
		Main Engine (Maneuvering)	25	100%	157,168	30.25	0.42	6.94	0.93	0.90	0.04	0.00	0.07	0.00	1,951.54	0.01	0.09	0.30	27.86	1,979.71
		Auxiliary Engine (Transit)	25	27%	16,385	3.28	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	184.35	0.00	0.01	0.03	2.63	187.00
		Auxiliary Engine (Maneuvering)	25	100%	186,792	37.45	0.45	8.04	1.04	1.01	0.02	0.00	0.07	0.00	2,101.54	0.01	0.10	0.32	29.95	2,131.82
Crew Transfer	Crew Transfer Vessel	Main Engine (Transit)	17	100%	8,322	1.32	0.02	0.33	0.04	0.04	0.00	0.00	0.00	0.00	93.63	0.00	0.00	0.01	1.33	94.98
		Main Engine (Maneuvering)	17	100%	156,578	24.87	0.38	6.25	0.84	0.82	0.02	0.00	0.06	0.00	1,761.51	0.01	0.08	0.27	25.11	1,786.89
		Auxiliary Engine (Transit)	17	100%	112	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.00	0.00	0.00	0.02	1.27
		Auxiliary Engine (Maneuvering)	17	100%	8,706	1.57	0.02	0.37	0.05	0.05	0.00	0.00	0.00	0.00	97.95	0.00	0.00	0.02	1.40	99.37
WTG Commissioning SOV	Service Operation Vessel	Main Engine (Transit)	25	27%	244	0.04	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.69	0.00	0.00	0.00	0.04	2.73
		Main Engine (Maneuvering)	25	100%	187,446	30.88	0.81	7.16	1.11	1.07	0.28	0.00	0.11	0.01	2,066.02	0.01	0.10	0.33	30.06	2,096.40
		Auxiliary Engine (Transit)	25	27%	41	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46	0.00	0.00	0.00	0.01	0.46
		Auxiliary Engine (Maneuvering)	25	100%	31,241	5.36	0.08	1.34	0.17	0.17	0.00	0.00	0.01	0.00	351.48	0.00	0.02	0.05	5.01	356.55
Export Cable Installation																				
Cable Installation Vessel 1	Cable Installation Vessel	Main Engine (Transit)	25	27%	2,358	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.99	0.00	0.00	0.00	0.38	26.37
		Main Engine (Maneuvering)	25	51%	242,448	39.94	1.05	9.26	1.43	1.39	0.36	0.00	0.14	0.02	2,672.25	0.02	0.13	0.42	38.87	2,711.54
		Auxiliary Engine (Transit)	25	27%	498	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	5.60	0.00	0.00	0.00	0.08	5.68
		Auxiliary Engine (Maneuvering)	25	51%	212,474	36.47	0.52	9.15	1.18	1.14	0.02	0.00	0.08	0.00	2,390.48	0.01	0.11	0.37	34.07	2,424.92
Cable Installation Vessel 2	Cable Installation Vessel	Main Engine (Transit)	25	27%	2,358	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.99	0.00	0.00	0.00	0.38	26.37
		Main Engine (Maneuvering)	25	51%	242,448	39.94	1.05	9.26	1.43	1.39	0.36	0.00	0.14	0.02	2,672.25	0.02	0.13	0.42	38.87	2,711.54
		Auxiliary Engine (Transit)	25	27%	498	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	5.60	0.00	0.00	0.00	0.08	5.68
		Auxiliary Engine (Maneuvering)	25	51%	212,474	36.47	0.52	9.15	1.18	1.14	0.02	0.00	0.08	0.00	2,390.48	0.01	0.11	0.37	34.07	2,424.92
Support and Jointing Vessel	Support Vessel	Main Engine (Transit)	25	27%	1,709	0.28	0.01	0.07	0.01	0.01	0.00	0.00	0.00	0.00	18.84	0.00	0.00	0.00	0.27	19.12
		Main Engine (Maneuvering)	25	51%	35,358	5.82	0.15	1.35	0.21	0.20	0.05	0.00	0.02	0.00	389.71	0.00	0.02	0.06	5.67	395.44
		Auxiliary Engine (Transit)	25	27%	354	0.06	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	3.98	0.00	0.00	0.00	0.06	4.03
		Auxiliary Engine (Maneuvering)	25	51%	30,345	5.21	0.07	1.31	0.17	0.16	0.00	0.00	0.01	0.00	341.40	0.00	0.02	0.05	4.87	346.32
TSHD	Dredger	Main Engine (Transit)	25	27%	338	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.70	0.00	0.00	0.00	0.05	3.75
		Main Engine (Maneuvering)	25	51%	25,371	4.23	0.12	0.94	0.16	0.15	0.05	0.00	0.02	0.00	277.70	0.00	0.01	0.04	4.07	281.81
		Auxiliary Engine (Transit)	25	27%	170	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.91	0.00	0.00	0.00	0.03	1.94
		Auxiliary Engine (Maneuvering)	25	51%	52,866	9.04	0.13	2.28	0.29	0.28	0.01	0.00	0.02	0.00	594.78	0.00	0.03	0.09	8.48	603.35
AHTS	Tug	Main Engine (Transit)	25	27%	2,372	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	26.50	0.00	0.00	0.00	0.38	26.88
		Main Engine (Maneuvering)	25	51%	72,893	12.04	0.23	2.90	0.42	0.40	0.04	0.00	0.03	0.00	814.35	0.01	0.04	0.13	11.69	826.17
		Auxiliary Engine (Transit)	25	27%	112	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.26	0.00	0.00	0.00	0.02	1.28
		Auxiliary Engine (Maneuvering)	25	51%	14,279	2.50	0.03	0.61	0.08	0.08	0.00	0.00	0.01	0.00	160.65	0.00	0.01	0.02	2.29	162.96
Post-Install Rock Protection	Rock Dumping Vessel (Fall Pipe Vessel)	Main Engine (Transit)	25	10%	5,640	0.93	0.02	0.22	0.03	0.03	0.01	0.00	0.00	0.00	62.17	0.00	0.00	0.01	0.90	63.08
		Main Engine (Maneuvering)	25	51%	9,999	1.65	0.04	0.38	0.06	0.06	0.01	0.00	0.01	0.00	110.21	0.00	0.01	0.02	1.60	111.83
		Auxiliary Engine (Transit)	25	10%	525	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	5.90	0.00	0.00	0.00	0.08	5.99
		Auxiliary Engine (Maneuvering)	25	51%	3,860	0.66	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.00	43.42	0.00	0.00	0.01	0.62	44.05

Activity	Representative Vessel Type	Engine Type	OCS Trip Distance (NM)	Percentage OCS	Fuel Consumption (gal)	OCS Emissions (tons)														
						NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Fuel Bunkering																				
Towing Tug	Tug	Main Engine (Transit)	25	27%	15,971	2.64	0.05	0.63	0.09	0.09	0.01	0.00	0.01	0.00	178.43	0.00	0.01	0.03	2.56	181.02
		Main Engine (Maneuvering)	25	100%	123,153	20.35	0.38	4.89	0.71	0.68	0.07	0.00	0.06	0.00	1,375.86	0.01	0.07	0.21	19.75	1,395.82
		Auxiliary Engine (Transit)	25	27%	387	0.07	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.35	0.00	0.00	0.00	0.06	4.41
		Auxiliary Engine (Maneuvering)	25	100%	12,374	2.17	0.03	0.53	0.07	0.07	0.00	0.00	0.00	0.00	139.22	0.00	0.01	0.02	1.98	141.22
Barge	Barge	Main Engine (Transit)	25	27%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	25	100%	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Transit)	25	27%	82	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.01	0.94
		Auxiliary Engine (Maneuvering)	25	100%	2,622	0.57	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.00	29.50	0.00	0.00	0.00	0.42	29.92
Motion Compensation	Motion Compensation	Motion Compensation Engine	N/A	100%	68,571	4.23	0.52	3.70	0.21	0.21	0.01	0.00	0.01	0.00	782.65	0.03	0.01	0.79	1.89	785.34
Commissioning Generators																				
OSS Commissioning Generators	Generator	Marine Tier 3 Generator	N/A	100%	24,000	2.15	0.26	1.85	0.04	0.04	0.00	0.00	0.01	0.00	273.93	0.01	0.00	0.28	0.66	274.87
WTG Commissioning Generators	Generator	Marine Tier 3 Generator	N/A	100%	25,303	2.11	0.25	1.95	0.05	0.05	0.00	0.00	0.01	0.00	288.80	0.01	0.00	0.29	0.70	289.79
Miscellaneous																				
Marine Paint	N/A	N/A	N/A	100%	N/A	N/A	0.75	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
Fuel Evaporation	N/A	N/A	N/A	100%	N/A	N/A	0.11	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

BOEM Emissions Tool Default Vessel Emissions Factors													
EF Ref	Vessel Type	Engine type	Emission Factors (g/kWh)										
			NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O
1M	Anchor Handling Tugs	Main	9.26	0.24	2.16	0.34	0.33	0.079	4.0E-05	0.033	636.09	0.004	0.031
1A		Auxiliary	9.88	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
2M	Barge	Main	13.61	0.63	1.40	0.45	0.42	0.362	1.2E-05	0.078	588.90	0.004	0.031
2A		Auxiliary	12.57	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
3M	Cable Laying	Main	9.49	0.25	2.20	0.34	0.33	0.085	3.9E-05	0.034	635.02	0.004	0.031
3A		Auxiliary	9.89	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
4M	Crew	Main	9.15	0.14	2.30	0.31	0.30	0.006	4.6E-05	0.022	648.16	0.004	0.031
4A		Auxiliary	10.39	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
5M	Dredging	Main	9.60	0.28	2.13	0.36	0.34	0.112	3.7E-05	0.038	630.62	0.004	0.031
5A		Auxiliary	9.85	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
6M	Ice Breaker	Main	9.92	0.45	1.78	0.40	0.38	0.230	2.5E-05	0.057	610.83	0.004	0.031
6A		Auxiliary	10.09	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
7M	Jackup	Main	10.03	0.14	2.30	0.31	0.30	0.013	4.5E-05	0.022	647.08	0.004	0.031
7A		Auxiliary	11.55	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
8M	Research / Survey	Main	9.86	0.22	2.25	0.34	0.33	0.066	4.2E-05	0.031	638.26	0.004	0.031
8A		Auxiliary	10.21	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
9M	Shuttle Tanker	Main	9.05	0.63	1.40	0.45	0.42	0.362	1.2E-05	0.078	588.90	0.004	0.031
9A		Auxiliary	9.80	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
10M	Supply Ship	Main	9.44	0.17	2.29	0.32	0.31	0.028	4.5E-05	0.025	644.58	0.004	0.031
10A		Auxiliary	10.43	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031
11M	Tug	Main	9.52	0.18	2.29	0.33	0.32	0.033	4.5E-05	0.026	643.66	0.004	0.031
11A		Auxiliary	10.10	0.14	2.48	0.32	0.31	0.006	4.8E-05	0.022	648.20	0.004	0.031

BOEM Emissions Tool Default Helicopter Emissions Factors													
EF Ref	Engine	Size (kW)	Emission Factors (lb/hr)										
			NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	CO2	CH4	N2O
12	Helicopter	Single	2.32	1.63	1.89	0.07	0.07	0.300	0.0E+00	N/A	956.92	0.030	0.030
13	Helicopter	Twin Light	3.14	3.66	4.28	0.10	0.09	0.500	0.0E+00	N/A	1589.69	0.040	0.050
14	Helicopter	Twin Medium	7.22	3.02	3.48	0.20	0.20	0.780	0.0E+00	N/A	2459.92	0.070	0.080
15	Helicopter	Twin heavy	34.66	2.40	2.67	0.82	0.80	2.110	0.0E+00	N/A	6640.46	0.190	0.220

Load Factors for Main Engines		
Vessel/Engine	Activity	Load Factor
Cat. 3 Main (Propulsion) Engine	Transit/cruise	0.83
Cat. 3 Main (Propulsion) Engine	Maneuvering	0.2
Cat. 3 Main (Propulsion) Engine	Hoteling	0
Cat. 1/2 Main (Propulsion) Engine	Transit/cruise	0.83
Cat. 1/2 Main (Propulsion) Engine	Maneuvering	0.2
Cat. 1/2 Main (Propulsion) Engine	Hoteling	0

Load Factors for Auxiliary Engines on Vessels w/ Cat. 3 Main Engines		
Vessel Type	Maneuver	Hotel
Bulk Carrier	0.45	0.1
Bulk Carrier, Laker	0.45	0.22
Buoy Tender	0.45	0.19
Container	0.48	0.26
Crude Oil Tanker	0.33	0.22
Drilling	0.45	0.22
Fishing	0.45	0.22
Floating Production and Storage Offloading	0.45	0.22
General Cargo	0.45	0.22
Icebreaker	0.45	0.22
Jackup	0.45	0.22
LNG Tanker	0.33	0.26
LPG Tanker	0.33	0.26
Misc.	0.45	0.22
Passenger	0.8	0.64
Pipelaying	0.45	0.22
Reefer	0.67	0.32
Research	0.45	0.22
RORO	0.45	0.26
Supply	0.45	0.22
Support	0.45	0.22
Tanker	0.33	0.26
Tug	0.45	0.22
Vehicle Carrier	0.45	0.22
Well stimulation	0.45	0.22

Table 4-120 of https://www.epa.gov/sites/production/files/2018-07/documents/nei2014v2_tsd_05jul2018.pdf

Emissions Factors for Engines													
EF Ref	Engine	Size (kW)	Emission Factors (g/kWh)										
			NOx[1]	VOC[2]	CO	PM10	PM2.5	SO2[3]	Pb	HAPs[5]	CO2[4]	CH4[4]	N2O[4]
16	Air Compressor Engines	~399	2	0.19	3.5	0.025	0.025	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
17	Motion Compensation Engines	500	4	0.495	3.5	0.2	0.2	0.0068	0.00E+00	7.14E-03	739.60	0.030	0.0060
18	Cat C18 Acert	597	6.4	0.8	3.5	0.2	0.2	0.0068	0.00E+00	7.14E-03	739.60	0.030	0.0060
19	Tier 2 Engines 0-8 kW	0-8	7.5	0.929	8	0.8	0.8	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
20	Tier 2 Engines 8-19 kW	8-19	7.5	0.929	6.6	0.8	0.8	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
21	Tier 2 Engines 19-37 kW	19-37	7.5	0.929	5.5	0.6	0.6	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
22	Tier 3 Engines 37-75 kW	37-75	4.7	0.582	5	0.4	0.4	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
23	Tier 3 Engines 75-130 kW	75-130	4	0.495	5	0.3	0.3	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
24	Tier 3 Engines 130-225 kW	130-225	4	0.495	3.5	0.2	0.2	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
25	Tier 3 Engines 225-450 kW	225-450	4	0.495	3.5	0.2	0.2	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
26	Tier 3 Engines 450-560 kW	450-560	4	0.495	3.5	0.2	0.2	0.0068	0.00E+00	7.14E-03	739.60	0.030	0.0060
27	Tier 2 Engines >560 kW	>560	6.4	0.792	3.5	0.2	0.2	0.0068	0.00E+00	7.14E-03	739.60	0.030	0.0060
30	Tier 4 Engine 130-560 kW	130-560	0.67	0.19	3.5	0.02	0.02	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
31	OSS Commissioning Generator	500 kW	5.80	0.70	5.00	0.10	0.10	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060
32	WTG Commissioning Generator	240 kW	5.40	0.65	5.00	0.12	0.12	0.0068	0.00E+00	1.76E-02	739.60	0.030	0.0060

1 NOx emission values are assumed to be 100% of the relevant tier standard for NOx+NMHC if no separate NOx standard

2 VOC emission values are assumed to be 12% of the relevant tier standard for NOx+NMHC if no separate VOC/NMHC standard

3 Based on ULSD Fuel Sulfur of 0.0015%, fuel density of ~7lb/gal, fuel heat content of ~0.14 MMBtu/gal, and SO2:Sulfur ratio of 2.0

4 Based on GHG emissions and heat content of ULSD from 40 CFR 98 Tables C-1 and C-2 and an assumed engine efficiency of 10,000 Btu/kW

5 HAP Emission Factors are in lb/MMBtu in AP-42 and converted to g/kwH based on an assumed 10,000 btu/kW

Commuting Emissions												
EF Ref	Engine	Fuel	Emission Factors (g/VMT)									
			NOx[1]	VOC[1]	CO[1]	PM10[1]	PM2.5[1]	SO2[2]	Pb	HAPs	CO2[3]	CH4[3]	N2O[3]
28	Light-duty vehicles	Gasoline	0.289	0.35	3.94	0.012	0.012	0.0025	0.00E+00	N/A	393.61	0.017	0.0034
29	Light-duty trucks	Gasoline	0.478	0.421	5.66	0.014	0.014	0.0025	0.00E+00	N/A	393.61	0.017	0.0034

1 2018 values from Table 4-43 "Estimated U.S. Average Vehicle emissions Rates per Vehicle by Vehicle Type Using Gasoline and Diesel" at https://www.bts.gov/content/estimated-national-average-vehicle-emissions-rates-vehicle-vehicle-type-using-gasoline-and

2 Based on 10 ppm sulfur in gasoline, 6.17 lb/gal density, fleet average of 22.3 mpg, and SO2 to Sulfur weight ratio of 2.

3 Based on GHG emissions and heat content of motor gasoline from 40 CFR 98 Tables C-1 and C-2 and fleet average of 22.3 mpg

4 Fleet average MPG is from Table 4-23M from Bureau of Transportation Statistics found here: https://www.bts.gov/content/average-fuel-efficiency-us-passenger-cars-and-light-trucks

Load Factors for Auxiliary Engines on Vessels w/ Cat. 1 & 2 Main	
Vessel Group	Auxiliary Operating Load Factor
Bulk Carrier	0.1
Commercial Fishing	0.43
Container Ship	0.19
Ferry Excursion	0.43
General Cargo	0.22
Government	0.43
Miscellaneous	0.43
Offshore support	0.56
Reefer	0.32
RORO	0.26
Tanker	0.26
Tug	0.43
Work Boat	0.43

Eastern Research Group. 2019. Category 1 and 2 Commercial Marine Vessel 2017 Emissions Inventory (2019). Table 4. Auxiliary and Boiler Power Surrogates.

Load Factors for Auxiliary Engines on Vessels w/ Cat. 3 Main Engines			
EPA Vessel Type (NEI Vessel Types)	Cruise	RSZ	Maneuver
Auto Carrier	0.15	0.3	0.45
Bulk Carrier	0.17	0.27	0.45
Container Ship	0.13	0.25	0.48
Cruise Ship (Passenger)	0.8	0.8	0.8
General Cargo (Supply, Vehicle Carrier)	0.17	0.27	0.45
Miscellaneous (Buoy Tender, Drilling, Fishing, FPSO, Icebreaker, Jackup, Miscellaneous, Pipelaying, Research, Support, Well Stimulation)	0.17	0.27	0.45
OG Tug (Tug)	0.17	0.27	0.45
Reefer	0.2	0.34	0.67
RORO	0.15	0.3	0.45
Tanker (LNG Tanker, LPG Tanker, Crude Oil Tanker)	0.24	0.28	0.33

Sources:

EPA. 2009. Current Methodologies in Preparing Mobile Source Port-Related Emission Inventories: Final

EPA. 2015. Commercial Marine Vessels – 2014 NEI Commercial Marine Vessels Final. Table 4-17: Auxiliary

Fuel Use Factors		
Engine Type	**Fuel Use (g/kWh)**	**Fuel Use (gal/kWh)**
Slow-speed Diesel, Marine Diesel Oil[1]	185	0.057
Medium-speed Diesel, Marine Diesel Oil[1]	205	0.064
Medium-speed Diesel, Marine Diesel Oil Auxiliary[1]	217	0.067
Cat. 1 & 2 (main and auxiliary)[2]	N/A	0.064

1 From "Current Methodologies and Best Practices in Preparing Port Emission Inventories" April 2009, Table 2-9: Emission Factors for OGV Main Engines, Table 2-16: Auxiliary Engine Emission Factors
2 Calculated from BOEM CO2 emission rate for Cat. 1 & 2 Marine Engines below

Fuel Use Calculations	
Diesel Fuel Density (lb/gal)[1]	7.10
Distillate Fuel No. 2 Higher Heating Value (MMBtu/gal)[2]	0.138
Distillate Fuel No. 2 CO2 Emission Factor (kg CO2/MMBtu)[2]	73.96
Cat. 1 & 2 Main Engine CO2 Emission Factor (g/kW*hr)[3]	648.20
Cat. 1 & 2 (main and auxiliary)) fuel use (gal/kWh)	0.064

1 From Table 3.4-1 AP 42
2 From 40 CFR Part 98 Table C-1: Default CO2 Emission Factors and High Heat Values for Various Types of Fuel
3 From BOEM Offshore Wind Energy Facilities Emission Estimating Tool Technical Documentation Table 3: Weighted Marine Vessel Emission Factors

Global Warming Potentials[1]	
Compound	**GWP**
CH4	25
N2O	298

1 Table A-1 of 40 CFR 98

Overall Port Distance			
Port Name	**Lookup**	**Port Distance (Mi)**	**Port Distance (NM)**
Atlantic City	Atlantic City	20	17
New Jersey Wind Port	NJWP	105	91
Europe	Europe	288	250
Paulsboro	Paulsboro	145	126

Overall Port Distance in OCS Applicability Zone			
Port Name	**Lookup**	**Port Distance (Mi)**	**Port Distance (NM)**
Atlantic City	Atlantic City	20	17
New Jersey Wind Port	NJWP	29	25
Europe	Europe	29	25
Paulsboro	Paulsboro	29	25

Max Export Cable Included in OCS Area	51%	
measured export cable length max in OCS area	37.74	miles
measured export cable length max	73.86	miles
North Export Cable OCS	29.19	miles
North Export Cable Total	61.86	miles
South Export Cable OCS	8.55	miles
South Export Cable Total	12	miles

2017 NEI HAPs for Marine Vessels		
Pollutant	**Basis**	**Fraction**
1,3-Butadiene	VOC	1.01E-03
2,2,4-Trimethylpentane	VOC	7.12E-03
Acenaphthene	VOC	5.09E-05
Acenaphthylene	VOC	1.18E-04
Acetaldehyde	VOC	9.78E-03
Acrolein	VOC	1.85E-03
Ammonia	PM2.5	1.92E-02
Anthracene	VOC	3.44E-04
Antimony	PM2.5	6.15E-04
Arsenic	PM2.5	2.59E-05
Benz[a]Anthracene	PM2.5	8.82E-06
Benzene	VOC	4.74E-03
Benzo[a]Pyrene	PM2.5	4.18E-06
Benzo[b]Fluoranthene	PM2.5	8.35E-06
Benzo[k]Fluoranthene	PM2.5	4.18E-06
Benzo(g,h,i)Fluoranthene	PM2.5	1.32E-04
Cadmium	PM2.5	2.36E-04
Chrysene	PM2.5	1.63E-05
Chromium (VI)	PM2.5	7.24E-09
Dibenzo[a,h]anthracene	PM2.5	8.65E-06
Ethyl Benzene	VOC	4.39E-04
Fluoranthene	PM2.5	8.97E-05
Fluorene	VOC	1.64E-04
Formaldehyde	VOC	4.27E-02
Indeno[1,2,3-c,d]Pyrene	PM2.5	8.35E-06
Lead	PM2.5	1.25E-04
Manganese	PM2.5	3.22E-06
Mercury	PM2.5	4.18E-08
Naphthalene	VOC	3.13E-02
Hexane	VOC	2.79E-03
Nickel	PM2.5	6.87E-04
Polychlorinated Biphenyls	PM2.5	4.18E-07
Phenanthrene	VOC	1.36E-03
Propionaldehyde	VOC	1.52E-03
Pyrene	PM2.5	3.37E-05
Selenium	PM2.5	4.38E-08
Toluene	VOC	2.04E-03
Xylenes (Mixed Isomers)	VOC	1.42E-03
o-Xylene	VOC	5.13E-04
Total Fraction of VOC		**0.1093**
Total Fraction of PM2.5		**0.0213**

Stationary Internal Combustion Engine (<600 HP) HAPs from AP-42 Chapter 3.3	
Pollutant	**Emission Factor (lb/mmBtu)**
Benzene	9.33E-04
Toluene	4.09E-04
Xylenes	2.85E-04
1,3-Butadiene	3.91E-05
Formaldehyde	1.18E-03
Acetaldehyde	7.67E-04
Acrolein	9.25E-05
Total PAH	1.68E-04
Total HAP	**3.87E-03**

Total HAP Emission Factor	
lb/MMBtu	3.87E-03
g/MMBtu	1.76
Btu/kW	10,000
MMBtu/kW	0.010
g/kW	**1.76E-02**

Stationary Internal Combustion Engine (>600 HP) HAPs from AP-42 Chapter 3.4	
Pollutant	**Emission Factor (lb/mmBtu)**
Benzene	7.76E-04
Toluene	2.81E-04
Xylenes	1.93E-04
Formaldehyde	7.89E-05
Acetaldehyde	2.52E-05
Acrolein	7.88E-06
Total PAH	2.12E-04
Total HAP	**1.57E-03**

Total HAP Emission Factor	
lb/MMBtu	1.57E-03
g/MMBtu	0.71
Btu/kW	10,000
MMBtu/kW	0.010
g/kW	**7.14E-03**

*Source: EPA 2017 NEI Development Documentation - Methodology Documentation for EPA's Commercial Marine Emissions Estimates

	Mode	Yearly Operating Time	Avg. Engine Load Factor	Average Fuel Consumption per Year (L)	% of In Field (maneuvering)	Weighted Maneuvering Load Factor
1	Dynamic Positioning / gangway operations	40%	10%	640,000	42.6%	4.3%
2	Standby in field / hotel	33%	8%	465,000	35.1%	2.8%
3	In field transit	21%	15%	486,000	22.3%	3.4%
4	Transit to/from harbor	2%	**16%**	46,000	0.0%	0.0%
5	Harbor	4%	4%	28,000	0.0%	0.0%
Maneuvering					100.0%	**10.4%**

*Preliminary results for assessment of logistics options

~94% of activities in windfarm each year

85 m “standard” European SOV with 60 PAX and diesel electric propulsion system

Total engine capacity of 6,600 kW made up of 4x 1,650 kW generators

CTV Scenario Total Emissions																
Scenario	Fuel Consumption (gal/yr)	Emissions (tons per year)														
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Project 1 with Overlap	1,672,285.59	289.41	4.39	69.07	9.32	9.03	0.39	0.0014	0.67	0.02	19,270.51	0.12	0.92	3.00	274.80	21,805.24
Project 2 with Overlap	1,200,127.40	208.11	3.17	49.64	6.70	6.48	0.29	0.0010	0.48	0.01	13,840.33	0.09	0.66	2.16	197.29	15,729.96
Sum P1 and P2	2,872,413.00	497.52	7.56	118.71	16.02	15.51	0.69	0.0023	1.15	0.03	33,110.85	0.21	1.58	5.17	472.09	37,535.20
PDE	2,716,112.89	480.79	7.20	113.27	15.26	14.78	0.68	0.0022	1.10	0.03	31,524.48	0.20	1.51	4.92	449.50	35,497.48

SOV Scenario Total Emissions																
Scenario	Fuel Consumption (gal/yr)	Emissions (tons per year)														
		NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Project 1 with Overlap	1,967,419.75	344.3	6.1	81.3	11.2	10.9	1.1	0.0	0.9	0.1	22,476.3	0.1	1.1	3.5	322.1	25,058.9
Project 2 with Overlap	1,631,934.55	284.9	5.2	67.3	9.4	9.1	1.0	0.0	0.8	0.0	18,583.7	0.1	0.9	2.9	266.5	20,543.3
Sum P1 and P2	3,599,354.30	629.2	11.3	148.6	20.6	20.0	2.1	0.0	1.6	0.1	41,060.0	0.3	2.0	6.4	588.7	45,602.2
PDE	2,913,549.79	520.1	8.6	121.6	16.7	16.1	1.4	0.0	1.3	0.1	33,631.2	0.2	1.6	5.3	481.2	37,636.2

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (CTV Scenario)																	
WTG and BoP Crew logistics																	
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 4	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 5	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 4	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 5	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 6	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	8	91	1,460	10	146	0	0	0	146	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		8	91	1,460	10	146	0	0	0	146	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	40	24	960	960	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	8	91	1,460	10	146	0	0	0	146	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		8	91	1,460	10	146	0	0	0	146	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	40	24	960	960	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	8	250	4,000	10	400	0	0	0	400	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		8	250	4,000	10	400	0	0	0	400	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	40	24	960	960	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	0.7	91	128	10	13	0	0	0	13	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	25	24	600	600	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		0.7	91	128	10	13	0	0	0	13	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	25	24	600	600	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Cable repair vessel - arrray cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	0.9	91	164	10	16	0	0	0	16	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	11	24	264	264	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		0.9	91	164	10	16	0	0	0	16	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	11	24	264	264	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	30	24	720	720	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	30	24	720	720	8A
Cable survey vessel - arrray cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	13	24	312	312	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	13	24	312	312	8A
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	5	17	174	10	17	0	0	0	17	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	40	24	960	960	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		5	17	174	10	17	0	0	0	17	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	40	24	960	960	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	8	500	4,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (CTV Scenario)																			
WTG and BoP Crew logistics																			
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 4	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 5	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 4	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 5	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 6	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	139,211	26.79	0.37	6.14	0.83	0.80	0.03	0.00	0.06	0.00	1728.57	0.01	0.08	0	25	1,754
		Main Engine (Maneuvering)	0.20	220,586	42.46	0.59	9.74	1.31	1.27	0.06	0.00	0.09	0.00	2739.01	0.02	0.13	0	39	2,779
		Auxiliary Engine (Transit)	0.43	16,919	3.20	0.04	0.69	0.09	0.09	0.00	0.00	0.01	0.00	179.42	0.00	0.01	0	3	182
		Auxiliary Engine (Maneuvering)	0.43	111,259	21.02	0.25	4.51	0.58	0.56	0.01	0.00	0.04	0.00	1179.81	0.01	0.06	0	17	1,197
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	32,715	6.30	0.09	1.44	0.19	0.19	0.01	0.00	0.01	0.00	406.21	0.00	0.02	0	6	412
		Main Engine (Maneuvering)	0.20	51,838	9.98	0.14	2.29	0.31	0.30	0.01	0.00	0.02	0.00	643.67	0.00	0.03	0	9	653
		Auxiliary Engine (Transit)	0.45	8,853	1.67	0.02	0.36	0.05	0.04	0.00	0.00	0.00	0.00	93.88	0.00	0.00	0	1	95
		Auxiliary Engine (Maneuvering)	0.45	58,217	11.00	0.13	2.36	0.30	0.30	0.01	0.00	0.02	0.00	617.34	0.00	0.03	0	9	626
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	381,431	73.41	1.02	16.83	2.27	2.20	0.10	0.00	0.16	0.00	4736.20	0.03	0.23	1	68	4,805
		Main Engine (Maneuvering)	0.20	220,586	42.46	0.59	9.74	1.31	1.27	0.06	0.00	0.09	0.00	2739.01	0.02	0.13	0	39	2,779
		Auxiliary Engine (Transit)	0.43	46,358	8.76	0.11	1.88	0.24	0.24	0.00	0.00	0.02	0.00	491.59	0.00	0.02	0	7	499
		Auxiliary Engine (Maneuvering)	0.43	111,259	21.02	0.25	4.51	0.58	0.56	0.01	0.00	0.04	0.00	1179.81	0.01	0.06	0	17	1,197
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	4,902	0.81	0.02	0.19	0.03	0.03	0.01	0.00	0.00	0.00	54.03	0.00	0.00	0	1	55
		Main Engine (Maneuvering)	0.20	55,481	9.14	0.24	2.12	0.33	0.32	0.08	0.00	0.03	0.00	611.51	0.00	0.03	0	9	621
		Auxiliary Engine (Transit)	0.56	100	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.56	4,695	0.81	0.01	0.20	0.03	0.03	0.00	0.00	0.00	0.00	52.82	0.00	0.00	0	1	54

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Cable repair vessel - arrray cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	6,302	1.04	0.03	0.24	0.04	0.04	0.01	0.00	0.00	0.00	69.47	0.00	0.00	0	1	70
		Main Engine (Maneuvering)	0.20	24,412	4.02	0.11	0.93	0.14	0.14	0.04	0.00	0.01	0.00	269.06	0.00	0.01	0	4	273
		Auxiliary Engine (Transit)	0.56	129	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.56	2,066	0.35	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	23.24	0.00	0.00	0	0	24
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0	1	41
		Main Engine (Maneuvering)	0.20	34,752	5.95	0.13	1.36	0.21	0.20	0.04	0.00	0.02	0.00	384.99	0.00	0.02	0	6	391
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	3,893	0.69	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.00	43.80	0.00	0.00	0	1	44
Cable survey vessel - arrray cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0	1	41
		Main Engine (Maneuvering)	0.20	15,059	2.58	0.06	0.59	0.09	0.09	0.02	0.00	0.01	0.00	166.83	0.00	0.01	0	2	169
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	1,687	0.30	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0	0	19
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	3,481	0.60	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	38.57	0.00	0.00	0	1	39
		Main Engine (Maneuvering)	0.20	46,336	7.93	0.18	1.81	0.27	0.27	0.05	0.00	0.02	0.00	513.32	0.00	0.02	0	7	521
		Auxiliary Engine (Transit)	0.43	94	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	5,191	0.92	0.01	0.22	0.03	0.03	0.00	0.00	0.00	0.00	58.40	0.00	0.00	0	1	59
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	3,519
OSS Generators	Generator	Marine Tier 3 Generator	0.75	5,143	0.46	0.06	0.40	0.01	0.01	0.00	0.00	0.00	0.00	58.70	0.00	0.00	0	0	59

Total/yr	2,716,113	480.79	7.20	113.27	15.26	14.78	0.68	0.00	1.10	0.03	31,524.48	0.20	1.51	4.92	449.50	35,497.48
Total over Project Life	81,483,387	14,423.63	215.88	3,398.24	457.87	443.27	20.33	0.07	32.86	0.93	945,734.40	5.91	45.25	147.71	13,484.86	1,064,924.31
Vessels	2,710,970	480.33	7.14	112.88	15.25	14.77	0.68	0.00	1.09	0.03	31,465.78	0.19	1.51	4.86	449.35	31,920.00
	81,329,101	14,409.82	214.22	3,386.34	457.63	443.04	20.31	0.07	32.82	0.93	943,973.43	5.84	45.24	145.93	13,480.61	957,599.96
Non-vessel	5,143	0.46	0.06	0.40	0.01	0.01	0.00	0.00	0.00	0.00	58.70	0.00	0.00	0.06	0.14	3,577.48
	154,286	13.81	1.66	11.90	0.24	0.23	0.02	0.00	0.04	0.00	1,760.97	0.07	0.01	1.79	4.26	107,324.35

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (CTV Scenario)																	
WTG and BoP Crew logistics																	
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 4	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 4	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 5	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	4	91	730	10	73	0	0	0	73	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		4	91	730	10	73	0	0	0	73	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	17	24	408	408	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	4	91	730	10	73	0	0	0	73	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		4	91	730	10	73	0	0	0	73	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	17	24	408	408	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	4	250	2,000	10	200	0	0	0	200	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		4	250	2,000	10	200	0	0	0	200	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	17	24	408	408	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	7	24	168	168	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	7	24	168	168	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Cable repair vessel - arrray cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	9	24	216	216	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	9	24	216	216	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	14	24	336	336	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	14	24	336	336	8A
Cable survey vessel - arrray cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	17	24	408	408	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	17	24	408	408	8A
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	3	17	104	10	10	0	0	0	10	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	19	24	456	456	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		3	17	104	10	10	0	0	0	10	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	19	24	456	456	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (CTV Scenario)																			
WTG and BoP Crew logistics																			
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 4	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 4	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 5	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	69,605	13.40	0.19	3.07	0.41	0.40	0.02	0.00	0.03	0.00	864.29	0.01	0.04	0	12	877
		Main Engine (Maneuvering)	0.20	93,749	18.04	0.25	4.14	0.56	0.54	0.02	0.00	0.04	0.00	1164.08	0.01	0.06	0	17	1,181
		Auxiliary Engine (Transit)	0.43	8,460	1.60	0.02	0.34	0.04	0.04	0.00	0.00	0.00	0.00	89.71	0.00	0.00	0	1	91
		Auxiliary Engine (Maneuvering)	0.43	47,285	8.93	0.11	1.92	0.25	0.24	0.00	0.00	0.02	0.00	501.42	0.00	0.02	0	7	509
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	16,357	3.15	0.04	0.72	0.10	0.09	0.00	0.00	0.01	0.00	203.11	0.00	0.01	0	3	206
		Main Engine (Maneuvering)	0.20	22,031	4.24	0.06	0.97	0.13	0.13	0.01	0.00	0.01	0.00	273.56	0.00	0.01	0	4	278
		Auxiliary Engine (Transit)	0.45	4,427	0.84	0.01	0.18	0.02	0.02	0.00	0.00	0.00	0.00	46.94	0.00	0.00	0	1	48
		Auxiliary Engine (Maneuvering)	0.45	24,742	4.68	0.06	1.00	0.13	0.13	0.00	0.00	0.01	0.00	262.37	0.00	0.01	0	4	266
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	190,715	36.71	0.51	8.42	1.13	1.10	0.05	0.00	0.08	0.00	2368.10	0.01	0.11	0	34	2,402
		Main Engine (Maneuvering)	0.20	93,749	18.04	0.25	4.14	0.56	0.54	0.02	0.00	0.04	0.00	1164.08	0.01	0.06	0	17	1,181
		Auxiliary Engine (Transit)	0.43	23,179	4.38	0.05	0.94	0.12	0.12	0.00	0.00	0.01	0.00	245.79	0.00	0.01	0	4	249
		Auxiliary Engine (Maneuvering)	0.43	47,285	8.93	0.11	1.92	0.25	0.24	0.00	0.00	0.02	0.00	501.42	0.00	0.02	0	7	509
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0	1	78
		Main Engine (Maneuvering)	0.20	15,535	2.56	0.07	0.59	0.09	0.09	0.02	0.00	0.01	0.00	171.22	0.00	0.01	0	2	174
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0	0	2
		Auxiliary Engine (Maneuvering)	0.56	1,314	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.79	0.00	0.00	0	0	15

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Cable repair vessel - arrray cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0	1	78
		Main Engine (Maneuvering)	0.20	19,973	3.29	0.09	0.76	0.12	0.11	0.03	0.00	0.01	0.00	220.14	0.00	0.01	0	3	223
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0	0	2
		Auxiliary Engine (Maneuvering)	0.56	1,690	0.29	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	19.01	0.00	0.00	0	0	19
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0	1	41
		Main Engine (Maneuvering)	0.20	16,218	2.78	0.06	0.63	0.10	0.09	0.02	0.00	0.01	0.00	179.66	0.00	0.01	0	3	182
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	1,817	0.32	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.00	20.44	0.00	0.00	0	0	21
Cable survey vessel - arrray cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	7,311	1.25	0.03	0.29	0.04	0.04	0.01	0.00	0.00	0.00	80.99	0.00	0.00	0	1	82
		Main Engine (Maneuvering)	0.20	19,693	3.37	0.08	0.77	0.12	0.11	0.02	0.00	0.01	0.00	218.16	0.00	0.01	0	3	221
		Auxiliary Engine (Transit)	0.43	197	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0	0	2
		Auxiliary Engine (Maneuvering)	0.43	2,206	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0	0	25
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	2,089	0.36	0.01	0.08	0.01	0.01	0.00	0.00	0.00	0.00	23.14	0.00	0.00	0	0	23
		Main Engine (Maneuvering)	0.20	22,010	3.77	0.08	0.86	0.13	0.13	0.03	0.00	0.01	0.00	243.83	0.00	0.01	0	4	247
		Auxiliary Engine (Transit)	0.43	56	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	2,466	0.44	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.00	27.74	0.00	0.00	0	0	28
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	2,257
OSS Generators	Generator	Marine Tier 3 Generator	0.75	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0	0	29

Total/yr	1,672,286	289.41	4.39	69.07	9.32	9.03	0.39	0.00	0.67	0.02	19,270.51	0.12	0.92	3.00	274.80	21,805.24
Total over Project Life	50,168,568	8,682.35	131.78	2,072.23	279.70	270.77	11.83	0.04	20.08	0.54	578,115.44	3.60	27.66	90.11	8,244.14	654,157.17
Vessels	1,669,714	289.18	4.37	68.88	9.32	9.02	0.39	0.00	0.67	0.02	19,241.17	0.12	0.92	2.97	274.73	19,518.87
	50,091,425	8,675.44	130.95	2,066.28	279.58	270.66	11.82	0.04	20.06	0.54	577,234.95	3.57	27.66	89.22	8,242.01	585,566.18
Non-vessel	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0.03	0.07	2,286.37
	77,143	6.90	0.83	5.95	0.12	0.12	0.01	0.00	0.02	0.00	880.49	0.04	0.01	0.89	2.13	68,591.00

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (CTV Scenario)																	
WTG and BoP Crew logistics																	
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	124	17	4,310	20	216	0	0	0	216	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	124	12	1,488	1,488	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		124	17	4,310	20	216	0	0	0	216	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	124	12	1,488	1,488	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	3	91	547	10	55	0	0	0	55	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		3	91	547	10	55	0	0	0	55	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	12	24	288	288	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	3	91	547	10	55	0	0	0	55	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		3	91	547	10	55	0	0	0	55	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	12	24	288	288	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	3	250	1,500	10	150	0	0	0	150	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		3	250	1,500	10	150	0	0	0	150	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	12	24	288	288	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	5	24	120	120	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	5	24	120	120	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Cable repair vessel - arrray cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	7	24	168	168	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	7	24	168	168	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	10	24	240	240	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	10	24	240	240	8A
Cable survey vessel - arrray cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	12	24	288	288	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	12	24	288	288	8A
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	2	17	70	10	7	0	0	0	7	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	13	24	312	312	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		2	17	70	10	7	0	0	0	7	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	13	24	312	312	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (CTV Scenario)																			
WTG and BoP Crew logistics																			
CTV all-year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV all-year 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0	8	546
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0	13	908
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0	0	7
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0	1	50
CTV Summer Campaign 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
CTV Summer Campaign 3	Crew Transfer Vessel	Main Engine (Transit)	0.83	23,719	3.77	0.06	0.95	0.13	0.12	0.00	0.00	0.01	0.00	266.84	0.00	0.01	0	4	271
		Main Engine (Maneuvering)	0.20	39,463	6.27	0.10	1.58	0.21	0.21	0.00	0.00	0.01	0.00	443.96	0.00	0.02	0	6	450
		Auxiliary Engine (Transit)	0.43	318	0.06	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.58	0.00	0.00	0	0	4
		Auxiliary Engine (Maneuvering)	0.43	2,194	0.40	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.69	0.00	0.00	0	0	25
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	52,204	10.05	0.14	2.30	0.31	0.30	0.01	0.00	0.02	0.00	648.21	0.00	0.03	0	9	658
		Main Engine (Maneuvering)	0.20	66,176	12.74	0.18	2.92	0.39	0.38	0.02	0.00	0.03	0.00	821.70	0.01	0.04	0	12	834
		Auxiliary Engine (Transit)	0.43	6,345	1.20	0.01	0.26	0.03	0.03	0.00	0.00	0.00	0.00	67.28	0.00	0.00	0	1	68
		Auxiliary Engine (Maneuvering)	0.43	33,378	6.31	0.08	1.35	0.17	0.17	0.00	0.00	0.01	0.00	353.94	0.00	0.02	0	5	359
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	12,268	2.36	0.03	0.54	0.07	0.07	0.00	0.00	0.01	0.00	152.33	0.00	0.01	0	2	155
		Main Engine (Maneuvering)	0.20	15,551	2.99	0.04	0.69	0.09	0.09	0.00	0.00	0.01	0.00	193.10	0.00	0.01	0	3	196
		Auxiliary Engine (Transit)	0.45	3,320	0.63	0.01	0.13	0.02	0.02	0.00	0.00	0.00	0.00	35.20	0.00	0.00	0	1	36
		Auxiliary Engine (Maneuvering)	0.45	17,465	3.30	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	185.20	0.00	0.01	0	3	188
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	143,037	27.53	0.38	6.31	0.85	0.82	0.04	0.00	0.06	0.00	1776.08	0.01	0.09	0	25	1,802
		Main Engine (Maneuvering)	0.20	66,176	12.74	0.18	2.92	0.39	0.38	0.02	0.00	0.03	0.00	821.70	0.01	0.04	0	12	834
		Auxiliary Engine (Transit)	0.43	17,384	3.28	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	184.35	0.00	0.01	0	3	187
		Auxiliary Engine (Maneuvering)	0.43	33,378	6.31	0.08	1.35	0.17	0.17	0.00	0.00	0.01	0.00	353.94	0.00	0.02	0	5	359
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0	1	78
		Main Engine (Maneuvering)	0.20	11,096	1.83	0.05	0.42	0.07	0.06	0.02	0.00	0.01	0.00	122.30	0.00	0.01	0	2	124
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0	0	2
		Auxiliary Engine (Maneuvering)	0.56	939	0.16	0.00	0.04	0.01	0.01	0.00	0.00	0.00	0.00	10.56	0.00	0.00	0	0	11

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Cable repair vessel - arrray cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0	1	78
		Main Engine (Maneuvering)	0.20	15,535	2.56	0.07	0.59	0.09	0.09	0.02	0.00	0.01	0.00	171.22	0.00	0.01	0	2	174
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0	0	2
		Auxiliary Engine (Maneuvering)	0.56	1,314	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.79	0.00	0.00	0	0	15
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0	1	41
		Main Engine (Maneuvering)	0.20	11,584	1.98	0.04	0.45	0.07	0.07	0.01	0.00	0.01	0.00	128.33	0.00	0.01	0	2	130
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	1,298	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.60	0.00	0.00	0	0	15
Cable survey vessel - arrray cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0	1	41
		Main Engine (Maneuvering)	0.20	13,901	2.38	0.05	0.54	0.08	0.08	0.02	0.00	0.01	0.00	154.00	0.00	0.01	0	2	156
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.43	1,557	0.28	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	17.52	0.00	0.00	0	0	18
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	1,392	0.24	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.00	15.43	0.00	0.00	0	0	16
		Main Engine (Maneuvering)	0.20	15,059	2.58	0.06	0.59	0.09	0.09	0.02	0.00	0.01	0.00	166.83	0.00	0.01	0	2	169
		Auxiliary Engine (Transit)	0.43	38	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	1,687	0.30	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0	0	19
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	1,690
OSS Generators	Generator	Marine Tier 3 Generator	0.75	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0	0	29

Total/yr	1,200,127	208.11	3.17	49.64	6.70	6.48	0.29	0.00	0.48	0.01	13,840.33	0.09	0.66	2.16	197.29	15,729.96
Total over Project Life	36,003,822	6,243.31	95.13	1,489.18	200.90	194.49	8.75	0.03	14.45	0.40	415,209.94	2.60	19.86	64.94	5,918.70	471,898.79
Vessels	1,197,556	207.88	3.14	49.44	6.69	6.48	0.29	0.00	0.48	0.01	13,810.98	0.09	0.66	2.13	197.22	14,010.34
	35,926,679	6,236.41	94.30	1,483.23	200.78	194.38	8.74	0.03	14.43	0.40	414,329.45	2.56	19.85	64.05	5,916.57	420,310.07
Non-vessel	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0.03	0.07	1,719.62
	77,143	6.90	0.83	5.95	0.12	0.12	0.01	0.00	0.02	0.00	880.49	0.04	0.01	0.89	2.13	51,588.73

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (SOV Scenario)																	
WTG and BoP Crew logistics																	
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
CTV All-Year 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	250	17	8,690	20	434	0	0	0	434	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	250	12	3,000	3,000	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		250	17	8,690	20	434	0	0	0	434	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	250	12	3,000	3,000	4A
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	Atlantic City	24	17	834	20	42	0	0	0	42	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	17	0	0	0	341	24	8,184	8,184	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		24	17	834	20	42	0	0	0	42	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	17	0	0	0	341	24	8,184	8,184	3A
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	N/A	0	0	0	20	0	0	0	0	0	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	0	0	0	0	220	8	1,760	1,760	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		0	0	0	20	0	0	0	0	0	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	0	0	0	0	220	8	1,760	1,760	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	8	91	1,460	10	146	0	0	0	146	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		8	91	1,460	10	146	0	0	0	146	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	40	24	960	960	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	8	91	1,460	10	146	0	0	0	146	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		8	91	1,460	10	146	0	0	0	146	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	40	24	960	960	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	8	250	4,000	10	400	0	0	0	400	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	40	24	960	960	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		8	250	4,000	10	400	0	0	0	400	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	40	24	960	960	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	0.7	91	128	10	13	0	0	0	13	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	25	24	600	600	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		0.7	91	128	10	13	0	0	0	13	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	25	24	600	600	3A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Cable repair vessel - array cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	0.9	91	164	10	16	0	0	0	16	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	11	24	264	264	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		0.9	91	164	10	16	0	0	0	16	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	11	24	264	264	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	30	24	720	720	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	30	24	720	720	8A
Cable survey vessel - array cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	13	24	312	312	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	13	24	312	312	8A
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	5	17	174	10	17	0	0	0	17	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	40	24	960	960	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		5	17	174	10	17	0	0	0	17	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	40	24	960	960	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	8	500	4,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (SOV Scenario)																			
WTG and BoP Crew logistics																			
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0.08	7.67	545.73
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0.14	12.76	907.97
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0.00	0.10	7.31
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0.01	0.71	50.49
CTV All-Year 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	47,820	7.59	0.12	1.91	0.26	0.25	0.00	0.00	0.02	0.00	537.98	0.00	0.03	0.08	7.67	545.73
		Main Engine (Maneuvering)	0.20	79,562	12.64	0.19	3.18	0.43	0.41	0.01	0.00	0.03	0.00	895.08	0.01	0.04	0.14	12.76	907.97
		Auxiliary Engine (Transit)	0.43	641	0.12	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.21	0.00	0.00	0.00	0.10	7.31
		Auxiliary Engine (Maneuvering)	0.43	4,424	0.80	0.01	0.19	0.02	0.02	0.00	0.00	0.00	0.00	49.77	0.00	0.00	0.01	0.71	50.49
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	0.16	3,910	0.64	0.02	0.15	0.02	0.02	0.01	0.00	0.00	0.00	43.09	0.00	0.00	0.01	0.63	43.72
		Main Engine (Maneuvering)	0.10	499,313	82.25	2.17	19.07	2.95	2.86	0.74	0.00	0.30	0.03	5,503.40	0.03	0.27	0.87	80.06	5,584.33
		Auxiliary Engine (Transit)	0.16	3,391	0.58	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	38.15	0.00	0.00	0.01	0.54	38.70
		Auxiliary Engine (Maneuvering)	0.10	433,055	74.34	1.05	18.64	2.41	2.33	0.05	0.00	0.16	0.00	4,872.18	0.03	0.23	0.75	69.44	4,942.37
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	46,676	7.41	0.11	1.86	0.25	0.24	0.00	0.00	0.02	0.00	525.11	0.00	0.03	0.08	7.48	532.68
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	2,595	0.47	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.00	29.20	0.00	0.00	0.00	0.42	29.62
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	139,211	26.79	0.37	6.14	0.83	0.80	0.03	0.00	0.06	0.00	1,728.57	0.01	0.08	0.27	24.68	1,753.52
		Main Engine (Maneuvering)	0.20	220,586	42.46	0.59	9.74	1.31	1.27	0.06	0.00	0.09	0.00	2,739.01	0.02	0.13	0.42	39.10	2,778.54
		Auxiliary Engine (Transit)	0.43	16,919	3.20	0.04	0.69	0.09	0.09	0.00	0.00	0.01	0.00	179.42	0.00	0.01	0.03	2.56	182.00
		Auxiliary Engine (Maneuvering)	0.43	111,259	21.02	0.25	4.51	0.58	0.56	0.01	0.00	0.04	0.00	1,179.81	0.01	0.06	0.18	16.81	1,196.81
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	32,715	6.30	0.09	1.44	0.19	0.19	0.01	0.00	0.01	0.00	406.21	0.00	0.02	0.06	5.80	412.08
		Main Engine (Maneuvering)	0.20	51,838	9.98	0.14	2.29	0.31	0.30	0.01	0.00	0.02	0.00	643.67	0.00	0.03	0.10	9.19	652.96
		Auxiliary Engine (Transit)	0.45	8,853	1.67	0.02	0.36	0.05	0.04	0.00	0.00	0.00	0.00	93.88	0.00	0.00	0.01	1.34	95.23
		Auxiliary Engine (Maneuvering)	0.45	58,217	11.00	0.13	2.36	0.30	0.30	0.01	0.00	0.02	0.00	617.34	0.00	0.03	0.10	8.80	626.24
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	381,431	73.41	1.02	16.83	2.27	2.20	0.10	0.00	0.16	0.00	4,736.20	0.03	0.23	0.73	67.62	4,804.55
		Main Engine (Maneuvering)	0.20	220,586	42.46	0.59	9.74	1.31	1.27	0.06	0.00	0.09	0.00	2,739.01	0.02	0.13	0.42	39.10	2,778.54
		Auxiliary Engine (Transit)	0.43	46,358	8.76	0.11	1.88	0.24	0.24	0.00	0.00	0.02	0.00	491.59	0.00	0.02	0.08	7.01	498.67
		Auxiliary Engine (Maneuvering)	0.43	111,259	21.02	0.25	4.51	0.58	0.56	0.01	0.00	0.04	0.00	1,179.81	0.01	0.06	0.18	16.81	1,196.81
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	4,902	0.81	0.02	0.19	0.03	0.03	0.01	0.00	0.00	0.00	54.03	0.00	0.00	0.01	0.79	54.82
		Main Engine (Maneuvering)	0.20	55,481	9.14	0.24	2.12	0.33	0.32	0.08	0.00	0.03	0.00	611.51	0.00	0.03	0.10	8.90	620.50
		Auxiliary Engine (Transit)	0.56	100	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	0.00	0.00	0.00	0.02	1.14
		Auxiliary Engine (Maneuvering)	0.56	4,695	0.81	0.01	0.20	0.03	0.03	0.00	0.00	0.00	0.00	52.82	0.00	0.00	0.01	0.75	53.58

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Cable repair vessel - array cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	6,302	1.04	0.03	0.24	0.04	0.04	0.01	0.00	0.00	0.00	69.47	0.00	0.00	0.01	1.01	70.49
		Main Engine (Maneuvering)	0.20	24,412	4.02	0.11	0.93	0.14	0.14	0.04	0.00	0.01	0.00	269.06	0.00	0.01	0.04	3.91	273.02
		Auxiliary Engine (Transit)	0.56	129	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.45	0.00	0.00	0.00	0.02	1.47
		Auxiliary Engine (Maneuvering)	0.56	2,066	0.35	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	23.24	0.00	0.00	0.00	0.33	23.57
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0.01	0.59	41.09
		Main Engine (Maneuvering)	0.20	34,752	5.95	0.13	1.36	0.21	0.20	0.04	0.00	0.02	0.00	384.99	0.00	0.02	0.06	5.57	390.62
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0.00	0.02	1.13
		Auxiliary Engine (Maneuvering)	0.43	3,893	0.69	0.01	0.17	0.02	0.02	0.00	0.00	0.00	0.00	43.80	0.00	0.00	0.01	0.62	44.43
Cable survey vessel - array cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0.01	0.59	41.09
		Main Engine (Maneuvering)	0.20	15,059	2.58	0.06	0.59	0.09	0.09	0.02	0.00	0.01	0.00	166.83	0.00	0.01	0.03	2.41	169.27
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0.00	0.02	1.13
		Auxiliary Engine (Maneuvering)	0.43	1,687	0.30	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.27	19.25
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	3,481	0.60	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	38.57	0.00	0.00	0.01	0.56	39.13
		Main Engine (Maneuvering)	0.20	46,336	7.93	0.18	1.81	0.27	0.27	0.05	0.00	0.02	0.00	513.32	0.00	0.02	0.08	7.43	520.83
		Auxiliary Engine (Transit)	0.43	94	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	0.00	0.00	0.00	0.02	1.07
		Auxiliary Engine (Maneuvering)	0.43	5,191	0.92	0.01	0.22	0.03	0.03	0.00	0.00	0.00	0.00	58.40	0.00	0.00	0.01	0.83	59.24
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	3,519
OSS Generators	Generator	Marine Tier 3 Generator	0.75	5,143	0.46	0.06	0.40	0.01	0.01	0.00	0.00	0.00	0.00	58.70	0.00	0.00	0	0	58.9

Total/yr	2,913,550	520.1	8.6	121.6	16.7	16.1	1.4	0.0	1.3	0.1	33,631.2	0.2	1.6	5.3	481.2	37,636.2
Total over Project Life	87,406,494	15,603.8	259.1	3,646.8	499.7	484.1	41.6	0.1	38.5	1.9	1,008,934.9	6.3	48.4	158.0	14,434.6	1,129,084.8

Vessels	2,908,407	519.7	8.6	121.2	16.6	16.1	1.4	0.0	1.3	0.1	33,572.5	0.2	1.6	5.2	481.0	34,058.7
	87,252,208	15,589.9	257.4	3,634.9	499.5	483.9	41.6	0.1	38.4	1.9	1,007,174.0	6.2	48.4	156.2	14,430.3	1,021,760.5

Non-vessel	5,143	0.46	0.06	0.40	0.01	0.01	0.00	0.00	0.00	0.00	58.70	0.00	0.00	0.06	0.14	3,577.48
	154,286	13.8	1.7	11.9	0.2	0.2	0.0	0.0	0.0	0.0	1,761.0	0.1	0.0	1.8	4.3	107,324.3

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (SOV Scenario)																	
WTG and BoP Crew logistics																	
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	170	17	5,909	20	295	0	0	0	295	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	170	12	2,040	2,040	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		170	17	5,909	20	295	0	0	0	295	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	170	12	2,040	2,040	4A
CTV All-Year 2	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	170	17	5,909	20	295	0	0	0	295	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	170	12	2,040	2,040	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		170	17	5,909	20	295	0	0	0	295	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	170	12	2,040	2,040	4A
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	Atlantic City	24	17	834	20	42	0	0	0	42	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	17	0	0	0	341	24	8,184	8,184	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		24	17	834	20	42	0	0	0	42	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	17	0	0	0	341	24	8,184	8,184	3A
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	N/A	0	0	0	20	0	0	0	0	0	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	0	0	0	0	150	8	1,200	1,200	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		0	0	0	20	0	0	0	0	0	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	0	0	0	0	150	8	1,200	1,200	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	4	91	730	10	73	0	0	0	73	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		4	91	730	10	73	0	0	0	73	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	17	24	408	408	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	4	91	730	10	73	0	0	0	73	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		4	91	730	10	73	0	0	0	73	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	17	24	408	408	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	4	250	2,000	10	200	0	0	0	200	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	17	24	408	408	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		4	250	2,000	10	200	0	0	0	200	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	17	24	408	408	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	7	24	168	168	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	7	24	168	168	3A
Cable repair vessel - arrray cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	9	24	216	216	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	9	24	216	216	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	14	24	336	336	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	14	24	336	336	8A
Cable survey vessel - arrray cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	2	91	365	10	36	0	0	0	36	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	17	24	408	408	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		2	91	365	10	36	0	0	0	36	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	17	24	408	408	8A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	3	17	104	10	10	0	0	0	10	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	19	24	456	456	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		3	17	104	10	10	0	0	0	10	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	19	24	456	456	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (SOV Scenario)																			
WTG and BoP Crew logistics																			
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	32,518	5.16	0.08	1.30	0.17	0.17	0.00	0.00	0.01	0.00	365.83	0.00	0.02	0.06	5.21	371.10
		Main Engine (Maneuvering)	0.20	54,102	8.59	0.13	2.16	0.29	0.28	0.01	0.00	0.02	0.00	608.65	0.00	0.03	0.09	8.67	617.42
		Auxiliary Engine (Transit)	0.43	436	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.90	0.00	0.00	0.00	0.07	4.97
		Auxiliary Engine (Maneuvering)	0.43	3,008	0.54	0.01	0.13	0.02	0.02	0.00	0.00	0.00	0.00	33.85	0.00	0.00	0.01	0.48	34.33
CTV All-Year 2	Crew Transfer Vessel	Main Engine (Transit)	0.83	32,518	5.16	0.08	1.30	0.17	0.17	0.00	0.00	0.01	0.00	365.83	0.00	0.02	0.06	5.21	371.10
		Main Engine (Maneuvering)	0.20	54,102	8.59	0.13	2.16	0.29	0.28	0.01	0.00	0.02	0.00	608.65	0.00	0.03	0.09	8.67	617.42
		Auxiliary Engine (Transit)	0.43	436	0.08	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	4.90	0.00	0.00	0.00	0.07	4.97
		Auxiliary Engine (Maneuvering)	0.43	3,008	0.54	0.01	0.13	0.02	0.02	0.00	0.00	0.00	0.00	33.85	0.00	0.00	0.01	0.48	34.33
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	0.16	3,910	0.64	0.02	0.15	0.02	0.02	0.01	0.00	0.00	0.00	43.09	0.00	0.00	0.01	0.63	43.72
		Main Engine (Maneuvering)	0.10	499,313	82.25	2.17	19.07	2.95	2.86	0.74	0.00	0.30	0.03	5,503.40	0.03	0.27	0.87	80.06	5,584.33
		Auxiliary Engine (Transit)	0.16	3,391	0.58	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	38.15	0.00	0.00	0.01	0.54	38.70
		Auxiliary Engine (Maneuvering)	0.10	433,055	74.34	1.05	18.64	2.41	2.33	0.05	0.00	0.16	0.00	4,872.18	0.03	0.23	0.75	69.44	4,942.37
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	31,825	5.05	0.08	1.27	0.17	0.17	0.00	0.00	0.01	0.00	358.03	0.00	0.02	0.06	5.10	363.19
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	1,770	0.32	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.00	19.91	0.00	0.00	0.00	0.28	20.20
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	69,605	13.40	0.19	3.07	0.41	0.40	0.02	0.00	0.03	0.00	864.29	0.01	0.04	0.13	12.34	876.76
		Main Engine (Maneuvering)	0.20	93,749	18.04	0.25	4.14	0.56	0.54	0.02	0.00	0.04	0.00	1,164.08	0.01	0.06	0.18	16.62	1,180.88
		Auxiliary Engine (Transit)	0.43	8,460	1.60	0.02	0.34	0.04	0.04	0.00	0.00	0.00	0.00	89.71	0.00	0.00	0.01	1.28	91.00
		Auxiliary Engine (Maneuvering)	0.43	47,285	8.93	0.11	1.92	0.25	0.24	0.00	0.00	0.02	0.00	501.42	0.00	0.02	0.08	7.15	508.64
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	16,357	3.15	0.04	0.72	0.10	0.09	0.00	0.00	0.01	0.00	203.11	0.00	0.01	0.03	2.90	206.04
		Main Engine (Maneuvering)	0.20	22,031	4.24	0.06	0.97	0.13	0.13	0.01	0.00	0.01	0.00	273.56	0.00	0.01	0.04	3.91	277.51
		Auxiliary Engine (Transit)	0.45	4,427	0.84	0.01	0.18	0.02	0.02	0.00	0.00	0.00	0.00	46.94	0.00	0.00	0.01	0.67	47.62
		Auxiliary Engine (Maneuvering)	0.45	24,742	4.68	0.06	1.00	0.13	0.13	0.00	0.00	0.01	0.00	262.37	0.00	0.01	0.04	3.74	266.15
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	190,715	36.71	0.51	8.42	1.13	1.10	0.05	0.00	0.08	0.00	2,368.10	0.01	0.11	0.37	33.81	2,402.28
		Main Engine (Maneuvering)	0.20	93,749	18.04	0.25	4.14	0.56	0.54	0.02	0.00	0.04	0.00	1,164.08	0.01	0.06	0.18	16.62	1,180.88
		Auxiliary Engine (Transit)	0.43	23,179	4.38	0.05	0.94	0.12	0.12	0.00	0.00	0.01	0.00	245.79	0.00	0.01	0.04	3.50	249.34
		Auxiliary Engine (Maneuvering)	0.43	47,285	8.93	0.11	1.92	0.25	0.24	0.00	0.00	0.02	0.00	501.42	0.00	0.02	0.08	7.15	508.64
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0.01	1.12	78.32
		Main Engine (Maneuvering)	0.20	15,535	2.56	0.07	0.59	0.09	0.09	0.02	0.00	0.01	0.00	171.22	0.00	0.01	0.03	2.49	173.74
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.02	1.63
		Auxiliary Engine (Maneuvering)	0.56	1,314	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.79	0.00	0.00	0.00	0.21	15.00
Cable repair vessel - arrray cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0.01	1.12	78.32
		Main Engine (Maneuvering)	0.20	19,973	3.29	0.09	0.76	0.12	0.11	0.03	0.00	0.01	0.00	220.14	0.00	0.01	0.03	3.20	223.38
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.02	1.63
		Auxiliary Engine (Maneuvering)	0.56	1,690	0.29	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	19.01	0.00	0.00	0.00	0.27	19.29
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0.01	0.59	41.09
		Main Engine (Maneuvering)	0.20	16,218	2.78	0.06	0.63	0.10	0.09	0.02	0.00	0.01	0.00	179.66	0.00	0.01	0.03	2.60	182.29
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0.00	0.02	1.13
		Auxiliary Engine (Maneuvering)	0.43	1,817	0.32	0.00	0.08	0.01	0.01	0.00	0.00	0.00	0.00	20.44	0.00	0.00	0.00	0.29	20.73
Cable survey vessel - arrray cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	7,311	1.25	0.03	0.29	0.04	0.04	0.01	0.00	0.00	0.00	80.99	0.00	0.00	0.01	1.17	82.17
		Main Engine (Maneuvering)	0.20	19,693	3.37	0.08	0.77	0.12	0.11	0.02	0.00	0.01	0.00	218.16	0.00	0.01	0.03	3.16	221.35
		Auxiliary Engine (Transit)	0.43	197	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0.00	0.03	2.25
		Auxiliary Engine (Maneuvering)	0.43	2,206	0.39	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	24.82	0.00	0.00	0.00	0.35	25.18

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	2,089	0.36	0.01	0.08	0.01	0.01	0.00	0.00	0.00	0.00	23.14	0.00	0.00	0.00	0.33	23.48
		Main Engine (Maneuvering)	0.20	22,010	3.77	0.08	0.86	0.13	0.13	0.03	0.00	0.01	0.00	243.83	0.00	0.01	0.04	3.53	247.39
		Auxiliary Engine (Transit)	0.43	56	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00	0.01	0.64
		Auxiliary Engine (Maneuvering)	0.43	2,466	0.44	0.01	0.11	0.01	0.01	0.00	0.00	0.00	0.00	27.74	0.00	0.00	0.00	0.40	28.14
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	2,257
OSS Generators	Generator	Marine Tier 3 Generator	0.75	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0	0	29.5

Total/yr	1,967,420	344.3	6.1	81.3	11.2	10.9	1.1	0.0	0.9	0.1	22,476.3	0.1	1.1	3.5	322.1	25,058.9
Total over Project Life	59,022,593	10,330.2	182.1	2,438.1	337.3	326.9	33.4	0.0	26.8	1.5	674,288.9	4.2	32.4	105.5	9,663.8	751,765.7

Vessels	1,964,848	344.1	6.0	81.1	11.2	10.9	1.1	0.0	0.9	0.1	22,446.9	0.1	1.1	3.5	322.1	22,772.5
	58,945,450	10,323.3	181.3	2,432.2	337.2	326.8	33.4	0.0	26.8	1.5	673,408.4	4.2	32.4	104.6	9,661.7	683,174.7

Non-vessel	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0.03	0.07	2,286.37
	77,143	6.9	0.8	6.0	0.1	0.1	0.0	0.0	0.0	0.0	880.5	0.0	0.0	0.9	2.1	68,591.0

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Emissions During Operations (SOV Scenario)																	
WTG and BoP Crew logistics																	
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	119	17	4,136	20	207	0	0	0	207	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	119	12	1,428	1,428	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		119	17	4,136	20	207	0	0	0	207	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	119	12	1,428	1,428	4A
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	Atlantic City	24	17	834	20	42	0	0	0	42	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	17	0	0	0	341	24	8,184	8,184	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		24	17	834	20	42	0	0	0	42	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	17	0	0	0	341	24	8,184	8,184	3A
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	N/A	0	0	0	20	0	0	0	0	0	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	0	0	0	0	105	8	840	840	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		0	0	0	20	0	0	0	0	0	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	0	0	0	0	105	8	840	840	4A
WTG heavy logistics / jack-up																	
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	3	91	547	10	55	0	0	0	55	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		3	91	547	10	55	0	0	0	55	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	12	24	288	288	7A
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	2	2350	4,700	3 main	NJWP	3	91	547	10	55	0	0	0	55	7M
		Main Engine (Maneuvering)	2	2350	4,700	3 main		0	91	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	2	1000	2,000	3 auxiliary		3	91	547	10	55	0	0	0	55	7A
		Auxiliary Engine (Maneuvering)	2	1000	2,000	3 auxiliary		0	91	0	0	0	12	24	288	288	7A
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	Europe	3	250	1,500	10	150	0	0	0	150	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	250	0	0	0	12	24	288	288	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		3	250	1,500	10	150	0	0	0	150	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	250	0	0	0	12	24	288	288	7A
Cable repair vessel - export cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	5	24	120	120	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	5	24	120	120	3A
Cable repair vessel - arrray cable																	
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	1	7,280	7,280	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	3M
		Main Engine (Maneuvering)	1	7,280	7,280	1 & 2 main		0	91	0	0	0	7	24	168	168	3M
		Auxiliary Engine (Transit)	1	220	220	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	3A
		Auxiliary Engine (Maneuvering)	1	220	220	1 & 2 auxiliary		0	91	0	0	0	7	24	168	168	3A
Cable survey vessel - export cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	10	24	240	240	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	10	24	240	240	8A
Cable survey vessel - arrray cable																	
Cable survey vessel	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	NJWP	1	91	182	10	18	0	0	0	18	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	91	0	0	0	12	24	288	288	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		1	91	182	10	18	0	0	0	18	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	91	0	0	0	12	24	288	288	8A

Activity	Representative Vessel Type	Engine Type	Engine Count	Engine Size (kW)	Total Size (kW)	Engine Category	Home Port	Vessel Round Trips (per year)	One-Way Trip Distance (NM)	Total Distance Traveled (NM)	Vessel Transit Speed (knots)	Hours in Transit/Year	Operating Days in WTA/Year	Operating Hours/Day	Total Non-Transit Hours	Total Operating Hours	Emission Factors Ref
Foundation below water inspection																	
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	2	1,900	3,800	1 & 2 main	Atlantic City	2	17	70	10	7	0	0	0	7	8M
		Main Engine (Maneuvering)	2	1,900	3,800	1 & 2 main		0	17	0	0	0	13	24	312	312	8M
		Auxiliary Engine (Transit)	2	99	198	1 & 2 auxiliary		2	17	70	10	7	0	0	0	7	8A
		Auxiliary Engine (Maneuvering)	2	99	198	1 & 2 auxiliary		0	17	0	0	0	13	24	312	312	8A
Other vessels																	
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	4	522	2,088	1 & 2 main	Atlantic City	12	17	417	20	21	0	0	0	21	4M
		Main Engine (Maneuvering)	4	522	2,088	1 & 2 main		0	17	0	0	0	12	8	96	96	4M
		Auxiliary Engine (Transit)	2	27	54	1 & 2 auxiliary		12	17	417	20	21	0	0	0	21	4A
		Auxiliary Engine (Maneuvering)	2	27	54	1 & 2 auxiliary		0	17	0	0	0	12	8	96	96	4A
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	4	2,306	9,224	1 & 2 main	NJWP	0.03	91	6	10	1	0	0	0	1	3M
		Main Engine (Maneuvering)	4	2,306	9,224	1 & 2 main		0	91	0	0	0	3	24	72	72	3M
		Auxiliary Engine (Transit)	4	2,000	8,000	1 & 2 auxiliary		0.03	91	6	10	1	0	0	0	1	3A
		Auxiliary Engine (Maneuvering)	4	2,000	8,000	1 & 2 auxiliary		0	91	0	0	0	3	24	72	72	3A
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	5	4000	20,000	3 main	NJWP	0.03	91	6	10	1	0	0	0	1	7M
		Main Engine (Maneuvering)	5	4000	20,000	3 main		0	91	0	0	0	3	24	72	72	7M
		Auxiliary Engine (Transit)	1	4000	4,000	3 auxiliary		0.03	91	6	10	1	0	0	0	1	7A
		Auxiliary Engine (Maneuvering)	1	4000	4,000	3 auxiliary		0	91	0	0	0	3	24	72	72	7A
Miscellaneous																	
SF6 Loss	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	N/A	N/A	N/A
OSS Generators	Generator	Marine Tier 3 Generator	4	500	2,000	Marine Tier 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	24	24	31

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Emissions During Operations (SOV Scenario)																			
WTG and BoP Crew logistics																			
CTV All-Year 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	22,762	3.62	0.06	0.91	0.12	0.12	0.00	0.00	0.01	0.00	256.08	0.00	0.01	0.04	3.65	259.77
		Main Engine (Maneuvering)	0.20	37,872	6.01	0.09	1.51	0.20	0.20	0.00	0.00	0.01	0.00	426.06	0.00	0.02	0.07	6.07	432.19
		Auxiliary Engine (Transit)	0.43	305	0.05	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	3.43	0.00	0.00	0.00	0.05	3.48
		Auxiliary Engine (Maneuvering)	0.43	2,106	0.38	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	23.69	0.00	0.00	0.00	0.34	24.03
SOV All-Year 1	Service Operation Vessel	Main Engine (Transit)	0.16	3,910	0.64	0.02	0.15	0.02	0.02	0.01	0.00	0.00	0.00	43.09	0.00	0.00	0.01	0.63	43.72
		Main Engine (Maneuvering)	0.10	499,313	82.25	2.17	19.07	2.95	2.86	0.74	0.00	0.30	0.03	5,503.40	0.03	0.27	0.87	80.06	5,584.33
		Auxiliary Engine (Transit)	0.16	3,391	0.58	0.01	0.15	0.02	0.02	0.00	0.00	0.00	0.00	38.15	0.00	0.00	0.01	0.54	38.70
		Auxiliary Engine (Maneuvering)	0.10	433,055	74.34	1.05	18.64	2.41	2.33	0.05	0.00	0.16	0.00	4,872.18	0.03	0.23	0.75	69.44	4,942.37
SOV Daughter Craft 1	Crew Transfer Vessel	Main Engine (Transit)	0.83	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Main Engine (Maneuvering)	0.20	22,277	3.54	0.05	0.89	0.12	0.12	0.00	0.00	0.01	0.00	250.62	0.00	0.01	0.04	3.57	254.23
		Auxiliary Engine (Transit)	0.43	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Auxiliary Engine (Maneuvering)	0.43	1,239	0.22	0.00	0.05	0.01	0.01	0.00	0.00	0.00	0.00	13.94	0.00	0.00	0.00	0.20	14.14
WTG heavy logistics / jack-up																			
US Jack-Up	Jack-Up Vessel	Main Engine (Transit)	0.83	52,204	10.05	0.14	2.30	0.31	0.30	0.01	0.00	0.02	0.00	648.21	0.00	0.03	0.10	9.25	657.57
		Main Engine (Maneuvering)	0.20	66,176	12.74	0.18	2.92	0.39	0.38	0.02	0.00	0.03	0.00	821.70	0.01	0.04	0.13	11.73	833.56
		Auxiliary Engine (Transit)	0.43	6,345	1.20	0.01	0.26	0.03	0.03	0.00	0.00	0.00	0.00	67.28	0.00	0.00	0.01	0.96	68.25
		Auxiliary Engine (Maneuvering)	0.43	33,378	6.31	0.08	1.35	0.17	0.17	0.00	0.00	0.01	0.00	353.94	0.00	0.02	0.05	5.04	359.04
US Feeder Vessel	Feeder/Jack-up	Main Engine (Transit)	0.83	12,268	2.36	0.03	0.54	0.07	0.07	0.00	0.00	0.01	0.00	152.33	0.00	0.01	0.02	2.17	154.53
		Main Engine (Maneuvering)	0.20	15,551	2.99	0.04	0.69	0.09	0.09	0.00	0.00	0.01	0.00	193.10	0.00	0.01	0.03	2.76	195.89
		Auxiliary Engine (Transit)	0.45	3,320	0.63	0.01	0.13	0.02	0.02	0.00	0.00	0.00	0.00	35.20	0.00	0.00	0.01	0.50	35.71
		Auxiliary Engine (Maneuvering)	0.45	17,465	3.30	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	185.20	0.00	0.01	0.03	2.64	187.87
European Jack-up	Jack-Up Vessel	Main Engine (Transit)	0.83	143,037	27.53	0.38	6.31	0.85	0.82	0.04	0.00	0.06	0.00	1,776.08	0.01	0.09	0.27	25.36	1,801.71
		Main Engine (Maneuvering)	0.20	66,176	12.74	0.18	2.92	0.39	0.38	0.02	0.00	0.03	0.00	821.70	0.01	0.04	0.13	11.73	833.56
		Auxiliary Engine (Transit)	0.43	17,384	3.28	0.04	0.71	0.09	0.09	0.00	0.00	0.01	0.00	184.35	0.00	0.01	0.03	2.63	187.00
		Auxiliary Engine (Maneuvering)	0.43	33,378	6.31	0.08	1.35	0.17	0.17	0.00	0.00	0.01	0.00	353.94	0.00	0.02	0.05	5.04	359.04
Cable repair vessel - export cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0.01	1.12	78.32
		Main Engine (Maneuvering)	0.20	11,096	1.83	0.05	0.42	0.07	0.06	0.02	0.00	0.01	0.00	122.30	0.00	0.01	0.02	1.78	124.10
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.02	1.63
		Auxiliary Engine (Maneuvering)	0.56	939	0.16	0.00	0.04	0.01	0.01	0.00	0.00	0.00	0.00	10.56	0.00	0.00	0.00	0.15	10.72
Cable repair vessel - arrray cable																			
Cable repair vessel	Cable Lay Vessel	Main Engine (Transit)	0.83	7,003	1.15	0.03	0.27	0.04	0.04	0.01	0.00	0.00	0.00	77.18	0.00	0.00	0.01	1.12	78.32
		Main Engine (Maneuvering)	0.20	15,535	2.56	0.07	0.59	0.09	0.09	0.02	0.00	0.01	0.00	171.22	0.00	0.01	0.03	2.49	173.74
		Auxiliary Engine (Transit)	0.56	143	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.61	0.00	0.00	0.00	0.02	1.63
		Auxiliary Engine (Maneuvering)	0.56	1,314	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.79	0.00	0.00	0.00	0.21	15.00
Cable survey vessel - export cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0.01	0.59	41.09
		Main Engine (Maneuvering)	0.20	11,584	1.98	0.04	0.45	0.07	0.07	0.01	0.00	0.01	0.00	128.33	0.00	0.01	0.02	1.86	130.21
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0.00	0.02	1.13
		Auxiliary Engine (Maneuvering)	0.43	1,298	0.23	0.00	0.06	0.01	0.01	0.00	0.00	0.00	0.00	14.60	0.00	0.00	0.00	0.21	14.81
Cable survey vessel - arrray cable																			
Cable survey vessel	Survey Vessel	Main Engine (Transit)	0.83	3,655	0.63	0.01	0.14	0.02	0.02	0.00	0.00	0.00	0.00	40.49	0.00	0.00	0.01	0.59	41.09
		Main Engine (Maneuvering)	0.20	13,901	2.38	0.05	0.54	0.08	0.08	0.02	0.00	0.01	0.00	154.00	0.00	0.01	0.02	2.23	156.25
		Auxiliary Engine (Transit)	0.43	99	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.11	0.00	0.00	0.00	0.02	1.13
		Auxiliary Engine (Maneuvering)	0.43	1,557	0.28	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	17.52	0.00	0.00	0.00	0.25	17.77

Activity	Representative Vessel Type	Engine Type	Load Factor	Fuel Consumption (gal)	Emissions (tons)														
					NOx	VOC	CO	PM10	PM2.5	SO2	Pb	HAPs	H2SO4	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Foundation below water inspection																			
Vessel for subsea inspection	Survey Vessel	Main Engine (Transit)	0.83	1,392	0.24	0.01	0.05	0.01	0.01	0.00	0.00	0.00	0.00	15.43	0.00	0.00	0.00	0.22	15.65
		Main Engine (Maneuvering)	0.20	15,059	2.58	0.06	0.59	0.09	0.09	0.02	0.00	0.01	0.00	166.83	0.00	0.01	0.03	2.41	169.27
		Auxiliary Engine (Transit)	0.43	38	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.01	0.43
		Auxiliary Engine (Maneuvering)	0.43	1,687	0.30	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	18.98	0.00	0.00	0.00	0.27	19.25
Other vessels																			
Environmental monitoring vessel	Crew Transfer Vessel	Main Engine (Transit)	0.83	2,295	0.36	0.01	0.09	0.01	0.01	0.00	0.00	0.00	0.00	25.82	0.00	0.00	0	0	26
		Main Engine (Maneuvering)	0.20	2,546	0.40	0.01	0.10	0.01	0.01	0.00	0.00	0.00	0.00	28.64	0.00	0.00	0	0	29
		Auxiliary Engine (Transit)	0.43	31	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0	0	0
		Auxiliary Engine (Maneuvering)	0.43	142	0.03	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	1.59	0.00	0.00	0	0	2
SOV campaign (e.g., for retrofit campaign)	Service Operation Vessel	Main Engine (Transit)	0.16	57	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0	0	1
		Main Engine (Maneuvering)	0.10	4,393	0.72	0.02	0.17	0.03	0.03	0.01	0.00	0.00	0.00	48.42	0.00	0.00	0	1	49
		Auxiliary Engine (Transit)	0.16	49	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.10	3,810	0.65	0.01	0.16	0.02	0.02	0.00	0.00	0.00	0.00	42.86	0.00	0.00	0	1	43
OSS repair vessel (major repair)	Jack-Up Vessel	Main Engine (Transit)	0.83	580	0.11	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	7.20	0.00	0.00	0	0	7
		Main Engine (Maneuvering)	0.20	16,544	3.18	0.04	0.73	0.10	0.10	0.00	0.00	0.01	0.00	205.43	0.00	0.01	0	3	208
		Auxiliary Engine (Transit)	0.45	74	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.78	0.00	0.00	0	0	1
		Auxiliary Engine (Maneuvering)	0.45	8,733	1.65	0.02	0.35	0.05	0.04	0.00	0.00	0.00	0.00	92.60	0.00	0.00	0	1	94
Miscellaneous																			
SF6 Loss	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	N/A	N/A	N/A	N/A	1,690
OSS Generators	Generator	Marine Tier 3 Generator	0.75	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0	0	29.5

Total/yr	1,631,935	284.9	5.2	67.3	9.4	9.1	1.0	0.0	0.8	0.0	18,583.7	0.1	0.9	2.9	266.5	20,543.3
Total over Project Life	48,958,036	8,545.6	155.4	2,019.2	280.6	272.0	30.8	0.0	22.7	1.4	557,510.8	3.5	26.8	87.4	7,995.8	616,299.2

Vessels	1,629,363	284.6	5.2	67.1	9.4	9.1	1.0	0.0	0.8	0.0	18,554.3	0.1	0.9	2.9	266.5	18,823.7
	48,880,894	8,538.7	154.6	2,013.3	280.5	271.9	30.8	0.0	22.7	1.4	556,630.3	3.5	26.8	86.5	7,993.7	564,710.5

Non-vessel	2,571	0.23	0.03	0.20	0.00	0.00	0.00	0.00	0.00	0.00	29.35	0.00	0.00	0.03	0.07	1,719.62
	77,143	6.9	0.8	6.0	0.1	0.1	0.0	0.0	0.0	0.0	880.5	0.0	0.0	0.9	2.1	51,588.7

Equipment Type	Activity Description	Equipment Count	Fuel Type	Individual Equipment Power		Operating Time Per Equipment			Commute Information		
				HP	kW	Days	Hour/Day	Total Hours	One-Way Trips	Distance per Trip (miles)	Total Distance (miles)
Onshore Substation Installation											
Crane	Lift/Set Substation Equipment	2	ULSD	1000	746	250	10	2,500	N/A	N/A	N/A
Excavator	Excavation/Land Leveling	2	ULSD	500	373	250	10	2,500	N/A	N/A	N/A
Front-end Loader	Material Transfer	2	ULSD	100	75	30	10	300	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	2	ULSD	250	186	30	10	300	N/A	N/A	N/A
Trencher	Land Leveling/Trenching	2	ULSD	100	75	30	10	300	N/A	N/A	N/A
Dump Truck	Material Transfer	2	ULSD	300	224	30	10	300	N/A	N/A	N/A
Bucket Truck	Build/Set Equipment	2	ULSD	200	149	250	10	2,500	N/A	N/A	N/A
Forklift	Build/Set Equipment	2	ULSD	150	112	250	10	2,500	N/A	N/A	N/A
Grader	Land Leveling	2	ULSD	300	224	250	10	2,500	N/A	N/A	N/A
Paver	Pave Foundation	2	ULSD	200	149	30	5	150	N/A	N/A	N/A
Concrete Truck	Mix/Pour Foundation	2	ULSD	300	224	30	5	150	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	295	15	354,000
Horizontal Directional Drilling (HDD)											
Crane	Setup/Breakdown	2	ULSD	1000	746	50	10	500	N/A	N/A	N/A
Front-end Loader	Material Transfer	2	ULSD	100	75	50	10	500	N/A	N/A	N/A
HDD Drill Rig	HDD Boring	2	ULSD	600	447	25	24	600	N/A	N/A	N/A
Pumps	Pumping Mud	2	ULSD	100	75	25	24	600	N/A	N/A	N/A
Generator	Ancillary Power	2	ULSD	200	149	25	24	600	N/A	N/A	N/A
Slurry Handler	Slurry Handling	2	ULSD	100	75	25	24	600	N/A	N/A	N/A
Desilter	Removing Silt	2	ULSD	100	75	25	24	600	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	80	15	96,000
Onshore Duct Bank Installation											
Crane	Equipment/Pipe Placement	2	ULSD	1000	746	200	10	2000	N/A	N/A	N/A
Excavator	Breaking Pavement/Excavating	2	ULSD	500	373	200	10	2000	N/A	N/A	N/A
Front-end Loader	Material Transfer	2	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	2	ULSD	250	186	200	10	2000	N/A	N/A	N/A
Trencher	Trenching	2	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Dump Truck	Material Transfer	2	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Grader	Land Leveling	2	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Paver	Repaving roadways	2	ULSD	200	149	200	10	2000	N/A	N/A	N/A
Concrete Truck	Concrete Mixing/Pouring	2	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	250	15	300,000
Onshore Cable Installation											
Winch Truck	Cable install	4	ULSD	200	149	70	10	700	N/A	N/A	N/A
Generator	Power Production	2	ULSD	200	149	70	10	700	N/A	N/A	N/A
Cable Reel Truck	Cable install/delivery	2	ULSD	200	149	70	10	700	N/A	N/A	N/A
Support Trucks	Support Activities	4	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	8,400
Crew Trucks	Crew Transit	4	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	8,400
Port Activities											
Crane	Loading/Unloading	1	ULSD	1000	746	876	12	10,512	N/A	N/A	N/A
Crane	Loading/Unloading	1	ULSD	1000	746	241	12	2,892	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	241	12	2,892	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	250	15	300,000

Equipment Type	Activity Description	Emission Factors Ref	Load Factor	Fuel Consumption (gal)	Emissions (tons)											
					NOx	VOC	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Onshore Substation Installation																
Crane	Lift/Set Substation Equipment	27	0.5	133,161	13.15	1.63	7.19	0.41	0.41	0.01	1,519.86	0.06	0.01	1.54	3.67	1,525.07
Excavator	Excavation/Land Leveling	25	0.5	66,580	4.11	0.51	3.60	0.21	0.21	0.01	759.93	0.03	0.01	0.77	1.84	762.54
Front-end Loader	Material Transfer	22	0.25	799	0.06	0.01	0.06	0.00	0.00	0.00	9.12	0.00	0.00	0.01	0.02	9.15
Bulldozer	Land Leveling/Misc	24	0.5	3,995	0.25	0.03	0.22	0.01	0.01	0.00	45.60	0.00	0.00	0.05	0.11	45.75
Trencher	Land Leveling/Trenching	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Dump Truck	Material Transfer	24	0.5	4,794	0.30	0.04	0.26	0.01	0.01	0.00	54.71	0.00	0.00	0.06	0.13	54.90
Bucket Truck	Build/Set Equipment	24	0.5	26,632	1.64	0.20	1.44	0.08	0.08	0.00	303.97	0.01	0.00	0.31	0.73	305.01
Forklift	Build/Set Equipment	23	0.5	19,974	1.23	0.15	1.54	0.09	0.09	0.00	227.98	0.01	0.00	0.23	0.55	228.76
Grader	Land Leveling	24	0.5	39,948	2.47	0.31	2.16	0.12	0.12	0.00	455.96	0.02	0.00	0.46	1.10	457.52
Paver	Pave Foundation	24	0.5	1,598	0.10	0.01	0.09	0.00	0.00	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Concrete Truck	Mix/Pour Foundation	24	0.5	2,397	0.15	0.02	0.13	0.01	0.01	0.00	27.36	0.00	0.00	0.03	0.07	27.45
Passenger Vehicles	Worker Commute	28	N/A	15,874	0.11	0.14	1.54	0.00	0.00	0.00	153.59	0.01	0.00	0.16	0.39	154.15
Horizontal Directional Drilling (HDD)																
Crane	Setup/Breakdown	27	0.5	26,632	2.63	0.33	1.44	0.08	0.08	0.00	303.97	0.01	0.00	0.31	0.73	305.01
Front-end Loader	Material Transfer	22	0.25	1,332	0.10	0.01	0.10	0.01	0.01	0.00	15.20	0.00	0.00	0.02	0.04	15.25
HDD Drill Rig	HDD Boring	25	0.5	19,175	1.18	0.15	1.04	0.06	0.06	0.00	218.86	0.01	0.00	0.22	0.53	219.61
Pumps	Pumping Mud	22	0.5	3,196	0.23	0.03	0.25	0.02	0.02	0.00	36.48	0.00	0.00	0.04	0.09	36.60
Generator	Ancillary Power	24	0.5	6,392	0.39	0.05	0.35	0.02	0.02	0.00	72.95	0.00	0.00	0.07	0.18	73.20
Slurry Handler	Slurry Handling	22	0.5	3,196	0.23	0.03	0.25	0.02	0.02	0.00	36.48	0.00	0.00	0.04	0.09	36.60
Desilter	Removing Silt	22	0.5	3,196	0.23	0.03	0.25	0.02	0.02	0.00	36.48	0.00	0.00	0.04	0.09	36.60
Passenger Vehicles	Worker Commute	28	N/A	4,305	0.03	0.04	0.42	0.00	0.00	0.00	41.65	0.00	0.00	0.04	0.11	41.80
Onshore Duct Bank Installation																
Crane	Equipment/Pipe Placement	27	0.5	106,529	10.52	1.30	5.75	0.33	0.33	0.01	1,215.89	0.05	0.01	1.23	2.94	1,220.06
Excavator	Breaking Pavement/Excavating	25	0.5	53,264	3.29	0.41	2.88	0.16	0.16	0.01	607.94	0.02	0.00	0.62	1.47	610.03
Front-end Loader	Material Transfer	22	0.25	5,326	0.39	0.05	0.41	0.03	0.03	0.00	60.79	0.00	0.00	0.06	0.15	61.00
Bulldozer	Land Leveling/Misc	24	0.5	26,632	1.64	0.20	1.44	0.08	0.08	0.00	303.97	0.01	0.00	0.31	0.73	305.01
Trencher	Trenching	22	0.5	10,653	0.77	0.10	0.82	0.07	0.07	0.00	121.59	0.00	0.00	0.12	0.29	122.01
Dump Truck	Material Transfer	24	0.5	31,959	1.97	0.24	1.73	0.10	0.10	0.00	364.77	0.01	0.00	0.37	0.88	366.02
Grader	Land Leveling	24	0.5	31,959	1.97	0.24	1.73	0.10	0.10	0.00	364.77	0.01	0.00	0.37	0.88	366.02
Paver	Repaving roadways	24	0.5	21,306	1.32	0.16	1.15	0.07	0.07	0.00	243.18	0.01	0.00	0.25	0.59	244.01
Concrete Truck	Concrete Mixing/Pouring	24	0.5	31,959	1.97	0.24	1.73	0.10	0.10	0.00	364.77	0.01	0.00	0.37	0.88	366.02
Passenger Vehicles	Worker Commute	28	N/A	13,453	0.10	0.12	1.30	0.00	0.00	0.00	130.16	0.01	0.00	0.14	0.33	130.63
Onshore Cable Installation																
Winch Truck	Cable install	24	0.5	14,914	0.92	0.11	0.81	0.05	0.05	0.00	170.22	0.01	0.00	0.17	0.41	170.81
Generator	Power Production	24	0.5	7,457	0.46	0.06	0.40	0.02	0.02	0.00	85.11	0.00	0.00	0.09	0.21	85.40
Cable Reel Truck	Cable install/delivery	24	0.5	7,457	0.46	0.06	0.40	0.02	0.02	0.00	85.11	0.00	0.00	0.09	0.21	85.40
Support Trucks	Support Activities	29	N/A	377	0.00	0.00	0.05	0.00	0.00	0.00	3.64	0.00	0.00	0.00	0.01	3.66
Crew Trucks	Crew Transit	28	N/A	377	0.00	0.00	0.04	0.00	0.00	0.00	3.64	0.00	0.00	0.00	0.01	3.66
Port Activities																
Crane	Loading/Unloading	27	0.5	279,957	27.65	3.42	15.12	0.86	0.86	0.03	3,195.35	0.13	0.03	3.24	7.72	3,206.31
Crane	Loading/Unloading	27	0.5	77,020	7.61	0.94	4.16	0.24	0.24	0.01	879.09	0.04	0.01	0.89	2.13	882.10
Front-end Loader	Material Transfer	22	0.25	3,851	0.28	0.03	0.30	0.02	0.02	0.00	43.95	0.00	0.00	0.04	0.11	44.11
Passenger Vehicles	Worker Commute	28	N/A	13,453	0.10	0.12	1.30	0.00	0.00	0.00	130.16	0.01	0.00	0.14	0.33	130.63

Total	**1,122,674**	**90.1**	**11.5**	**63.9**	**3.5**	**3.5**	**0.1**	**12,730.7**	**0.5**	**0.1**	**12.9**	**30.8**	**12,774.5**
Stationary Engines	**13,849**	**0.9**	**0.1**	**0.7**	**0.0**	**0.0**	**0.0**	**158.1**	**0.0**	**0.0**	**0.2**	**0.4**	**158.6**
Vehicles	**1,108,826**	**89.3**	**11.4**	**63.2**	**3.4**	**3.4**	**0.1**	**12,572.7**	**0.5**	**0.1**	**12.8**	**30.5**	**12,615.9**

Equipment Type	Activity Description	Equipment Count	Fuel Type	Individual Equipment Power		Operating Time Per Equipment			Commute Information		
				HP	kW	Days	Hour/Day	Total Hours	One-Way Trips	Distance per Trip (miles)	Total Distance (miles)
Onshore Substation Installation											
Crane	Lift/Set Substation Equipment	1	ULSD	1000	746	250	10	2,500	N/A	N/A	N/A
Excavator	Excavation/Land Leveling	1	ULSD	500	373	250	10	2,500	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	30	10	300	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	1	ULSD	250	186	30	10	300	N/A	N/A	N/A
Trencher	Land Leveling/Trenching	1	ULSD	100	75	30	10	300	N/A	N/A	N/A
Dump Truck	Material Transfer	1	ULSD	300	224	30	10	300	N/A	N/A	N/A
Bucket Truck	Build/Set Equipment	1	ULSD	200	149	250	10	2,500	N/A	N/A	N/A
Forklift	Build/Set Equipment	1	ULSD	150	112	250	10	2,500	N/A	N/A	N/A
Grader	Land Leveling	1	ULSD	300	224	250	10	2,500	N/A	N/A	N/A
Paver	Pave Foundation	1	ULSD	200	149	30	5	150	N/A	N/A	N/A
Concrete Truck	Mix/Pour Foundation	1	ULSD	300	224	30	5	150	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	295	15	177,000
Horizontal Directional Drilling (HDD)											
Crane	Setup/Breakdown	1	ULSD	1000	746	50	10	500	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	50	10	500	N/A	N/A	N/A
HDD Drill Rig	HDD Boring	1	ULSD	600	447	25	24	600	N/A	N/A	N/A
Pumps	Pumping Mud	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Generator	Ancillary Power	1	ULSD	200	149	25	24	600	N/A	N/A	N/A
Slurry Handler	Slurry Handling	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Desilter	Removing Silt	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	80	15	48,000
Onshore Duct Bank Installation											
Crane	Equipment/Pipe Placement	1	ULSD	1000	746	200	10	2000	N/A	N/A	N/A
Excavator	Breaking Pavement/Excavating	1	ULSD	500	373	200	10	2000	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	1	ULSD	250	186	200	10	2000	N/A	N/A	N/A
Trencher	Trenching	1	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Dump Truck	Material Transfer	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Grader	Land Leveling	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Paver	Repaving roadways	1	ULSD	200	149	200	10	2000	N/A	N/A	N/A
Concrete Truck	Concrete Mixing/Pouring	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	250	15	150,000
Onshore Cable Installation											
Winch Truck	Cable install	2	ULSD	200	149	70	10	700	N/A	N/A	N/A
Generator	Power Production	1	ULSD	200	149	70	10	700	N/A	N/A	N/A
Cable Reel Truck	Cable install/delivery	1	ULSD	200	149	70	10	700	N/A	N/A	N/A
Support Trucks	Support Activities	2	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	4,200
Crew Trucks	Crew Transit	2	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	4,200
Port Activities											
Crane	Loading/Unloading	1	ULSD	1000	746	599	12	7,188	N/A	N/A	N/A
Crane	Loading/Unloading	1	ULSD	1000	746	165	12	1,980	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	165	12	1,980	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	171	15	205,200

Equipment Type	Activity Description	Emission Factors Ref	Load Factor	Fuel Consumption (gal)	Emissions (tons)											
					NOx	VOC	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Onshore Substation Installation																
Crane	Lift/Set Substation Equipment	27	0.5	66,580	6.58	0.81	3.60	0.21	0.21	0.01	759.93	0.03	0.01	0.77	1.84	762.54
Excavator	Excavation/Land Leveling	25	0.5	33,290	2.05	0.25	1.80	0.10	0.10	0.00	379.96	0.02	0.00	0.39	0.92	381.27
Front-end Loader	Material Transfer	22	0.25	399	0.03	0.00	0.03	0.00	0.00	0.00	4.56	0.00	0.00	0.00	0.01	4.58
Bulldozer	Land Leveling/Misc	24	0.5	1,997	0.12	0.02	0.11	0.01	0.01	0.00	22.80	0.00	0.00	0.02	0.06	22.88
Trencher	Land Leveling/Trenching	22	0.5	799	0.06	0.01	0.06	0.00	0.00	0.00	9.12	0.00	0.00	0.01	0.02	9.15
Dump Truck	Material Transfer	24	0.5	2,397	0.15	0.02	0.13	0.01	0.01	0.00	27.36	0.00	0.00	0.03	0.07	27.45
Bucket Truck	Build/Set Equipment	24	0.5	13,316	0.82	0.10	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Forklift	Build/Set Equipment	23	0.5	9,987	0.62	0.08	0.77	0.05	0.05	0.00	113.99	0.00	0.00	0.12	0.28	114.38
Grader	Land Leveling	24	0.5	19,974	1.23	0.15	1.08	0.06	0.06	0.00	227.98	0.01	0.00	0.23	0.55	228.76
Paver	Pave Foundation	24	0.5	799	0.05	0.01	0.04	0.00	0.00	0.00	9.12	0.00	0.00	0.01	0.02	9.15
Concrete Truck	Mix/Pour Foundation	24	0.5	1,198	0.07	0.01	0.06	0.00	0.00	0.00	13.68	0.00	0.00	0.01	0.03	13.73
Passenger Vehicles	Worker Commute	28	N/A	7,937	0.06	0.07	0.77	0.00	0.00	0.00	76.80	0.00	0.00	0.08	0.20	77.07
Horizontal Directional Drilling (HDD)																
Crane	Setup/Breakdown	27	0.5	13,316	1.32	0.16	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Front-end Loader	Material Transfer	22	0.25	666	0.05	0.01	0.05	0.00	0.00	0.00	7.60	0.00	0.00	0.01	0.02	7.63
HDD Drill Rig	HDD Boring	25	0.5	9,588	0.59	0.07	0.52	0.03	0.03	0.00	109.43	0.00	0.00	0.11	0.26	109.81
Pumps	Pumping Mud	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Generator	Ancillary Power	24	0.5	3,196	0.20	0.02	0.17	0.01	0.01	0.00	36.48	0.00	0.00	0.04	0.09	36.60
Slurry Handler	Slurry Handling	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Desilter	Removing Silt	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Passenger Vehicles	Worker Commute	28	N/A	2,152	0.02	0.02	0.21	0.00	0.00	0.00	20.83	0.00	0.00	0.02	0.05	20.90
Onshore Duct Bank Installation																
Crane	Equipment/Pipe Placement	27	0.5	53,264	5.26	0.65	2.88	0.16	0.16	0.01	607.94	0.02	0.00	0.62	1.47	610.03
Excavator	Breaking Pavement/Excavating	25	0.5	26,632	1.64	0.20	1.44	0.08	0.08	0.00	303.97	0.01	0.00	0.31	0.73	305.01
Front-end Loader	Material Transfer	22	0.25	2,663	0.19	0.02	0.21	0.02	0.02	0.00	30.40	0.00	0.00	0.03	0.07	30.50
Bulldozer	Land Leveling/Misc	24	0.5	13,316	0.82	0.10	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Trencher	Trenching	22	0.5	5,326	0.39	0.05	0.41	0.03	0.03	0.00	60.79	0.00	0.00	0.06	0.15	61.00
Dump Truck	Material Transfer	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Grader	Land Leveling	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Paver	Repaving roadways	24	0.5	10,653	0.66	0.08	0.58	0.03	0.03	0.00	121.59	0.00	0.00	0.12	0.29	122.01
Concrete Truck	Concrete Mixing/Pouring	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Passenger Vehicles	Worker Commute	28	N/A	6,726	0.05	0.06	0.65	0.00	0.00	0.00	65.08	0.00	0.00	0.07	0.17	65.32
Onshore Cable Installation																
Winch Truck	Cable install	24	0.5	3,728	0.46	0.06	0.40	0.02	0.02	0.00	85.11	0.00	0.00	0.09	0.21	85.40
Generator	Power Production	24	0.5	3,728	0.23	0.03	0.20	0.01	0.01	0.00	42.56	0.00	0.00	0.04	0.10	42.70
Cable Reel Truck	Cable install/delivery	24	0.5	3,728	0.23	0.03	0.20	0.01	0.01	0.00	42.56	0.00	0.00	0.04	0.10	42.70
Support Trucks	Support Activities	29	N/A	188	0.00	0.00	0.03	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	1.83
Crew Trucks	Crew Transit	28	N/A	188	0.00	0.00	0.02	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	1.83
Port Activities																
Crane	Loading/Unloading	27	0.5	191,432	18.91	2.34	10.34	0.59	0.59	0.02	2,184.95	0.09	0.02	2.22	5.28	2,192.45
Crane	Loading/Unloading	27	0.5	52,732	5.21	0.64	2.85	0.16	0.16	0.01	601.86	0.02	0.00	0.61	1.46	603.93
Front-end Loader	Material Transfer	22	0.25	2,637	0.19	0.02	0.20	0.02	0.02	0.00	30.09	0.00	0.00	0.03	0.07	30.20
Passenger Vehicles	Worker Commute	28	N/A	9,202	0.07	0.08	0.89	0.00	0.00	0.00	89.03	0.00	0.00	0.10	0.23	89.35

Total	**626,470**	**51.6**	**6.6**	**35.8**	**1.9**	**1.9**	**0.1**	**7,147.0**	**0.3**	**0.1**	**7.3**	**17.3**	**7,171.6**
Stationary Engines	**6,924**	**0.4**	**0.1**	**0.4**	**0.0**	**0.0**	**0.0**	**79.0**	**0.0**	**0.0**	**0.1**	**0.2**	**79.3**
Vehicles	**619,546**	**51.2**	**6.5**	**35.4**	**1.9**	**1.9**	**0.1**	**7,068.0**	**0.3**	**0.1**	**7.2**	**17.1**	**7,092.3**

Equipment Type	Activity Description	Equipment Count	Fuel Type	Individual Equipment Power		Operating Time Per Equipment			Commute Information		
				HP	kW	Days	Hour/Day	Total Hours	One-Way Trips	Distance per Trip (miles)	Total Distance (miles)
Onshore Substation Installation											
Crane	Lift/Set Substation Equipment	1	ULSD	1000	746	250	10	2,500	N/A	N/A	N/A
Excavator	Excavation/Land Leveling	1	ULSD	500	373	250	10	2,500	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	30	10	300	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	1	ULSD	250	186	30	10	300	N/A	N/A	N/A
Trencher	Land Leveling/Trenching	1	ULSD	100	75	30	10	300	N/A	N/A	N/A
Dump Truck	Material Transfer	1	ULSD	300	224	30	10	300	N/A	N/A	N/A
Bucket Truck	Build/Set Equipment	1	ULSD	200	149	250	10	2,500	N/A	N/A	N/A
Forklift	Build/Set Equipment	1	ULSD	150	112	250	10	2,500	N/A	N/A	N/A
Grader	Land Leveling	1	ULSD	300	224	250	10	2,500	N/A	N/A	N/A
Paver	Pave Foundation	1	ULSD	200	149	30	5	150	N/A	N/A	N/A
Concrete Truck	Mix/Pour Foundation	1	ULSD	300	224	30	5	150	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	295	15	177,000
Horizontal Directional Drilling (HDD)											
Crane	Setup/Breakdown	1	ULSD	1000	746	50	10	500	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	50	10	500	N/A	N/A	N/A
HDD Drill Rig	HDD Boring	1	ULSD	600	447	25	24	600	N/A	N/A	N/A
Pumps	Pumping Mud	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Generator	Ancillary Power	1	ULSD	200	149	25	24	600	N/A	N/A	N/A
Slurry Handler	Slurry Handling	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Desilter	Removing Silt	1	ULSD	100	75	25	24	600	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	80	15	48,000
Onshore Duct Bank Installation											
Crane	Equipment/Pipe Placement	1	ULSD	1000	746	200	10	2000	N/A	N/A	N/A
Excavator	Breaking Pavement/Excavating	1	ULSD	500	373	200	10	2000	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Bulldozer	Land Leveling/Misc	1	ULSD	250	186	200	10	2000	N/A	N/A	N/A
Trencher	Trenching	1	ULSD	100	75	200	10	2000	N/A	N/A	N/A
Dump Truck	Material Transfer	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Grader	Land Leveling	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Paver	Repaving roadways	1	ULSD	200	149	200	10	2000	N/A	N/A	N/A
Concrete Truck	Concrete Mixing/Pouring	1	ULSD	300	224	200	10	2000	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	20	Gasoline	N/A	N/A	N/A	N/A	N/A	250	15	150,000
Onshore Cable Installation											
Winch Truck	Cable install	2	ULSD	200	149	70	10	700	N/A	N/A	N/A
Generator	Power Production	1	ULSD	200	149	70	10	700	N/A	N/A	N/A
Cable Reel Truck	Cable install/delivery	1	ULSD	200	149	70	10	700	N/A	N/A	N/A
Support Trucks	Support Activities	2	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	4,200
Crew Trucks	Crew Transit	2	ULSD	N/A	N/A	N/A	N/A	N/A	70	15	4,200
Port Activities											
Crane	Loading/Unloading	1	ULSD	1000	746	421	12	5,052	N/A	N/A	N/A
Crane	Loading/Unloading	1	ULSD	1000	746	116	12	1,392	N/A	N/A	N/A
Front-end Loader	Material Transfer	1	ULSD	100	75	116	12	1,392	N/A	N/A	N/A
Passenger Vehicles	Worker Commute	40	Gasoline	N/A	N/A	N/A	N/A	N/A	121	15	145,200

Equipment Type	Activity Description	Emission Factors Ref	Load Factor	Fuel Consumption (gal)	Emissions (tons)											
					NOx	VOC	CO	PM10	PM2.5	SO2	CO2	CH4	N2O	CH4 as CO2e	N2O as CO2e	CO2e
Onshore Substation Installation																
Crane	Lift/Set Substation Equipment	27	0.5	66,580	6.58	0.81	3.60	0.21	0.21	0.01	759.93	0.03	0.01	0.77	1.84	762.54
Excavator	Excavation/Land Leveling	25	0.5	33,290	2.05	0.25	1.80	0.10	0.10	0.00	379.96	0.02	0.00	0.39	0.92	381.27
Front-end Loader	Material Transfer	22	0.25	399	0.03	0.00	0.03	0.00	0.00	0.00	4.56	0.00	0.00	0.00	0.01	4.58
Bulldozer	Land Leveling/Misc	24	0.5	1,997	0.12	0.02	0.11	0.01	0.01	0.00	22.80	0.00	0.00	0.02	0.06	22.88
Trencher	Land Leveling/Trenching	22	0.5	799	0.06	0.01	0.06	0.00	0.00	0.00	9.12	0.00	0.00	0.01	0.02	9.15
Dump Truck	Material Transfer	24	0.5	2,397	0.15	0.02	0.13	0.01	0.01	0.00	27.36	0.00	0.00	0.03	0.07	27.45
Bucket Truck	Build/Set Equipment	24	0.5	13,316	0.82	0.10	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Forklift	Build/Set Equipment	23	0.5	9,987	0.62	0.08	0.77	0.05	0.05	0.00	113.99	0.00	0.00	0.12	0.28	114.38
Grader	Land Leveling	24	0.5	19,974	1.23	0.15	1.08	0.06	0.06	0.00	227.98	0.01	0.00	0.23	0.55	228.76
Paver	Pave Foundation	24	0.5	799	0.05	0.01	0.04	0.00	0.00	0.00	9.12	0.00	0.00	0.01	0.02	9.15
Concrete Truck	Mix/Pour Foundation	24	0.5	1,198	0.07	0.01	0.06	0.00	0.00	0.00	13.68	0.00	0.00	0.01	0.03	13.73
Passenger Vehicles	Worker Commute	28	N/A	7,937	0.06	0.07	0.77	0.00	0.00	0.00	76.80	0.00	0.00	0.08	0.20	77.07
Horizontal Directional Drilling (HDD)																
Crane	Setup/Breakdown	27	0.5	13,316	1.32	0.16	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Front-end Loader	Material Transfer	22	0.25	666	0.05	0.01	0.05	0.00	0.00	0.00	7.60	0.00	0.00	0.01	0.02	7.63
HDD Drill Rig	HDD Boring	25	0.5	9,588	0.59	0.07	0.52	0.03	0.03	0.00	109.43	0.00	0.00	0.11	0.26	109.81
Pumps	Pumping Mud	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Generator	Ancillary Power	24	0.5	3,196	0.20	0.02	0.17	0.01	0.01	0.00	36.48	0.00	0.00	0.04	0.09	36.60
Slurry Handler	Slurry Handling	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Desilter	Removing Silt	22	0.5	1,598	0.12	0.01	0.12	0.01	0.01	0.00	18.24	0.00	0.00	0.02	0.04	18.30
Passenger Vehicles	Worker Commute	28	N/A	2,152	0.02	0.02	0.21	0.00	0.00	0.00	20.83	0.00	0.00	0.02	0.05	20.90
Onshore Duct Bank Installation																
Crane	Equipment/Pipe Placement	27	0.5	53,264	5.26	0.65	2.88	0.16	0.16	0.01	607.94	0.02	0.00	0.62	1.47	610.03
Excavator	Breaking Pavement/Excavating	25	0.5	26,632	1.64	0.20	1.44	0.08	0.08	0.00	303.97	0.01	0.00	0.31	0.73	305.01
Front-end Loader	Material Transfer	22	0.25	2,663	0.19	0.02	0.21	0.02	0.02	0.00	30.40	0.00	0.00	0.03	0.07	30.50
Bulldozer	Land Leveling/Misc	24	0.5	13,316	0.82	0.10	0.72	0.04	0.04	0.00	151.99	0.01	0.00	0.15	0.37	152.51
Trencher	Trenching	22	0.5	5,326	0.39	0.05	0.41	0.03	0.03	0.00	60.79	0.00	0.00	0.06	0.15	61.00
Dump Truck	Material Transfer	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Grader	Land Leveling	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Paver	Repaving roadways	24	0.5	10,653	0.66	0.08	0.58	0.03	0.03	0.00	121.59	0.00	0.00	0.12	0.29	122.01
Concrete Truck	Concrete Mixing/Pouring	24	0.5	15,979	0.99	0.12	0.86	0.05	0.05	0.00	182.38	0.01	0.00	0.18	0.44	183.01
Passenger Vehicles	Worker Commute	28	N/A	6,726	0.05	0.06	0.65	0.00	0.00	0.00	65.08	0.00	0.00	0.07	0.17	65.32
Onshore Cable Installation																
Winch Truck	Cable install	24	0.5	3,728	0.46	0.06	0.40	0.02	0.02	0.00	85.11	0.00	0.00	0.09	0.21	85.40
Generator	Power Production	24	0.5	3,728	0.23	0.03	0.20	0.01	0.01	0.00	42.56	0.00	0.00	0.04	0.10	42.70
Cable Reel Truck	Cable install/delivery	24	0.5	3,728	0.23	0.03	0.20	0.01	0.01	0.00	42.56	0.00	0.00	0.04	0.10	42.70
Support Trucks	Support Activities	29	N/A	188	0.00	0.00	0.03	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	1.83
Crew Trucks	Crew Transit	28	N/A	188	0.00	0.00	0.02	0.00	0.00	0.00	1.82	0.00	0.00	0.00	0.00	1.83
Port Activities																
Crane	Loading/Unloading	27	0.5	134,546	13.29	1.65	7.27	0.42	0.42	0.01	1,535.66	0.06	0.01	1.56	3.71	1,540.93
Crane	Loading/Unloading	27	0.5	37,072	3.66	0.45	2.00	0.11	0.11	0.00	423.13	0.02	0.00	0.43	1.02	424.58
Front-end Loader	Material Transfer	22	0.25	1,854	0.13	0.02	0.14	0.01	0.01	0.00	21.16	0.00	0.00	0.02	0.05	21.23
Passenger Vehicles	Worker Commute	28	N/A	6,511	0.05	0.06	0.63	0.00	0.00	0.00	63.00	0.00	0.00	0.07	0.16	63.23

Total	**550,450**	**44.4**	**5.7**	**31.6**	**1.7**	**1.7**	**0.1**	**6,284.0**	**0.3**	**0.1**	**6.4**	**15.2**	**6,305.6**
Stationary Engines	**6,924**	**0.4**	**0.1**	**0.4**	**0.0**	**0.0**	**0.0**	**79.0**	**0.0**	**0.0**	**0.1**	**0.2**	**79.3**
Vehicles	**543,526**	**44.0**	**5.6**	**31.2**	**1.7**	**1.7**	**0.1**	**6,205.0**	**0.3**	**0.1**	**6.3**	**15.0**	**6,226.3**

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