

Appendix H

Greenhouse Gas Analysis

Northern Crescent Solar 150 Mwac + 50 MWac BESS	From SPA- Sections 4.3.1.3 Construction Personnel and Equipment and 5.2.9.1 Impacts (Roadways)	Traffic during construction of the solar facility is estimated to average 130-200 pickup trucks, cars, and/or other types of employee vehicles and approximately 10-20 semi-trucks per day for component delivery onsite for the 12-18 month duration of construction. Approximately 10-20 semi-trucks per day will be used for delivery of facility components. Semi-truck delivery will vary per day depending on time of construction and delivery timeline of equipment.
Faribault County, MN	From SPA - Section 3.3.1 Construction and Construction Mgmt, Section 5.2.13.4 Impacts and Mitigation (Socioeconomics)	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 200 jobs during the peak construction and installation phases, , 130 jobs on average during construction, and up to 3 full time jobs during the operations phase.
7/8/2024		After construction is complete, traffic impacts during the operational phase of the Project are expected to be negligible. A small maintenance crew driving through the area in light duty trucks on a regular basis will monitor and maintain the facilities as needed; traffic function in 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	35	8	7.6	Diesel	4,264	Caterpillar D6T Medium Load
Construction	Grader/scrapper	2	210	8	5.6	Diesel	18,849	Caterpillar 140M Medium Load
Construction	Backhoe	2	175	8	3.1	Diesel	8,695	Caterpillar 422F2 Low Load
Construction	Vibratory compactor	4	109	8	5	Diesel	17,391	Caterpillar CS56/CP56 High Load
Construction	100 HP Tractors	5	140	8	7	Diesel	39,269	Mowing, sitework, trench backfill
Construction	Dump Truck	2	53	8	10	Diesel	8,415	Tandem Axle 10-14 CY
Construction	Excavator	4	140	8	8.1	Diesel	36,352	Caterpillar 336D Medium Load
Construction	Concrete truck and boom	6	26	8	12	Diesel	15,147	Primarily Substation
Construction	High-reach bucket truck	0	0	0	0	Diesel	-	
Construction	Semi truck/trailer	6	105	8	10	Diesel	50,489	Standard size and weight semitruck for equipment deliveries (non-peak)
Construction	Semi truck/trailer	12	105	8	10	Diesel	100,978	Standard size and weight semitruck - volume during peak delivery of modules and racking
Construction	Tracked Loader	3	70	8	4	Diesel	6,732	953 Tracked Loader
Construction	Skid steer	4	109	8	3.3	Diesel	11,478	Caterpillar 299D Medium Load
Construction	Fork lift (all terrain)	8	135	8	2.9	Diesel	25,054	JLG 1255 Medium Load or telehandler
Construction	Pile driver	7	109	8	7.1	Diesel	43,216	Vermeer PD10 Medium/High Load
Construction	Truck-mounted auger/drill	0	0	0	0	Diesel	-	
Construction	Medium duty crane	2	26	4	18.8	Diesel	3,955	120T RT Telescopic Crane (This may end up being a 90 ton RTC or work split the a 120 & 90 ton)
Construction	Watering truck	4	175	9	11	Diesel	69,422	
Construction	Generator	10	109	8	1	Gasoline	8,695	Honda EB10000 Half Load Average
Construction	Light-duty pickup truck (on-site)	20	193	8	3.6	Gasoline	111,076	
Construction	ATVs	42	109	8	0.4	Gasoline	14,608	Club Car 4 Seater ATV
Construction	Construction contractor vehicles (commute to/from site)	150	305	1.3	2.5	Gasoline	152,500	Assume bulk of the workforce lives in Mankato, MN and drive to the site. Workers in Mankato are about 40 minutes one way, 80 min round trip. Assume 75% carpool.
	TOTAL GALLONS GAS (per year)						286,879	
	TOTAL GALLONS DIESEL (per year)						459,704	

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) - 3 full time staff	3	228	0.5	2.5	Gasoline	855	3 Solar Technicians performing maintenance checks.
Operation	ATV (on-site) - 3 full time staff	2	144	8	0.4	Gasoline	924	Inverter Checks Twice/Yr. Assume 43 solar inverters/14 BESS inverters, and maintenance checks at 2/day (29 days) for 1 Crew of 2. 2nd Crew of 2 will perform Tracker Maintenance in the same duration of 116 days at 40 trackers/day. Most trackers will require only a cursory visual inspection/routine maintenance; some are assumed to required additional maintenance.
Operation	O&M contractor vehicles (commute to/from site)	1	12	1.3	2.5	Gasoline	40	2 HV Technicians assumed from Mankato, MN, 80 min round trip.
Operation	O&M contractor vehicles (on-site)	1	12	8	1	Gasoline	96	1 HV Contractor performing monthly checks on Substation. 1 full 8hr day for Monthly Maintenance. Vehicle is parked at Substation and not used for maintenance checks.
Operation	BESS Emergency Generator	0	12	0.5	18.8	Diesel	-	Manufacturer manual and NFPA 110 require exercising the generator set at least once a month for 30 minutes under not less than 30% of the nameplate. Fuel consumption used here is at 50% load.
	TOTAL GALLONS GAS (per year)						1,915	
	TOTAL GALLONS DIESEL (per year)						-	

Summary						
Construction	Annual Gallons	KG of CO2 per Gallon Diesel	KG of CO2 per Gallon Gas	Total KG	KG to Tons Conversion Factor	Total Short Tons
Total Gas	286,879		8.78	2,518,797	0.00110231	2776.5
Total Diesel	459,704	10.19		4,684,385	0.00110231	5163.6
						7,940.14
Operation						
Total Gas	1,915		8.78	16,812	0.00110231	18.5
Total Diesel	-	10.19		0	0.00110231	0.0
						18.5