

# **Appendix G**

## **Emissions Calculations**

National Grid Renewables  
Lake Charlotte Solar Facility  
Construction Emission Calculations

<b>Summary of Potential Construction Emissions (tons)</b>								
Description	Emissions							Total
	Criteria Pollutants				HAPs			
	NOx	CO	VOC	SO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	Formaldehyde	
<b>SOLAR FARM</b>								
Off-Road Engine Emissions	61.37	13.43	3.15	0.03	2.12	2.12	0.37	0.56
Unpaved Roads	--	--	--	--	0.57	0.06	--	--
Earthmoving	--	--	--	--	178.53	18.85	--	--
Solar Farm Subtotal	61.37	13.43	3.15	0.03	181.22	21.02	0.37	0.56
<b>BESS</b>								
Off-Road Engine Emissions	21.87	4.51	0.99	0.01	0.69	0.69	0.12	0.17
Unpaved Roads	--	--	--	--	0.01	0.00	--	--
Earthmoving	--	--	--	--	0.00	0.00	--	--
BESS Subtotal	21.87	4.51	0.99	0.01	0.70	0.69	0.12	0.17
<b>TOTAL PROJECT</b>								
Off-Road Engine Emissions	83.24	17.94	4.14	0.04	2.81	2.81	0.49	0.73
Unpaved Roads	--	--	--	--	0.57	0.06	--	--
Earthmoving	--	--	--	--	178.53	18.85	--	--
<b>PROJECT TOTAL</b>	<b>83.24</b>	<b>17.94</b>	<b>4.14</b>	<b>0.04</b>	<b>181.92</b>	<b>21.71</b>	<b>0.49</b>	<b>0.73</b>

National Grid Renewables  
Lake Charlotte Solar Facility  
Construction Emission Calculations

Emission Factors for Construction Engines														
Equipment	Quantity <sup>a</sup>	Total Hours Used	Max Power (HP)	Load Factor <sup>b</sup>	Loaded Power (HP)	Emission Factors <sup>c,d</sup> (g/hp-hr)								
						VOC	CO	NOx	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Air Compressor	1	120	80	1	80	0.367	2.366	4.700	0.240	0.240	0.002	188.262	0.008	0.002
ATV	42	30,240	20	0.5	10	0.438	2.161	4.440	0.267	0.267	0.002	188.262	0.008	0.002
Backhoe	5	3,360	75	0.8	60	0.367	2.366	4.700	0.240	0.240	0.002	188.262	0.008	0.002
Bulldozer	4	1,280	250	1	250	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Compactor	1	112	300	1	300	0.167	0.843	4.335	0.132	0.132	0.002	188.262	0.008	0.002
Compactor, Vibratory	5	2,936	100	1	100	0.338	0.867	4.100	0.180	0.180	0.002	188.262	0.008	0.002
Fork Lift	13	8,240	120	1	120	0.167	0.843	4.335	0.132	0.132	0.002	188.262	0.008	0.002
Concrete Mixer Truck	6	1,440	325	1	325	0.338	0.867	4.100	0.180	0.180	0.002	188.262	0.008	0.002
Concrete Pump	0	0	300	1	300	0.338	0.867	4.100	0.180	0.180	0.002	188.262	0.008	0.002
Dump Truck	4	832	325	0.8	260	0.338	0.867	4.100	0.180	0.180	0.002	188.262	0.008	0.002
Excavator	5	3,960	138	1	138	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Front End Loader	4	1,680	196	1	196	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Generator	18	12,960	250	0.5	125	0.167	0.843	4.335	0.132	0.132	0.002	188.262	0.008	0.002
Guided Bore Machine	4	960	150	0.8	120	0.637	2.366	4.700	0.240	0.240	0.002	188.262	0.008	0.002
Light Tower	0	0	50	1	50	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Manlift	0	0	50	1	50	0.338	0.867	4.100	0.180	0.180	0.002	188.262	0.008	0.002
Pickup Truck	30	31,200	150	0.25	38	0.167	0.843	4.335	0.132	0.132	0.002	188.262	0.008	0.002
Piping Truck	0	0	300	1	300	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Skid steer loader	5	3,000	50	1	50	0.309	0.748	4.000	0.132	0.132	0.002	188.262	0.008	0.002
Water truck	5	5,512	100	0.5	50	0.637	2.366	4.700	0.240	0.240	0.002	188.262	0.008	0.002
Welding machine	2	56	35	0.8	28	0.367	2.366	4.700	0.240	0.240	0.002	188.262	0.008	0.002
Grader	3	2,908	35	0.8	28	0.438	2.161	4.44	0.267	0.259	0.002	188.262	0.008	0.002
Large Crane	0	0	15	0.21	3	0.438	2.161	4.44	0.267	0.259	0.002	188.262	0.008	0.002
Medium Crane	6	576	450	0.7	315	0.3085	0.7475	4.0	0.132	0.128	0.002	188.262	0.008	0.002
Fuel Truck	1	100	200	0.59	118	0.3085	0.7475	4.0	0.132	0.128	0.002	188.262	0.008	0.002
Hydrovac Truck	1	40	200	0.59	118	0.3085	0.7475	4.0	0.132	0.128	0.002	188.262	0.008	0.002
Road Bore Machine	0	0	260	0.79	205	0.3085	0.7475	4.0	0.132	0.128	0.002	188.262	0.008	0.002
6-inch Water Pump	2	320	30	0.69	21	0.438	2.161	4.44	0.267	0.259	0.002	188.262	0.008	0.002
4-inch Water Pump	0	0	10	0.69	7	0.438	2.161	4.44	0.267	0.259	0.002	188.262	0.008	0.002
2-inch Water Pump	0	0	5	0.69	3	0.438	2.161	4.44	0.267	0.259	0.002	188.262	0.008	0.002
Pile Driver	7	5,040	49	1	49	0.2789	1.5323	4.7279	0.3389	0.3389	0.002	188.262	0.008	0.002
100 HP Tractor	5	4,800	100	0.21	100	0.338	0.867	4.1	0.18	0.18	0.002	188.262	0.008	0.002
Semitruck/Trailer	48	18,960	500	0.59	500	0.167	0.843	4.335	0.132	0.132	0.002	188.262	0.008	0.002

<sup>a</sup> Equipment counts include construction equipment for the solar farm, BESS, and gen-tie line.  
<sup>b</sup> Load Factors from Appendix A of EPA 420\_P-04-005, Median Life, Annual Activity, and Load Factor Values for  
<sup>c</sup> EPA 420-P-04-009, Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition, USEPA, April 2004 - Tier 2 Engines.  
<sup>d</sup> GHG emission factors from EPA's 2024 GHG Emission Factors Hub. Available online at <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>.

Assumption:

393.5  
453.6

National Grid Renewables  
Lake Charlotte Solar Facility  
Construction Emission Calculations

Criteria Pollutant Emission Estimates from Construction Engines						
Equipment	Potential Emissions (ton)					
	VOC	CO	NOx	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>
Air Compressor	3.89E-03	0.025	0.050	0.003	0.003	0.000
ATV	1.46E-01	0.720	1.480	0.089	0.089	0.001
Backhoe	8.16E-02	0.526	1.044	0.053	0.053	0.000
Bulldozer	1.09E-01	0.264	1.411	0.046	0.046	0.001
Compactor	6.18E-03	0.031	0.161	0.005	0.005	0.000
Compactor, Vibratory	1.10E-01	0.280	1.327	0.058	0.058	0.001
Fork Lift	1.82E-01	0.918	4.725	0.143	0.143	0.002
Concrete Mixer Truck	1.75E-01	0.447	2.115	0.093	0.093	0.001
Concrete Pump	0.00E+00	0.000	0.000	0.000	0.000	0.000
Dump Truck	8.07E-02	0.207	0.978	0.043	0.043	0.000
Excavator	1.86E-01	0.450	2.410	0.079	0.079	0.001
Front End Loader	1.12E-01	0.271	1.452	0.048	0.048	0.001
Generator	2.98E-01	1.504	7.741	0.235	0.235	0.004
Guided Bore Machine	8.09E-02	0.300	0.597	0.030	0.030	0.000
Light Tower	0.00E+00	0.000	0.000	0.000	0.000	0.000
Manlift	0.00E+00	0.000	0.000	0.000	0.000	0.000
Pickup Truck	2.15E-01	1.087	5.591	0.170	0.170	0.003
Piping Truck	0.00E+00	0.000	0.000	0.000	0.000	0.000
Skid steer loader	5.10E-02	0.124	0.661	0.022	0.022	0.000
Water truck	1.94E-01	0.719	1.428	0.073	0.073	0.001
Welding machine	6.35E-04	0.004	0.008	0.000	0.000	0.000
Grader	3.93E-02	0.194	0.399	0.024	0.023	0.000
Large Crane	0.00E+00	0.000	0.000	0.000	0.000	0.000
Medium Crane	6.17E-02	0.150	0.800	0.026	0.026	0.000
Fuel Truck	4.01E-03	0.010	0.052	0.002	0.002	0.000
Hydrovac Truck	1.61E-03	0.004	0.021	0.001	0.001	0.000
Road Bore Machine	0.00E+00	0.000	0.000	0.000	0.000	0.000
6-inch Water Pump	3.20E-03	0.016	0.032	0.002	0.002	0.000
4-inch Water Pump.	0.00E+00	0.000	0.000	0.000	0.000	0.000
2-inch Water Pump	0.00E+00	0.000	0.000	0.000	0.000	0.000
Pile Driver	7.59E-02	0.417	1.287	0.092	0.092	0.001
100 HP Tractor	1.79E-01	0.459	2.169	0.095	0.095	0.001
Semitruck/Trailer	1.75E+00	8.809	45.300	1.379	1.379	0.021
<b>TOTAL</b>	<b>4.14</b>	<b>17.94</b>	<b>83.24</b>	<b>2.81</b>	<b>2.81</b>	<b>0.04</b>

National Grid Renewables  
Lake Charlotte Solar Facility  
Construction Emission Calculations

Fugitive Dust Emissions from Unpaved Roads								
Equipment	Quantity <sup>a</sup>	Total Days Used	VMT <sup>b</sup>	Emission Factor (lb/VMT) <sup>c</sup>			Project Total Emissions (ton)	
				W	PM <sub>10</sub>	PM <sub>2.5</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
ATV	42	90	45	20	1.88	0.19	0.04	0.00
Backhoe	5	200	100	50	2.83	0.28	0.13	0.01
Bulldozer	4	80	40	20	1.88	0.19	0.01	0.00
Fork Lift	13	134	67	20	1.88	0.19	0.06	0.01
Concrete Mixer Truck	6	30	15	20	1.88	0.19	0.01	0.00
Dump Truck	4	52	26	21	1.92	0.19	0.02	0.00
Excavator	5	180	90	22	1.96	0.20	0.06	0.01
Front End Loader	4	90	45	23	2.00	0.20	0.03	0.00
Pickup Truck	30	285	143	24	2.04	0.20	0.09	0.01
Piping Truck	0	0	0	25	2.07	0.21	0.00	0.00
Skid steer loader	5	210	105	26	2.11	0.21	0.05	0.00
Water truck	5	164	82	20	1.88	0.19	0.07	0.01
Welding Machine	2	7	4	20	1.88	0.19	0.00	0.00
<b>TOTAL</b>	--	--	--	--	--	--	<b>0.57</b>	<b>0.06</b>

<sup>a</sup> Equipment counts are estimated based current construction plan.  
<sup>b</sup> Each vehicle is assumed to travel 0.5 mile per day on site.  
<sup>c</sup> AP-42 Section 13.2.2 Unpaved Roads, dated November 2006, Equations 1a and 2 TOTALS 11.19 1.12 Surface Silt content based on Table 13.2.2-1 - construction sites.

Eq 1a:  $E = k * (s/12)^a * (W/3)^b$

Eq 2:  $E_{ext} = E * [(365-P)/365]$

where:

VMT = Vehicle Miles Traveled

W = Mean Vehicle Weight, tons

S = Mean Vehicle Speed, mph

P = 100 days with at least 0.01 inches rain, EPA's AP-42 Figure 13.2.2-1

s = 8.5 surface material silt content (%) for construction sites, EPA's AP-42 Table 13.2.2-1

E = size-specific emission factor, lb/ VMT

E<sub>ext</sub> = annual size-specific emission factor extrapolated for natural migration, lb/VMT

Constants	PM	PM <sub>10</sub>	PM <sub>2.5</sub>
k (lb/VMT)	4.9	1.5	0.15
a	0.7	0.9	0.9
b	0.45	0.45	0.45

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Construction Emission Calculations

<b>Fugitive Dust Emissions From Earthmoving Activities</b>							
<b>Construction Activity</b>	<b>Daily Material Handling</b>		<b>Average Exposed Area (acres)</b>	<b>Emission Factors<sup>b-f</sup> (lb/ton)</b>		<b>Emissions (ton)</b>	
	<b>Construction Rate<sup>a</sup> (ton/day)</b>	<b>Handling Time<sup>b</sup> (days)</b>		<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>
<b>Solar Farm</b>							
Topsoil removed by scraper <sup>g</sup>	14,262.3	240	---	0.058	0.0061	99.27	10.44
Project excavation and loading to storage piles	115.5	240	---	0.037	0.0039	0.51	0.05
Backfilling excavations	115.5	240	---	0.012	0.0013	0.17	0.02
Topsoil replacement	14,262.3	240	---	0.012	0.0013	20.54	2.22
Wind erosion of exposed areas	--	240	1,273.00	0.38	0.03999	58.05	6.11
<b>Solar Farm Subtotal</b>						<b>178.53</b>	<b>18.85</b>
<b>BESS</b>							
Topsoil removed by scraper <sup>g</sup>	0.0	120	---	0.058	0.0061	0.00	0.00
Project excavation and loading to storage piles	0.0	120	---	0.037	0.0039	0.00	0.00
Backfilling excavations	0.0	120	---	0.012	0.0013	0.00	0.00
Topsoil replacement	0.0	120	---	0.012	0.0013	0.00	0.00
Wind erosion of exposed areas	--	120	0.00	0.38	0.03999	0.00	0.00
<b>BESS Subtotal</b>						<b>0.00</b>	<b>0.00</b>
<b>PROJECT TOTAL</b>							
Topsoil removed by scraper <sup>g</sup>	14,262.3	240	---	0.058	0.0061	99.27	10.44
Project excavation and loading to storage piles	115.5	240	---	0.037	0.0039	0.51	0.05
Backfilling excavations	115.5	240	---	0.012	0.0013	0.17	0.02
Topsoil replacement	14,262.3	240	---	0.012	0.0013	20.54	2.22
Wind erosion of exposed areas	--	240	1,273.00	0.38	0.03999	58.05	6.11
<b>PROJECT TOTAL</b>						<b>178.53</b>	<b>18.85</b>

Notes and Assumptions:

<sup>a</sup> Soil density: 1.25 tons per yard

<sup>b</sup> Conservatively assumes handling time is the maximum amount of days a construction equipment is used on the portion of the project.

<sup>c</sup> Backfilling and topsoil replacement emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, overburden replacement

<sup>d</sup> As worst case, PM<sub>10</sub> is set equal to Total Particulate Matter. PM<sub>2.5</sub> is set to 0.105 times PM<sub>10</sub> per Table 11.9-1

<sup>e</sup> Emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, topsoil removal by scraper

<sup>f</sup> Wind Erosion Exposed Areas emission factor: AP-42 Section 11.9 Western Surface Coal Mining, Table 11.9-4, July 1998, wind erosion of exposed areas (ton/yr/acre)

<sup>g</sup> Assumes the entire workspace is cleared to 1 foot deep, 1.25 tons per cubic yard.

National Grid Renewables  
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Construction Emission Calculations

Construction Schedule		
Work Hours:	12	7 am - 7 pm
Work Days	6	Monday through Saturday
Hours per week	72	
Crews:	2	
Weeks:	30	
Total Days:	180	

Topsoil Removed by Scraper <sup>a</sup>				
County/Facility	Total (Acres)	Soil Volume (yd <sup>3</sup> )	Soil Weight (ton)	Daily Material Handling Rate (ton/day)
Land Control Area	1,273	2,053,773	2,567,217	14,262
		0	0	0
		0	0	0
<b>TOTAL</b>	<b>1,273</b>	<b>2,053,773</b>	<b>2,567,217</b>	<b>14,262</b>

<sup>a</sup> Acreages from SPA, Section 4.3

Project Excavation and Loading to Storage Piles						
Project Section	Length (ft)	Depth (ft)	Total Volume (ft <sup>3</sup> )	Total Volume (yd <sup>3</sup> )	Soil Weight (ton)	Daily Material Handling Rate (ton/day)
Cable Trench (at 2 feet wide)	56,116	4	448,927	16,627	20,784	115.5
<b>TOTAL</b>			<b>448,927</b>	<b>16,627</b>	<b>20,784</b>	<b>115.5</b>

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Greenhouse Gas Emissions Summary (tons)				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e <sup>a</sup>
Off-Road Engine Emissions	3,638.92	0.15	0.03	3,650.88
Commuters and Delivery Vehicles	951.39	0.00	0.00	951.39
<b>PROJECT TOTAL</b>	<b>4,590.31</b>	<b>0.15</b>	<b>0.03</b>	<b>4,602.27</b>

National Grid Renewables  
Lake Charlotte Solar Facility  
Construction Emission Calculations

Greenhouse Gas Emissions from On Road Construction Traffic					
	Vehicles per day	Miles per vehicle	Number of Days	Fuel Used (gallons)	CO <sub>2</sub> Emissions <sup>a</sup> (tons)
<b>Solar Farm</b>					
Commuter Vehicles - Gasoline <sup>b,c</sup>	150	60	180	67,500	661.25
Delivery Trucks - Diesel <sup>d</sup>	18	60	90	14,954	167.84
Concrete Mixer Trucks - Diesel <sup>e</sup>	6	60	30	3,176	35.65
<b>Solar Farm Subtotal</b>					<b>864.74</b>
<b>BESS</b>					
Commuter Vehicles - Gasoline <sup>b,c</sup>	10	60	100	2,500	24.49
Delivery Trucks - Diesel <sup>d</sup>	30	60	20	5,538	62.16
Concrete Mixer Trucks - Diesel <sup>e</sup>	0	60	0	0	0.00
<b>BESS Subtotal</b>					<b>86.65</b>
Commuter Vehicles - Gasoline <sup>b,c</sup>	160	60	175	70,000	685.74
Delivery Trucks - Diesel <sup>d</sup>	48	60	46	20,492	230.00
Concrete Mixer Trucks - Diesel <sup>e</sup>	6	60	30	3,176	35.65
<b>PROJECT TOTAL</b>					<b>951.39</b>
<p><sup>a</sup> Assumes 1 gallon of gasoline = 8,887 grams CO<sub>2</sub> and 1 gallon of diesel = 10,180 g CO<sub>2</sub>, per US EPA's "Greenhouse Gas Emissions from a Typical Passenger Vehicle," available online at: <a href="https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P100U8YT.pdf">https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P100U8YT.pdf</a></p> <p><sup>b</sup> Assumes commuters travel 30 miles each way (60 miles round trip) per day, with a fuel economy of 24 miles per gallon, per US EPA and US Department of Energy Fuel Economy data for combined city and highway driving in 2023, available online at: <a href="https://www.fueleconomy.gov/feg/download.shtml">https://www.fueleconomy.gov/feg/download.shtml</a>.</p> <p><sup>c</sup> Commuter counts include the solar farm and BESS. Number of days is a weighted average of the three project components.</p> <p><sup>d</sup> Assumes delivery trucks travel 30 miles each way (60 miles round trip) per day, with a fuel economy of 6.5 miles per gallon, industry average.</p> <p><sup>e</sup> Assumes concrete mixer trucks travel 30 miles each way (60 miles round trip) per day, with a fuel economy of 3.4 miles per gallon, industry average.</p> <p><a href="http://ascpro0.ascweb.org/archives/cd/2012/paper/CPRT221002012.pdf#:~:text=The%20National%20Ready%20Mix%20Concrete%20Association%20%28NRMCA%29%20in,average%203.4%20miles%20per%20gallon%20of%20diesel%20fuel.">http://ascpro0.ascweb.org/archives/cd/2012/paper/CPRT221002012.pdf#:~:text=The%20National%20Ready%20Mix%20Concrete%20Association%20%28NRMCA%29%20in,average%203.4%20miles%20per%20gallon%20of%20diesel%20fuel.</a></p>					

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<b>Greenhouse Gas Emission Factors for Construction Engines</b>								
Equipment	Quantity <sup>a</sup>	Total Hours Used	Max Power (HP)	Load Factor <sup>b</sup>	Loaded Power (HP)	Emission Factors <sup>c,d</sup> (g/hp-hr)		
						CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
Air Compressor	1	120	80	1	80	188.262	0.008	0.002
ATV	42	30,240	20	0.5	10	188.262	0.008	0.002
Backhoe	5	3,360	75	0.8	60	188.262	0.008	0.002
Bulldozer	4	1,280	250	1	250	188.262	0.008	0.002
Compactor	1	112	300	1	300	188.262	0.008	0.002
Compactor, Vibratory	5	2,936	100	1	100	188.262	0.008	0.002
Fork Lift	13	8,240	120	1	120	188.262	0.008	0.002
Concrete Mixer Truck	6	1,440	325	1	325	188.262	0.008	0.002
Concrete Pump	0	0	300	1	300	188.262	0.008	0.002
Dump Truck	4	832	325	0.8	260	188.262	0.008	0.002
Excavator	5	3,960	138	1	138	188.262	0.008	0.002
Front End Loader	4	1,680	196	1	196	188.262	0.008	0.002
Generator	18	12,960	250	0.5	125	188.262	0.008	0.002
Guided Bore Machine	4	960	150	0.8	120	188.262	0.008	0.002
Light Tower	0	0	50	1	50	188.262	0.008	0.002
Manlift	0	0	50	1	50	188.262	0.008	0.002
Pickup Truck	30	31,200	150	0.25	38	188.262	0.008	0.002
Piping Truck	0	0	300	1	300	188.262	0.008	0.002
Skid steer loader	5	3,000	50	1	50	188.262	0.008	0.002
Water truck	5	5,512	100	0.5	50	188.262	0.008	0.002
Welding machine	2	56	35	0.8	28	188.262	0.008	0.002
Grader	3	2,908	35	0.8	28	188.262	0.008	0.002
Large Crane	0	0	15	0.21	3	188.262	0.008	0.002
Medium Crane	6	576	450	0.7	315	188.262	0.008	0.002
Fuel Truck	1	100	200	0.59	118	188.262	0.008	0.002
Hydrovac Truck	1	40	200	0.59	118	188.262	0.008	0.002
Road Bore Machine	0	0	260	0.79	205	188.262	0.008	0.002
6-inch Water Pump	2	320	30	0.69	21	188.262	0.008	0.002
4-inch Water Pump	0	0	10	0.69	7	188.262	0.008	0.002
2-inch Water Pump	0	0	5	0.69	3	188.262	0.008	0.002
Pile Driver	7	5,040	49	1	49	188.262	0.008	0.002
100 HP Tractor	5	4,800	100	0.21	100	188.262	0.008	0.002
Semitruck/Trailer	48	18,960	500	0.59	500	188.262	0.008	0.002

<sup>a</sup> Equipment counts include construction equipment for the solar farm, BESS, and gen-tie line.  
<sup>b</sup> Load Factors from Appendix A of EPA 420\_P-04-005, Median Life, Annual Activity, and Load Factor  
<sup>c</sup> EPA 420-P-04-009, Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling - Compression Ignition, USEPA, April 2004 - Tier 2 Engines.  
<sup>d</sup> GHG emission factors from EPA's 2024 GHG Emission Factors Hub. Available online at <https://www.epa.gov/climateleadership/ghg-emission-factors-hub>.

National Grid Renewables  
 Lake Charlotte Solar Facility  
 Construction Emission Calculations

<b>Greenhouse Gas Emission Estimates from Construction Engines</b>				
Equipment	Potential Emissions (ton)			
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e <sup>a</sup>
Air Compressor	1.99	0.00	0.00	2.00
ATV	62.76	0.00	0.00	62.96
Backhoe	41.84	0.00	0.00	41.97
Bulldozer	66.41	0.00	0.00	66.63
Compactor	6.97	0.00	0.00	7.00
Compactor, Vibratory	60.93	0.00	0.00	61.13
Fork Lift	205.20	0.01	0.00	205.87
Concrete Mixer Truck	97.12	0.00	0.00	97.44
Concrete Pump	0.00	0.00	0.00	0.00
Dump Truck	44.89	0.00	0.00	45.04
Excavator	113.41	0.00	0.00	113.78
Front End Loader	68.33	0.00	0.00	68.56
Generator	336.19	0.01	0.00	337.29
Guided Bore Machine	23.91	0.00	0.00	23.99
Light Tower	0.00	0.00	0.00	0.00
Manlift	0.00	0.00	0.00	0.00
Pickup Truck	242.80	0.01	0.00	243.60
Piping Truck	0.00	0.00	0.00	0.00
Skid steer loader	31.13	0.00	0.00	31.23
Water truck	57.19	0.00	0.00	57.38
Welding machine	0.33	0.00	0.00	0.33
Grader	16.90	0.00	0.00	16.95
Large Crane	0.00	0.00	0.00	0.00
Medium Crane	37.65	0.00	0.00	37.78
Fuel Truck	2.45	0.00	0.00	2.46
Hydrovac Truck	0.98	0.00	0.00	0.98
Road Bore Machine	0.00	0.00	0.00	0.00
6-inch Water Pump	1.37	0.00	0.00	1.38
4-inch Water Pump.	0.00	0.00	0.00	0.00
2-inch Water Pump	0.00	0.00	0.00	0.00
Pile Driver	51.25	0.00	0.00	51.42
100 HP Tractor	99.61	0.00	0.00	99.94
Semitruck/Trailer	1,967.32	0.08	0.02	1,973.78
<b>TOTAL</b>	<b>3,638.92</b>	<b>0.15</b>	<b>0.03</b>	<b>3,650.88</b>

<sup>a</sup> Calculated using global warming potentials from EPA's 2024 GHG Emission Factors Hub.

<b>Global Warming Potentials</b>		
CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O
1	28	265