

# **Appendix H**

## **Greenhouse Gas Analysis**

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**GHG Worksheet**

| Midwater BESS LLC                   | From SPA- Section 6.2.7.1<br>Transportation<br>Section 5.2.1.4 Operations and Maintenance    | Midwater Energy Storage Project estimates that there will be between five and ten semi-trucks used daily for equipment delivery during construction. This volume of traffic will only occur for several weeks during the delivery of the battery enclosures and the transformer skids; truck traffic will decrease once these components are delivered. Light duty trucks will also be used daily for transportation of construction workers to and from the site. |      |                      |                             |           |                    |  |
|-------------------------------------|--|--|------|----------------------|-----------------------------|-----------|--------------------|--|
| Freeborn County, MN                 | From SPA - Section 5.2.1 BESS<br>Construction<br>Section 5.2.2 HVTL Facility<br>Construction | Typical onsite construction staff levels will depend on the number of concurrent tasks being performed and the phasing of the Project. The Project will create approximately fifty jobs during the peak construction and installation phases, and up to two full-time positions during the operations phase.   |      |                      |                             |           |                    |  |
| 8/1/2024                            |  | After construction is complete, traffic impacts during the operational phase of the Project are expected to be negligible. A small maintenance crew driving to the site in light duty trucks on a regular basis will monitor and maintain the facilities as needed; traffic levels in the community adjacent to the Project Area will not be impacted as a result  |      |                      |                             |           |                    |  |
| Equipment Fuel Consumption Estimate |  |  |      |                      |                             |           |                    |  |
| Phase                               | Equipment Type   | No. of Equipment   | Days | Duration (hours/day) | Fuel Consumption (gal/hour) | Fuel Type | Est. Total Gallons | Notes/Assumptions  |
| Construction                        | Bulldozer  | 2  | 30   | 8                    | 7.6                         | Diesel    | 3,648              | Caterpillar D6T Medium Load  |
| Construction                        | Grader/scrapper  | 1  | 30   | 8                    | 5.6                         | Diesel    | 1,344              | Caterpillar 140M3 Medium Load  |
| Construction                        | Backhoe  | 1  | 30   | 8                    | 3.1                         | Diesel    | 744                | Caterpillar 420F Low Load  |
| Construction                        | Roller   | 1  | 20   | 8                    | 6.6                         | Diesel    | 1,056              | CAT 84" (2), CAT CS56B, CAT CB24   |
| Construction                        | Excavator  | 1  | 20   | 8                    | 8.1                         | Diesel    | 1,296              | Caterpillar 336D Medium Load   |
| Construction                        | Wheel Loader   | 1  | 30   | 8                    | 4                           | Diesel    | 960                | CAT 950M   |
| Construction                        | Skid steer   | 1  | 120  | 8                    | 3.3                         | Diesel    | 3,168              | Caterpillar 289D Medium Load   |
| Construction                        | Fork lift (all terrain)  | 2  | 120  | 8                    | 2.9                         | Diesel    | 5,568              | JLG 12K (3), JCB 512-56 (2), JCB 12K VR (6), CAT 12K VR  |
| Construction                        | Tractors   | 1  | 20   | 8                    | 7                           | Diesel    | 1,120              | Ford 4600 AG & International 9200I   |
| Construction                        | Track Manlift  | 1  | 20   | 8                    | 2.6                         | Diesel    | 416                | GENIE S-60 TraX MANLIFT  |
| Construction                        | Track Boom   | 1  | 30   | 8                    | 2.6                         | Diesel    | 624                | GENIE S-65 TraX BOOM   |
| Construction                        | Track Loader   | 1  | 30   | 8                    | 5.33                        | Diesel    | 1,279              | CAT 963K TRACK LOADER W/ FORKS & BKT   |
| Construction                        | Wheel Loader   | 1  | 30   | 8                    | 4.4                         | Diesel    | 1,056              | CAT 950K WHEEL LOADER W/BKT & FORKS  |
| Construction                        | Dump Truck   | 2  | 20   | 8                    | 10                          | Diesel    | 3,200              | Tandem Axle 10-14 CY   |
| Construction                        | Concrete truck and boom  | 2  | 20   | 8                    | 12                          | Diesel    | 3,840              | Primarily Foundations, also substation   |
|                                     | Semi truck/trailer   | 1  | 30   | 8                    | 10                          | Diesel    | 2,400              | Standard size and weight semitruck for equipment deliveries  |
| Construction                        | Light Duty Crane   | 1  | 20   | 8                    | 12.6                        | Diesel    | 2,016              | LINK-BELT LS-238 HSL CRAWLER CRANE   |
| Construction                        | Medium Duty Crane  | 1  | 20   | 8                    | 12.6                        | Diesel    | 2,016              | LINK-BELT LS 248 200 TON CRAWLER CRANE   |
| Construction                        | Watering truck   | 1  | 120  | 8                    | 4.3                         | Diesel    | 4,128              | BAS VOLVO FMX WATER TANK TRUCK   |
| Construction                        | Truck Mounted Auger or Drill Rig   | 1  | 20   | 8                    | 5.33                        | Diesel    | 853                |  |
| Construction                        | Pile Driver  | 1  | 30   | 8                    | 5.33                        | Diesel    | 1,279              | Could also be driver for helical piles   |
| Construction                        | Generator  | 1  | 120  | 8                    | 1                           | Gasoline  | 960                | CAT XQ30KW   |
| Construction                        | Light-duty pickup truck (on-site)  | 4  | 130  | 6                    | 3.6                         | Gasoline  | 11,232             |  |
| Construction                        | Construction contractor vehicles (commute to/from site)                                      | 50   | 130  | 1.3                  | 2.5                         | Gasoline  | 21,667             | Assume bulk of the workforce lives in Rochester, MN and drive to the site. Workers in Rochester are about 40 minutes one way, 80 min round trip. Assume 50% carpool. |
|                                     | TOTAL GALLONS GAS (per year)   |  |      |                      |                             |           | 33,859             |  |
|                                     | TOTAL GALLONS DIESEL (per year)  |  |      |                      |                             |           | 39,879             |  |

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| Phase                                  | Equipment Type   | No. of Equipment | Days/Year | Duration (hours/day) | Fuel Consumption (gal/hour) | Fuel Type | Est. Total Gallons | Notes/Assumptions                               |
|--|--|------------------|-----------|----------------------|-----------------------------|-----------|--------------------|---|
| Operation                              | Light-duty pickup truck (commute to/from site) - 1 full time staff | 1                | 60        | 2                    | 2.5                         | Gasoline  | 300                | 1 BESS Tech (Only on-site for troubleshooting)  |
| Operation                              | O&M contractor vehicles (commute to/from site)                     | 1                | 50        | 1.0                  | 2.5                         | Gasoline  | 125                | 1 Off site Manager visiting site once per week  |
| Operation                              | O&M contractor vehicles (on-site)                                  | 1                | 60        | 1                    | 2.5                         | Gasoline  | 150                | 1 Service Tech at 1.25 days average per service |
| <b>TOTAL GALLONS GAS (per year)</b>    |  |                  |           |                      |                             |           | <b>575</b>         |   |
| <b>TOTAL GALLONS DIESEL (per year)</b> |  |                  |           |                      |                             |           | -                  |   |

| Summary          |                |                             |                          |          |                              |              |
|------------------|----------------|-----------------------------|--------------------------|----------|------------------------------|--------------|
| Construction     | Annual Gallons | KG of CO2 per Gallon Diesel | KG of CO2 per Gallon Gas | Total KG | KG to Tons Conversion Factor | Total Tons   |
| Total Gas        | 33,859         |                             | 8.78                     | 297,279  | 0.00110231                   | 327.7        |
| Total Diesel     | 39,879         | 10.19                       |                          | 406,369  | 0.00110231                   | 447.9        |
|                  |                |                             |                          | 703,648  |                              | <b>775.6</b> |
| <b>Operation</b> |                |                             |                          |          |                              |              |
| Total Gas        | 575            |                             | 8.78                     | 5,049    | 0.00110231                   | 5.6          |
| Total Diesel     | -              | 10.19                       |                          | 0        | 0.00110231                   | 0.0          |
|                  |                |                             |                          |          |                              | <b>5.6</b>   |

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| <b><u>Construction</u></b>     |        | <b>KG of CO2 per<br/>Gallon Diesel</b> | <b>KG of CO2 per<br/>Gallon Gas</b> | <b>Total KG</b> |            |   |
|--------------------------------|--------|--|-------------------------------------|-----------------|------------|---|
| Total Diesel                   | 39,879 | 10.19                                  |                                     | 406,369         |            | <a href="https://www.eia.gov/environment/emissions/co2_vol_mass.php">https://www.eia.gov/environment/emissions/co2_vol_mass.php</a> |
| Total Gas                      | 33,859 |  | 8.78                                | 297,279         |            | <a href="https://www.eia.gov/environment/emissions/co2_vol_mass.php">https://www.eia.gov/environment/emissions/co2_vol_mass.php</a> |
|                                |        |  | <b>Total - KG</b>                   | <b>703,648</b>  | 0.00110231 | Conversion Factor KG to Tons  |
|                                |        |  | <b>Total - Tons</b>                 | <b>776</b>      |            |   |
| <b><u>Annual Operation</u></b> |        | <b>KG of CO2 per<br/>Gallon Diesel</b> | <b>KG of CO2 per<br/>Gallon Gas</b> | <b>Total KG</b> |            |   |
| Total Diesel                   | 0      | 10.19                                  |                                     | 0               |            | <a href="https://www.eia.gov/environment/emissions/co2_vol_mass.php">https://www.eia.gov/environment/emissions/co2_vol_mass.php</a> |
| Total Gas                      | 575    |  | 8.78                                | 5,049           |            | <a href="https://www.eia.gov/environment/emissions/co2_vol_mass.php">https://www.eia.gov/environment/emissions/co2_vol_mass.php</a> |
|                                |        |  | <b>Total - KG</b>                   | <b>5,049</b>    | 0.00110231 | Conversion Factor KG to Tons  |
|                                |        |  | <b>Total - Tons</b>                 | <b>6</b>        |            |   |