



## Appendix II-C

### Air Emissions Calculation Methodology

#### Note:

On March 26, 2021, Atlantic Shores Offshore Wind, LLC (Atlantic Shores) submitted a Construction and Operations Plan (COP) to BOEM for the southern portion of Lease OCS-A 0499. On June 30, 2021, the New Jersey Board of Public Utilities (NJ BPU) awarded Atlantic Shores an Offshore Renewable Energy Credit (OREC) allowance to deliver 1,509.6 megawatts (MW) of offshore renewable wind energy into the State of New Jersey. In response to this award, Atlantic Shores updated Volume 1 of the COP to divide the southern portion of Lease OCS-A 0499 into two separate and electrically distinct Projects. Project 1 will deliver renewable energy under this OREC allowance and Project 2 will be developed to support future New Jersey solicitations and power purchase agreements.

As a result of the June 30, 2021 NJ BPU OREC award, Atlantic Shores updated Volume I (Project Information) of the COP in August 2021 to reflect the two Projects. COP Volume II (Affected Environment) and applicable Appendices do not currently include this update and will be updated to reflect Projects 1 and 2 as part Atlantic Shores' December 2021 COP revision.



# Air Emissions Calculation Methodology

## Atlantic Shores Offshore Wind

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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<sup>1</sup>, 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 the worst case between monopile and transition piece (MP/TP) and gravity based structure (GBS) installation, with heavy vessels using the New Jersey Wind Port (NJWP) and Paulsboro. 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 twice 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 Tier 4 nonroad 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

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<sup>1</sup> 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 for the first three years of operation, followed by a new-construction US-flagged vessel.

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 Tier 4 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 two 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 CO<sub>2</sub> and SO<sub>2</sub> 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 NO<sub>x</sub> 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](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 89.112 Table 1 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
- OSS Engines are 4 engines each at 500 kW Tier 4
- 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, air compressors, motion compensation, etc.) are assumed to meet the best available engine tier from 40 CFR 89.112 Table 1 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
  - 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
  - OSS install 6 trips each barge/tug combo (24 total trips). One tug per barge
  - CTV OSS install trips one every four days for crew transfer (so, 7 trips)

- Scour protection (simon stevin) 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)
- Bunkering by barge/tug every 2 weeks
- 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 vessels are assumed to use Category 3 engines
- NJWP is used for all non CTV vessels going to a US Port (except one specific modeled case of using Paulsboro for one vessel in Case B04)
- Case B04 GBS Foundations pulled out with all 6 tugs for each trip
  - Results in 200 trips per tug
- Vessels assumed as operating on maneuvering load factor for 24 hr/day for operating days spent in WDA
- All vessel count, trips, and days are based on modeled scenario of 200 WTGs and up to 2 OSS
  - FOU package has 2 scenarios (B02 and B04)
  - Rest of packages is the worst case use of each vessel ("Frankenstein case")
- 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
- Voltaire
  - 4x3535 kW and 4x2650kW engine – assume all large and 3 small are main and 1 small acts as auxiliary

#### O&M Assumptions:

- General
  - Worst case year heavy logistics
    - 1 US jackup for 40 days/year at 24 hrs/day
      - 8 trips per year
    - 1 European jackup for 40 days/year at 24 hrs/day
      - 8 trips per year
    - 1 US Feeder Vessel for 40 days/year at 24 hrs/day
      - 8 trips per year
  - Export Cable Repair

- 1 cable repair vessel at 25 days/year in WDA for 24 hr/day
    - 0.7 trips per year
  - 1 Survey vessel at 30 days/year in WDA for 24 hr/day
- Array Cable Repair
  - 1 cable repair vessel at 11 days/year in WDA for 24 hr/day
    - 0.9 trips per year
  - 1 Survey vessel at 13 days/year in WDA for 24 hr/day
- Subsea Inspection
  - 1 Survey vessel at 40 days/year in WDA for 24 hr/day
    - 5 trips per year
- SF6 loss from switchgear
  - 1500 kg SF6 charge per OSS, 2 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](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
- CTV Case
  - 5 year round CTVs at 250 days/year in WDA at 12 hrs/day
    - 250 trips to port per year
  - 6 summer campaign CTVs at 124 days/year in WDA at 12 hrs/day
    - 124 trips to port per year
- SOV Case
  - 2 year round CTVs at 250 days/year in WDA at 12 hrs/day
    - 250 trips to port per year
  - 1 year round SOV at 341 days/year in WDA at 24 hrs/day
    - 24 trips to port per year
  - 1 SOV Daughter craft at 220 days/year in WDA at 8 hrs/day

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Total Emissions  |       |         |       |       |      |           |     |      |             |             |           |
|--|--------------|------------------------|------------------|-------|---------|-------|-------|------|-----------|-----|------|-------------|-------------|-----------|
|  |              |                        | Emissions (tons) |       |         |       |       |      |           |     |      |             |             |           |
|  |              |                        | NOx              | VOC   | CO      | PM10  | PM2.5 | SO2  | CO2       | CH4 | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Foundation Installation (FOU)          | 7            | 8,658,708.6            | 1,370.3          | 57.3  | 350.0   | 47.3  | 45.5  | 16.1 | 95,297.5  | 1.6 | 3.5  | 40.2        | 1,049.1     | 96,386.7  |
| Offshore Substation Installation (OSS) | 16           | 866,081.1              | 164.9            | 5.5   | 30.9    | 5.4   | 5.2   | 2.3  | 9,393.7   | 0.1 | 0.4  | 2.1         | 130.5       | 9,526.4   |
| Scour Protection                       | 2            | 965,259.6              | 161.0            | 3.7   | 38.2    | 5.6   | 5.4   | 1.0  | 10,702.4  | 0.1 | 0.5  | 1.7         | 154.8       | 10,858.8  |
| Inter Array Cable Installation         | 7            | 3,182,198.2            | 531.5            | 11.7  | 126.6   | 18.4  | 17.9  | 3.2  | 35,330.7  | 0.2 | 1.7  | 5.5         | 510.2       | 35,846.5  |
| WTG Installation                       | 10           | 14,359,645.7           | 2,660.0          | 40.9  | 615.6   | 82.7  | 80.1  | 4.7  | 169,790.2 | 1.1 | 8.1  | 28.2        | 2,400.5     | 172,218.9 |
| Export Cable Installation              | 6            | 4,624,125.1            | 776.4            | 15.8  | 187.0   | 26.6  | 25.7  | 3.8  | 51,476.5  | 0.3 | 2.5  | 8.0         | 741.4       | 52,225.9  |
| Fuel Bunkering                         | 2            | 3,048,028.4            | 415.0            | 13.4  | 134.5   | 15.1  | 14.7  | 1.2  | 34,284.1  | 0.6 | 1.2  | 14.1        | 370.4       | 34,668.5  |
| Stationary Generators                  | 0            | 24,000.0               | 0.2              | 0.1   | 1.3     | 0.0   | 0.0   | 0.0  | 273.9     | 0.0 | 0.0  | 0.3         | 0.7         | 274.9     |
| Miscellaneous                          | 0            | 0.0                    | 0.0              | 1.0   | 0.0     | 0.0   | 0.0   | 0.0  | 0.0       | 0.0 | 0.0  | 0.0         | 0.0         | 0.0       |
| Total                                  | 50.0         | 35,728,046.7           | 6,079.3          | 149.2 | 1,484.2 | 201.1 | 194.5 | 32.3 | 406,549.0 | 4.0 | 18.0 | 100.1       | 5,357.6     | 412,006.7 |

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Vessel Emissions |       |         |       |       |      |           |     |      |             |             |           |
|--|--------------|------------------------|------------------|-------|---------|-------|-------|------|-----------|-----|------|-------------|-------------|-----------|
|  |              |                        | Emissions (tons) |       |         |       |       |      |           |     |      |             |             |           |
|  |              |                        | NOx              | VOC   | CO      | PM10  | PM2.5 | SO2  | CO2       | CH4 | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Foundation Installation (FOU)          | 7            | 6,102,798.6            | 1,198.6          | 35.9  | 211.9   | 39.4  | 37.6  | 15.8 | 66,125.1  | 0.4 | 3.3  | 10.6        | 978.5       | 67,114.2  |
| Offshore Substation Installation (OSS) | 16           | 803,267.5              | 160.6            | 4.9   | 27.5    | 5.2   | 5.0   | 2.2  | 8,676.8   | 0.1 | 0.4  | 1.4         | 128.8       | 8,807.0   |
| Scour Protection                       | 2            | 965,259.6              | 161.0            | 3.7   | 38.2    | 5.6   | 5.4   | 1.0  | 10,702.4  | 0.1 | 0.5  | 1.7         | 154.8       | 10,858.8  |
| Inter Array Cable Installation         | 7            | 3,182,198.2            | 531.5            | 11.7  | 126.6   | 18.4  | 17.9  | 3.2  | 35,330.7  | 0.2 | 1.7  | 5.5         | 510.2       | 35,846.5  |
| WTG Installation                       | 10           | 14,162,502.9           | 2,647.8          | 39.3  | 605.0   | 82.1  | 79.5  | 4.7  | 167,540.1 | 1.0 | 8.0  | 25.9        | 2,395.1     | 169,961.1 |
| Export Cable Installation              | 6            | 4,624,125.1            | 776.4            | 15.8  | 187.0   | 26.6  | 25.7  | 3.8  | 51,476.5  | 0.3 | 2.5  | 8.0         | 741.4       | 52,225.9  |
| Fuel Bunkering                         | 2            | 2,156,381.7            | 359.9            | 6.6   | 86.4    | 12.3  | 11.9  | 1.1  | 24,107.1  | 0.1 | 1.2  | 3.7         | 345.8       | 24,456.6  |
| Stationary Generators                  | 0            | 0.0                    | 0.0              | 0.0   | 0.0     | 0.0   | 0.0   | 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  | 0.0       | 0.0 | 0.0  | 0.0         | 0.0         | 0.0       |
| Total                                  | 50.0         | 31,996,533.5           | 5,835.8          | 117.9 | 1,282.6 | 189.7 | 183.0 | 31.9 | 363,958.6 | 2.3 | 17.6 | 56.9        | 5,254.6     | 369,270.1 |

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Non-Vessel Emissions |      |       |      |       |     |          |     |     |             |             |          |
|--|--------------|------------------------|----------------------|------|-------|------|-------|-----|----------|-----|-----|-------------|-------------|----------|
|  |              |                        | Emissions (tons)     |      |       |      |       |     |          |     |     |             |             |          |
|  |              |                        | NOx                  | VOC  | CO    | PM10 | PM2.5 | SO2 | CO2      | CH4 | N2O | CH4 as CO2e | N2O as CO2e | CO2e     |
| Foundation Installation (FOU)          | 7            | 2,555,910.0            | 171.7                | 21.4 | 138.1 | 7.9  | 7.9   | 0.3 | 29,172.4 | 1.2 | 0.2 | 29.6        | 70.5        | 29,272.5 |
| Offshore Substation Installation (OSS) | 16           | 62,813.6               | 4.3                  | 0.5  | 3.4   | 0.2  | 0.2   | 0.0 | 716.9    | 0.0 | 0.0 | 0.7         | 1.7         | 719.4    |
| Scour Protection                       | 2            | 0.0                    | 0.0                  | 0.0  | 0.0   | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Inter Array Cable Installation         | 7            | 0.0                    | 0.0                  | 0.0  | 0.0   | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| WTG Installation                       | 10           | 197,142.9              | 12.2                 | 1.5  | 10.6  | 0.6  | 0.6   | 0.0 | 2,250.1  | 0.1 | 0.0 | 2.3         | 5.4         | 2,257.9  |
| Export Cable Installation              | 6            | 0.0                    | 0.0                  | 0.0  | 0.0   | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Fuel Bunkering                         | 2            | 891,646.7              | 55.0                 | 6.8  | 48.2  | 2.8  | 2.8   | 0.1 | 10,177.0 | 0.4 | 0.1 | 10.3        | 24.6        | 10,211.9 |
| Stationary Generators                  | 0            | 24,000.0               | 0.2                  | 0.1  | 1.3   | 0.0  | 0.0   | 0.0 | 273.9    | 0.0 | 0.0 | 0.3         | 0.7         | 274.9    |
| Miscellaneous                          | 0            | 0.0                    | 0.0                  | 1.0  | 0.0   | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Total                                  | 50.0         | 3,731,513.1            | 243.5                | 31.3 | 201.6 | 11.5 | 11.5  | 0.4 | 42,590.4 | 1.7 | 0.3 | 43.2        | 103.0       | 42,736.6 |
| Engines Only                           |              |                        | 243.5                | 30.3 | 201.6 | 11.5 | 11.5  | 0.4 | 42,590.4 | 1.7 | 0.3 | 43.2        | 103.0       | 42,736.6 |

| 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 | Operating Days in WTA | Operating Hours/Day | Total Non-Transit Hours | Total Operating Hours | Emission Factors Ref |
|---|----------------------------|--------------------------------|--------------|--------------------------|-----------------|-----------------|---------------|--------------|----------------------------|------------------------------|------------------------------|------------------|-----------------------|---------------------|-------------------------|-----------------------|----------------------|
| <b>Emissions During Construction</b>          |                            |                                |              |                          |                 |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |
| <b>Foundation Installation (FOU)</b>          |                            |                                |              |                          |                 |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |
| Medium HLV                                    | Heavy Lift Vessel          | Main Engine (Transit)          | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      | Europe        | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 2M                   |
|   |                            | Main Engine (Maneuvering)      | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      |               | 0            | 250                        | 0                            | 10                           | 0                | 294                   | 24                  | 7,056                   | 7,056                 | 2M                   |
|   |                            | Auxiliary Engine (Transit)     | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |               | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 2A                   |
|   |                            | Auxiliary Engine (Maneuvering) | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |               | 0            | 250                        | 0                            | 10                           | 0                | 294                   | 24                  | 7,056                   | 7,056                 | 2A                   |
| Bubble Curtain Support Vessel                 | Tug                        | Main Engine (Transit)          | 1            | 5,530                    | 5,530           | 1 & 2 main      | NJWP          | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 11M                  |
|   |                            | Main Engine (Maneuvering)      | 1            | 5,530                    | 5,530           | 1 & 2 main      |               | 0            | 91                         | 0                            | 10                           | 0                | 294                   | 24                  | 7,056                   | 7,056                 | 11M                  |
|   |                            | Auxiliary Engine (Transit)     | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 11A                  |
|   |                            | Auxiliary Engine (Maneuvering) | 1            | 5,530                    | 5,530           | 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                   |
| Motion Compensation 1                         | Motion Compensation        | Main Engine (Transit)          | 1            | 500                      | 500             | Tier 3 Non-Road | NJWP          | 0            | 91                         | 0                            | 0                            | 0                | 294                   | 24                  | 7,056                   | 7,056                 | 17                   |
| Motion Compensation 2                         | Motion Compensation        | Main Engine (Transit)          | 1            | 500                      | 500             | Tier 3 Non-Road | NJWP          | 0            | 91                         | 0                            | 0                            | 0                | 294                   | 24                  | 7,056                   | 7,056                 | 17                   |
| Bubble Curtain Power                          | Air Compressor             | Air Compressor                 | 20           | 399                      | 7,980           | Tier 3 Non-Road | N/A           | 0            | 0                          | 0                            | 0                            | 294              | 10                    | 2,940               | 2,940                   | 16                    |                      |
| Hydraulic Hammer Power                        | Hydraulic Hammer Engine    | Hammer Engine                  | 3            | 597                      | 1,791           | Tier 2 Non-Road | N/A           | 0            | 0                          | 0                            | 0                            | 294              | 10                    | 2,940               | 2,940                   | 18                    |                      |
| <b>Offshore Substation Installation (OSS)</b> |                            |                                |              |                          |                 |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |
| Large HLV                                     | Heavy Lift Vessel          | Main Engine (Transit)          | 11           | 5,833                    | 64,167          | 1 & 2 main      | NJWP          | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 2M                   |
|   |                            | Main Engine (Maneuvering)      | 11           | 5,833                    | 64,167          | 1 & 2 main      |               | 0            | 91                         | 0                            | 10                           | 0                | 9                     | 24                  | 216                     | 216                   | 2M                   |
|   |                            | Auxiliary Engine (Transit)     | 1            | 5,833                    | 5,833           | 1 & 2 auxiliary |               | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 2A                   |
|   |                            | Auxiliary Engine (Maneuvering) | 1            | 5,833                    | 5,833           | 1 & 2 auxiliary |               | 0            | 91                         | 0                            | 10                           | 0                | 9                     | 24                  | 216                     | 216                   | 2A                   |
| Medium HLV                                    | Heavy Lift Vessel          | Main Engine (Transit)          | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      | NJWP          | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 2M                   |
|   |                            | Main Engine (Maneuvering)      | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      |               | 0            | 91                         | 0                            | 10                           | 0                | 9                     | 24                  | 216                     | 216                   | 2M                   |
|   |                            | Auxiliary Engine (Transit)     | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |               | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 2A                   |
|   |                            | Auxiliary Engine (Maneuvering) | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |               | 0            | 91                         | 0                            | 10                           | 0                | 9                     | 24                  | 216                     | 216                   | 2A                   |
| Bubble Curtain Support Vessel                 | Tug                        | Main Engine (Transit)          | 1            | 5,530                    | 5,530           | 1 & 2 main      | NJWP          | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 11M                  |
|   |                            | Main Engine (Maneuvering)      | 1            | 5,530                    | 5,530           | 1 & 2 main      |               | 0            | 91                         | 0                            | 10                           | 0                | 9                     | 24                  | 216                     | 216                   | 11M                  |
|   |                            | Auxiliary Engine (Transit)     | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 11A                  |
|   |                            | Auxiliary Engine (Maneuvering) | 1            | 5,530                    | 5               |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |

| 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 | Operating Days in WTA | Operating Hours/Day | Total Non-Transit Hours | Total Operating Hours | Emission Factors Ref |
|---|--------------------------------|--------------------------------|--------------|--------------------------|-----------------|-----------------|---------------|--------------|----------------------------|------------------------------|------------------------------|------------------|-----------------------|---------------------|-------------------------|-----------------------|----------------------|
| 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                  |
| 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                  |
| Non-US Assistance Tug 1                       | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 1            | 5,530                    | 5,530           | 1 & 2 main      | Europe        | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 11M                  |
|   |                                | Main Engine (Maneuvering)      | 1            | 5,530                    | 5,530           | 1 & 2 main      |               | 0            | 250                        | 0                            | 10                           | 0                | 10                    | 24                  | 240                     | 240                   | 11M                  |
|   |                                | Auxiliary Engine (Transit)     | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 11A                  |
|   |                                | Auxiliary Engine (Maneuvering) | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 0            | 250                        | 0                            | 10                           | 0                | 10                    | 24                  | 240                     | 240                   | 11A                  |
| Non-US Assistance Tug 2                       | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 1            | 5,530                    | 5,530           | 1 & 2 main      | Europe        | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 11M                  |
|   |                                | Main Engine (Maneuvering)      | 1            | 5,530                    | 5,530           | 1 & 2 main      |               | 0            | 250                        | 0                            | 10                           | 0                | 10                    | 24                  | 240                     | 240                   | 11M                  |
|   |                                | Auxiliary Engine (Transit)     | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 11A                  |
|   |                                | Auxiliary Engine (Maneuvering) | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |               | 0            | 250                        | 0                            | 10                           | 0                | 10                    | 24                  | 240                     | 240                   | 11A                  |
| Crew Transfer / PSO / Noise Monitoring Vessel | 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                          | Bubble Curtain Power           | Air Compressor                 | 20           | 399                      | 7,980           | Tier 3 Non-Road | N/A           | 0            | 0                          | 0                            | 0                            | 0                | 9                     | 10                  | 90                      | 90                    | 16                   |
| Hydraulic Hammer Power                        | 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                   |
| <b>Scour Protection</b>                       |                                |                                |              |                          |                 |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |
| Scour Protection Vessel                       | Fall Pipe Vessel               | Main Engine (Transit)          | 8            | 4 x 3350kW<br>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<br>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 |               | 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                | 92                    | 24                  | 2,208                   | 2,208                 | 3A                   |
| Dredger                                       | 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                | 58                    | 24                  | 1,392                   | 1,392                 | 5M                   |
|   |                                | Auxiliary Engine (Transit)     | 0            | 0                        | 954             | 1 & 2 auxiliary |               | 1            | 91                         | 182                          | 10                           | 18               | 0                     | 0                   | 0                       | 18                    | 5A                   |
|   |                                | Auxiliary Engine (Maneuvering) | 0            | 0                        | 954             | 1 & 2 auxiliary |               | 0            | 91                         | 0                            | 10                           | 0                | 58                    | 24                  | 1,392                   | 1,392                 | 5A                   |
|   |                                |                                |              |                          |                 |                 |               |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |

| 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 | Operating Days in WTA | Operating Hours/Day | Total Non-Transit Hours | Total Operating Hours | Emission Factors Ref |
|------------------------------|--|--------------------------------|--------------|----------------------------|-----------------|-----------------|-----------|--------------|----------------------------|------------------------------|------------------------------|------------------|-----------------------|---------------------|-------------------------|-----------------------|----------------------|
| Cable Burial                 | Cable Burial Vessel                    | Main Engine (Transit)          | 5            | 2,130                      | 10,650          | 1 & 2 main      | Europe    | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 3M                   |
|                              |  | Main Engine (Maneuvering)      | 5            | 2,130                      | 10,650          | 1 & 2 main      |           | 0            | 250                        | 0                            | 10                           | 0                | 118                   | 24                  | 2,832                   | 2,832                 | 3M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 2,130                      | 2,130           | 1 & 2 auxiliary |           | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 3A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 2,130                      | 2,130           | 1 & 2 auxiliary |           | 0            | 250                        | 0                            | 10                           | 0                | 118                   | 24                  | 2,832                   | 2,832                 | 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                | 259                   | 24                  | 6,216                   | 6,216                 | 5M                   |
|                              |  | Auxiliary Engine (Transit)     | 0            | 0                          | 954             | 1 & 2 auxiliary |           | 1            | 250                        | 500                          | 10                           | 50               | 0                     | 0                   | 0                       | 50                    | 5A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 0            | 0                          | 954             | 1 & 2 auxiliary |           | 0            | 250                        | 0                            | 10                           | 0                | 259                   | 24                  | 6,216                   | 6,216                 | 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                | 38                    | 24                  | 912                     | 912                   | 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                | 38                    | 24                  | 912                     | 912                   | 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                | 38                    | 24                  | 912                     | 912                   | 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                | 38                    | 24                  | 912                     | 912                   | 11A                  |
| Post-Install Rock Protection | Rock Dumping Vessel (Fall Pipe Vessel) | Main Engine (Transit)          | 8            | 4 x 3350kW<br>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<br>4 x 2000kW   | 21,400          | 1 & 2 main      |           | 0            | 250                        | 0                            | 10                           | 0                | 5                     | 24                  | 120                     | 120                   | 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                | 5                     | 24                  | 120                     | 120                   | 3A                   |
| <b>WTG Installation</b>      |  |                                |              |                            |                 |                 |           |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |
| WTG Installation Vessel      | Jackup Vessel                          | Main Engine (Transit)          | 7            | 4 x 3,535kW<br>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<br>3 x 2,650kW | 22,090          | 3 main          |           | 0            | 91                         | 0                            | 10                           | 0                | 876                   | 24                  | 21,024                  | 21,024                | 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                | 876                   | 24                  | 21,024                  | 21,024                | 7A                   |
| Barge 1                      | Barge                                  | Main Engine (Transit)          | 0            | 0                          | 0               | 1 & 2 main      | NJWP      | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 2M                   |
|                              |  | Main Engine (Maneuvering)      | 0            | 0                          | 0               | 1 & 2 main      |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 2M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 50                         | 50              | 1 & 2 auxiliary |           | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 2A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 50                         | 50              | 1 & 2 auxiliary |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 2A                   |
| Barge 2                      | Barge                                  | Main Engine (Transit)          | 0            | 0                          | 0               | 1 & 2 main      | NJWP      | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 2M                   |
|                              |  | Main Engine (Maneuvering)      | 0            | 0                          | 0               | 1 & 2 main      |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 2M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 50                         | 50              | 1 & 2 auxiliary |           | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 2A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 50                         | 50              | 1 & 2 auxiliary |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 2A                   |
| Motion Compensation 1        | Motion Compensation                    | Main Engine (Transit)          | 1            | 500                        | 500             | Tier 3 Non-Road | NJWP      | 0            | 91                         | 0                            | 0                            | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 17                   |
| Motion Compensation 2        | Motion Compensation                    | Main Engine (Transit)          | 1            | 500                        | 500             | Tier 3 Non-Road | NJWP      | 0            | 91                         | 0                            | 0                            | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 17                   |
| Towing Tug 1                 | Tug                                    | Main Engine (Transit)          | 2            | 2,525                      | 5,050           | 1 & 2 main      | NJWP      | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                      | 5,050           | 1 & 2 main      |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                         | 236             | 1 & 2 auxiliary |           | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                         | 236             | 1 & 2 auxiliary |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 11A                  |
| Towing Tug 2                 | Tug                                    | Main Engine (Transit)          | 2            | 2,525                      | 5,050           | 1 & 2 main      | NJWP      | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                      | 5,050           | 1 & 2 main      |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                         | 236             | 1 & 2 auxiliary |           | 100          | 91                         | 18,249                       | 10                           | 1,825            | 0                     | 0                   | 0                       | 1,825                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                         | 236             | 1 & 2 auxiliary |           | 0            | 91                         | 0                            | 10                           | 0                | 115                   | 24                  | 2,760                   | 2,760                 | 11A                  |
| US Jack Up Feeder 1          | Jackup Vessel                          | 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                | 404                   | 24                  | 9,696                   | 9,696                 | 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                   |
|                              |  |                                |              |                            |                 |                 |           |              |                            |                              |                              |                  |                       |                     |                         |                       |                      |



| Activity                                      | Representative Vessel Type | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |       |       |       |       |           |      |      |             |             |           |  |  |  |
|---|----------------------------|--------------------------------|-------------|------------------------|------------------|-------|-------|-------|-------|-----------|------|------|-------------|-------------|-----------|--|--|--|
|   |                            |                                |             |                        | NOx              | VOC   | CO    | PM10  | PM2.5 | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |  |  |  |
| <b>Emissions During Construction</b>          |                            |                                |             |                        |                  |       |       |       |       |           |      |      |             |             |           |  |  |  |
| <b>Foundation Installation (FOU)</b>          |                            |                                |             |                        |                  |       |       |       |       |           |      |      |             |             |           |  |  |  |
| Medium HLV                                    | Heavy Lift Vessel          | Main Engine (Transit)          | 0.83        | 65,785                 | 15.54            | 0.72  | 1.60  | 0.51  | 0.48  | 672.42    | 0.00 | 0.04 | 0.11        | 10.55       | 683.08    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 2,237,001              | 528.44           | 24.46 | 54.36 | 17.47 | 16.31 | 22,865.41 | 0.16 | 1.20 | 3.88        | 358.69      | 23,227.98 |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.56        | 1,974                  | 0.43             | 0.00  | 0.08  | 0.01  | 0.01  | 22.21     | 0.00 | 0.00 | 0.00        | 0.32        | 22.53     |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.56        | 278,550                | 60.77            | 0.68  | 11.99 | 1.55  | 1.50  | 3,133.88  | 0.02 | 0.15 | 0.48        | 44.66       | 3,179.03  |  |  |  |
| Bubble Curtain Support Vessel                 | Tug                        | Main Engine (Transit)          | 0.83        | 5,319                  | 0.88             | 0.02  | 0.21  | 0.03  | 0.03  | 59.43     | 0.00 | 0.00 | 0.01        | 0.85        | 60.29     |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 495,618                | 81.89            | 1.55  | 19.70 | 2.84  | 2.75  | 5,537.00  | 0.03 | 0.27 | 0.86        | 79.47       | 5,617.33  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 2,756                  | 0.48             | 0.01  | 0.12  | 0.02  | 0.01  | 31.01     | 0.00 | 0.00 | 0.00        | 0.44        | 31.45     |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 1,065,578              | 186.80           | 2.59  | 45.87 | 5.92  | 5.73  | 11,988.52 | 0.07 | 0.57 | 1.85        | 170.86      | 12,161.22 |  |  |  |
| 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      |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 0                      | 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  | 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  | 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      |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 0                      | 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  | 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  | 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  | 3,876.31  | 0.02 | 0.19 | 0.60        | 55.63       | 3,932.55  |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 452,588                | 74.78            | 1.41  | 17.99 | 2.59  | 2.51  | 5,056.27  | 0.03 | 0.24 | 0.79        | 72.57       | 5,129.63  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 8,401                  | 1.47             | 0.02  | 0.36  | 0.05  | 0.05  | 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  | 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  | 3,876.31  | 0.02 | 0.19 | 0.60        | 55.63       | 3,932.55  |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 452,588                | 74.78            | 1.41  | 17.99 | 2.59  | 2.51  | 5,056.27  | 0.03 | 0.24 | 0.79        | 72.57       | 5,129.63  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 8,401                  | 1.47             | 0.02  | 0.36  | 0.05  | 0.05  | 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  | 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  | 255.21    | 0.00 | 0.01 | 0.04        | 3.64        | 258.89    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 187,130                | 29.72            | 0.45  | 7.47  | 1.01  | 0.97  | 2,105.22  | 0.01 | 0.10 | 0.32        | 30.00       | 2,135.55  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 304                    | 0.05             | 0.00  | 0.01  | 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  | 117.07    | 0.00 | 0.01 | 0.02        | 1.67        | 118.75    |  |  |  |
| Motion Compensation 1                         | Motion Compensation        | Main Engine (Transit)          | 1.00        | 252,000                | 15.56            | 1.93  | 13.61 | 0.78  | 0.78  | 2,876.26  | 0.12 | 0.02 | 2.92        | 6.95        | 2,886.13  |  |  |  |
| Motion Compensation 2                         | Motion Compensation        | Main Engine (Transit)          | 1.00        | 252,000                | 15.56            | 1.93  | 13.61 | 0.78  | 0.78  | 2,876.26  | 0.12 | 0.02 | 2.92        | 6.95        | 2,886.13  |  |  |  |
| Bubble Curtain Power                          | Air Compressor             | Air Compressor                 | 1.00        | 1,675,800              | 103.45           | 12.93 | 90.52 | 5.17  | 5.17  | 19,127.10 | 0.78 | 0.16 | 19.40       | 46.24       | 19,192.74 |  |  |  |
| Hydraulic Hammer Power                        | Hydraulic Hammer Engine    | Hammer Engine                  | 1.00        | 376,110                | 37.15            | 4.60  | 20.31 | 1.16  | 1.16  | 4,292.81  | 0.17 | 0.03 | 4.35        | 10.38       | 4,307.54  |  |  |  |
| <b>Offshore Substation Installation (OSS)</b> |                            |                                |             |                        |                  |       |       |       |       |           |      |      |             |             |           |  |  |  |
| Large HLV                                     | Heavy Lift Vessel          | Main Engine (Transit)          | 0.83        | 61,723                 | 14.58            | 0.67  | 1.50  | 0.48  | 0.45  | 630.90    | 0.00 | 0.03 | 0.11        | 9.90        | 640.90    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 176,046                | 41.59            | 1.93  | 4.28  | 1.38  | 1.28  | 1,799.45  | 0.01 | 0.09 | 0.31        | 28.23       | 1,827.98  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.56        | 3,786                  | 0.83             | 0.01  | 0.16  | 0.02  | 0.02  | 42.59     | 0.00 | 0.00 | 0.01        | 0.61        | 43.21     |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.56        | 44,812                 | 9.78             | 0.11  | 1.93  | 0.25  | 0.24  | 504.16    | 0.00 | 0.02 | 0.08        | 7.19        | 511.43    |  |  |  |
| Medium HLV                                    | Heavy Lift Vessel          | Main Engine (Transit)          | 0.83        | 24,009                 | 5.67             | 0.26  | 0.58  | 0.19  | 0.18  | 245.41    | 0.00 | 0.01 | 0.04        | 3.85        | 249.30    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 68,480                 | 16.18            | 0.75  | 1.66  | 0.53  | 0.50  | 699.96    | 0.00 | 0.04 | 0.12        | 10.98       | 711.06    |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.56        | 720                    | 0.16             | 0.00  | 0.03  | 0.00  | 0.00  | 8.10      | 0.00 | 0.00 | 0.00        | 0.12        | 8.22      |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.56        | 8,527                  | 1.86             | 0.02  | 0.37  | 0.05  | 0.05  | 95.94     | 0.00 | 0.00 | 0.01        | 1.37        | 97.32     |  |  |  |
| Bubble Curtain Support Vessel                 | Tug                        | Main Engine (Transit)          | 0.83        | 5,319                  | 0.88             | 0.02  | 0.21  | 0.03  | 0.03  | 59.43     | 0.00 | 0.00 | 0.01        | 0.85        | 60        |  |  |  |

| Activity                                      | Representative Vessel Type     | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |      |       |      |       |          |      |      |             |             |          |
|---|--------------------------------|--------------------------------|-------------|------------------------|------------------|------|-------|------|-------|----------|------|------|-------------|-------------|----------|
|   |                                |                                |             |                        | NOx              | VOC  | CO    | PM10 | PM2.5 | CO2      | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e     |
| 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 | 0.00        | 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 | 0.00        | 0.00        | 0.00     |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 150                    | 0.03             | 0.00 | 0.01  | 0.00 | 0.00  | 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  | 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 | 0.00        | 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 | 0.00        | 0.00        | 0.00     |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 150                    | 0.03             | 0.00 | 0.01  | 0.00 | 0.00  | 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  | 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  | 325.61   | 0.00 | 0.02 | 0.05        | 4.67        | 330.33   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61  | 0.09 | 0.09  | 171.98   | 0.00 | 0.01 | 0.03        | 2.47        | 174.48   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 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  | 17.40    | 0.00 | 0.00 | 0.00        | 0.25        | 17.65    |
| US Towing Tug 2                               | US Towing Tug                  | Main Engine (Transit)          | 0.83        | 29,145                 | 4.82             | 0.09 | 1.16  | 0.17 | 0.16  | 325.61   | 0.00 | 0.02 | 0.05        | 4.67        | 330.33   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61  | 0.09 | 0.09  | 171.98   | 0.00 | 0.01 | 0.03        | 2.47        | 174.48   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 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  | 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  | 325.61   | 0.00 | 0.02 | 0.05        | 4.67        | 330.33   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61  | 0.09 | 0.09  | 171.98   | 0.00 | 0.01 | 0.03        | 2.47        | 174.48   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 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  | 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  | 325.61   | 0.00 | 0.02 | 0.05        | 4.67        | 330.33   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61  | 0.09 | 0.09  | 171.98   | 0.00 | 0.01 | 0.03        | 2.47        | 174.48   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 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  | 17.40    | 0.00 | 0.00 | 0.00        | 0.25        | 17.65    |
| Non-US Assistance Tug 1                       | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 0.83        | 14,575                 | 2.41             | 0.05 | 0.58  | 0.08 | 0.08  | 162.83   | 0.00 | 0.01 | 0.03        | 2.34        | 165.19   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 16,858                 | 2.79             | 0.05 | 0.67  | 0.10 | 0.09  | 188.33   | 0.00 | 0.01 | 0.03        | 2.70        | 191.07   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 7,551                  | 1.32             | 0.02 | 0.33  | 0.04 | 0.04  | 84.95    | 0.00 | 0.00 | 0.01        | 1.21        | 86.18    |
|   |                                | Auxiliary Engine (Maneuvering) | 0.43        | 36,244                 | 6.35             | 0.09 | 1.56  | 0.20 | 0.20  | 407.77   | 0.00 | 0.02 | 0.06        | 5.81        | 413.65   |
| Non-US Assistance Tug 2                       | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 0.83        | 14,575                 | 2.41             | 0.05 | 0.58  | 0.08 | 0.08  | 162.83   | 0.00 | 0.01 | 0.03        | 2.34        | 165.19   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 16,858                 | 2.79             | 0.05 | 0.67  | 0.10 | 0.09  | 188.33   | 0.00 | 0.01 | 0.03        | 2.70        | 191.07   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 7,551                  | 1.32             | 0.02 | 0.33  | 0.04 | 0.04  | 84.95    | 0.00 | 0.00 | 0.01        | 1.21        | 86.18    |
|   |                                | Auxiliary Engine (Maneuvering) | 0.43        | 36,244                 | 6.35             | 0.09 | 1.56  | 0.20 | 0.20  | 407.77   | 0.00 | 0.02 | 0.06        | 5.81        | 413.65   |
| Crew Transfer / PSO / Noise Monitoring Vessel | Crew Transfer Vessel           | Main Engine (Transit)          | 0.83        | 940                    | 0.15             | 0.00 | 0.04  | 0.01 | 0.00  | 10.57    | 0.00 | 0.00 | 0.00        | 0.15        | 10.72    |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 17,822                 | 2.83             | 0.04 | 0.71  | 0.10 | 0.09  | 200.50   | 0.00 | 0.01 | 0.03        | 2.86        | 203.39   |
|   |                                | Auxiliary Engine (Transit)     | 0.43        | 13                     | 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) | 0.43        | 991                    | 0.18             | 0.00 | 0.04  | 0.01 | 0.01  | 11.15    | 0.00 | 0.00 | 0.00        | 0.16        | 11.31    |
| Bubble Curtain Power                          | Bubble Curtain Power           | Air Compressor                 | 1.00        | 51,300                 | 3.17             | 0.40 | 2.77  | 0.16 | 0.16  | 585.52   | 0.02 | 0.00 | 0.59        | 1.42        | 587.53   |
| Hydraulic Hammer Power                        | Hydraulic Hammer Power         | Hammer Engine                  | 1.00        | 11,514                 | 1.14             | 0.14 | 0.62  | 0.04 | 0.04  | 131.41   | 0.01 | 0.00 | 0.13        | 0.32        | 131.86   |
| <b>Scour Protection</b>                       |                                |                                |             |                        |                  |      |       |      |       |          |      |      |             |             |          |
| Scour Protection Vessel                       | Fall Pipe Vessel               | Main Engine (Transit)          | 0.83        | 56,402                 | 9.29             | 0.24 | 2.15  | 0.33 | 0.32  | 621.66   | 0.00 | 0.03 | 0.10        | 9.04        | 630.80   |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 600,172                | 98.86            | 2.60 | 22.92 | 3.54 | 3.44  | 6,615.07 | 0.04 | 0.32 | 1.04        | 96.23       | 6,712.35 |
|   |                                | Auxiliary Engine (Transit)     | 0.56        | 5,246                  | 0.90             | 0.01 | 0.23  | 0.03 | 0.03  | 59.02    | 0.00 | 0.00 | 0.01        | 0.84        | 59.87    |
|   |                                | Auxiliary Engine (Maneuvering) | 0.56        | 231,655                | 39.77            | 0.56 | 9.97  | 1.29 | 1.25  | 2,606.29 | 0.02 | 0.12 | 0.40        | 37.14       | 2,643.83 |
| Dredger                                       | US Dredger                     | Main Engine (Transit)          | 0.83        | 1,234                  | 0.21             | 0.01 | 0.05  | 0.01 | 0.01  | 13.50    | 0.00 | 0.00 | 0.00        | 0.20        | 13.70    |
|   |                                | Main Engine (Maneuvering)      | 0.20        | 22,677                 | 3.78             | 0.11 | 0.84  | 0.14 | 0.13  | 248.22   | 0.00 | 0.01 | 0.0         |             |          |

| Activity                     | Representative Vessel Type             | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |       |        |       |       |           |      |      |             |             |           |
|------------------------------|--|--------------------------------|-------------|------------------------|------------------|-------|--------|-------|-------|-----------|------|------|-------------|-------------|-----------|
|                              |  |                                |             |                        | NOx              | VOC   | CO     | PM10  | PM2.5 | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Cable Burial                 | Cable Burial Vessel                    | Main Engine (Transit)          | 0.83        | 28,069                 | 4.62             | 0.12  | 1.07   | 0.17  | 0.16  | 309.38    | 0.00 | 0.02 | 0.05        | 4.50        | 313.93    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 383,094                | 63.10            | 1.66  | 14.63  | 2.26  | 2.19  | 4,222.45  | 0.03 | 0.21 | 0.66        | 61.43       | 4,284.54  |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 3,788                  | 0.65             | 0.01  | 0.16   | 0.02  | 0.02  | 42.61     | 0.00 | 0.00 | 0.01        | 0.61        | 43.23     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 214,533                | 36.83            | 0.52  | 9.23   | 1.19  | 1.15  | 2,413.65  | 0.01 | 0.12 | 0.37        | 34.40       | 2,448.42  |
| Sand Wave Clearance          | TSHD (Dredger)                         | Main Engine (Transit)          | 0.83        | 3,380                  | 0.56             | 0.02  | 0.12   | 0.02  | 0.02  | 37.00     | 0.00 | 0.00 | 0.01        | 0.54        | 37.55     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 101,267                | 16.87            | 0.49  | 3.74   | 0.63  | 0.60  | 1,108.42  | 0.01 | 0.05 | 0.18        | 16.24       | 1,124.84  |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 1,697                  | 0.29             | 0.00  | 0.07   | 0.01  | 0.01  | 19.10     | 0.00 | 0.00 | 0.00        | 0.27        | 19.37     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 211,011                | 36.08            | 0.51  | 9.08   | 1.17  | 1.14  | 2,374.03  | 0.01 | 0.11 | 0.37        | 33.83       | 2,408.23  |
| Pre Lay Grapnel Run AHTS 1   | AHTS                                   | Main Engine (Transit)          | 0.83        | 8,657                  | 1.43             | 0.03  | 0.34   | 0.05  | 0.05  | 96.72     | 0.00 | 0.00 | 0.02        | 1.39        | 98.12     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 104,256                | 17.23            | 0.33  | 4.14   | 0.60  | 0.58  | 1,164.74  | 0.01 | 0.06 | 0.18        | 16.72       | 1,181.64  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 409                    | 0.07             | 0.00  | 0.02   | 0.00  | 0.00  | 4.60      | 0.00 | 0.00 | 0.00        | 0.07        | 4.66      |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 20,423                 | 3.58             | 0.05  | 0.88   | 0.11  | 0.11  | 229.77    | 0.00 | 0.01 | 0.04        | 3.27        | 233.08    |
| Pre Lay Grapnel Run AHTS 2   | AHTS                                   | Main Engine (Transit)          | 0.83        | 8,657                  | 1.43             | 0.03  | 0.34   | 0.05  | 0.05  | 96.72     | 0.00 | 0.00 | 0.02        | 1.39        | 98.12     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 104,256                | 17.23            | 0.33  | 4.14   | 0.60  | 0.58  | 1,164.74  | 0.01 | 0.06 | 0.18        | 16.72       | 1,181.64  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 409                    | 0.07             | 0.00  | 0.02   | 0.00  | 0.00  | 4.60      | 0.00 | 0.00 | 0.00        | 0.07        | 4.66      |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 20,423                 | 3.58             | 0.05  | 0.88   | 0.11  | 0.11  | 229.77    | 0.00 | 0.01 | 0.04        | 3.27        | 233.08    |
| 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  | 621.66    | 0.00 | 0.03 | 0.10        | 9.04        | 630.80    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 32,618                 | 5.37             | 0.14  | 1.25   | 0.19  | 0.19  | 359.51    | 0.00 | 0.02 | 0.06        | 5.23        | 364.80    |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 5,246                  | 0.90             | 0.01  | 0.23   | 0.03  | 0.03  | 59.02     | 0.00 | 0.00 | 0.01        | 0.84        | 59.87     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 12,590                 | 2.16             | 0.03  | 0.54   | 0.07  | 0.07  | 141.65    | 0.00 | 0.01 | 0.02        | 2.02        | 143.69    |
| <b>WTG Installation</b>      |  |                                |             |                        |                  |       |        |       |       |           |      |      |             |             |           |
| WTG Installation Vessel      | Jackup Vessel                          | Main Engine (Transit)          | 0.83        | 19,220                 | 3.70             | 0.05  | 0.85   | 0.11  | 0.11  | 238.65    | 0.00 | 0.01 | 0.04        | 3.41        | 242.09    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 5,335,667              | 1,026.94         | 14.33 | 235.49 | 31.74 | 30.72 | 66,252.66 | 0.41 | 3.17 | 10.24       | 945.85      | 67,208.75 |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 1,321                  | 0.26             | 0.00  | 0.06   | 0.01  | 0.01  | 14.86     | 0.00 | 0.00 | 0.00        | 0.21        | 15.07     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 1,521,468              | 305.01           | 3.70  | 65.49  | 8.45  | 8.19  | 17,117.60 | 0.11 | 0.82 | 2.64        | 243.96      | 17,364.20 |
| 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      |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 0                      | 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        | 2,492                  | 0.54             | 0.01  | 0.11   | 0.01  | 0.01  | 28.03     | 0.00 | 0.00 | 0.00        | 0.40        | 28.44     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 3,769                  | 0.82             | 0.01  | 0.16   | 0.02  | 0.02  | 42.40     | 0.00 | 0.00 | 0.01        | 0.60        | 43.01     |
| 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      |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 0                      | 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        | 2,492                  | 0.54             | 0.01  | 0.11   | 0.01  | 0.01  | 28.03     | 0.00 | 0.00 | 0.00        | 0.40        | 28.44     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 3,769                  | 0.82             | 0.01  | 0.16   | 0.02  | 0.02  | 42.40     | 0.00 | 0.00 | 0.01        | 0.60        | 43.01     |
| Motion Compensation 1        | Motion Compensation                    | Main Engine (Transit)          | 1.00        | 98,571                 | 6.08             | 0.75  | 5.32   | 0.30  | 0.30  | 1,125.07  | 0.05 | 0.01 | 1.14        | 2.72        | 1,128.93  |
| Motion Compensation 2        | Motion Compensation                    | Main Engine (Transit)          | 1.00        | 98,571                 | 6.08             | 0.75  | 5.32   | 0.30  | 0.30  | 1,125.07  | 0.05 | 0.01 | 1.14        | 2.72        | 1,128.93  |
| Towing Tug 1                 | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52  | 19.31  | 2.78  | 2.70  | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55  | 7.04   | 1.01  | 0.98  | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 11,761                 | 2.06             | 0.03  | 0.51   | 0.07  | 0.06  | 132.32    | 0.00 | 0.01 | 0.02        | 1.89        | 134.22    |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 17,788                 | 3.12             | 0.04  | 0.77   | 0.10  | 0.10  | 200.13    | 0.00 | 0.01 | 0.03        | 2.85        | 203.01    |
| Towing Tug 2                 | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52  | 19.31  | 2.78  | 2.70  | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55  | 7.04   | 1.01  | 0.98  | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 11,761                 | 2.06             | 0.03  | 0.51   | 0.07  | 0.06  | 132.32    | 0.00 | 0.01 | 0.02        | 1.89        | 134.22    |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 17,788                 | 3.12             | 0.04  | 0.77   | 0.10  | 0.10  | 200.13    | 0.00 | 0.01 | 0.03        | 2.85        | 203.01    |
| US Jack Up Feeder 1          | Jackup Vessel                          | Main Engine (Transit)          | 0.83        | 435,034                | 83.73            | 1.17  | 19.20  | 2.59  | 2.50  | 5,401.79  | 0.03 | 0.26 | 0.83        | 77.1        |           |

| Activity                         | Representative Vessel Type             | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |      |       |      |       |           |      |      |             |             |           |
|----------------------------------|--|--------------------------------|-------------|------------------------|------------------|------|-------|------|-------|-----------|------|------|-------------|-------------|-----------|
|                                  |  |                                |             |                        | NOx              | VOC  | CO    | PM10 | PM2.5 | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| US Harbor Tug                    | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52 | 19.31 | 2.78 | 2.70  | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55 | 7.04  | 1.01 | 0.98  | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                                  |  | Auxiliary Engine (Transit)     | 0.43        | 11,761                 | 2.06             | 0.03 | 0.51  | 0.07 | 0.06  | 132.32    | 0.00 | 0.01 | 0.02        | 1.89        | 134.22    |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.43        | 17,788                 | 3.12             | 0.04 | 0.77  | 0.10 | 0.10  | 200.13    | 0.00 | 0.01 | 0.03        | 2.85        | 203.01    |
| WTG Commissioning SOV            | Service Operation Vessel               | Main Engine (Transit)          | 0.16        | 890                    | 0.15             | 0.00 | 0.03  | 0.01 | 0.01  | 9.81      | 0.00 | 0.00 | 0.00        | 0.14        | 9.95      |
|                                  |  | Main Engine (Maneuvering)      | 0.10        | 873,223                | 143.83           | 3.79 | 33.34 | 5.15 | 5.00  | 9,624.62  | 0.06 | 0.47 | 1.52        | 140.01      | 9,766.15  |
|                                  |  | Auxiliary Engine (Transit)     | 0.16        | 148                    | 0.03             | 0.00 | 0.01  | 0.00 | 0.00  | 1.67      | 0.00 | 0.00 | 0.00        | 0.02        | 1.69      |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.10        | 145,537                | 24.98            | 0.35 | 6.26  | 0.81 | 0.78  | 1,637.40  | 0.01 | 0.08 | 0.25        | 23.34       | 1,660.99  |
| <b>Export Cable Installation</b> |  |                                |             |                        |                  |      |       |      |       |           |      |      |             |             |           |
| Cable Installation Vessel 1      | Cable Installation Vessel              | Main Engine (Transit)          | 0.83        | 8,638                  | 1.42             | 0.04 | 0.33  | 0.05 | 0.05  | 95.21     | 0.00 | 0.00 | 0.01        | 1.39        | 96.61     |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 952,642                | 156.92           | 4.13 | 36.38 | 5.62 | 5.46  | 10,499.98 | 0.07 | 0.51 | 1.65        | 152.75      | 10,654.38 |
|                                  |  | Auxiliary Engine (Transit)     | 0.56        | 1,817                  | 0.31             | 0.00 | 0.08  | 0.01 | 0.01  | 20.44     | 0.00 | 0.00 | 0.00        | 0.29        | 20.74     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.56        | 831,706                | 142.77           | 2.02 | 35.80 | 4.62 | 4.48  | 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        | 8,638                  | 1.42             | 0.04 | 0.33  | 0.05 | 0.05  | 95.21     | 0.00 | 0.00 | 0.01        | 1.39        | 96.61     |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 952,642                | 156.92           | 4.13 | 36.38 | 5.62 | 5.46  | 10,499.98 | 0.07 | 0.51 | 1.65        | 152.75      | 10,654.38 |
|                                  |  | Auxiliary Engine (Transit)     | 0.56        | 1,817                  | 0.31             | 0.00 | 0.08  | 0.01 | 0.01  | 20.44     | 0.00 | 0.00 | 0.00        | 0.29        | 20.74     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.56        | 831,706                | 142.77           | 2.02 | 35.80 | 4.62 | 4.48  | 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        | 6,239                  | 1.03             | 0.03 | 0.24  | 0.04 | 0.04  | 68.77     | 0.00 | 0.00 | 0.01        | 1.00        | 69.78     |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 138,404                | 22.80            | 0.60 | 5.28  | 0.82 | 0.79  | 1,525.48  | 0.01 | 0.07 | 0.24        | 22.19       | 1,547.92  |
|                                  |  | Auxiliary Engine (Transit)     | 0.56        | 1,290                  | 0.22             | 0.00 | 0.06  | 0.01 | 0.01  | 14.52     | 0.00 | 0.00 | 0.00        | 0.21        | 14.73     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.56        | 118,781                | 20.39            | 0.29 | 5.11  | 0.66 | 0.64  | 1,336.37  | 0.01 | 0.06 | 0.21        | 19.05       | 1,355.62  |
| TSHD                             | Dredger                                | Main Engine (Transit)          | 0.83        | 1,234                  | 0.21             | 0.01 | 0.05  | 0.01 | 0.01  | 13.50     | 0.00 | 0.00 | 0.00        | 0.20        | 13.70     |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 98,921                 | 16.48            | 0.48 | 3.66  | 0.62 | 0.58  | 1,082.75  | 0.01 | 0.05 | 0.17        | 15.86       | 1,098.78  |
|                                  |  | Auxiliary Engine (Transit)     | 0.56        | 619                    | 0.11             | 0.00 | 0.03  | 0.00 | 0.00  | 6.97      | 0.00 | 0.00 | 0.00        | 0.10        | 7.07      |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.56        | 206,123                | 35.24            | 0.50 | 8.87  | 1.14 | 1.11  | 2,319.03  | 0.01 | 0.11 | 0.36        | 33.05       | 2,352.44  |
| AHTS                             | Tug                                    | Main Engine (Transit)          | 0.83        | 8,657                  | 1.43             | 0.03 | 0.34  | 0.05 | 0.05  | 96.72     | 0.00 | 0.00 | 0.02        | 1.39        | 98.12     |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 282,588                | 46.69            | 0.88 | 11.23 | 1.62 | 1.57  | 3,157.05  | 0.02 | 0.15 | 0.49        | 45.31       | 3,202.85  |
|                                  |  | Auxiliary Engine (Transit)     | 0.43        | 409                    | 0.07             | 0.00 | 0.02  | 0.00 | 0.00  | 4.60      | 0.00 | 0.00 | 0.00        | 0.07        | 4.66      |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.43        | 55,356                 | 9.70             | 0.13 | 2.38  | 0.31 | 0.30  | 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        | 56,402                 | 9.29             | 0.24 | 2.15  | 0.33 | 0.32  | 621.66    | 0.00 | 0.03 | 0.10        | 9.04        | 630.80    |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 39,142                 | 6.45             | 0.17 | 1.49  | 0.23 | 0.22  | 431.42    | 0.00 | 0.02 | 0.07        | 6.28        | 437.76    |
|                                  |  | Auxiliary Engine (Transit)     | 0.56        | 5,246                  | 0.90             | 0.01 | 0.23  | 0.03 | 0.03  | 59.02     | 0.00 | 0.00 | 0.01        | 0.84        | 59.87     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.56        | 15,108                 | 2.59             | 0.04 | 0.65  | 0.08 | 0.08  | 169.98    | 0.00 | 0.01 | 0.03        | 2.42        | 172.42    |
| <b>Fuel Bunkering</b>            |  |                                |             |                        |                  |      |       |      |       |           |      |      |             |             |           |
| Towing Tug                       | Tug                                    | Main Engine (Transit)          | 0.83        | 349,745                | 57.79            | 1.09 | 13.90 | 2.00 | 1.94  | 3,907.33  | 0.02 | 0.19 | 0.61        | 56.08       | 3,964.01  |
|                                  |  | Main Engine (Maneuvering)      | 0.20        | 1,601,382              | 264.61           | 5.00 | 63.65 | 9.17 | 8.89  | 17,890.51 | 0.11 | 0.86 | 2.78        | 256.77      | 18,150.06 |
|                                  |  | Auxiliary Engine (Transit)     | 0.43        | 8,468                  | 1.48             | 0.02 | 0.36  | 0.05 | 0.05  | 95.27     | 0.00 | 0.00 | 0.01        | 1.36        | 96.64     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.43        | 160,903                | 28.21            | 0.39 | 6.93  | 0.89 | 0.87  | 1,810.28  | 0.01 | 0.09 | 0.28        | 25.80       | 1,836.35  |
| Barge                            | Barge                                  | Main Engine (Transit)          | 0.83        | 0                      | 0.00             | 0.00 | 0.00  | 0.00 | 0.00  | 0.00      | 0.00 | 0.00 | 0.00        | 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 | 0.00        | 0.00        | 0.00      |
|                                  |  | Auxiliary Engine (Transit)     | 0.43        | 1,794                  | 0.39             | 0.00 | 0.08  | 0.01 | 0.01  | 20.18     | 0.00 | 0.00 | 0.00        | 0.29        | 20.47     |
|                                  |  | Auxiliary Engine (Maneuvering) | 0.43        | 34,090                 | 7.44             | 0.08 | 1.47  | 0.19 | 0.18  | 383.53    | 0.00 | 0.02 | 0.06        | 5.47        | 389.06    |
| Motion Compensation              | Motion Compensation                    | Motion Compensation Engine     | 1.00        | 891,647                | 55.04            | 6.81 | 48.16 | 2.75 | 2.75  | 10,177.00 | 0.41 | 0.08 | 10.32       | 24.60       | 10,211.92 |
| <b>Stationary Generators</b>     |  |                                |             |                        |                  |      |       |      |       |           |      |      |             |             |           |
| OSS Commissioning Generators     | Generator</td                          |                                |             |                        |                  |      |       |      |       |           |      |      |             |             |           |

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Total Emissions  |       |         |       |       |      |           |     |      |             |             |           |
|--|--------------|------------------------|------------------|-------|---------|-------|-------|------|-----------|-----|------|-------------|-------------|-----------|
|  |              |                        | Emissions (tons) |       |         |       |       |      |           |     |      |             |             |           |
|  |              |                        | NOx              | VOC   | CO      | PM10  | PM2.5 | SO2  | CO2       | CH4 | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Foundation Installation (FOU)          | 8            | 22,030,232.4           | 3,646.9          | 68.3  | 877.9   | 125.9 | 122.1 | 12.3 | 246,178.1 | 1.5 | 11.9 | 38.2        | 3,532.4     | 249,748.8 |
| Offshore Substation Installation (OSS) | 16           | 866,081.1              | 164.9            | 5.5   | 30.9    | 5.4   | 5.2   | 2.3  | 9,393.7   | 0.1 | 0.4  | 2.1         | 130.5       | 9,526.4   |
| Scour Protection                       | 2            | 965,259.6              | 161.0            | 3.7   | 38.2    | 5.6   | 5.4   | 1.0  | 10,702.4  | 0.1 | 0.5  | 1.7         | 154.8       | 10,858.8  |
| Inter Array Cable Installation         | 7            | 3,182,198.2            | 531.5            | 11.7  | 126.6   | 18.4  | 17.9  | 3.2  | 35,330.7  | 0.2 | 1.7  | 5.5         | 510.2       | 35,846.5  |
| WTG Installation                       | 10           | 14,359,645.7           | 2,660.0          | 40.9  | 615.6   | 82.7  | 80.1  | 4.7  | 169,790.2 | 1.1 | 8.1  | 28.2        | 2,400.5     | 172,218.9 |
| Export Cable Installation              | 6            | 4,624,125.1            | 776.4            | 15.8  | 187.0   | 26.6  | 25.7  | 3.8  | 51,476.5  | 0.3 | 2.5  | 8.0         | 741.4       | 52,225.9  |
| Fuel Bunkering                         | 2            | 3,048,028.4            | 415.0            | 13.4  | 134.5   | 15.1  | 14.7  | 1.2  | 34,284.1  | 0.6 | 1.2  | 14.1        | 370.4       | 34,668.5  |
| Stationary Generators                  | 0            | 24,000.0               | 0.2              | 0.1   | 1.3     | 0.0   | 0.0   | 0.0  | 273.9     | 0.0 | 0.0  | 0.3         | 0.7         | 274.9     |
| Miscellaneous                          | 0            | 0.0                    | 0.0              | 1.1   | 0.0     | 0.0   | 0.0   | 0.0  | 0.0       | 0.0 | 0.0  | 0.0         | 0.0         | 0.0       |
| Total                                  | 51           | 49,099,570.5           | 8,355.9          | 160.3 | 2,012.0 | 279.7 | 271.1 | 28.4 | 557,429.7 | 3.9 | 26.3 | 98.1        | 7,840.9     | 565,368.7 |

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Vessel Emissions |       |         |       |       |      |           |     |      |             |             |           |
|--|--------------|------------------------|------------------|-------|---------|-------|-------|------|-----------|-----|------|-------------|-------------|-----------|
|  |              |                        | Emissions (tons) |       |         |       |       |      |           |     |      |             |             |           |
|  |              |                        | NOx              | VOC   | CO      | PM10  | PM2.5 | SO2  | CO2       | CH4 | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Foundation Installation (FOU)          | 8            | 22,030,232.4           | 3,646.9          | 68.3  | 877.9   | 125.9 | 122.1 | 12.3 | 246,178.1 | 1.5 | 11.9 | 38.2        | 3,532.4     | 249,748.8 |
| Offshore Substation Installation (OSS) | 16           | 803,267.5              | 160.6            | 4.9   | 27.5    | 5.2   | 5.0   | 2.2  | 8,676.8   | 0.1 | 0.4  | 1.4         | 128.8       | 8,807.0   |
| Scour Protection                       | 2            | 965,259.6              | 161.0            | 3.7   | 38.2    | 5.6   | 5.4   | 1.0  | 10,702.4  | 0.1 | 0.5  | 1.7         | 154.8       | 10,858.8  |
| Inter Array Cable Installation         | 7            | 3,182,198.2            | 531.5            | 11.7  | 126.6   | 18.4  | 17.9  | 3.2  | 35,330.7  | 0.2 | 1.7  | 5.5         | 510.2       | 35,846.5  |
| WTG Installation                       | 10           | 14,162,502.9           | 2,647.8          | 39.3  | 605.0   | 82.1  | 79.5  | 4.7  | 167,540.1 | 1.0 | 8.0  | 25.9        | 2,395.1     | 169,961.1 |
| Export Cable Installation              | 6            | 4,624,125.1            | 776.4            | 15.8  | 187.0   | 26.6  | 25.7  | 3.8  | 51,476.5  | 0.3 | 2.5  | 8.0         | 741.4       | 52,225.9  |
| Fuel Bunkering                         | 2            | 2,156,381.7            | 359.9            | 6.6   | 86.4    | 12.3  | 11.9  | 1.1  | 24,107.1  | 0.1 | 1.2  | 3.7         | 345.8       | 24,456.6  |
| Stationary Generators                  | 0            | 0.0                    | 0.0              | 0.0   | 0.0     | 0.0   | 0.0   | 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  | 0.0       | 0.0 | 0.0  | 0.0         | 0.0         | 0.0       |
| Total                                  | 51           | 47,923,967.3           | 8,284.1          | 150.3 | 1,948.5 | 276.2 | 267.6 | 28.3 | 544,011.7 | 3.4 | 26.2 | 84.5        | 7,808.5     | 551,904.7 |

| Activity Group                         | # of Vessels | Fuel Consumption (gal) | Non-Vessel Emissions |      |      |      |       |     |          |     |     |             |             |          |
|--|--------------|------------------------|----------------------|------|------|------|-------|-----|----------|-----|-----|-------------|-------------|----------|
|  |              |                        | Emissions (tons)     |      |      |      |       |     |          |     |     |             |             |          |
|  |              |                        | NOx                  | VOC  | CO   | PM10 | PM2.5 | SO2 | CO2      | CH4 | N2O | CH4 as CO2e | N2O as CO2e | CO2e     |
| Foundation Installation (FOU)          | 8            | 0.0                    | 0.0                  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Offshore Substation Installation (OSS) | 16           | 62,813.6               | 4.3                  | 0.5  | 3.4  | 0.2  | 0.2   | 0.0 | 716.9    | 0.0 | 0.0 | 0.7         | 1.7         | 719.4    |
| Scour Protection                       | 2            | 0.0                    | 0.0                  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Inter Array Cable Installation         | 7            | 0.0                    | 0.0                  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| WTG Installation                       | 10           | 197,142.9              | 12.2                 | 1.5  | 10.6 | 0.6  | 0.6   | 0.0 | 2,250.1  | 0.1 | 0.0 | 2.3         | 5.4         | 2,257.9  |
| Export Cable Installation              | 6            | 0.0                    | 0.0                  | 0.0  | 0.0  | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Fuel Bunkering                         | 2            | 891,646.7              | 55.0                 | 6.8  | 48.2 | 2.8  | 2.8   | 0.1 | 10,177.0 | 0.4 | 0.1 | 10.3        | 24.6        | 10,211.9 |
| Stationary Generators                  | 0            | 24,000.0               | 0.2                  | 0.1  | 1.3  | 0.0  | 0.0   | 0.0 | 273.9    | 0.0 | 0.0 | 0.3         | 0.7         | 274.9    |
| Miscellaneous                          | 0            | 0.0                    | 0.0                  | 1.1  | 0.0  | 0.0  | 0.0   | 0.0 | 0.0      | 0.0 | 0.0 | 0.0         | 0.0         | 0.0      |
| Total                                  | 51           | 1,175,603.1            | 71.8                 | 10.0 | 63.5 | 3.6  | 3.6   | 0.1 | 13,418.0 | 0.5 | 0.1 | 13.6        | 32.4        | 13,464.0 |
| Engines Only                           |              |                        | 71.8                 | 8.9  | 63.5 | 3.6  | 3.6   | 0.1 | 13,418.0 | 0.5 | 0.1 | 13.6        | 32.4        | 13,464.0 |

| Activity                                      | Representative Vessel Type    | Engine Type                    | Engine Count | Engine Size (kW)         | Total Size (kW) | Engine Category | Home Port | Vessel 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 |
|---|-------------------------------|--------------------------------|--------------|--------------------------|-----------------|-----------------|-----------|-------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|----------------------|
| <b>Emissions During Construction</b>          |                               |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| <b>Foundation Installation (FOU)</b>          |                               |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| Bulk Carrier                                  | Bulk Carrier                  | Main Engine (Transit)          | 1            | 7,010                    | 7,010           | 1 & 2 main      | Europe    | 19                      | 250                        | 9,500                        | 10                           | 950                   | 0                          | 0                   | 0                       | 950                   | 10M                  |
|   |                               | Main Engine (Maneuvering)      | 1            | 7,010                    | 7,010           | 1 & 2 main      |           | 0                       | 250                        | 0                            | 10                           | 0                     | 241                        | 24                  | 5,784                   | 5,784                 | 10M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 1,050                    | 3,150           | 1 & 2 auxiliary |           | 19                      | 250                        | 9,500                        | 10                           | 950                   | 0                          | 0                   | 0                       | 950                   | 10A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 1,050                    | 3,150           | 1 & 2 auxiliary |           | 0                       | 250                        | 0                            | 10                           | 0                     | 241                        | 24                  | 5,784                   | 5,784                 | 10A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| Tug   | Tug                           | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 200                     | 91                         | 36,497                       | 3                            | 12,166                | 0                          | 0                   | 0                       | 12,166                | 11A                  |
|   |                               | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 3                            | 0                     | 102                        | 24                  | 2,448                   | 2,448                 | 11A                  |
| SOV   | Service Operation Vessel      | Main Engine (Transit)          | 4            | 1,200                    | 4,800           | 1 & 2 main      | Paulsboro | 200                     | 91                         | 1,008                        | 10                           | 101                   | 0                          | 0                   | 0                       | 101                   | 3M                   |
|   |                               | Main Engine (Maneuvering)      | 4            | 1,200                    | 4,800           | 1 & 2 main      |           | 0                       | 126                        | 0                            | 10                           | 0                     | 97                         | 24                  | 2,328                   | 2,328                 | 3M                   |
|   |                               | Auxiliary Engine (Transit)     | 1            | 800                      | 800             | 1 & 2 auxiliary |           | 4                       | 126                        | 1,008                        | 10                           | 101                   | 0                          | 0                   | 0                       | 101                   | 3A                   |
|   |                               | Auxiliary Engine (Maneuvering) | 1            | 800                      | 800             | 1 & 2 auxiliary |           | 0                       | 126                        | 0                            | 10                           | 0                     | 97                         | 24                  | 2,328                   | 2,328                 | 3A                   |
| <b>Offshore Substation Installation (OSS)</b> |                               |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
|   | Large HLV                     | Main Engine (Transit)          | 11           | 5,833                    | 64,167          | 1 & 2 main      | NJWP      | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 2M                   |
|   |                               | Main Engine (Maneuvering)      | 11           | 5,833                    | 64,167          | 1 & 2 main      |           | 0                       | 91                         | 0                            | 10                           | 0                     | 9                          | 24                  | 216                     | 216                   | 2M                   |
|   |                               | Auxiliary Engine (Transit)     | 1            | 5,833                    | 5,833           | 1 & 2 auxiliary |           | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 2A                   |
|   |                               | Auxiliary Engine (Maneuvering) | 1            | 5,833                    | 5,833           | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 10                           | 0                     | 9                          | 24                  | 216                     | 216                   | 2A                   |
|   | Medium HLV                    | Main Engine (Transit)          | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      | NJWP      | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 2M                   |
|   |                               | Main Engine (Maneuvering)      | 6            | 4 x 3840kW<br>2 x 4800kW | 24,960          | 1 & 2 main      |           | 0                       | 91                         | 0                            | 10                           | 0                     | 9                          | 24                  | 216                     | 216                   | 2M                   |
|   |                               | Auxiliary Engine (Transit)     | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |           | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 2A                   |
|   |                               | Auxiliary Engine (Maneuvering) | 1            | 1,110                    | 1,110           | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 10                           | 0                     | 9                          | 24                  | 216                     | 216                   | 2A                   |
|   | Bubble Curtain Support Vessel | Main Engine (Transit)          | 1            | 5,530                    | 5,530           | 1 & 2 main      | NJWP      | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 11M                  |
|   |                               | Main Engine (Maneuvering)      | 1            | 5,530                    | 5,530           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 10                           | 0                     | 9                          | 24                  | 216                     | 216                   | 11M                  |
|   |                               | Auxiliary Engine (Transit)     | 1            | 5,530                    | 5,530           | 1 & 2 auxiliary |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |

| Activity                | Representative Vessel Type     | Engine Type                    | Engine Count | Engine Size (kW) | Total Size (kW) | Engine Category | Home Port     | Vessel 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 |
|-------------------------|--------------------------------|--------------------------------|--------------|------------------|-----------------|-----------------|---------------|-------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|----------------------|
| 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                  |
| Non-US Assistance Tug 1 | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 1            | 5,530            | 5,530           | 1 & 2 main      | Europe        | 1                       | 250                        | 500                          | 10                           | 50                    | 0                          | 0                   | 0                       | 50                    | 11M                  |
|                         |                                | Main Engine (Maneuvering)      | 1            | 5,530            | 5,530           | 1 & 2 main      |               | 0                       | 250                        | 0                            | 10                           | 0                     | 10                         | 24                  | 240                     | 240                   | 11M                  |
|                         |                                | Auxiliary Engine (Transit)     | 1            | 5,530            | 5,530           | 1 & 2 auxiliary |               | 1                       | 250                        | 500                          | 10                           | 50                    | 0                          | 0                   | 0                       | 50                    | 11A                  |
|                         |                                | Auxiliary Engine (Maneuvering) | 1            | 5,530            | 5,530           | 1 & 2 auxiliary |               | 0                       | 250                        | 0                            | 10                           | 0                     | 10                         | 24                  | 240                     | 240                   | 11A                  |
| Non-US Assistance Tug 2 | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 1            | 5,530            | 5,530           | 1 & 2 main      | Europe        | 1                       | 250                        | 500                          | 10                           | 50                    | 0                          | 0                   | 0                       | 50                    | 11M                  |
|                         |                                | Main Engine (Maneuvering)      | 1            | 5,530            | 5,530           | 1 & 2 main      |               | 0                       | 250                        | 0                            | 10                           | 0                     | 10                         | 24                  | 240                     | 240                   | 11M                  |
|                         |                                | Auxiliary Engine (Transit)     | 1            | 5,530            | 5,530           | 1 & 2 auxiliary |               | 1                       | 250                        | 500                          | 10                           | 50                    | 0                          | 0                   | 0                       | 50                    | 11A                  |
|                         |                                | Auxiliary Engine (Maneuvering) | 1            | 5,530            | 5,530           | 1 & 2 auxiliary |               | 0                       | 250                        | 0                            | 10                           | 0                     | 10                         | 24                  | 240                     | 240                   | 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            | Tier 3 Non-Road | 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<br>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<br>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 |        | 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  | 92 | 24 | 2,208 | 2,208 | 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  | 58 | 24 | 1,392 | 1,392 | 5M |
|                  |                  | Auxiliary Engine (Transit)     | 0 | 0                        | 954    | 1 & 2 auxiliary |        | 1 | 91  | 182 | 10 | 18 | 0  | 0  | 0     | 18    | 5A |
|                  |                  | Auxiliary Engine (Maneuvering) | 0 | 0                        | 954    | 1 & 2 auxiliary |        | 0 | 91  | 0   | 10 | 0  | 58 | 24 | 1,392 | 1,392 | 5A |

| Inter Array Cable Installation |                                       |                                |   |                          |       |                 |        |   |     |     |    |    |     |    |       |       |    |
|--------------------------------|---------------------------------------|--------------------------------|---|--------------------------|-------|-----------------|--------|---|-----|-----|----|----|-----|----|-------|-------|----|
|                                | Cable Installation Vessel             | Main Engine (Transit)          | 4 | 2 x 2666kW<br>2 x 2000kW | 9,332 | 1 & 2 main      | Europe | 1 | 250 | 500 | 10 | 50 | 0   | 0  | 0     | 50    | 3M |
|                                |                                       | Main Engine (Maneuvering)      | 4 | 2 x 2666kW<br>2 x 2000kW | 9,332 | 1 & 2 main      |        | 0 | 250 | 0   | 10 | 0  | 396 | 24 | 9,504 | 9,504 | 3M |
|                                |                                       | Auxiliary Engine (Transit)     | 1 | 1,432                    | 1,432 | 1 & 2 auxiliary |        | 1 | 250 | 500 | 10 | 50 | 0   | 0  | 0     | 50    | 3A |
|                                |                                       | Auxiliary Engine (Maneuvering) | 1 | 1,432                    | 1,432 | 1 & 2 auxiliary |        | 0 | 250 | 0   | 10 | 0  | 396 | 24 | 9,504 | 9,504 | 3A |
|                                | Cable Installation Support Activities | Main Engine (Transit)          | 4 | 1,200                    | 4,800 | 1 & 2 main      | Europe | 1 | 250 | 500 | 10 | 50 | 0   | 0  | 0     |       |    |

| Activity                     | Representative Vessel Type             | Engine Type                    | Engine Count | Engine Size (kW)           | Total Size (kW) | Engine Category | Home Port     | Vessel 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 |
|------------------------------|--|--------------------------------|--------------|----------------------------|-----------------|-----------------|---------------|-------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|----------------------|
| Post-Install Rock Protection | Rock Dumping Vessel (Fall Pipe Vessel) | Main Engine (Transit)          | 8            | 4 x 3350kW<br>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<br>4 x 2000kW   | 21,400          | 1 & 2 main      |               | 0                       | 250                        | 0                            | 10                           | 0                     | 5                          | 24                  | 120                     | 120                   | 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                     | 5                          | 24                  | 120                     | 120                   | 3A                   |
| <b>WTG Installation</b>      |  |                                |              |                            |                 |                 |               |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| WTG Installation Vessel      | Jackup Vessel                          | Main Engine (Transit)          | 7            | 4 x 3,535kW<br>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<br>3 x 2,650kW | 22,090          | 3 main          |               | 0                       | 91                         | 0                            | 10                           | 0                     | 876                        | 24                  | 21,024                  | 21,024                | 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                     | 876                        | 24                  | 21,024                  | 21,024                | 7A                   |
| Barge 1                      | Barge                                  | Main Engine (Transit)          | 0            | 0                          | 0               | 1 & 2 main      | NJWP          | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 2M                   |
|                              |  | Main Engine (Maneuvering)      | 0            | 0                          | 0               | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 2M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 50                         | 50              | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 2A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 50                         | 50              | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 2A                   |
| Barge 2                      | Barge                                  | Main Engine (Transit)          | 0            | 0                          | 0               | 1 & 2 main      | NJWP          | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 2M                   |
|                              |  | Main Engine (Maneuvering)      | 0            | 0                          | 0               | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 2M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 50                         | 50              | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 2A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 50                         | 50              | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 2A                   |
| Motion Compensation 1        | Motion Compensation                    | Main Engine (Transit)          | 1            | 500                        | 500             | Tier 3 Non-Road | NJWP          | 0                       | 91                         | 0                            | 0                            | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 17                   |
| Motion Compensation 2        | Motion Compensation                    | Main Engine (Transit)          | 1            | 500                        | 500             | Tier 3 Non-Road | NJWP          | 0                       | 91                         | 0                            | 0                            | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 17                   |
| Towing Tug 1                 | Tug                                    | Main Engine (Transit)          | 2            | 2,525                      | 5,050           | 1 & 2 main      | NJWP          | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                      | 5,050           | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11A                  |
| Towing Tug 2                 | Tug                                    | Main Engine (Transit)          | 2            | 2,525                      | 5,050           | 1 & 2 main      | NJWP          | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                      | 5,050           | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11A                  |
| 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                     | 404                        | 24                  | 9,696                   | 9,696                 | 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                     | 404                        | 24                  | 9,696                   | 9,696                 | 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                     | 404                        | 24                  | 9,696                   | 9,696                 | 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                     | 404                        | 24                  | 9,696                   | 9,696                 | 7A                   |
| Crew Transfer                | Crew Transfer Vessel                   | Main Engine (Transit)          | 4            | 522                        | 2,088           | 1 & 2 main      | Atlantic City | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 4M                   |
|                              |  | Main Engine (Maneuvering)      | 4            | 522                        | 2,088           | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 404                        | 24                  | 9,696                   | 9,696                 | 4M                   |
|                              |  | Auxiliary Engine (Transit)     | 2            | 27                         | 54              | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 4A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 2            | 27                         | 54              | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 404                        | 24                  | 9,696                   | 9,696                 | 4A                   |
| US Harbor Tug                | Tug                                    | Main Engine (Transit)          | 2            | 2,525                      | 5,050           | 1 & 2 main      | NJWP          | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                      | 5,050           | 1 & 2 main      |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 100                     | 91                         | 18,249                       | 10                           | 1,825                 | 0                          | 0                   | 0                       | 1,825                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                         | 236             | 1 & 2 auxiliary |               | 0                       | 91                         | 0                            | 10                           | 0                     | 115                        | 24                  | 2,760                   | 2,760                 | 11A                  |
| 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                     | 1,146                      | 24                  | 27,504                  | 27,504                | 3M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 800                        | 800             | 1 & 2 auxiliary |               | 1</                     |                            |                              |                              |                       |                            |                     |                         |                       |                      |

| Activity                     | Representative Vessel Type             | Engine Type                    | Engine Count | Engine Size (kW)         | Total Size (kW) | Engine Category | Home Port | Vessel 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 |
|------------------------------|--|--------------------------------|--------------|--------------------------|-----------------|-----------------|-----------|-------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|----------------------|
| Support and Jointing Vessel  |  | Main Engine (Transit)          | 3            | 2 x 2350kW<br>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<br>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 |           | 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                     | 70                         | 24                  | 1,680                   | 1,680                 | 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                     | 253                        | 24                  | 6,072                   | 6,072                 | 5M                   |
|                              |  | Auxiliary Engine (Transit)     | 0            | 0                        | 954             | 1 & 2 auxiliary |           | 1                       | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    | 5A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 0            | 0                        | 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      | 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                     | 103                        | 24                  | 2,472                   | 2,472                 | 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                     | 103                        | 24                  | 2,472                   | 2,472                 | 11A                  |
| Post-Install Rock Protection | Rock Dumping Vessel (Fall Pipe Vessel) | Main Engine (Transit)          | 8            | 4 x 3350kW<br>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<br>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 |           | 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                     | 6                          | 24                  | 144                     | 144                   | 3A                   |
| <b>Fuel Bunkering</b>        |  |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| Towing Tug                   | Tug                                    | Main Engine (Transit)          | 2            | 2,525                    | 5,050           | 1 & 2 main      | NJWP      | 72                      | 91                         | 13,139                       | 10                           | 1,314                 | 0                          | 0                   | 0                       | 1,314                 | 11M                  |
|                              |  | Main Engine (Maneuvering)      | 2            | 2,525                    | 5,050           | 1 & 2 main      |           | 0                       | 91                         | 0                            | 10                           | 0                     | 1,040                      | 24                  | 24,966                  | 24,966                | 11M                  |
|                              |  | Auxiliary Engine (Transit)     | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 72                      | 91                         | 13,139                       | 10                           | 1,314                 | 0                          | 0                   | 0                       | 1,314                 | 11A                  |
|                              |  | Auxiliary Engine (Maneuvering) | 3            | 79                       | 236             | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 10                           | 0                     | 1,040                      | 24                  | 24,966                  | 24,966                | 11A                  |
| Barge                        | Barge                                  | Main Engine (Transit)          | 0            | 0                        | 0               | 1 & 2 main      | NJWP      | 72                      | 91                         | 13,139                       | 10                           | 1,314                 | 0                          | 0                   | 0                       | 1,314                 | 2M                   |
|                              |  | Main Engine (Maneuvering)      | 0            | 0                        | 0               | 1 & 2 main      |           | 0                       | 91                         | 0                            | 10                           | 0                     | 1,040                      | 24                  | 24,966                  | 24,966                | 2M                   |
|                              |  | Auxiliary Engine (Transit)     | 1            | 50                       | 50              | 1 & 2 auxiliary |           | 72                      | 91                         | 13,139                       | 10                           | 1,314                 | 0                          | 0                   | 0                       | 1,314                 | 2A                   |
|                              |  | Auxiliary Engine (Maneuvering) | 1            | 50                       | 50              | 1 & 2 auxiliary |           | 0                       | 91                         | 0                            | 10                           | 0                     | 1,040                      | 24                  | 24,966                  | 24,966                | 2A                   |
| Motion Compensation          | Motion Compensation                    | Motion Compensation Engine     | 1            | 500                      | 500             | Tier 3 Non-Road | NJWP      | 0                       | 91                         | 0                            | 0                            | 0                     | 1,040                      | 24                  | 24,966                  | 24,966                | 17                   |
| <b>Stationary Generators</b> |  |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| OSS Commissioning Generators | Generator                              | Tier 4 Generator               | 4            | 500                      | 2,000           | Tier 4 Non-Road | N/A       | 0                       | 0                          | 0                            | 0                            | 0                     | 28                         | 12                  | 336                     | 336                   | 30                   |
| <b>Miscellaneous</b>         |  |                                |              |                          |                 |                 |           |                         |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| 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  | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |  |  |  |
| <b>Emissions During Construction</b>          |                            |                                |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |  |  |  |
| <b>Foundation Installation (FOU)</b>          |                            |                                |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |  |  |  |
| Bulk Carrier                                  | Bulk Carrier               | Main Engine (Transit)          | 0.83        | 351,037                | 57.52            | 1.04  | 13.95  | 1.95  | 1.89  | 0.17 | 3,927.36  | 0.02 | 0.19 | 0.61        | 56.29       | 3,984.26  |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 515,002                | 84.38            | 1.52  | 20.47  | 2.86  | 2.77  | 0.25 | 5,761.79  | 0.04 | 0.28 | 0.89        | 82.58       | 5,845.26  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.10        | 19,005                 | 3.44             | 0.05  | 0.82   | 0.11  | 0.10  | 0.00 | 213.82    | 0.00 | 0.01 | 0.03        | 3.05        | 216.90    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.10        | 115,710                | 20.95            | 0.28  | 4.98   | 0.64  | 0.62  | 0.01 | 1,301.82  | 0.01 | 0.06 | 0.20        | 18.55       | 1,320.58  |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| Tug   | Tug                        | Main Engine (Transit)          | 0.83        | 3,238,382              | 535.10           | 10.12 | 128.72 | 18.55 | 17.99 | 1.85 | 36,178.94 | 0.22 | 1.74 | 5.62        | 519.25      | 36,703.81 |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 157,020                | 25.95            | 0.49  | 6.24   | 0.90  | 0.87  | 0.09 | 1,754.22  | 0.01 | 0.08 | 0.27        | 25.18       | 1,779.67  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.43        | 78,406                 | 13.74            | 0.19  | 3.37   | 0.44  | 0.42  | 0.01 | 882.12    | 0.01 | 0.04 | 0.14        | 12.57       | 894.83    |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.43        | 15,777                 | 2.77             | 0.04  | 0.68   | 0.09  | 0.08  | 0.00 | 177.50    | 0.00 | 0.01 | 0.03        | 2.53        | 180.06    |  |  |  |
| SOV   | Service Operation Vessel   | Main Engine (Transit)          | 0.16        | 4,917                  | 0.81             | 0.02  | 0.19   | 0.03  | 0.03  | 0.01 | 54.19     | 0.00 | 0.00 | 0.01        | 0.79        | 54.99     |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.10        | 73,912                 | 12.17            | 0.32  | 2.82   | 0.44  | 0.42  | 0.11 | 814.65    | 0.01 | 0.04 | 0.13        | 11.85       | 826.63    |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.16        | 819                    | 0.14             | 0.00  | 0.04   | 0.00  | 0.00  | 0.00 | 9.22      | 0.00 | 0.00 | 0.00        | 0.13        | 9.35      |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.10        | 12,319                 | 2.11             | 0.03  | 0.53   | 0.07  | 0.07  | 0.00 | 138.59    | 0.00 | 0.01 | 0.02        | 1.98        | 140.59    |  |  |  |
| <b>Offshore Substation Installation (OSS)</b> |                            |                                |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |  |  |  |
| Large HLV                                     | Large HLV                  | Main Engine (Transit)          | 0.83        | 61,723                 | 14.58            | 0.67  | 1.50   | 0.48  | 0.45  | 0.39 | 630.90    | 0.00 | 0.03 | 0.11        | 9.90        | 640.90    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 176,046                | 41.59            | 1.93  | 4.28   | 1.38  | 1.28  | 1.11 | 1,799.45  | 0.01 | 0.09 | 0.31        | 28.23       | 1,827.98  |  |  |  |
|   |                            | Auxiliary Engine (Transit)     | 0.56        | 3,786                  | 0.83             | 0.01  | 0.16   | 0.02  | 0.02  | 0.00 | 42.59     | 0.00 | 0.00 | 0.01        | 0.61        | 43.21     |  |  |  |
|   |                            | Auxiliary Engine (Maneuvering) | 0.56        | 44,812                 | 9.78             | 0.11  | 1.93   | 0.25  | 0.24  | 0.00 | 504.16    | 0.00 | 0.02 | 0.08        | 7.19        | 511.43    |  |  |  |
| Medium HLV                                    | Medium HLV                 | Main Engine (Transit)          | 0.83        | 24,009                 | 5.67             | 0.26  | 0.58   | 0.19  | 0.18  | 0.15 | 245.41    | 0.00 | 0.01 | 0.04        | 3.85        | 249.30    |  |  |  |
|   |                            | Main Engine (Maneuvering)      | 0.20        | 68,480                 | 16.18            | 0.75  | 1.66   | 0.53  | 0.50  | 0.43 | 699.96    | 0.00 | 0.04 | 0.12        | 10.98       | 711.06    |  |  |  |
|   |                            |                                |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |  |  |  |

| Activity                | Representative Vessel Type     | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |      |      |      |       |        |        |      |      |             |             |        |
|-------------------------|--------------------------------|--------------------------------|-------------|------------------------|------------------|------|------|------|-------|--------|--------|------|------|-------------|-------------|--------|
|                         |                                |                                |             |                        | NOx              | VOC  | CO   | PM10 | PM2.5 | SO2    | 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   | 325.61 | 0.00 | 0.02 | 0.05        | 4.67        | 330.33 |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61 | 0.09 | 0.09  | 0.01   | 171.98 | 0.00 | 0.01 | 0.03        | 2.47        | 174.48 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03 | 0.00 | 0.00  | 0.00   | 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   | 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   | 325.61 | 0.00 | 0.02 | 0.05        | 4.67        | 330.33 |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61 | 0.09 | 0.09  | 0.01   | 171.98 | 0.00 | 0.01 | 0.03        | 2.47        | 174.48 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03 | 0.00 | 0.00  | 0.00   | 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   | 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   | 325.61 | 0.00 | 0.02 | 0.05        | 4.67        | 330.33 |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 15,394                 | 2.54             | 0.05 | 0.61 | 0.09 | 0.09  | 0.01   | 171.98 | 0.00 | 0.01 | 0.03        | 2.47        | 174.48 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 706                    | 0.12             | 0.00 | 0.03 | 0.00 | 0.00  | 0.00   | 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   | 17.40  | 0.00 | 0.00 | 0.00        | 0.25        | 17.65  |
| Non-US Assistance Tug 1 | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 0.83        | 14,575                 | 2.41             | 0.05 | 0.58 | 0.08 | 0.08  | 0.01   | 162.83 | 0.00 | 0.01 | 0.03        | 2.34        | 165.19 |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 16,858                 | 2.79             | 0.05 | 0.67 | 0.10 | 0.09  | 0.01   | 188.33 | 0.00 | 0.01 | 0.03        | 2.70        | 191.07 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 7,551                  | 1.32             | 0.02 | 0.33 | 0.04 | 0.04  | 0.00   | 84.95  | 0.00 | 0.00 | 0.01        | 1.21        | 86.18  |
|                         |                                | Auxiliary Engine (Maneuvering) | 0.43        | 36,244                 | 6.35             | 0.09 | 1.56 | 0.20 | 0.20  | 0.00   | 407.77 | 0.00 | 0.02 | 0.06        | 5.81        | 413.65 |
| Non-US Assistance Tug 2 | Non-US Assistance / Towing Tug | Main Engine (Transit)          | 0.83        | 14,575                 | 2.41             | 0.05 | 0.58 | 0.08 | 0.08  | 0.01   | 162.83 | 0.00 | 0.01 | 0.03        | 2.34        | 165.19 |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 16,858                 | 2.79             | 0.05 | 0.67 | 0.10 | 0.09  | 0.01   | 188.33 | 0.00 | 0.01 | 0.03        | 2.70        | 191.07 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 7,551                  | 1.32             | 0.02 | 0.33 | 0.04 | 0.04  | 0.00   | 84.95  | 0.00 | 0.00 | 0.01        | 1.21        | 86.18  |
|                         |                                | Auxiliary Engine (Maneuvering) | 0.43        | 36,244                 | 6.35             | 0.09 | 1.56 | 0.20 | 0.20  | 0.00   | 407.77 | 0.00 | 0.02 | 0.06        | 5.81        | 413.65 |
|                         | Crew Transfer Vessel           | Main Engine (Transit)          | 0.83        | 940                    | 0.15             | 0.00 | 0.04 | 0.01 | 0.00  | 0.00   | 10.57  | 0.00 | 0.00 | 0.00        | 0.15        | 10.72  |
|                         |                                | Main Engine (Maneuvering)      | 0.20        | 17,822                 | 2.83             | 0.04 | 0.71 | 0.10 | 0.09  | 0.00   | 200.50 | 0.00 | 0.01 | 0.03        | 2.86        | 203.39 |
|                         |                                | Auxiliary Engine (Transit)     | 0.43        | 13                     | 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) | 0.43        | 991                    | 0.18             | 0.00 | 0.04 | 0.01 | 0.01  | 0.00   | 11.15  | 0.00 | 0.00 | 0.00        | 0.16        | 11.31  |
| Bubble Curtain Power    | Air Compressor                 | 1.00                           | 51,300      | 3.17                   | 0.40             | 2.77 | 0.16 | 0.16 | 0.01  | 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  | 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 | 621.66   | 0.00 | 0.03 | 0.10 | 9.04  | 630.80   |
|  |                  | Main Engine (Maneuvering)      | 0.20 | 600,172 | 98.86 | 2.60 | 22.92 | 3.54 | 3.44 | 0.89 | 6,615.07 | 0.04 | 0.32 | 1.04 | 96.23 | 6,712.35 |
|  |                  | Auxiliary Engine (Transit)     | 0.56 | 5,246   | 0.90  | 0.01 | 0.23  | 0.03 | 0.03 | 0.00 | 59.02    | 0.00 | 0.00 | 0.01 | 0.84  | 59.87    |
|  |                  | Auxiliary Engine (Maneuvering) | 0.56 | 231,655 | 39.77 | 0.56 | 9.97  | 1.29 | 1.25 | 0.02 | 2,606.29 | 0.02 | 0.12 | 0.40 | 37.14 | 2,643.83 |
|  | US Dredger       | Main Engine (Transit)          | 0.83 | 1,234   | 0.21  | 0.01 | 0.05  | 0.01 | 0.01 | 0.00 | 13.50    | 0.00 | 0.00 | 0.00 | 0.20  | 13.70    |
|  |                  | Main Engine (Maneuvering)      | 0.20 | 22,677  | 3.78  | 0.11 | 0.84  | 0.14 | 0.13 | 0.04 | 248.22   | 0.00 | 0.01 | 0.04 | 3.64  | 251.89   |
|  |                  | Auxiliary Engine (Transit)     | 0.56 | 619     | 0.11  | 0.00 | 0.03  | 0.00 | 0.00 | 0.00 | 6.97     | 0.00 | 0.00 | 0.00 | 0.10  | 7.07     |
|  |                  | Auxiliary Engine (Maneuvering) | 0.56 | 47,254  | 8.08  | 0.11 | 2.03  | 0.26 | 0.25 | 0.00 | 531.64   | 0.00 | 0.03 | 0.08 | 7.58  | 539.30   |

#### Inter Array Cable Installation

|  |                           |                            |      |           |        |      |       |      |      |      |           |      |      |      |        |           |
|--|---------------------------|----------------------------|------|-----------|--------|------|-------|------|------|------|-----------|------|------|------|--------|-----------|
|  | Cable Installation Vessel | Main Engine (Transit)      | 0.83 | 24,596    | 4.05   | 0.11 | 0.94  | 0.15 | 0.14 | 0.04 | 271.09    | 0.00 | 0.01 | 0.04 | 3.94   | 275.08    |
|  |                           | Main Engine (Maneuvering)  | 0.20 | 1,126,534 | 185.56 | 4.89 | 43.02 | 6.65 | 6.45 | 1.66 | 12,416.60 | 0.08 | 0.61 | 1.96 | 180.63 | 12,599.19 |
|  |                           | Auxiliary Engine (Transit) | 0.56 | 2,546     | 0.44   | 0.01 | 0.11  | 0.01 | 0.01 | 0.00 |           |      |      |      |        |           |

| Activity                     | Representative Vessel Type             | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |       |        |       |       |      |           |      |      |             |             |           |
|------------------------------|--|--------------------------------|-------------|------------------------|------------------|-------|--------|-------|-------|------|-----------|------|------|-------------|-------------|-----------|
|                              |  |                                |             |                        | NOx              | VOC   | CO     | PM10  | PM2.5 | SO2  | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| 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 | 621.66    | 0.00 | 0.03 | 0.10        | 9.04        | 630.80    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 32,618                 | 5.37             | 0.14  | 1.25   | 0.19  | 0.19  | 0.05 | 359.51    | 0.00 | 0.02 | 0.06        | 5.23        | 364.80    |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 5,246                  | 0.90             | 0.01  | 0.23   | 0.03  | 0.03  | 0.00 | 59.02     | 0.00 | 0.00 | 0.01        | 0.84        | 59.87     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 12,590                 | 2.16             | 0.03  | 0.54   | 0.07  | 0.07  | 0.00 | 141.65    | 0.00 | 0.01 | 0.02        | 2.02        | 143.69    |
| <b>WTG Installation</b>      |  |                                |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |
| WTG Installation Vessel      | Jackup Vessel                          | Main Engine (Transit)          | 0.83        | 19,220                 | 3.70             | 0.05  | 0.85   | 0.11  | 0.11  | 0.00 | 238.65    | 0.00 | 0.01 | 0.04        | 3.41        | 242.09    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 5,335,667              | 1,026.94         | 14.33 | 235.49 | 31.74 | 30.72 | 1.33 | 66,252.66 | 0.41 | 3.17 | 10.24       | 945.85      | 67,208.75 |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 1,321                  | 0.26             | 0.00  | 0.06   | 0.01  | 0.01  | 0.00 | 14.86     | 0.00 | 0.00 | 0.00        | 0.21        | 15.07     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 1,521,468              | 305.01           | 3.70  | 65.49  | 8.45  | 8.19  | 0.16 | 17,117.60 | 0.11 | 0.82 | 2.64        | 243.96      | 17,364.20 |
| 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      |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 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      |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 2,492                  | 0.54             | 0.01  | 0.11   | 0.01  | 0.01  | 0.00 | 28.03     | 0.00 | 0.00 | 0.00        | 0.40        | 28.44     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 3,769                  | 0.82             | 0.01  | 0.16   | 0.02  | 0.02  | 0.00 | 42.40     | 0.00 | 0.00 | 0.01        | 0.60        | 43.01     |
| 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      |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 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      |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 2,492                  | 0.54             | 0.01  | 0.11   | 0.01  | 0.01  | 0.00 | 28.03     | 0.00 | 0.00 | 0.00        | 0.40        | 28.44     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 3,769                  | 0.82             | 0.01  | 0.16   | 0.02  | 0.02  | 0.00 | 42.40     | 0.00 | 0.00 | 0.01        | 0.60        | 43.01     |
| Motion Compensation 1        | Motion Compensation                    | Main Engine (Transit)          | 1.00        | 98,571                 | 6.08             | 0.75  | 5.32   | 0.30  | 0.30  | 0.01 | 1,125.07  | 0.05 | 0.01 | 1.14        | 2.72        | 1,128.93  |
| Motion Compensation 2        | Motion Compensation                    | Main Engine (Transit)          | 1.00        | 98,571                 | 6.08             | 0.75  | 5.32   | 0.30  | 0.30  | 0.01 | 1,125.07  | 0.05 | 0.01 | 1.14        | 2.72        | 1,128.93  |
| Towing Tug 1                 | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52  | 19.31  | 2.78  | 2.70  | 0.28 | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55  | 7.04   | 1.01  | 0.98  | 0.10 | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 11,761                 | 2.06             | 0.03  | 0.51   | 0.07  | 0.06  | 0.00 | 132.32    | 0.00 | 0.01 | 0.02        | 1.89        | 134.22    |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 17,788                 | 3.12             | 0.04  | 0.77   | 0.10  | 0.10  | 0.00 | 200.13    | 0.00 | 0.01 | 0.03        | 2.85        | 203.01    |
| Towing Tug 2                 | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52  | 19.31  | 2.78  | 2.70  | 0.28 | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55  | 7.04   | 1.01  | 0.98  | 0.10 | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 11,761                 | 2.06             | 0.03  | 0.51   | 0.07  | 0.06  | 0.00 | 132.32    | 0.00 | 0.01 | 0.02        | 1.89        | 134.22    |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 17,788                 | 3.12             | 0.04  | 0.77   | 0.10  | 0.10  | 0.00 | 200.13    | 0.00 | 0.01 | 0.03        | 2.85        | 203.01    |
| 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 | 5,401.79  | 0.03 | 0.26 | 0.83        | 77.12       | 5,479.74  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 556,981                | 107.20           | 1.50  | 24.58  | 3.31  | 3.21  | 0.14 | 6,916.00  | 0.04 | 0.33 | 1.07        | 98.74       | 7,015.80  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 124,586                | 24.98            | 0.30  | 5.36   | 0.69  | 0.67  | 0.01 | 1,401.68  | 0.01 | 0.07 | 0.22        | 19.98       | 1,421.87  |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 661,964                | 132.71           | 1.61  | 28.49  | 3.68  | 3.56  | 0.07 | 7,447.57  | 0.05 | 0.36 | 1.15        | 106.14      | 7,554.86  |
| 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 | 5,401.79  | 0.03 | 0.26 | 0.83        | 77.12       | 5,479.74  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 556,981                | 107.20           | 1.50  | 24.58  | 3.31  | 3.21  | 0.14 | 6,916.00  | 0.04 | 0.33 | 1.07        | 98.74       | 7,015.80  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 124,586                | 24.98            | 0.30  | 5.36   | 0.69  | 0.67  | 0.01 | 1,401.68  | 0.01 | 0.07 | 0.22        | 19.98       | 1,421.87  |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 661,964                | 132.71           | 1.61  | 28.49  | 3.68  | 3.56  | 0.07 | 7,447.57  | 0.05 | 0.36 | 1.15        | 106.14      | 7,554.86  |
| Crew Transfer                | Crew Transfer Vessel                   | Main Engine (Transit)          | 0.83        | 29,397                 | 4.67             | 0.07  | 1.17   | 0.16  | 0.15  | 0.00 | 330.71    | 0.00 | 0.02 | 0.05        | 4.71        | 335.48    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 557,571                | 88.55            | 1.35  | 22.26  | 3.00  | 2.90  | 0.06 | 6,272.69  | 0.04 | 0.30 | 0.97        | 89.40       | 6,363.06  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 394                    | 0.07             | 0.00  | 0.02   | 0.00  | 0.00  | 0.00 | 4.43      | 0.00 | 0.00 | 0.06        | 4.50        |           |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 31,003                 | 5.59             | 0.08  | 1.33   | 0.17  | 0.17  | 0.00 | 348.81    | 0.00 | 0.02 | 0.05        | 4.97        | 353.84    |
| US Harbor Tug                | Tug                                    | Main Engine (Transit)          | 0.83        | 485,757                | 80.27            | 1.52  | 19.31  | 2.78  | 2.70  | 0.28 | 5,426.84  | 0.03 | 0.26 | 0.84        | 77.89       | 5,505.57  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 177,033                | 29.25            | 0.55  | 7.04   | 1.01  | 0.98  | 0.10 | 1,977.79  | 0.01 | 0.10 | 0.31        | 28.39       | 2,006.49  |
|                              |  | Aux                            |             |                        |                  |       |        |       |       |      |           |      |      |             |             |           |

| Activity                     | Representative Vessel Type             | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |       |         |       |       |      |           |      |      |             |             |           |
|------------------------------|--|--------------------------------|-------------|------------------------|------------------|-------|---------|-------|-------|------|-----------|------|------|-------------|-------------|-----------|
|                              |  |                                |             |                        | NOx              | VOC   | CO      | PM10  | PM2.5 | SO2  | CO2       | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e      |
| Support and Jointing Vessel  |  | Main Engine (Transit)          | 0.83        | 6,239                  | 1.03             | 0.03  | 0.24    | 0.04  | 0.04  | 0.01 | 68.77     | 0.00 | 0.00 | 0.01        | 1.00        | 69.78     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 138,404                | 22.80            | 0.60  | 5.28    | 0.82  | 0.79  | 0.20 | 1,525.48  | 0.01 | 0.07 | 0.24        | 22.19       | 1,547.92  |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 1,290                  | 0.22             | 0.00  | 0.06    | 0.01  | 0.01  | 0.00 | 14.52     | 0.00 | 0.00 | 0.00        | 0.21        | 14.73     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 118,781                | 20.39            | 0.29  | 5.11    | 0.66  | 0.64  | 0.01 | 1,336.37  | 0.01 | 0.06 | 0.21        | 19.05       | 1,355.62  |
| TSHD                         | Dredger                                | Main Engine (Transit)          | 0.83        | 1,234                  | 0.21             | 0.01  | 0.05    | 0.01  | 0.01  | 0.00 | 13.50     | 0.00 | 0.00 | 0.00        | 0.20        | 13.70     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 98,921                 | 16.48            | 0.48  | 3.66    | 0.62  | 0.58  | 0.19 | 1,082.75  | 0.01 | 0.05 | 0.17        | 15.86       | 1,098.78  |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 619                    | 0.11             | 0.00  | 0.03    | 0.00  | 0.00  | 0.00 | 6.97      | 0.00 | 0.00 | 0.00        | 0.10        | 7.07      |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 206,123                | 35.24            | 0.50  | 8.87    | 1.14  | 1.11  | 0.02 | 2,319.03  | 0.01 | 0.11 | 0.36        | 33.05       | 2,352.44  |
| AHTS                         | Tug                                    | Main Engine (Transit)          | 0.83        | 8,657                  | 1.43             | 0.03  | 0.34    | 0.05  | 0.05  | 0.00 | 96.72     | 0.00 | 0.00 | 0.02        | 1.39        | 98.12     |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 282,588                | 46.69            | 0.88  | 11.23   | 1.62  | 1.57  | 0.16 | 3,157.05  | 0.02 | 0.15 | 0.49        | 45.31       | 3,202.85  |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 409                    | 0.07             | 0.00  | 0.02    | 0.00  | 0.00  | 0.00 | 4.60      | 0.00 | 0.00 | 0.00        | 0.07        | 4.66      |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 55,356                 | 9.70             | 0.13  | 2.38    | 0.31  | 0.30  | 0.01 | 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        | 56,402                 | 9.29             | 0.24  | 2.15    | 0.33  | 0.32  | 0.08 | 621.66    | 0.00 | 0.03 | 0.10        | 9.04        | 630.80    |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 39,142                 | 6.45             | 0.17  | 1.49    | 0.23  | 0.22  | 0.06 | 431.42    | 0.00 | 0.02 | 0.07        | 6.28        | 437.76    |
|                              |  | Auxiliary Engine (Transit)     | 0.56        | 5,246                  | 0.90             | 0.01  | 0.23    | 0.03  | 0.03  | 0.00 | 59.02     | 0.00 | 0.00 | 0.01        | 0.84        | 59.87     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.56        | 15,108                 | 2.59             | 0.04  | 0.65    | 0.08  | 0.08  | 0.00 | 169.98    | 0.00 | 0.01 | 0.03        | 2.42        | 172.42    |
| <b>Fuel Bunkering</b>        |  |                                |             |                        |                  |       |         |       |       |      |           |      |      |             |             |           |
| Towing Tug                   | Tug                                    | Main Engine (Transit)          | 0.83        | 349,745                | 57.79            | 1.09  | 13.90   | 2.00  | 1.94  | 0.20 | 3,907.33  | 0.02 | 0.19 | 0.61        | 56.08       | 3,964.01  |
|                              |  | Main Engine (Maneuvering)      | 0.20        | 1,601,382              | 264.61           | 5.00  | 63.65   | 9.17  | 8.89  | 0.92 | 17,890.51 | 0.11 | 0.86 | 2.78        | 256.77      | 18,150.06 |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 8,468                  | 1.48             | 0.02  | 0.36    | 0.05  | 0.05  | 0.00 | 95.27     | 0.00 | 0.00 | 0.01        | 1.36        | 96.64     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 160,903                | 28.21            | 0.39  | 6.93    | 0.89  | 0.87  | 0.02 | 1,810.28  | 0.01 | 0.09 | 0.28        | 25.80       | 1,836.35  |
| Barge                        | Barge                                  | Main Engine (Transit)          | 0.83        | 0                      | 0.00             | 0.00  | 0.00    | 0.00  | 0.00  | 0.00 | 0.00      | 0.00 | 0.00 | 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 | 0.00 | 0.00        | 0.00        | 0.00      |
|                              |  | Auxiliary Engine (Transit)     | 0.43        | 1,794                  | 0.39             | 0.00  | 0.08    | 0.01  | 0.01  | 0.00 | 20.18     | 0.00 | 0.00 | 0.00        | 0.29        | 20.47     |
|                              |  | Auxiliary Engine (Maneuvering) | 0.43        | 34,090                 | 7.44             | 0.08  | 1.47    | 0.19  | 0.18  | 0.00 | 383.53    | 0.00 | 0.02 | 0.06        | 5.47        | 389.06    |
| Motion Compensation          | Motion Compensation                    | Motion Compensation Engine     | 1.00        | 891,647                | 55.04            | 6.81  | 48.16   | 2.75  | 2.75  | 0.09 | 10,177.00 | 0.41 | 0.08 | 10.32       | 24.60       | 10,211.92 |
| <b>Stationary Generators</b> |  |                                |             |                        |                  |       |         |       |       |      |           |      |      |             |             |           |
| OSS Commissioning Generators | Generator                              | Tier 4 Generator               | 0.50        | 24,000                 | 0.25             | 0.07  | 1.30    | 0.01  | 0.01  | 0.00 | 273.93    | 0.01 | 0.00 | 0.28        | 0.66        | 274.87    |
| <b>Miscellaneous</b>         |  |                                |             |                        |                  |       |         |       |       |      |           |      |      |             |             |           |
| 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       |
| Fuel Evaporation             | N/A                                    | N/A                            | N/A         | N/A                    | N/A              | 0.34  | N/A     | N/A   | N/A   | N/A  | N/A       | N/A  | N/A  | N/A         | N/A         | N/A       |
| <b>Total</b>                 |  |                                |             | 49,099,570             | 8,355.9          | 160.3 | 2,012.0 | 279.7 | 271.1 | 28.4 | 557,429.7 | 3.9  | 26.3 | 98.1        | 7,840.9     | 565,368.7 |

| <b>B02:</b>                            | <b>Europe</b> | <b>NJWP</b> | <b>Atlantic City</b> | <b>Paulsboro</b> | <b>Total</b> | <b># of days</b> | <b>Trips per Day</b> |
|--|---------------|-------------|----------------------|------------------|--------------|------------------|----------------------|
| Foundation Installation (FOU)          | 1             | 101         | 169                  | 0                | 271          | 294              | 0.92                 |
| Offshore Substation Installation (OSS) | 2             | 27          | 7                    | 0                | 36           | 143              | 0.25                 |
| Scour Protection                       | 1             | 1           | 0                    | 0                | 2            | 294              | 0.01                 |
| Inter Array Cable Installation         | 5             | 2           | 0                    | 0                | 7            | 396              | 0.02                 |
| WTG Installation                       | 0             | 402         | 219                  | 0                | 621          | 509              | 1.22                 |
| Export Cable Installation              | 1             | 5           | 0                    | 0                | 6            | 142              | 0.04                 |
| Fuel Bunkering                         | 0             | 72          | 0                    | 0                | 72           | 1095             | 0.07                 |
| <b>Total</b>                           | <b>10</b>     | <b>610</b>  | <b>395</b>           | <b>0</b>         | <b>1,015</b> |                  | <b>2.53</b>          |

| <b>B04:</b>                            | <b>Europe</b> | <b>NJWP</b>  | <b>Atlantic City</b> | <b>Paulsboro</b> | <b>Total</b> | <b># of days</b> | <b>Trips per Day</b> |
|--|---------------|--------------|----------------------|------------------|--------------|------------------|----------------------|
| Foundation Installation (FOU)          | 19            | 1,200        | 0                    | 4                | 1,223        | 294              | 4.16                 |
| Offshore Substation Installation (OSS) | 2             | 27           | 7                    | 0                | 36           | 143              | 0.25                 |
| Scour Protection                       | 1             | 1            | 0                    | 0                | 2            | 294              | 0.01                 |
| Inter Array Cable Installation         | 5             | 2            | 0                    | 0                | 7            | 396              | 0.02                 |
| WTG Installation                       | 0             | 402          | 219                  | 0                | 621          | 509              | 1.22                 |
| Export Cable Installation              | 1             | 5            | 0                    | 0                | 6            | 142              | 0.04                 |
| Fuel Bunkering                         | 0             | 72           | 0                    | 0                | 72           | 1095             | 0.07                 |
| <b>Total</b>                           | <b>28</b>     | <b>1,709</b> | <b>226</b>           | <b>4</b>         | <b>1,967</b> |                  | <b>5.76</b>          |

\*This tab counts each trip for Tug + Barge combos as only one grouped trip and does not include trips associated with harbor tugs since they are not full transits to the WTA but instead maneuvering in port

| BOEM Emissions Tool Default Vessel Emissions Factors |                      |             |                          |      |      |      |       |       |        |       |       |
|--|----------------------|-------------|--------------------------|------|------|------|-------|-------|--------|-------|-------|
| EF Ref   | Vessel Type          | Engine type | Emission Factors (g/kWh) |      |      |      |       |       |        |       |       |
|  |                      |             | NOx                      | VOC  | CO   | PM10 | PM2.5 | SO2   | CO2    | CH4   | N2O   |
| 1M   | Anchor Handling Tugs | Main        | 9.26                     | 0.24 | 2.16 | 0.34 | 0.33  | 0.079 | 636.09 | 0.004 | 0.031 |
| 1A   |                      | Auxiliary   | 9.88                     | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 2M   | Barge                | Main        | 13.61                    | 0.63 | 1.40 | 0.45 | 0.42  | 0.362 | 588.90 | 0.004 | 0.031 |
| 2A   |                      | Auxiliary   | 12.57                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 3M   | Cable Laying         | Main        | 9.49                     | 0.25 | 2.20 | 0.34 | 0.33  | 0.085 | 635.02 | 0.004 | 0.031 |
| 3A   |                      | Auxiliary   | 9.89                     | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 4M   | Crew                 | Main        | 9.15                     | 0.14 | 2.30 | 0.31 | 0.30  | 0.006 | 648.16 | 0.004 | 0.031 |
| 4A   |                      | Auxiliary   | 10.39                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 5M   | Dredging             | Main        | 9.60                     | 0.28 | 2.13 | 0.36 | 0.34  | 0.112 | 630.62 | 0.004 | 0.031 |
| 5A   |                      | Auxiliary   | 9.85                     | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 6M   | Ice Breaker          | Main        | 9.92                     | 0.45 | 1.78 | 0.40 | 0.38  | 0.230 | 610.83 | 0.004 | 0.031 |
| 6A   |                      | Auxiliary   | 10.09                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 7M   | Jackup               | Main        | 10.03                    | 0.14 | 2.30 | 0.31 | 0.30  | 0.013 | 647.08 | 0.004 | 0.031 |
| 7A   |                      | Auxiliary   | 11.55                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 8M   | Research / Survey    | Main        | 9.86                     | 0.22 | 2.25 | 0.34 | 0.33  | 0.066 | 638.26 | 0.004 | 0.031 |
| 8A   |                      | Auxiliary   | 10.21                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 9M   | Shuttle Tanker       | Main        | 9.05                     | 0.63 | 1.40 | 0.45 | 0.42  | 0.362 | 588.90 | 0.004 | 0.031 |
| 9A   |                      | Auxiliary   | 9.80                     | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 10M  | Supply Ship          | Main        | 9.44                     | 0.17 | 2.29 | 0.32 | 0.31  | 0.028 | 644.58 | 0.004 | 0.031 |
| 10A  |                      | Auxiliary   | 10.43                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 648.20 | 0.004 | 0.031 |
| 11M  | Tug                  | Main        | 9.52                     | 0.18 | 2.29 | 0.33 | 0.32  | 0.033 | 643.66 | 0.004 | 0.031 |
| 11A  |                      | Auxiliary   | 10.10                    | 0.14 | 2.48 | 0.32 | 0.31  | 0.006 | 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   | CO2     | CH4   | N2O   |
| 12   | Helicopter | Single      | 2.32                     | 1.63 | 1.89 | 0.07 | 0.07  | 0.300 | 956.92  | 0.030 | 0.030 |
| 13   | Helicopter | Twin Light  | 3.14                     | 3.66 | 4.28 | 0.10 | 0.09  | 0.500 | 1589.69 | 0.040 | 0.050 |
| 14   | Helicopter | Twin Medium | 7.22                     | 3.02 | 3.48 | 0.20 | 0.20  | 0.780 | 2459.92 | 0.070 | 0.080 |
| 15   | Helicopter | Twin heavy  | 34.66                    | 2.40 | 2.67 | 0.82 | 0.80  | 2.110 | 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\\_tsds\\_05jul2018.pdf](https://www.epa.gov/sites/production/files/2018-07/documents/nei2014v2_tsds_05jul2018.pdf)

| Emissions Factors for Engines |                             |           |                          |                  |     |      |       |                  |                  |                  |        |
|-------------------------------|-----------------------------|-----------|--------------------------|------------------|-----|------|-------|------------------|------------------|------------------|--------|
| EF Ref                        | Engine                      | Size (kW) | Emission Factors (g/kWh) |                  |     |      |       |                  |                  |                  |        |
|                               |                             |           | NOx <sup>1</sup>         | VOC <sup>2</sup> | CO  | PM10 | PM2.5 | SO2 <sup>3</sup> | CO2 <sup>4</sup> | N2O <sup>4</sup> |        |
| 16                            | Air Compressor Engines      | ~399      | 4                        | 0.5              | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            | 0.0060 |
| 17                            | Motion Compensation Engines | 500       | 4                        | 0.495            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            | 0.0060 |
| 18                            | Cat C18 Acert               | 597       | 6.4                      | 0.8              | 3.5 | 0.2  | 0.2   | 0.0068           | 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           | 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           | 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           | 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           | 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           | 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           | 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           | 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           | 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           | 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           | 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

| Commuting Emissions |                     |          |                          |                  |                 |                   |                    |                  |                  |                  |        |
|---------------------|---------------------|----------|--------------------------|------------------|-----------------|-------------------|--------------------|------------------|------------------|------------------|--------|
| EF Ref              | Engine              | Fuel     | Emission Factors (g/VMT) |                  |                 |                   |                    |                  |                  |                  |        |
|                     |                     |          | NOx <sup>1</sup>         | VOC <sup>1</sup> | CO <sup>1</sup> | PM10 <sup>1</sup> | PM2.5 <sup>1</sup> | SO2 <sup>2</sup> | CO2 <sup>3</sup> | N2O <sup>3</sup> |        |
| 28                  | Light-duty vehicles | Gasoline | 0.289                    | 0.35             | 3.94            | 0.012             | 0.012              | 0.0025           | 393.61           | 0.017            | 0.0034 |
| 29                  | Light-duty trucks   | Gasoline | 0.478                    | 0.421            | 5.66            | 0.014             | 0.014              | 0.0025           | 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-diesel>

2 Based on 10 ppm sulfur in gasoline, 6.07 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 <sup>1</sup>   | 185              | 0.057              |
| Medium-speed Diesel, Marine Diesel Oil <sup>1</sup> | 203              | 0.063              |
| Medium-speed Diesel, Marine Diesel Oil Auxiliary    | 217              | 0.067              |
| Cat. 1 & 2 (main and auxiliary) <sup>2</sup>        | 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) <sup>1</sup>                             | 7.10   |
| Distillate Fuel No. 2 Higher Heating Value (MMBtu/gal) <sup>2</sup>   | 0.138  |
| Distillate Fuel No. 2 CO2 Emission Factor (kg CO2/MMBtu) <sup>2</sup> | 73.96  |
| Cat. 1 & 2 Main Engine CO2 Emission Factor (g/kW*hr) <sup>3</sup>     | 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 <sup>1</sup> |     |
|--|-----|
| Compound                               | GWP |
| CH4                                    | 25  |
| N2O                                    | 298 |

1 Table A-1 of 40 CFR 98

| 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                |

| 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%                    | <b>16%</b>              | 46,000                                | 0.0%                        | 0.0%                             |
| 5 Harbor                                   | 4%                    | 4%                      | 28,000                                | 0.0%                        | 0.0%                             |
| Maneuvering                                |                       |                         | 100.0%                                | <b>10.4%</b>                |                                  |

\*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

| 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) |
| <b>Onshore Substation Installation</b>       |                               |                 |           |                            |     |                              |          |             |                     |                           |                        |
| 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                |
| <b>Horizontal Directional Drilling (HDD)</b> |                               |                 |           |                            |     |                              |          |             |                     |                           |                        |
| 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                 |
| <b>Onshore Duct Bank Installation</b>        |                               |                 |           |                            |     |                              |          |             |                     |                           |                        |
| 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                |
| <b>Onshore Cable Installation</b>            |                               |                 |           |                            |     |                              |          |             |                     |                           |                        |
| 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                  |
| <b>Port Activities</b>                       |                               |                 |           |                            |     |                              |          |             |                     |                           |                        |
| 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        |             |                 |
| <b>Onshore Substation Installation</b>       |                               |                      |             |                        |                           |                |             |             |             |            |            |            |                 |             |             |             |             |                 |
| Crane  | Lift/Set Substation Equipment | 27                   | 0.5         | 66,580                 | 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         | 33,290                 | 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        | 399                    | 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         | 1,997                  | 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         | 799                    | 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         | 2,397                  | 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         | 13,316                 | 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         | 9,987                  | 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         | 19,974                 | 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         | 799                    | 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         | 1,198                  | 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      |             |                 |
| <b>Horizontal Directional Drilling (HDD)</b> |                               |                      |             |                        |                           |                |             |             |             |            |            |            |                 |             |             |             |             |                 |
| Crane  | Setup/Breakdown               | 27                   | 0.5         | 13,316                 | 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        | 666                    | 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         | 9,588                  | 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         | 1,598                  | 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                                    | Auxiliary Power               | 24                   | 0.5         | 3,196                  | 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         | 1,598                  | 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         | 1,598                  | 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       |             |                 |
| <b>Onshore Duct Bank Installation</b>        |                               |                      |             |                        |                           |                |             |             |             |            |            |            |                 |             |             |             |             |                 |
| Crane  | Equipment/Pipe Placement      | 27                   | 0.5         | 53,264                 | 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         | 26,632                 | 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        | 2,663                  | 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         | 13,316                 | 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         | 5,326                  | 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         | 15,979                 | 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         | 15,979                 | 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         | 10,653                 | 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         | 15,979                 | 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      |             |                 |
| <b>Onshore Cable Installation</b>            |                               |                      |             |                        |                           |                |             |             |             |            |            |            |                 |             |             |             |             |                 |
| Winch Truck                                  | Cable install                 | 24                   | 0.5         | 3,728                  | 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         | 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       |             |                 |
| Cable Reel Truck                             | Cable install/delivery        | 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       |             |                 |
| 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        |             |                 |
| <b>Port Activities</b>                       |                               |                      |             |                        |                           |                |             |             |             |            |            |            |                 |             |             |             |             |                 |
| 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      |             |                 |
|  |                               |                      |             |                        | <b>Total</b>              | <b>761,942</b> | <b>90.1</b> | <b>11.5</b> | <b>63.9</b> | <b>3.5</b> | <b>3.5</b> | <b>0.1</b> | <b>12,730.7</b> | <b>0.5</b>  | <b>0.1</b>  | <b>12.9</b> | <b>30.8</b> | <b>12,774.5</b> |
|  |                               |                      |             |                        | <b>Stationary Engines</b> | <b>6,924</b>   | <b>0.9</b>  | <b>0.1</b>  | <b>0.7</b>  | <b>0.0</b> | <b>0.0</b> | <b>0.0</b> | <b>158.1</b>    | <b>0.0</b>  | <b>0.0</b>  | <b>0.2</b>  | <b>0.4</b>  | <b>158.6</b>    |
|  |                               |                      |             |                        | <b>Vehicles</b>           | <b>755,018</b> | <b>89.3</b> | <b>11.4</b> | <b>63.2</b> | <b>3.4</b> | <b>3.4</b> | <b>0.1</b> | <b>12,572.7</b> | <b>0.5</b>  | <b>0.1</b>  | <b>12.8</b> | <b>30.5</b> | <b>12,615.9</b> |

| 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 |
|---|----------------------------|--------------------------------|--------------|------------------|-----------------|-----------------|---------------|-------------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|----------------------|
| <b>Emissions During Operations (CTV Scenario)</b> |                            |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| <b>WTG and BoP Crew logistics</b>                 |                            |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| 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                   |
| <b>WTG heavy logistics / jack-up</b>              |                            |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| 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           | 1 & 2 auxiliary |               | 8                             | 91                         | 1,460                        | 10                           | 146                   | 0                          | 0                   | 0                       | 146                   | 7A                   |
|   |                            | Auxiliary Engine (Maneuvering) | 2            | 1000             | 2,000           | 1 & 2 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                   |
| <b>Cable repair vessel - export cable</b>         |                            |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |                      |
| Cable repair vessel                               | Cable                      |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |                      |

| 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)          | 0            | 0                | 7,280           | 1 & 2 main      | NJWP          | 0.9                           | 91                         | 164                          | 10                           | 16                    | 0                          | 0                   | 0                       | 16                    | 3M                   |
|  |                            | Main Engine (Maneuvering)      | 0            | 0                | 7,280           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 11                         | 24                  | 264                     | 264                   | 3M                   |
|  |                            | Auxiliary Engine (Transit)     | 0            | 0                | 220             | 1 & 2 auxiliary |               | 0.9                           | 91                         | 164                          | 10                           | 16                    | 0                          | 0                   | 0                       | 16                    | 3A                   |
|  |                            | Auxiliary Engine (Maneuvering) | 0            | 0                | 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                     | 0                          | 30                  | 24                      | 720                   | 720                  |
| 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                     | 0                          | 13                  | 24                      | 312                   | 312                  |
| 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           | 1 & 2 auxiliary |               | 0.03                          | 91                         | 6                            | 10                           | 1                     | 0                          | 0                   | 0                       | 1                     | 7A                   |
|  |                            | Auxiliary Engine (Maneuvering) | 1            | 4000             | 4,000           | 1 & 2 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                  | Tier 4 Generator               | 4            | 500              | 2,000           | Tier 4 Non-Road | N/A           | N/A                           | N/A                        | N/A                          | N/A                          | N/A                   | N/A                        | N/A                 | 24                      | 24                    | 30                   |

| Activity  | Representative Vessel Type | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |      |      |      |       |      |        |      |      |             |             |      |
|---|----------------------------|--------------------------------|-------------|------------------------|------------------|------|------|------|-------|------|--------|------|------|-------------|-------------|------|
|   |                            |                                |             |                        | NOx              | VOC  | CO   | PM10 | PM2.5 | SO2  | CO2    | CH4  | N2O  | CH4 as CO2e | N2O as CO2e | CO2e |
| <b>Emissions During Operations (CTV Scenario)</b> |                            |                                |             |                        |                  |      |      |      |       |      |        |      |      |             |             |      |
| 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 3.58   | 0.00 | 0.00 | 0           |             |      |

| Activity                                   | Representative Vessel Type | Engine Type                    | Load Factor | Fuel Consumption (gal) | Emissions (tons) |      |      |      |       |      |        |      |      |             |             |      |
|--|----------------------------|--------------------------------|-------------|------------------------|------------------|------|------|------|-------|------|--------|------|------|-------------|-------------|------|
|  |                            |                                |             |                        | NOx              | VOC  | CO   | PM10 | PM2.5 | SO2  | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 43.80  | 0.00 | 0.00 | 0           | 1           | 44   |
| 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 0.35   | 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 | 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 | 0.63   | 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 | 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 | 0.56   | 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 | 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 | 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 | 205.43 | 0.00 | 0.01 | 0           | 3           | 208  |
|  |                            | Auxiliary Engine (Transit)     | 0.43        | 66                     | 0.01             | 0.00 | 0.00 | 0.00 | 0.00  | 0.00 | 0.75   | 0.00 | 0.00 | 0           | 0           | 1    |
|  |                            | Auxiliary Engine (Maneuvering) | 0.43        | 7,865                  | 1.58             | 0.02 | 0.34 | 0.04 | 0.04  | 0.00 | 88.49  | 0.00 | 0.00 | 0           | 1           | 90   |
| 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         | 377  |
| OSS Generators                             | Generator                  | Tier 4 Generator               | 0.75        | 2,571                  | 0.03             | 0.01 | 0.14 | 0.00 | 0.00  | 0.00 | 29.35  | 0.00 | 0.00 | 0           | 0           | 29   |

|                         |            |           |        |          |        |        |       |            |      |       |        |           |            |  |  |
|-------------------------|------------|-----------|--------|----------|--------|--------|-------|------------|------|-------|--------|-----------|------------|--|--|
| Total/yr                | 2,706,003  | 479.72    | 7.14   | 112.88   | 15.24  | 14.75  | 0.68  | 31,459.37  | 0.20 | 1.51  | 4.89   | 448.91    | 32,290.16  |  |  |
| Total over Project Life | 81,180,081 | 14,391.50 | 214.22 | 3,386.40 | 457.13 | 442.55 | 20.31 | 943,781.10 | 5.87 | 45.19 | 146.65 | 13,467.44 | 968,704.92 |  |  |

| Activity  | Representative Vessel Type | Example Vessel Used | 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 |
|---|----------------------------|---------------------|--------------------------------|--------------|------------------|-----------------|-----------------|---------------|-------------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|
| <b>Emissions During Operations (SOV Scenario)</b> |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| <b>WTG and BoP Crew logistics</b>                 |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| CTV All-Year 1                                    | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4            | 522              | 2,088           | 1 & 2 main      | Atlantic City | 250                           | 17                         | 8,690                        | 20                           | 434                   | 0                          | 0                   | 0                       | 434                   |
|   |                            |                     | Main Engine (Maneuvering)      | 4            | 522              | 2,088           | 1 & 2 main      |               | 0                             | 17                         | 0                            | 0                            | 0                     | 250                        | 12                  | 3,000                   | 3,000                 |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 27               | 54              | 1 & 2 auxiliary |               | 250                           | 17                         | 8,690                        | 20                           | 434                   | 0                          | 0                   | 0                       | 434                   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 27               | 54              | 1 & 2 auxiliary |               | 0                             | 17                         | 0                            | 0                            | 0                     | 250                        | 12                  | 3,000                   | 3,000                 |
| CTV All-Year 2                                    | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4            | 522              | 2,088           | 1 & 2 main      | Atlantic City | 250                           | 17                         | 8,690                        | 20                           | 434                   | 0                          | 0                   | 0                       | 434                   |
|   |                            |                     | Main Engine (Maneuvering)      | 4            | 522              | 2,088           | 1 & 2 main      |               | 0                             | 17                         | 0                            | 0                            | 0                     | 250                        | 12                  | 3,000                   | 3,000                 |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 27               | 54              | 1 & 2 auxiliary |               | 250                           | 17                         | 8,690                        | 20                           | 434                   | 0                          | 0                   | 0                       | 434                   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 27               | 54              | 1 & 2 auxiliary |               | 0                             | 17                         | 0                            | 0                            | 0                     | 250                        | 12                  | 3,000                   | 3,000                 |
| SOV All-Year 1                                    | Service Operation Vessel   | Edda Mistral        | Main Engine (Transit)          | 4            | 2,306            | 9,224           | 1 & 2 main      | Atlantic City | 24                            | 17                         | 834                          | 20                           | 42                    | 0                          | 0                   | 0                       | 42                    |
|   |                            |                     | Main Engine (Maneuvering)      | 4            | 2,306            | 9,224           | 1 & 2 main      |               | 0                             | 17                         | 0                            | 0                            | 0                     | 341                        | 24                  | 8,184                   | 8,184                 |
|   |                            |                     | Auxiliary Engine (Transit)     | 4            | 2,000            | 8,000           | 1 & 2 auxiliary |               | 24                            | 17                         | 834                          | 20                           | 42                    | 0                          | 0                   | 0                       | 42                    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 4            | 2,000            | 8,000           | 1 & 2 auxiliary |               | 0                             | 17                         | 0                            | 0                            | 0                     | 341                        | 24                  | 8,184                   | 8,184                 |
| SOV Daughter Craft 1                              | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4            | 522              | 2,088           | 1 & 2 main      | N/A           | 0                             | 0                          | 0                            | 20                           | 0                     | 0                          | 0                   | 0                       | 0                     |
|   |                            |                     | Main Engine (Maneuvering)      | 4            | 522              | 2,088           | 1 & 2 main      |               | 0                             | 0                          | 0                            | 0                            | 0                     | 220                        | 8                   | 1,760                   | 1,760                 |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 27               | 54              | 1 & 2 auxiliary |               | 0                             | 0                          | 0                            | 20                           | 0                     | 0                          | 0                   | 0                       | 0                     |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 27               | 54              | 1 & 2 auxiliary |               | 0                             | 0                          | 0                            | 0                            | 0                     | 220                        | 8                   | 1,760                   | 1,760                 |
| <b>WTG heavy logistics / jack-up</b>              |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| US Jack-Up  | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 5            | 4000             | 20,000          | 3 main          | NJWP          | 8                             | 91                         | 1,460                        | 10                           | 146                   | 0                          | 0                   | 0                       | 146                   |
|   |                            |                     | Main Engine (Maneuvering)      | 5            | 4000             | 20,000          | 3 main          |               | 0                             | 91                         | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 1            | 4000             | 4,000           | 3 auxiliary     |               | 8                             | 91                         | 1,460                        | 10                           | 146                   | 0                          | 0                   | 0                       | 146                   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 1            | 4000             | 4,000           | 3 auxiliary     |               | 0                             | 91                         | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
| US Feeder Vessel                                  | Feeder/Jack-up             | L/B Robert or Jill  | Main Engine (Transit)          | 2            | 2350             | 4,700           | 3 main          | NJWP          | 8                             | 91                         | 1,460                        | 10                           | 146                   | 0                          | 0                   | 0                       | 146                   |
|   |                            |                     | Main Engine (Maneuvering)      | 2            | 2350             | 4,700           | 3 main          |               | 0                             | 91                         | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 1000             | 2,000           | 1 & 2 auxiliary |               | 8                             | 91                         | 1,460                        | 10                           | 146                   | 0                          | 0                   | 0                       | 146                   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 1000             | 2,000           | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
| European Jack-up                                  | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 5            | 4000             | 20,000          | 3 main          | Europe        | 8                             | 250                        | 4,000                        | 10                           | 400                   | 0                          | 0                   | 0                       | 400                   |
|   |                            |                     | Main Engine (Maneuvering)      | 5            | 4000             | 20,000          | 3 main          |               | 0                             | 250                        | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 1            | 4000             | 4,000           | 3 auxiliary     |               | 8                             | 250                        | 4,000                        | 10                           | 400                   | 0                          | 0                   | 0                       | 400                   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 1            | 4000             | 4,000           | 3 auxiliary     |               | 0                             | 250                        | 0                            | 0                            | 0                     | 40                         | 24                  | 960                     | 960                   |
| <b>Cable repair vessel - export cable</b>         |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Cable repair vessel                               | Cable Lay Vessel           | Boskalis Ndurance   | Main Engine (Transit)          | 0            | 0                | 7,280           | 1 & 2 main      | NJWP          | 0.7                           | 91                         | 128                          | 10                           | 13                    | 0                          | 0                   | 0                       | 13                    |
|   |                            |                     | Main Engine (Maneuvering)      | 0            | 0                | 7,280           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 25                         | 24                  | 600                     | 600                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 0            | 0                | 220             | 1 & 2 auxiliary |               | 0.7                           | 91                         | 128                          | 10                           | 13                    | 0                          | 0                   | 0                       | 13                    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 0            | 0                | 220             | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 25                         | 24                  | 600                     | 600                   |
| <b>Cable repair vessel - array cable</b>          |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Cable repair vessel                               | Cable Lay Vessel           | Boskalis Ndurance   | Main Engine (Transit)          | 0            | 0                | 7,280           | 1 & 2 main      | NJWP          | 0.9                           | 91                         | 164                          | 10                           | 16                    | 0                          | 0                   | 0                       | 16                    |
|   |                            |                     | Main Engine (Maneuvering)      | 0            | 0                | 7,280           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 11                         | 24                  | 264                     | 264                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 0            | 0                | 220             | 1 & 2 auxiliary |               | 0.9                           | 91                         | 164                          | 10                           | 16                    | 0                          | 0                   | 0                       | 16                    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 0            | 0                | 220             | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 11                         | 24                  | 264                     | 264                   |
| <b>Cable survey vessel - export cable</b>         |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Cable survey vessel                               | Survey Vessel              | Danielle Miller     | Main Engine (Transit)          | 2            | 1,900            | 3,800           | 1 & 2 main      | NJWP          | 1                             | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    |
|   |                            |                     | Main Engine (Maneuvering)      | 2            | 1,900            | 3,800           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 30                         | 24                  | 720                     | 720                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 99               | 198             | 1 & 2 auxiliary |               | 1                             | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 99               | 198             | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 30                         | 24                  | 720                     | 720                   |
| <b>Cable survey vessel - array cable</b>          |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Cable survey vessel                               | Survey Vessel              | Danielle Miller     | Main Engine (Transit)          | 2            | 1,900            | 3,800           | 1 & 2 main      | NJWP          | 1                             | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    |
|   |                            |                     | Main Engine (Maneuvering)      | 2            | 1,900            | 3,800           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 13                         | 24                  | 312                     | 312                   |
|   |                            |                     | Auxiliary Engine (Transit)     | 2            | 99               | 198             | 1 & 2 auxiliary |               | 1                             | 91                         | 182                          | 10                           | 18                    | 0                          | 0                   | 0                       | 18                    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 99               | 198             | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 13                         | 24                  | 312                     | 312                   |

| Activity                                   | Representative Vessel Type | Example Vessel Used | 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 |
|--|----------------------------|---------------------|--------------------------------|--------------|------------------|-----------------|-----------------|---------------|-------------------------------|----------------------------|------------------------------|------------------------------|-----------------------|----------------------------|---------------------|-------------------------|-----------------------|
| <b>Foundation below water inspection</b>   |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Vessel for subsea inspection               | Survey Vessel              | Danielle Miller     | Main Engine (Transit)          | 2            | 1,900            | 3,800           | 1 & 2 main      | Atlantic City | 5                             | 17                         | 174                          | 10                           | 17                    | 0                          | 0                   | 0                       | 17                    |
|  |                            |                     | Main Engine (Maneuvering)      | 2            | 1,900            | 3,800           | 1 & 2 main      |               | 0                             | 17                         | 0                            | 0                            | 40                    | 24                         | 960                 | 960                     |                       |
|  |                            |                     | Auxiliary Engine (Transit)     | 2            | 99               | 198             | 1 & 2 auxiliary |               | 5                             | 17                         | 174                          | 10                           | 17                    | 0                          | 0                   | 0                       | 17                    |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 99               | 198             | 1 & 2 auxiliary |               | 0                             | 17                         | 0                            | 0                            | 40                    | 24                         | 960                 | 960                     |                       |
| <b>Other vessels</b>                       |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| Environmental monitoring vessel            | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4            | 522              | 2,088           | 1 & 2 main      | Atlantic City | 12                            | 17                         | 417                          | 20                           | 21                    | 0                          | 0                   | 0                       | 21                    |
|  |                            |                     | Main Engine (Maneuvering)      | 4            | 522              | 2,088           | 1 & 2 main      |               | 0                             | 17                         | 0                            | 0                            | 12                    | 8                          | 96                  | 96                      |                       |
|  |                            |                     | Auxiliary Engine (Transit)     | 2            | 27               | 54              | 1 & 2 auxiliary |               | 12                            | 17                         | 417                          | 20                           | 21                    | 0                          | 0                   | 0                       | 21                    |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 2            | 27               | 54              | 1 & 2 auxiliary |               | 0                             | 17                         | 0                            | 0                            | 12                    | 8                          | 96                  | 96                      |                       |
| SOV campaign (e.g., for retrofit campaign) | Service Operation Vessel   | Edda Mistral        | Main Engine (Transit)          | 4            | 2,306            | 9,224           | 1 & 2 main      | NJWP          | 0.03                          | 91                         | 6                            | 10                           | 1                     | 0                          | 0                   | 0                       | 1                     |
|  |                            |                     | Main Engine (Maneuvering)      | 4            | 2,306            | 9,224           | 1 & 2 main      |               | 0                             | 91                         | 0                            | 0                            | 0                     | 3                          | 24                  | 72                      | 72                    |
|  |                            |                     | Auxiliary Engine (Transit)     | 4            | 2,000            | 8,000           | 1 & 2 auxiliary |               | 0.03                          | 91                         | 6                            | 10                           | 1                     | 0                          | 0                   | 0                       | 1                     |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 4            | 2,000            | 8,000           | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 3                          | 24                  | 72                      | 72                    |
| OSS repair vessel (major repair)           | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 5            | 4000             | 20,000          | 3 main          | NJWP          | 0.03                          | 91                         | 6                            | 10                           | 1                     | 0                          | 0                   | 0                       | 1                     |
|  |                            |                     | Main Engine (Maneuvering)      | 5            | 4000             | 20,000          | 3 main          |               | 0                             | 91                         | 0                            | 0                            | 0                     | 3                          | 24                  | 72                      | 72                    |
|  |                            |                     | Auxiliary Engine (Transit)     | 1            | 4000             | 4,000           | 1 & 2 auxiliary |               | 0.03                          | 91                         | 6                            | 10                           | 1                     | 0                          | 0                   | 0                       | 1                     |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 1            | 4000             | 4,000           | 1 & 2 auxiliary |               | 0                             | 91                         | 0                            | 0                            | 0                     | 3                          | 24                  | 72                      | 72                    |
| <b>Miscellaneous</b>                       |                            |                     |                                |              |                  |                 |                 |               |                               |                            |                              |                              |                       |                            |                     |                         |                       |
| 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                  | Generator           | Tier 4 Generator               | 4            | 500              | 2,000           | Tier 4 Non-Road | N/A           | N/A                           | N/A                        | N/A                          | N/A                          | N/A                   | N/A                        | N/A                 | 24                      | 24                    |

| Activity  | Representative Vessel Type | Example Vessel Used | Engine Type                    | 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     |
| <b>Emissions During Operations (SOV Scenario)</b> |                            |                     |                                |                      |             |                        |                  |      |       |      |       |      |          |      |      |             |             |          |
| WTG and BoP Crew logistics                        |                            |                     |                                |                      |             |                        |                  |      |       |      |       |      |          |      |      |             |             |          |
| CTV All-Year 1                                    | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4M                   | 0.83        | 47,820                 | 7.59             | 0.12 | 1.91  | 0.26 | 0.25  | 0.00 | 537.98   | 0.00 | 0.03 | 0.08        | 7.67        | 545.73   |
|   |                            |                     | Main Engine (Maneuvering)      | 4M                   | 0.20        | 79,562                 | 12.64            | 0.19 | 3.18  | 0.43 | 0.41  | 0.01 | 895.08   | 0.01 | 0.04 | 0.14        | 12.76       | 907.97   |
|   |                            |                     | Auxiliary Engine (Transit)     | 4A                   | 0.43        | 641                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 0.00 | 7.21     | 0.00 | 0.00 | 0.00        | 0.10        | 7.31     |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 4A                   | 0.43        | 4,424                  | 0.80             | 0.01 | 0.19  | 0.02 | 0.02  | 0.00 | 49.77    | 0.00 | 0.00 | 0.01        | 0.71        | 50.49    |
| CTV All-Year 2                                    | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4M                   | 0.83        | 47,820                 | 7.59             | 0.12 | 1.91  | 0.26 | 0.25  | 0.00 | 537.98   | 0.00 | 0.03 | 0.08        | 7.67        | 545.73   |
|   |                            |                     | Main Engine (Maneuvering)      | 4M                   | 0.20        | 79,562                 | 12.64            | 0.19 | 3.18  | 0.43 | 0.41  | 0.01 | 895.08   | 0.01 | 0.04 | 0.14        | 12.76       | 907.97   |
|   |                            |                     | Auxiliary Engine (Transit)     | 4A                   | 0.43        | 641                    | 0.12             | 0.00 | 0.03  | 0.00 | 0.00  | 0.00 | 7.21     | 0.00 | 0.00 | 0.00        | 0.10        | 7.31     |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 4A                   | 0.43        | 4,424                  | 0.80             | 0.01 | 0.19  | 0.02 | 0.02  | 0.00 | 49.77    | 0.00 | 0.00 | 0.01        | 0.71        | 50.49    |
| SOV All-Year 1                                    | Service Operation Vessel   | Edda Mistral        | Main Engine (Transit)          | 3M                   | 0.16        | 3,910                  | 0.64             | 0.02 | 0.15  | 0.02 | 0.02  | 0.01 | 43.09    | 0.00 | 0.00 | 0.01        | 0.63        | 43.72    |
|   |                            |                     | Main Engine (Maneuvering)      | 3M                   | 0.10        | 499,313                | 82.25            | 2.17 | 19.07 | 2.95 | 2.86  | 0.74 | 5,503.40 | 0.03 | 0.27 | 0.87        | 80.06       | 5,584.33 |
|   |                            |                     | Auxiliary Engine (Transit)     | 3A                   | 0.16        | 3,391                  | 0.58             | 0.01 | 0.15  | 0.02 | 0.02  | 0.00 | 38.15    | 0.00 | 0.00 | 0.01        | 0.54        | 38.70    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 3A                   | 0.10        | 433,055                | 74.34            | 1.05 | 18.64 | 2.41 | 2.33  | 0.05 | 4,872.18 | 0.03 | 0.23 | 0.75        | 69.44       | 4,942.37 |
| SOV Daughter Craft 1                              | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4M                   | 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     |
|   |                            |                     | Main Engine (Maneuvering)      | 4M                   | 0.20        | 46,676                 | 7.41             | 0.11 | 1.86  | 0.25 | 0.24  | 0.00 | 525.11   | 0.00 | 0.03 | 0.08        | 7.48        | 532.68   |
|   |                            |                     | Auxiliary Engine (Transit)     | 4A                   | 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     |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 4A                   | 0.43        | 2,595                  | 0.47             | 0.01 | 0.11  | 0.01 | 0.01  | 0.00 | 29.20    | 0.00 | 0.00 | 0.00        | 0.42        | 29.62    |
| <b>WTG heavy logistics / jack-up</b>              |                            |                     |                                |                      |             |                        |                  |      |       |      |       |      |          |      |      |             |             |          |
| US Jack-Up  | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 7M                   | 0.83        | 139,211                | 26.79            | 0.37 | 6.14  | 0.83 | 0.80  | 0.03 | 1,728.57 | 0.01 | 0.08 | 0.27        | 24.68       | 1,753.52 |
|   |                            |                     | Main Engine (Maneuvering)      | 7M                   | 0.20        | 220,586                | 42.46            | 0.59 | 9.74  | 1.31 | 1.27  | 0.06 | 2,739.01 | 0.02 | 0.13 | 0.42        | 39.10       | 2,778.54 |
|   |                            |                     | Auxiliary Engine (Transit)     | 7A                   | 0.43        | 16,919                 | 3.20             | 0.04 | 0.69  | 0.09 | 0.09  | 0.00 | 179.42   | 0.00 | 0.01 | 0.03        | 2.56        | 182.00   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 7A                   | 0.43        | 111,259                | 21.02            | 0.25 | 4.51  | 0.58 | 0.56  | 0.01 | 1,179.81 | 0.01 | 0.06 | 0.18        | 16.81       | 1,196.81 |
| US Feeder Vessel                                  | Feeder/Jack-up             | L/B Robert or Jill  | Main Engine (Transit)          | 7M                   | 0.83        | 32,715                 | 6.30             | 0.09 | 1.44  | 0.19 | 0.19  | 0.01 | 406.21   | 0.00 | 0.02 | 0.06        | 5.80        | 412.08   |
|   |                            |                     | Main Engine (Maneuvering)      | 7M                   | 0.20        | 51,838                 | 9.98             | 0.14 | 2.29  | 0.31 | 0.30  | 0.01 | 643.67   | 0.00 | 0.03 | 0.10        | 9.19        | 652.96   |
|   |                            |                     | Auxiliary Engine (Transit)     | 7A                   | 0.43        | 7,973                  | 1.60             | 0.02 | 0.34  | 0.04 | 0.04  | 0.00 | 89.71    | 0.00 | 0.00 | 0.01        | 1.28        | 91.00    |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 7A                   | 0.43        | 52,433                 | 10.51            | 0.13 | 2.26  | 0.29 | 0.28  | 0.01 | 589.91   | 0.00 | 0.03 | 0.09        | 8.41        | 598.40   |
| European Jack-up                                  | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 7M                   | 0.83        | 381,431                | 73.41            | 1.02 | 16.83 | 2.27 | 2.20  | 0.10 | 4,736.20 | 0.03 | 0.23 | 0.73        | 67.62       | 4,804.55 |
|   |                            |                     | Main Engine (Maneuvering)      | 7M                   | 0.20        | 220,586                | 42.46            | 0.59 | 9.74  | 1.31 | 1.27  | 0.06 | 2,739.01 | 0.02 | 0.13 | 0.42        | 39.10       | 2,778.54 |
|   |                            |                     | Auxiliary Engine (Transit)     | 7A                   | 0.43        | 46,358                 | 8.76             | 0.11 | 1.88  | 0.24 | 0.24  | 0.00 | 491.59   | 0.00 | 0.02 | 0.08        | 7.01        | 498.67   |
|   |                            |                     | Auxiliary Engine (Maneuvering) | 7A                   | 0.43        | 111,259                | 21.02            | 0.25 | 4.51  | 0.58 | 0.56  | 0.01 | 1,179.81 | 0.01 | 0.06 | 0.18        | 16.81       | 1,196.81 |
| <b>Cable repair vessel - export cable</b>         |                            |                     |                                |                      |             |                        |                  |      |       |      |       |      |          |      |      |             |             |          |
| Cable repair vessel                               | Cable Lay Vessel           | Boskalis Ndurance   | Main Engine (Transit)          | 3M                   | 0.83        | 4,902                  | 0.81             | 0.02 | 0.19  | 0.03 | 0.03  | 0.01 | 54.03    | 0.00 | 0.00 | 0.01        | 0.79        | 54.82    |
|   |                            |                     | Main Engine (Maneuvering)      | 3M                   | 0.20        | 55,481                 | 9.14             | 0.24 | 2.12  | 0.33 | 0.32  | 0.08 | 611.51   | 0.00 | 0.03 | 0.10        | 8.90        | 620.50   |
|   |                            |                     | Auxiliary Engine (Transit)     | 3A                   | 0.56        | 100                    | 0.02             | 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) | 3A                   | 0.56        | 4,695                  | 0.81             | 0.01 | 0.20  | 0.03 | 0.03  | 0.00 | 52.82    | 0.00 | 0.00 | 0.01        | 0.75        | 53.58    |
| <b>Cable repair vessel - array cable</b>          |                            |                     |                                |                      |             |                        |                  |      |       |      |       |      |          |      |      |             |             |          |
| Cable repair vessel                               | Cable Lay Vessel           | Boskalis Ndurance   | Main Engine (Transit)          | 3M                   | 0.83        | 6,302                  | 1.04             | 0.03 | 0.24  | 0.04 | 0.04  | 0.01 | 69.47    | 0.00 |      |             |             |          |

| Activity                                   | Representative Vessel Type | Example Vessel Used | Engine Type                    | 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   |
| <b>Foundation below water inspection</b>   |                            |                     |                                |                      |             |                        |                  |      |      |      |       |      |        |      |      |             |             |        |
| Vessel for subsea inspection               | Survey Vessel              | Danielle Miller     | Main Engine (Transit)          | 8M                   | 0.83        | 3,481                  | 0.60             | 0.01 | 0.14 | 0.02 | 0.02  | 0.00 | 38.57  | 0.00 | 0.00 | 0.01        | 0.56        | 39.13  |
|  |                            |                     | Main Engine (Maneuvering)      | 8M                   | 0.20        | 46,336                 | 7.93             | 0.18 | 1.81 | 0.27 | 0.27  | 0.05 | 513.32 | 0.00 | 0.02 | 0.08        | 7.43        | 520.83 |
|  |                            |                     | Auxiliary Engine (Transit)     | 8A                   | 0.43        | 94                     | 0.02             | 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) | 8A                   | 0.43        | 5,191                  | 0.92             | 0.01 | 0.22 | 0.03 | 0.03  | 0.00 | 58.40  | 0.00 | 0.00 | 0.01        | 0.83        | 59.24  |
| <b>Other vessels</b>                       |                            |                     |                                |                      |             |                        |                  |      |      |      |       |      |        |      |      |             |             |        |
| Environmental monitoring vessel            | Crew Transfer Vessel       | Njord Odin          | Main Engine (Transit)          | 4M                   | 0.83        | 2,295                  | 0.36             | 0.01 | 0.09 | 0.01 | 0.01  | 0.00 | 25.82  | 0.00 | 0.00 | 0           | 0           | 26     |
|  |                            |                     | Main Engine (Maneuvering)      | 4M                   | 0.20        | 2,546                  | 0.40             | 0.01 | 0.10 | 0.01 | 0.01  | 0.00 | 28.64  | 0.00 | 0.00 | 0           | 0           | 29     |
|  |                            |                     | Auxiliary Engine (Transit)     | 4A                   | 0.43        | 31                     | 0.01             | 0.00 | 0.00 | 0.00 | 0.00  | 0.00 | 0.35   | 0.00 | 0.00 | 0           | 0           | 0      |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 4A                   | 0.43        | 142                    | 0.03             | 0.00 | 0.01 | 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   | Edda Mistral        | Main Engine (Transit)          | 3M                   | 0.16        | 57                     | 0.01             | 0.00 | 0.00 | 0.00 | 0.00  | 0.00 | 0.63   | 0.00 | 0.00 | 0           | 0           | 1      |
|  |                            |                     | Main Engine (Maneuvering)      | 3M                   | 0.10        | 4,393                  | 0.72             | 0.02 | 0.17 | 0.03 | 0.03  | 0.01 | 48.42  | 0.00 | 0.00 | 0           | 1           | 49     |
|  |                            |                     | Auxiliary Engine (Transit)     | 3A                   | 0.16        | 49                     | 0.01             | 0.00 | 0.00 | 0.00 | 0.00  | 0.00 | 0.56   | 0.00 | 0.00 | 0           | 0           | 1      |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 3A                   | 0.10        | 3,810                  | 0.65             | 0.01 | 0.16 | 0.02 | 0.02  | 0.00 | 42.86  | 0.00 | 0.00 | 0           | 1           | 43     |
| OSS repair vessel (major repair)           | Jack-Up Vessel             | Vole au Vent        | Main Engine (Transit)          | 7M                   | 0.83        | 580                    | 0.11             | 0.00 | 0.03 | 0.00 | 0.00  | 0.00 | 7.20   | 0.00 | 0.00 | 0           | 0           | 7      |
|  |                            |                     | Main Engine (Maneuvering)      | 7M                   | 0.20        | 16,544                 | 3.18             | 0.04 | 0.73 | 0.10 | 0.10  | 0.00 | 205.43 | 0.00 | 0.01 | 0           | 3           | 208    |
|  |                            |                     | Auxiliary Engine (Transit)     | 7A                   | 0.43        | 66                     | 0.01             | 0.00 | 0.00 | 0.00 | 0.00  | 0.00 | 0.75   | 0.00 | 0.00 | 0           | 0           | 1      |
|  |                            |                     | Auxiliary Engine (Maneuvering) | 7A                   | 0.43        | 7,865                  | 1.58             | 0.02 | 0.34 | 0.04 | 0.04  | 0.00 | 88.49  | 0.00 | 0.00 | 0           | 1           | 90     |
| <b>Miscellaneous</b>                       |                            |                     |                                |                      |             |                        |                  |      |      |      |       |      |        |      |      |             |             |        |
| 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         | 377    |
| OSS Generators                             | Generator                  | Generator           | Tier 4 Generator               | 30                   | 0.75        | 2,571                  | 0.03             | 0.01 | 0.14 | 0.00 | 0.00  | 0.00 | 29.35  | 0.00 | 0.00 | 0           | 0           | 29.5   |

|                         |            |          |       |         |       |       |      |             |      |      |       |          |             |
|-------------------------|------------|----------|-------|---------|-------|-------|------|-------------|------|------|-------|----------|-------------|
| Total/yr                | 2,903,440  | 519.1    | 8.6   | 121.2   | 16.6  | 16.1  | 1.4  | 33,566.1    | 0.2  | 1.6  | 5.2   | 480.6    | 34,428.8    |
| Total over Project Life | 87,103,189 | 15,571.6 | 257.4 | 3,635.0 | 499.0 | 483.4 | 41.6 | 1,006,981.6 | 6.3  | 48.4 | 156.9 | 14,417.2 | 1,032,865.5 |
| Vessels                 | 2,900,868  | 519.0    | 8.6   | 121.0   | 16.6  | 16.1  | 1.4  | 33,536.7    | 0.2  | 1.6  | 5.2   | 480.5    | 34,022.4    |
|                         | 87,026,046 | 15,570.8 | 257.2 | 3,630.8 | 499.0 | 483.4 | 41.6 | 1,006,101.1 | 6.2  | 48.4 | 156.0 | 14,415.0 | 1,020,672.2 |
| Non-vessel              | 2,571      | 0.03     | 0.01  | 0.14    | 0.00  | 0.00  | 0.00 | 29.35       | 0.00 | 0.00 | 0.03  | 0.07     | 406.44      |
|                         | 77,143     | 0.8      | 0.2   | 4.2     | 0.0   | 0.0   | 0.0  | 880.5       | 0.0  | 0.0  | 0.9   | 2.1      | 12,193.2    |

| <b>CTV Case</b>                    | <b>Vessel Count</b> | <b>Europe</b> | <b>NJWP</b> | <b>Atlantic City</b> | <b>Total</b>  | <b>days/yr</b> | <b>Trips/day</b> |
|------------------------------------|---------------------|---------------|-------------|----------------------|---------------|----------------|------------------|
| WTG and BoP Crew logistics         | 11                  | 0.0           | 0.0         | 1994.0               | 1994.0        | 365.0          | 5.5              |
| WTG heavy logistics / jack-up      | 3                   | 8.0           | 16.0        | 0.0                  | 24.0          | 365.0          | 0.1              |
| Cable repair vessel - export cable | 1                   | 0.0           | 0.7         | 0.0                  | 0.7           | 365.0          | 0.0              |
| Cable repair vessel - array cable  | 1                   | 0.0           | 0.9         | 0.0                  | 0.9           | 365.0          | 0.0              |
| Cable survey vessel - export cable | 1                   | 0.0           | 1.0         | 0.0                  | 1.0           | 365.0          | 0.0              |
| Cable survey vessel - array cable  | 1                   | 0.0           | 1.0         | 0.0                  | 1.0           | 365.0          | 0.0              |
| Foundation below water inspection  | 1                   | 0.0           | 0.0         | 5.0                  | 5.0           | 365.0          | 0.0              |
| Other vessels                      | 3                   | 0.0           | 0.1         | 12.0                 | 12.1          | 365.0          | 0.0              |
| <b>Total</b>                       | <b>22</b>           | <b>8.0</b>    | <b>19.7</b> | <b>2011.0</b>        | <b>2038.7</b> | <b>365.0</b>   | <b>6</b>         |

| <b>SOV Case</b>                    | <b>Vessel Count</b> | <b>Europe</b> | <b>NJWP</b> | <b>Atlantic City</b> | <b>Total</b> | <b>days/yr</b> | <b>Trips/day</b> |
|------------------------------------|---------------------|---------------|-------------|----------------------|--------------|----------------|------------------|
| WTG and BoP Crew logistics         | 4                   | 0.0           | 0.0         | 524.0                | 524.0        | 365.0          | 1.4              |
| WTG heavy logistics / jack-up      | 3                   | 8.0           | 16.0        | 0.0                  | 24.0         | 365.0          | 0.1              |
| Cable repair vessel - export cable | 1                   | 0.0           | 0.7         | 0.0                  | 0.7          | 365.0          | 0.0              |
| Cable repair vessel - array cable  | 1                   | 0.0           | 0.9         | 0.0                  | 0.9          | 365.0          | 0.0              |
| Cable survey vessel - export cable | 1                   | 0.0           | 1.0         | 0.0                  | 1.0          | 365.0          | 0.0              |
| Cable survey vessel - array cable  | 1                   | 0.0           | 1.0         | 0.0                  | 1.0          | 365.0          | 0.0              |
| Foundation below water inspection  | 1                   | 0.0           | 0.0         | 5.0                  | 5.0          | 365.0          | 0.0              |
| Other vessels                      | 3                   | 0.0           | 0.1         | 12.0                 | 12.1         | 365.0          | 0.0              |
| <b>Total</b>                       | <b>15</b>           | <b>8.0</b>    | <b>19.7</b> | <b>541.0</b>         | <b>568.7</b> | <b>365.0</b>   | <b>2</b>         |

\*Note one of the 4 vessels in FOU category is a daughter vessel which has 0 transits as it is on the SOV

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

| Helicopters |            |             |                          |      |      |      |       |       |         |       |       |
|-------------|------------|-------------|--------------------------|------|------|------|-------|-------|---------|-------|-------|
| EF Ref      | Engine     | Size (kW)   | Emission Factors (lb/hr) |      |      |      |       |       |         |       |       |
|             |            |             | NOx                      | VOC  | CO   | PM10 | PM2.5 | SO2   | CO2     | CH4   | N2O   |
| 12          | Helicopter | Single      | 2.32                     | 1.63 | 1.89 | 0.07 | 0.07  | 0.300 | 956.92  | 0.030 | 0.030 |
| 13          | Helicopter | Twin Light  | 3.14                     | 3.66 | 4.28 | 0.10 | 0.09  | 0.500 | 1589.69 | 0.040 | 0.050 |
| 14          | Helicopter | Twin Medium | 7.22                     | 3.02 | 3.48 | 0.20 | 0.20  | 0.780 | 2459.92 | 0.070 | 0.080 |
| 15          | Helicopter | Twin heavy  | 34.66                    | 2.40 | 2.67 | 0.82 | 0.80  | 2.110 | 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\\_tsds\\_05jul2018.pdf](https://www.epa.gov/sites/production/files/2018-07/documents/nei2014v2_tsds_05jul2018.pdf)

| Engines |                             |           |                          |                  |     |      |       |                  |                  |                  |
|---------|-----------------------------|-----------|--------------------------|------------------|-----|------|-------|------------------|------------------|------------------|
| EF Ref  | Engine                      | Size (kW) | Emission Factors (g/kWh) |                  |     |      |       |                  |                  |                  |
|         |                             |           | NOx <sup>1</sup>         | VOC <sup>2</sup> | CO  | PM10 | PM2.5 | SO2 <sup>3</sup> | CO2 <sup>4</sup> | CH4 <sup>4</sup> |
| 16      | Air Compressor Engines      | 399       | 4                        | 0.5              | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 17      | Motion Compensation Engines | 500       | 4                        | 0.495            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 18      | Cat C18 Acert               | 597       | 6.4                      | 0.8              | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 19      | Tier 2 Engines 0-8 kW       | 0-8       | 7.5                      | 0.929            | 8   | 0.8  | 0.8   | 0.0068           | 739.60           | 0.030            |
| 20      | Tier 2 Engines 8-19 kW      | 8-19      | 7.5                      | 0.929            | 6.6 | 0.8  | 0.8   | 0.0068           | 739.60           | 0.030            |
| 21      | Tier 2 Engines 19-37 kW     | 19-37     | 7.5                      | 0.929            | 5.5 | 0.6  | 0.6   | 0.0068           | 739.60           | 0.030            |
| 22      | Tier 3 Engines 37-75 kW     | 37-75     | 4.7                      | 0.582            | 5   | 0.4  | 0.4   | 0.0068           | 739.60           | 0.030            |
| 23      | Tier 3 Engines 75-130 kW    | 75-130    | 4                        | 0.495            | 5   | 0.3  | 0.3   | 0.0068           | 739.60           | 0.030            |
| 24      | Tier 3 Engines 130-225 kW   | 130-225   | 4                        | 0.495            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 25      | Tier 3 Engines 225-450 kW   | 225-450   | 4                        | 0.495            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 26      | Tier 3 Engines 450-560 kW   | 450-560   | 4                        | 0.495            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 27      | Tier 2 Engines >560 kW      | >560      | 6.4                      | 0.792            | 3.5 | 0.2  | 0.2   | 0.0068           | 739.60           | 0.030            |
| 30      | Tier 4 Engine 130-560 kW    | 130-560   | 0.67                     | 0.19             | 3.5 | 0.02 | 0.02  | 0.0068           | 739.60           | 0.030            |

1 NOx emission values are assumed to be 100% of the relevant tier standard for NOx+NMHC

2 VOC emission values are assumed to be 12% of the relevant tier standard for NOx+NMHC

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

Btu/kW

| Commuting Emissions |                     |          |                          |                  |                 |                   |                    |                  |                  |                  |
|---------------------|---------------------|----------|--------------------------|------------------|-----------------|-------------------|--------------------|------------------|------------------|------------------|
| EF Ref              | Engine              | Fuel     | Emission Factors (g/VMT) |                  |                 |                   |                    |                  |                  |                  |
|                     |                     |          | NOx <sup>1</sup>         | VOC <sup>1</sup> | CO <sup>1</sup> | PM10 <sup>1</sup> | PM2.5 <sup>1</sup> | SO2 <sup>2</sup> | CO2 <sup>3</sup> | CH4 <sup>3</sup> |
| 28                  | Light-duty vehicles | Gasoline | 0.289                    | 0.35             | 3.94            | 0.012             | 0.012              | 0.0025           | 393.61           | 0.017            |
| 29                  | Light-duty trucks   | Gasoline | 0.478                    | 0.421            | 5.66            | 0.014             | 0.014              | 0.0025           | 393.61           | 0.017            |

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-diesel>

2 Based on 10 ppm sulfur in gasoline, 6.07 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 <sup>1</sup>             | 185              | 0.057              |
| Medium-speed Diesel, Marine Diesel Oil <sup>1</sup>           | 203              | 0.063              |
| Medium-speed Diesel, Marine Diesel Oil Auxiliary <sup>1</sup> | 217              | 0.067              |
| Cat. 1 & 2 (main and auxiliary) <sup>2</sup>                  | 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) <sup>1</sup>                             | 7.10   |
| Distillate Fuel No. 2 Higher Heating Value (MMBtu/gal) <sup>2</sup>   | 0.138  |
| Distillate Fuel No. 2 CO2 Emission Factor (kg CO2/MMBtu) <sup>2</sup> | 73.96  |
| Cat. 1 & 2 Marine Engine CO2 Emission Factor (g/kW*hr) <sup>3</sup>   | 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 <sup>1</sup> |       |
|--|-------|
| Compound                               | GWP   |
| CH4                                    | 25    |
| N2O                                    | 298   |
| SF6                                    | 22800 |

1 Table A-1 of 40 CFR 98

| 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                |

| 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%                    | <b>16%</b>              | 46,000                                | 0.0%                        | 0.0%                             |
| 5 Harbor                                   | 4%                    | 4%                      | 28,000                                | 0.0%                        | 0.0%                             |
| Maneuvering                                |                       |                         |                                       | 100.0%                      | <b>10.4%</b>                     |

\*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