

Criteria Temporal Summary - Mitigated

Month	Activity	Mitigated				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
#4	Grading/Roads/Earthwork	1.29	24.53	18.39	34.83	4.50
	Month 4 Totals	1.3	24.5	18.4	34.8	4.5
#5	Solar Panel Construction	1.71	32.60	22.60	60.44	7.31
	Substation and O&M Building Construction	0.45	7.12	8.14	7.46	1.05
	Month 5 Totals	2.2	39.7	30.7	67.9	8.4
#6	Solar Panel Construction	1.71	32.60	22.60	60.44	7.31
	Substation and O&M Building Construction	0.45	7.12	8.14	7.46	1.05
	Month 6 Totals	2.2	39.7	30.7	67.9	8.4
#7	Solar Panel Construction	1.71	32.60	22.60	60.44	7.31
	Paving	0.22	3.68	3.81	3.20	0.51
	Month 7 Totals	1.9	36.3	26.4	63.6	7.8
#8	Solar Panel Construction	1.71	32.60	22.60	60.44	7.31
	Month 8 Totals	1.7	32.6	22.6	60.4	7.3
#9	Solar Panel Construction	1.71	32.60	22.60	60.44	7.31
	Month 9 Totals	1.7	32.6	22.6	60.4	7.3
#10	Offsite Transmission Facilities	0.89	7.49	6.95	6.33	1.06
	Month 10 Totals	0.9	7.5	6.9	6.3	1.1
Rockwood Solar Farm Maximum Daily		2.2	39.7	30.7	67.9	8.4
<i>Thresholds</i>		75	550	100	150	N/A
<i>Exceeds?</i>		N	N	N	N	

Criteria Temporal Summary - Unmitigated

Month	Activity	Mitigated				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
#4	Grading/Roads/Earthwork	3.37	24.53	24.43	78.94	9.74
	Month 4 Totals	3.4	24.5	24.4	78.9	9.7
#5	Solar Panel Construction	3.41	32.60	27.61	139.48	16.24
	Substation and O&M Building Construction	1.40	7.12	11.59	17.17	2.32
	Month 5 Totals	4.8	39.7	39.2	156.6	18.6
#6	Solar Panel Construction	3.41	32.60	27.61	139.48	16.24
	Substation and O&M Building Construction	1.40	7.12	11.59	17.17	2.32
	Month 6 Totals	4.8	39.7	39.2	156.6	18.6
#7	Solar Panel Construction	3.41	32.60	27.61	139.48	16.24
	Paving	0.61	3.68	4.98	7.26	1.03
	Month 7 Totals	4.0	36.3	32.6	146.7	17.3
#8	Solar Panel Construction	3.41	32.60	27.61	139.48	16.24
	Month 8 Totals	3.4	32.6	27.6	139.5	16.2
#9	Solar Panel Construction	3.41	32.60	27.61	139.48	16.24
	Month 9 Totals	3.4	32.6	27.6	139.5	16.2
#10	Offsite Transmission Facilities	1.50	7.49	8.58	14.29	2.06
	Month 10 Totals	1.5	7.5	8.6	14.3	2.1
Rockwood Solar Farm Maximum Daily		4.8	39.7	39.2	156.6	18.6
<i>Thresholds</i>		75	550	100	150	N/A
<i>Exceeds?</i>		N	N	N	Y	

Operational Emissions

Vehicle Activity

Activity	Vehicle Type	Workdays per Year	Trips per day	Round Trip (mi)	VMT per day	Annual VMT (mi)
On-site	Pickup Trucks LDT2	244	2.00	10	20	4,880
	Utility/Service Vehicles T6	244	0.25	10	3	610
	Water Truck T7	244	0.33	10	3	805
Off-site	Worker Commute * LDA+	244	10.00	30	300	73,200
	Carpenter Service Vehicle LHD1	244	0.50	30	15	3,660
	Electrical Service Vehicle LHD1	244	0.50	30	15	3,660
	Equipment/Material Delivery MDV	244	0.10	30	3	732
Totals					359	87,547

Criteria Emissions

Activity	Vehicle Type	Pounds per Day				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
On-site	Pickup Trucks	0.004	0.127	0.017	0.002	0.001
	Utility/Service Vehicles	0.000	0.016	0.002	0.000	0.000
	Water Truck	0.001	0.021	0.003	0.000	0.000
	Activity Type Total	0.005	0.163	0.022	0.003	0.001
Off-site	Worker Commute	0.058	1.899	0.251	0.031	0.013
	Carpenter Service Vehicle	0.003	0.095	0.013	0.002	0.001
	Electrical Service Vehicle	0.003	0.095	0.013	0.002	0.001
	Equipment/Material Delivery	0.001	0.019	0.003	0.000	0.000
	Activity Type Total	0.064	2.108	0.278	0.034	0.014
Totals		0.07	2.27	0.30	0.04	0.02

GHG Emissions

Activity	Vehicle Type	Total Tonnes			
		CO ₂	CH ₄	N ₂ O	CO ₂ e
On-site	Pickup Trucks	1.99	0.0002	0.0002	2.06
	Utility/Service Vehicles	0.63	0.0004	0.0003	0.74
	Water Truck	1.29	0.0005	0.0004	1.43
Off-site	Worker Commute	23.44	0.0021	0.0025	24.26
	Carpenter Service Vehicle	2.06	0.0001	0.0002	2.11
	Electrical Service Vehicle	2.06	0.0001	0.0002	2.11
	Equipment/Material Delivery	0.39	0.0000	0.0000	0.40
Totals		31.9	0.0034	0.0038	33.1

* Worker commute trips per day was estimated based on 5 full-time employees plus occasional extra workers for PV cleaning

Criteria Emissions Summary

Unmitigated

Phase Activity	Category	Criteria Emissions (lbs/d)				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Grading/Roads/Earthwork	Off-road	2.81	11.79	20.87	1.26	1.26
	On-site Mobile	0.01	0.04	0.22	0.02	0.01
	Vendors	0.04	0.16	1.73	0.04	0.03
	Employees	0.52	12.54	1.60	0.18	0.08
	Road Dust	--	--	--	76.46	8.26
	Grading Fugitive	--	--	--	0.99	0.11
	Phase 1 Activity Total		3.4	24.5	24.4	78.9
Solar Panel Construction	Off-road	2.30	9.08	16.66	1.06	1.06
	On-site Mobile	0.01	0.06	0.38	0.03	0.02
	Vendors	0.16	0.68	7.66	0.19	0.14
	Employees	0.94	22.77	2.91	0.33	0.14
	Road Dust	--	--	--	137.88	14.89
	Phase 2 Activity Total		3.4	32.6	27.6	139.5
Substation and O&M Building Construction	Off-road	1.26	4.36	10.65	0.48	0.48
	On-site Mobile	0.01	0.04	0.22	0.02	0.01
	Vendors	0.01	0.06	0.38	0.02	0.02
	Employees	0.11	2.66	0.34	0.04	0.02
	Road Dust	--	--	--	16.61	1.79
	Phase 3 Activity Total		1.4	7.1	11.6	17.2
Offsite Transmission Facilities	Off-road	1.38	5.10	7.65	0.55	0.55
	Vendors	0.03	0.11	0.64	0.03	0.03
	Employees	0.09	2.28	0.29	0.03	0.01
	Road Dust	--	--	--	13.67	1.48
	Phase 4 Activity Total		1.5	7.5	8.6	14.3
Paving	Off-road	0.55	2.46	3.97	0.25	0.25
	On-site Mobile	0.00	0.02	0.09	0.01	0.00
	Vendors	0.02	0.07	0.77	0.02	0.01
	Employees	0.05	1.14	0.15	0.02	0.01
	Road Dust	--	--	--	6.96	0.75
	Phase 5 Activity Total		0.6	3.7	5.0	7.3

Mitigated

Phase Activity	Category	Criteria Emissions (lbs/d)				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Grading/Roads/Earthwork	Off-road	0.73	11.79	14.83	0.72	0.72
	On-site Mobile	0.01	0.04	0.22	0.02	0.01
	Vendors	0.04	0.16	1.73	0.04	0.03
	Employees	0.52	12.54	1.60	0.18	0.08
	Road Dust	--	--	--	32.88	3.55
	Grading Fugitive	--	--	--	0.99	0.11
	Phase 1 Activity Total		1.3	24.5	18.4	34.8
Solar Panel Construction	Off-road	0.60	9.08	11.65	0.61	0.61
	On-site Mobile	0.01	0.06	0.38	0.03	0.02
	Vendors	0.16	0.68	7.66	0.19	0.14
	Employees	0.94	22.77	2.91	0.33	0.14
	Road Dust	--	--	--	59.29	6.40
	Phase 2 Activity Total		1.7	32.6	22.6	60.4
Substation and O&M Building Construction	Off-road	0.32	4.36	7.20	0.24	0.24
	On-site Mobile	0.01	0.04	0.22	0.02	0.01
	Vendors	0.01	0.06	0.38	0.02	0.02
	Employees	0.11	2.66	0.34	0.04	0.02
	Road Dust	--	--	--	7.14	0.77
	Phase 3 Activity Total		0.5	7.1	8.1	7.5
Offsite Transmission Facilities	Off-road	0.77	5.10	6.02	0.38	0.38
	Vendors	0.03	0.11	0.64	0.03	0.03
	Employees	0.09	2.28	0.29	0.03	0.01
	Road Dust	--	--	--	5.88	0.63
	Phase 4 Activity Total		0.9	7.5	6.9	6.3
Paving	Off-road	0.15	2.46	2.79	0.16	0.16
	On-site Mobile	0.00	0.02	0.09	0.01	0.00
	Vendors	0.02	0.07	0.77	0.02	0.01
	Employees	0.05	1.14	0.15	0.02	0.01
	Road Dust	--	--	--	2.99	0.32
	Phase 5 Activity Total		0.2	3.7	3.8	3.2

GHG Emissions Summary

Phase Activity	Category	GHG Emissions (tonnes)			
		CO ₂	CH ₄	N ₂ O	CO ₂ e
Grading/Roads/Earthwork	Off-road	39.58	0.0040	N/A	39.66
	On-site Mobile	0.19	0.0001	0.0001	0.19
	Vendors	1.80	0.0007	0.0007	2.02
	Employees	9.72	0.0183	0.0169	15.34
	Phase Activity Total	51.3	0.023	0.018	57.2
Solar Panel Construction	Off-road	112.95	0.0132	N/A	113.23
	On-site Mobile	1.19	0.0004	0.0004	1.21
	Vendors	6.53	0.0026	0.0024	7.32
	Employees	108.09	0.2038	0.1875	170.49
	Phase Activity Total	228.8	0.220	0.190	292.2
Substation and O&M Building Construction	Off-road	30.31	0.0025	N/A	30.37
	On-site Mobile	0.18	0.0000	0.0000	0.18
	Vendors	1.49	0.0007	0.0006	1.69
	Employees	5.16	0.0097	0.0089	8.13
	Phase Activity Total	37.1	0.013	0.010	40.4
Offsite Transmission Facilities	Off-road	7.94	0.0012	N/A	7.97
	Vendors	0.81	0.0003	0.0003	0.91
	Employees	2.21	0.0042	0.0038	3.49
	Phase Activity Total	11.0	0.006	0.004	12.4
Paving	Off-road	1.54	0.0002	N/A	1.55
	On-site Mobile	0.01	0.0000	0.0000	0.01
	Vendors	0.42	0.0002	0.0001	0.46
	Employees	0.44	0.0008	0.0008	0.70
	Phase Activity Total	2.4	0.001	0.001	2.7
Grand Total for RSF Site		330.6	0.263	0.222	404.9

Employee Commute

Vehicle Activity

Activity	Total Trips (days)	Trips per day	Round Trip (mi)	VMT per day	Total VMT (mi)
Grading/Roads/Earthwork	17	58	30	1,747	30,366
Solar Panel Construction	106	106	30	3,171	337,579
Substation and O&M Building Construction	43	12	30	371	16,103
Offsite Transmission Facilities	22	11	30	318	6,901
Paving	9	5	30	159	1,380
Totals				5,765	392,329

Criteria Emissions

Activity	Pounds per Day				
	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Grading/Roads/Earthwork	0.516	12.544	1.601	0.181	0.076
Solar Panel Construction	0.937	22.769	2.905	0.328	0.138
Substation and O&M Building Construction	0.109	2.661	0.340	0.038	0.016
Offsite Transmission Facilities	0.094	2.281	0.291	0.033	0.014
Paving	0.047	1.140	0.146	0.016	0.007
Totals	1.70	41.40	5.28	0.60	0.25

GHG Emissions

Activity	Total Tonnes			
	CO ₂	CH ₄	N ₂ O	CO ₂ e
Grading/Roads/Earthwork	9.72	0.0183	0.0169	15.34
Solar Panel Construction	108.09	0.2038	0.1875	170.49
Substation and O&M Building Construction	5.16	0.0097	0.0089	8.13
Offsite Transmission Facilities	2.21	0.0042	0.0038	3.49
Paving	0.44	0.0008	0.0008	0.70
Totals	125.6	0.2368	0.2179	198.1

On-site Mobile Equipment Emissions

Grading/Roads/Earthwork

Vehicle	Type	# Days	VMT per Day	Avg Number	Total VMT	Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
						ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Water Trucks	T6	17	5.45	0.82	78	0.002	0.011	0.063	0.005	0.003	0.088	0.0001	0.0000	0.09
Pick Up Trucks	LDT2	17	5.45	1.36	129	0.002	0.011	0.063	0.005	0.003	0.058	0.0000	0.0000	0.06
Flatbed Delivery Trucks	MDV	17	5.45	0.27	26	0.002	0.011	0.063	0.005	0.003	0.015	0.0000	0.0000	0.02
Lube/Fuel Trucks	T6	17	2.73	0.55	26	0.001	0.005	0.032	0.002	0.002	0.029	0.0000	0.0000	0.03
Totals					259	0.01	0.04	0.22	0.02	0.01	0.19	0.000	0.000	0.19

Solar Panel Construction

Vehicle	Type	# Days	VMT per Day	Avg Number	Total VMT	Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
						ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Water Trucks	T6	106	5.45	0.18	102	0.002	0.011	0.063	0.005	0.003	0.116	0.000	0.000	0.12
Concrete Trucks	T6	106	5.45	0.11	65	0.002	0.011	0.063	0.005	0.003	0.074	0.000	0.000	0.08
Pick Up Trucks	LDT2	106	5.45	1.36	792	0.002	0.011	0.063	0.005	0.003	0.357	0.000	0.000	0.36
Flatbed Delivery Trucks	MDV	106	5.45	0.55	317	0.002	0.011	0.063	0.005	0.003	0.186	0.000	0.000	0.19
Service Trucks	LHD1	106	2.73	0.55	158	0.001	0.005	0.032	0.002	0.002	0.098	0.000	0.000	0.10
Dump Trucks	T6	106	5.45	0.27	158	0.002	0.011	0.063	0.005	0.003	0.180	0.000	0.000	0.19
Lube/Fuel Trucks	T6	106	2.73	0.55	158	0.001	0.005	0.032	0.002	0.002	0.180	0.000	0.000	0.19
Totals					1,751	0.01	0.06	0.38	0.03	0.02	1.19	0.000	0.000	1.21

Substation and O&M Building Construction

Vehicle	Type	# Days	VMT per Day	Avg Number	Total VMT	Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
						ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Pick Up Trucks	LDT2	43	5.45	0.82	194	0.002	0.011	0.063	0.005	0.003	0.087	0.0000	0.0000	0.09
Flatbed Delivery Trucks	MDV	43	5.45	0.27	65	0.002	0.011	0.063	0.005	0.003	0.038	0.0000	0.0000	0.04
Service Trucks	LHD1	43	2.73	0.45	54	0.001	0.005	0.032	0.002	0.002	0.033	0.0000	0.0000	0.03
Concrete Trucks	T6	43	5.45	0.09	22	0.002	0.011	0.063	0.005	0.003	0.024	0.0000	0.0000	0.03
Totals					334	0.01	0.04	0.22	0.02	0.01	0.18	0.000	0.000	0.18

Paving

Vehicle	Type	# Days	VMT per Day	Avg Number	Total VMT	Criteria Emissions (lbs/d)					GHG Emissions (tonnes)			
						ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O	CO ₂ e
Pick Up Trucks	LDT2	9	5.45	0.18	9	0.002	0.011	0.063	0.005	0.003	0.004	0.0000	0.0000	0.00
Service Trucks	LHD1	9	2.73	0.18	4	0.001	0.005	0.032	0.002	0.002	0.003	0.0000	0.0000	0.00
Totals					13	0.00	0.02	0.09	0.01	0.00	0.01	0.000	0.000	0.01

Note: Lbs/day emission estimates assume worst-case of all vehicles operating on the same day traveling full mileage

Vendor Off-site Activity

Vehicle Activity

Activity Phase	Vehicle Type (EMFAC)	Days per Phase	Trips per day	Round Trip (mi)	VMT per day	Total VMT (mi)
Grading/Roads/Earthwork	Flatbed/Delivery Trucks (T7)	17	2.00	30	60	1,043
	Porto-Let Trucks (T6)	17	0.25	30	8	130
	Activity Phase Total					68
Solar Panel Construction	Flatbed/Delivery Trucks (T7)	106	1.18	30	35	3,756
	PV Panel Delivery Trucks (T7)	106	3.51	70	246	26,157
	Concrete Trucks (T6)	106	0.41	30	12	1,316
	Porto-Let Trucks (T6)	106	0.16	30	5	517
	Activity Phase Total					298
Substation and O&M Building Construction	Concrete Trucks (T6)	43	0.33	30	10	434
	Porto-Let Trucks (T6)	43	0.25	30	8	326
	Flatbed/Delivery Trucks (T7)	43	0.50	30	15	652
	Activity Phase Total					32
Offsite Transmission Facilities	Concrete Trucks (T6)	22	0.17	30	5	109
	Fuel & Lube Trucks (T7)	22	1.00	30	30	652
	Flatbed/Delivery Trucks (T7)	22	0.67	30	20	435
	Activity Phase Total					55
Paving	Flatbed/Delivery Trucks (T7)	9	0.67	30	20	174
	Fuel & Lube Trucks (T7)	9	0.33	30	10	87
	Activity Phase Total					30
Project Totals					483	35,787

Criteria Emissions

Activity Phase	Vehicle Type (EMFAC)	Pounds per Day				
		ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Grading/Roads/Earthwork	Flatbed/Delivery Trucks (T7)	0.031	0.138	1.542	0.038	0.028
	Porto-Let Trucks (T6)	0.004	0.017	0.193	0.005	0.003
	Activity Phase Total		0.04	0.16	1.73	0.04
Solar Panel Construction	Flatbed/Delivery Trucks (T7)	0.018	0.081	0.907	0.022	0.016
	PV Panel Delivery Trucks (T7)	0.128	0.564	6.315	0.156	0.114
	Concrete Trucks (T6)	0.006	0.028	0.318	0.008	0.006
	Porto-Let Trucks (T6)	0.003	0.011	0.125	0.003	0.002
	Activity Phase Total		0.16	0.68	7.66	0.19
Substation and O&M Building Construction	Concrete Trucks (T6)	0.005	0.019	0.116	0.006	0.005
	Porto-Let Trucks (T6)	0.003	0.015	0.087	0.005	0.003
	Flatbed/Delivery Trucks (T7)	0.007	0.029	0.174	0.010	0.007
	Activity Phase Total		0.01	0.06	0.38	0.02
Offsite Transmission Facilities	Concrete Trucks (T6)	0.002	0.010	0.058	0.003	0.002
	Fuel & Lube Trucks (T7)	0.014	0.058	0.348	0.019	0.014
	Flatbed/Delivery Trucks (T7)	0.009	0.039	0.232	0.013	0.009
	Activity Phase Total		0.03	0.11	0.64	0.03
Paving	Flatbed/Delivery Trucks (T7)	0.010	0.046	0.514	0.013	0.009
	Fuel & Lube Trucks (T7)	0.005	0.023	0.257	0.006	0.005
	Activity Phase Total		0.02	0.07	0.77	0.02
Project Totals		0.25	1.08	11.19	0.31	0.22

GHG Emissions

Activity Phase	Vehicle Type (EMFAC)	Total Tonnes			
		CO ₂	CH ₄	N ₂ O	CO ₂ e
Grading/Roads/Earthwork	Flatbed/Delivery Trucks (T7)	1.67	0.0006	0.0006	1.86
	Porto-Let Trucks (T6)	0.13	0.0001	0.0001	0.16
	Activity Phase Total	1.8	0.0007	0.0007	2.0
Solar Panel Construction	Flatbed/Delivery Trucks (T7)	6.00	0.0023	0.0021	6.69
	PV Panel Delivery Trucks (T7)	41.78	0.0158	0.0145	46.61
	Concrete Trucks (T6)	1.36	0.0008	0.0007	1.60
	Porto-Let Trucks (T6)	0.53	0.0003	0.0003	0.63
	Activity Phase Total	49.7	0.0192	0.0176	55.5
Substation and O&M Building Construction	Concrete Trucks (T6)	0.45	0.0003	0.0002	0.53
	Porto-Let Trucks (T6)	0.34	0.0002	0.0002	0.40
	Flatbed/Delivery Trucks (T7)	1.04	0.0004	0.0004	1.16
	Activity Phase Total	1.8	0.0009	0.0008	2.1
Offsite Transmission Facilities	Concrete Trucks (T6)	0.11	0.0001	0.0001	0.13
	Fuel & Lube Trucks (T7)	1.04	0.0004	0.0004	1.16
	Flatbed/Delivery Trucks (T7)	0.69	0.0003	0.0002	0.77
	Activity Phase Total	1.8	0.0007	0.0007	2.1
Paving	Flatbed/Delivery Trucks (T7)	0.28	0.0001	0.0001	0.31
	Fuel & Lube Trucks (T7)	0.14	0.0001	0.0000	0.15
	Activity Phase Total	0.4	0.0002	0.0001	0.5
Totals		55.6	0.0216	0.0199	62.2

Off Road Equipment Emissions

Grading/Roads/Earthwork

Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
	BHP	Load Factor	Length (wkday)	hrs/day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	CO ₂ e
Crawler Tractors	185	0.43	17	8	1.0	139	0.80	2.30	7.06	0.27	0.27	6.29	0.0006	6.30
Generator Sets	30	0.74	17	8	0.8	139	0.45	1.47	1.58	0.12	0.12	1.40	0.0003	1.41
Scrapers	365	0.48	17	8	1.0	139	1.66	6.20	14.28	0.55	0.55	13.84	0.0012	13.87
Rubber Tired Loaders	78	0.36	17	8	2.0	139	0.86	3.94	5.40	0.45	0.45	4.44	0.0006	4.45
Graders	185	0.41	17	8	1.0	139	0.62	1.84	5.67	0.20	0.20	5.99	0.0004	6.00
Rollers	83	0.38	17	4	1.5	70	0.37	1.62	2.37	0.20	0.20	1.87	0.0003	1.87
Pavers	173	0.42	17	4	2.0	70	0.96	4.39	7.43	0.41	0.41	5.74	0.0007	5.76
Totals							2.8	11.8	20.9	1.3	1.3	39.6	0.004	39.7

Solar Panel Construction

Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
	BHP	Load Factor	Length (wkday)	hrs/day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	CO ₂ e
Generator Sets	30	0.74	106	8	1.0	852	0.56	1.83	1.98	0.15	0.15	10.74	0.0024	10.80
Air Compressors	25	0.48	106	8	1.0	852	0.20	0.59	1.06	0.06	0.06	5.81	0.0009	5.83
Crawler Tractors	185	0.43	106	4	1.0	426	0.40	1.15	3.53	0.13	0.13	19.25	0.0017	19.29
Rubber Tired Loaders	78	0.36	106	4	1.0	426	0.22	0.98	1.35	0.11	0.11	6.80	0.0009	6.81
Rubber Tired Forklifts	99	0.40	106	5	1.5	532	0.52	2.56	3.34	0.28	0.28	17.97	0.0023	18.02
Trenchers	115	0.50	106	4	1.5	426	0.81	3.09	4.99	0.42	0.42	20.87	0.0035	20.95
Oher construction equipment	310	0.42	106	4	1.0	426	0.35	1.30	3.45	0.11	0.11	31.51	0.0015	31.54
Totals							2.3	9.1	16.7	1.1	1.1	112.9	0.013	113.2

Substation and O&M Building Construction

Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
	BHP	Load Factor	Length (wkday)	hrs/day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	CO ₂ e
Air Compressors	25	0.48	43	6	1.0	261	0.15	0.44	0.79	0.05	0.05	1.78	0.0003	1.78
Crawler Tractors	185	0.43	43	2	1.0	87	0.20	0.58	1.76	0.07	0.07	3.93	0.0004	3.94
Rubber Tired Loaders	78	0.36	43	2	1.0	87	0.11	0.49	0.68	0.06	0.06	1.39	0.0002	1.39
Oher construction equipment	310	0.42	43	4	1.0	174	0.35	1.30	3.45	0.11	0.11	12.86	0.0006	12.87
Trenchers	115	0.50	43	2	1.0	87	0.27	1.03	1.66	0.14	0.14	2.84	0.0005	2.85
Cranes	250	0.29	43	6	0.7	261	0.33	0.96	3.09	0.11	0.11	7.52	0.0006	7.53
Totals							1.3	4.4	10.6	0.5	0.5	30.3	0.002	30.4

Offsite Transmission Facilities

Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
	BHP	Load Factor	Length (wkday)	hrs/day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	CO ₂ e
Generator Sets	30	0.74	22	8	1.0	174	0.56	1.83	1.98	0.15	0.15	2.19	0.0005	2.20
Crawler Tractors	185	0.43	22	2	1.0	43	0.20	0.58	1.76	0.07	0.07	1.96	0.0002	1.97
Rubber Tired Loaders	78	0.36	22	4	1.0	87	0.22	0.98	1.35	0.11	0.11	1.39	0.0002	1.39
Rubber Tired Forklifts	99	0.40	22	2	1.0	43	0.14	0.68	0.89	0.08	0.08	0.98	0.0001	0.98
Trenchers	115	0.50	22	2	1.0	43	0.27	1.03	1.66	0.14	0.14	1.42	0.0002	1.42
Totals							1.4	5.1	7.6	0.5	0.5	7.9	0.001	8.0

Paving

Equipment Type	Activity						Criteria Emissions (lbs/d)					GHG Emissions (tonnes)		
	BHP	Load Factor	Length (wkday)	hrs/day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	CO ₂ e
Pavers	173	0.42	9	6	0.5	52	0.36	1.65	2.78	0.15	0.15	1.08	0.0001	1.08
Rollers	83	0.38	9	6	0.5	52	0.19	0.81	1.19	0.10	0.10	0.47	0.0001	0.47
Totals							0.5	2.5	4.0	0.3	0.3	1.5	0.000	1.5

Mitigated Off Road Equipment Emissions

Grading/Roads/Earthwork

Equipment Type	Activity							Mitigated Emissions (lbs/d)				
	BHP	Load Factor	Length (wkday)	Length (months)	hrs/ day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Crawler Tractors	185	0.43	17	0.8	8	1.0	139	0.20	2.30	4.76	0.10	0.10
Generator Sets	30	0.74	17	0.8	8	0.8	139	0.45	1.47	1.58	0.12	0.12
Scrapers	365	0.48	17	0.8	8	1.0	139	0.40	6.20	9.44	0.21	0.21
Rubber Tired Loaders	78	0.36	17	0.8	8	2.0	139	0.20	3.94	4.17	0.25	0.25
Graders	185	0.41	17	0.8	8	1.0	139	0.15	1.84	3.83	0.07	0.07
Rollers	83	0.38	17	0.8	4	1.5	70	0.09	1.62	1.83	0.11	0.11
Pavers	173	0.42	17	0.8	4	2.0	70	0.29	4.39	5.01	0.30	0.30
Totals								0.7	11.8	14.8	0.7	0.7

Solar Panel Construction

Equipment Type	Activity							Mitigated Emissions (lbs/d)				
	BHP	Load Factor	Length (wkday)	Length (months)	hrs/ day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Generator Sets	30	0.74	106	4.8	8	1.0	852	0.56	1.83	1.98	0.15	0.15
Air Compressors	25	0.48	106	4.8	8	1.0	852	0.20	0.59	1.06	0.06	0.06
Crawler Tractors	185	0.43	106	4.8	4	1.0	426	0.10	1.15	2.38	0.05	0.05
Rubber Tired Loaders	78	0.36	106	4.8	4	1.0	426	0.05	0.98	1.04	0.06	0.06
Rough Terrain Forklifts	99	0.40	106	4.8	5	1.5	532	0.12	2.56	2.58	0.15	0.15
Trenchers	115	0.50	106	4.8	4	1.5	426	0.24	3.09	3.37	0.30	0.30
Oher construction equipment	310	0.42	106	4.8	4	1.0	426	0.08	1.30	2.28	0.04	0.04
Totals								0.6	9.1	11.6	0.6	0.6

Substation and O&M Building Construction

Equipment Type	Activity							Mitigated Emissions (lbs/d)				
	BHP	Load Factor	Length (wkday)	Length (months)	hrs/ day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Air Compressors	25	0.48	43	2.0	6	1.0	261	0.15	0.44	0.79	0.05	0.05
Crawler Tractors	185	0.43	43	2.0	2	1.0	87	0.05	0.58	1.19	0.03	0.03
Rubber Tired Loaders	78	0.36	43	2.0	2	1.0	87	0.03	0.49	0.52	0.03	0.03
Other construction equipment	310	0.42	43	2.0	4	1.0	174	0.08	1.30	2.28	0.04	0.04
Trenchers	115	0.50	43	2.0	2	1.0	87	0.08	1.03	1.12	0.10	0.10
Cranes	250	0.29	43	2.0	6	0.7	261	0.08	0.96	2.09	0.04	0.04
<i>Totals</i>								0.3	4.4	7.2	0.2	0.2

Offsite Transmission Facilities

Equipment Type	Activity							Mitigated Emissions (lbs/d)				
	BHP	Load Factor	Length (wkday)	Length (months)	hrs/ day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Generator Sets	30	0.74	22	1.0	8	1.0	174	0.56	1.83	1.98	0.15	0.15
Crawler Tractors	185	0.43	22	1.0	2	1.0	43	0.05	0.58	1.19	0.03	0.03
Rubber Tired Loaders	78	0.36	22	1.0	4	1.0	87	0.05	0.98	1.04	0.06	0.06
Rough Terrain Forklifts	99	0.40	22	1.0	2	1.0	43	0.03	0.68	0.69	0.04	0.04
Trenchers	115	0.50	22	1.0	2	1.0	43	0.08	1.03	1.12	0.10	0.10
<i>Totals</i>								0.8	5.1	6.0	0.4	0.4

Paving

Equipment Type	Activity							Mitigated Emissions (lbs/d)				
	BHP	Load Factor	Length (wkday)	Length (months)	hrs/ day	Avg Daily Number	total hours	ROG	CO	NO _x	PM ₁₀	PM _{2.5}
Pavers	173	0.42	9	0.4	6	0.5	52	0.11	1.65	1.88	0.11	0.11
Rollers	83	0.38	9	0.4	6	0.5	52	0.04	0.81	0.92	0.05	0.05
<i>Totals</i>								0.2	2.5	2.8	0.2	0.2

Entrained Road Dust

Entrained road dust emissions are generated by vehicles traveling on both paved and unpaved roads. These equations are based on the paved and unpaved roads emission factors found in AP-42. Defaults are from URBEMIS.

Emission Factors - Paved Roads

$$EF_{PM_{10}} = k \times (sL \div 2) \times 0.65 \times (W \div 3) \times 1.5 = 0.000057 \text{ lbs } PM_{10}/VMT$$

Constant	Description	Value
$k =$	<i>particle size multiplier for particle size range and units of interest</i>	0.016
$sL =$	<i>road surface silt loading in g/m^2 (allowable range is 0.02 to 400 g/m^2)</i>	0.1
$W =$	<i>average weight of the vehicles traveling the road in megagrams (mean average fleet vehicle weight ranging from 1.8 - 39 megagrams or 2.0 - 42 tons)</i>	2.2

Emission Factors - Unpaved Roads

$$EF_{PM_{10}} = (k \times (s \div 12) \times 1.0 \times (S \div 30) \times 0.5) \div ((M \div 0.5) \times 0.2) = 0.086 \text{ lbs } PM_{10}/VMT$$

Constant	Description	Value
$k =$	<i>the fraction of particles less than or equal to the particle size cutoff of 10 microns</i>	1.8
$s =$	<i>surface material silt content (%) (allowable range [1.8 - 25.2 %])</i>	4.3%
$S =$	<i>the average vehicle speed (mph) (allowable range [10 - 43 mph])</i>	40
$M =$	<i>surface moisture content (%) (allowable range 0.03 - 13 %)</i>	0.5%

Entrained Road Dust Emissions

Phase/Category		VMT/d		Paved Roads (lbs/d)		Unpaved Roads (lbs/d)		Total Roads (lbs/d)		Mitigated (lbs/d)	
		(paved)	(unpaved)	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}	PM ₁₀	PM _{2.5}
Grading/Roads/ Earthwork	Employee	874	874	0.050	0.005	75.124	8.112	75.173	8.117	32.325	3.490
	Vendor	68	15	0.004	0.000	1.279	0.138	1.283	0.139	0.552	0.060
	TOTAL	941	888	0.05	0.01	76.40	8.25	76.46	8.26	32.88	3.55
Solar Panel Construction	Employee	1,586	1,586	0.0907	0.0098	136.353	14.7229	136.4437	14.7327	58.671	6.335
	Vendor	298	16	0.0171	0.0018	1.415	0.1528	1.4319	0.1546	0.616	0.066
	TOTAL	1,884	1,602	0.11	0.01	137.77	14.88	137.88	14.89	59.29	6.40
Substation and O&M Building Construction	Employee	185	185	0.0106	0.0011	15.935	1.7206	15.9459	1.7218	6.857	0.740
	Vendor	32	8	0.0019	0.0002	0.661	0.0714	0.6629	0.0716	0.285	0.031
	TOTAL	218	193	0.01	0.00	16.60	1.79	16.61	1.79	7.14	0.77
Offsite Transmission Facilities	Employee	159	159	0.0091	0.0010	13.659	1.4748	13.6679	1.4758	5.877	0.635
	Vendor	55	0	0.0031	0.0003	0.000	0.0000	0.0031	0.0003	0.001	0.000
	TOTAL	214	159	0.01	0.00	13.66	1.47	13.67	1.48	5.88	0.63
Paving	Employee	79	79	0.0045	0.0005	6.829	0.7374	6.8340	0.7379	2.939	0.317
	Vendor	30	1	0.0017	0.0002	0.128	0.0138	0.1296	0.0140	0.056	0.006
	TOTAL	109	81	0.01	0.00	6.96	0.75	6.96	0.75	2.99	0.32
GRAND TOTAL		3,366	2,923	0.2	0.0	251.4	27.1	251.6	27.2	108.2	11.7

Notes: Mitigation of 57% for traffic speed restriction

Per ICAPCD, vehicular in Imperial County is 50% on unpaved roads.

EMFAC 2011

2014 Estimated Annual Emission Rates

EMFAC2011 Vehicle Categories

Imperial COUNTY

Vehicle Info			Emission Factor (grams/mile)											
Type	Fuel	VMT	ROG	CO	NO _x	PM ₁₀			PM _{2.5}			CO ₂	CH ₄	N ₂ O
						Exhaust	TW+BW	Total	Exhaust	TW+BW	Total			
LDA	GAS	3,810,354	0.1431	3.1103	0.4072	0.0018	0.0447	0.0466	0.0017	0.0177	0.0194	285.7	0.0278	0.0294
LDA	DSL	11,288	0.0376	0.1941	0.5580	0.0275	0.0447	0.0723	0.0253	0.0177	0.0431	308.5		
LDT1	GAS	590,382	0.1877	5.1765	0.5521	0.0042	0.0447	0.0489	0.0038	0.0177	0.0215	334.2	0.0315	0.0433
LDT1	DSL	665	0.0584	0.2682	0.7043	0.0477	0.0447	0.0925	0.0439	0.0177	0.0617	314.9		
LDT2	GAS	1,391,517	0.0872	2.8720	0.3791	0.0020	0.0447	0.0467	0.0018	0.0177	0.0195	408.7	0.0315	0.0433
LDT2	DSL	806	0.0417	0.2235	0.6565	0.0317	0.0447	0.0765	0.0292	0.0177	0.0469	320.0		
Weighted Average for Employees			0.1340	3.2569	0.4156	0.0022	0.0447	0.0469	0.0020	0.0177	0.0197	320.2	0.0291	0.0342
LHD1	GAS	219,732	0.1010	2.2642	0.8235	0.0009	0.0447	0.0456	0.0008	0.0177	0.0186	562.1	0.0315	0.0433
MDV	GAS	1,385,611	0.0964	3.1290	0.5245	0.0018	0.0447	0.0465	0.0016	0.0177	0.0194	531.4	0.0315	0.0433
T6 instate construction small	DSL	16,565	0.2062	0.8836	5.2659	0.2342	0.1423	0.3765	0.2154	0.0589	0.2743	1,031.2	0.6037	0.5554
T7 tractor construction	DSL	12,313	0.2371	1.0418	11.6587	0.1899	0.0977	0.2877	0.1747	0.0355	0.2102	1,597.1	0.6037	0.5554

Notes: - Criteria and CO₂ factors come from 2014 EMFAC2011 and represent Estimated Annual Emission Rates for Imperial County in the Salton Sea Air Basin

- CH₄ and N₂O factors come from Local Government Operations Protocol: For the quantification and reporting of greenhouse gas emissions inventories. Version 1.1. California Air Resources Board, California Climate Action Registry, ICLEI - Local Governments for Sustainability, and The Climate Registry. May 2010

2014 Offroad Emission Factors (g/hp/hr)

Veh Type	BHP	Load Factor	Emission Factor (g/bhp-hr)						
			ROG	CO	NO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄
Air Compressors	25	0.48	0.960	2.780	5.000	0.291	0.291	568.3	0.086
Cranes	250	0.29	0.496	1.427	4.605	0.160	0.160	568.3	0.044
Crawler Tractors	185	0.43	0.571	1.640	5.029	0.192	0.192	568.3	0.051
Generator Sets	30	0.74	1.427	4.683	5.048	0.389	0.389	568.3	0.128
Graders	185	0.41	0.464	1.379	4.241	0.146	0.146	568.3	0.041
Other Construction Equipment	310	0.42	0.308	1.135	3.008	0.098	0.098	568.3	0.027
Pavers	173	0.42	0.750	3.429	5.794	0.319	0.319	568.3	0.067
Rollers	83	0.38	0.887	3.882	5.690	0.475	0.475	568.3	0.080
Rough Terrain Forklifts	99	0.40	0.798	3.905	5.107	0.431	0.431	568.3	0.072
Rubber Tired Loaders	78	0.36	0.869	3.973	5.454	0.459	0.459	568.3	0.078
Scrapers	365	0.48	0.536	2.007	4.621	0.178	0.178	568.3	0.048
Trenchers	115	0.50	1.061	4.063	6.558	0.550	0.550	568.3	0.095

From: CalEEMod Users Guide - Appendix D, CalEEMod User's Tips (June 2011), and 2011 Carl Moyer Program Guidelines

Mitigated Off-Road Emission Factors

Percentage Reduction from Tier 1 to Tier 2

Engine Size (hp)	Tier 1 to Tier 2		
	ROG	NO _x	PM
75 - 99	76.5%	22.9%	45.7%
100 - 174	70.1%	32.5%	27.6%
175 - 299	75.5%	32.5%	62.5%
300 - 600	76.0%	33.9%	62.5%

Mitigation Measures and Control Efficiencies page at SCAQMD
http://www.aqmd.gov/ceqa/handbook/mitigation/MM_intro.html

Adjusted Offroad Emission Factors (g/hp/hr)

Veh Type	BHP	Emission Factor (g/bhp-hr)			
		ROG	NO _x	PM ₁₀	PM _{2.5}
Cranes	250	0.122	3.107	0.060	0.060
Crawler Tractors	185	0.140	3.393	0.072	0.072
Graders	185	0.114	2.861	0.055	0.055
Other Construction Equipment	310	0.074	1.988	0.037	0.037
Pavers	173	0.224	3.909	0.231	0.231
Rollers	83	0.209	4.387	0.258	0.258
Rough Terrain Forklifts	99	0.188	3.938	0.234	0.234
Rubber Tired Loaders	78	0.204	4.205	0.249	0.249
Scrapers	365	0.129	3.054	0.067	0.067
Trenchers	115	0.317	4.424	0.398	0.398

Activity Data

Rockwood Solar Farm

MW = 100

Phase	Schedule		Average Daily Trips			
	Mo	WD	Emp	Emp w/rs	Vendors	
					T6	T7
Grading/Roads/Earthwork	0.8	17.4	64	58	0.2	0.8
Solar Panel Construction	4.9	106.5	116	106	0.2	2.2
Substation, Building and Water Tank Construction	2.0	43.5	14	12	9.6	0.3
Offsite Transmission Facilities	1.0	21.7	12	11	0.5	0.8
Paving	0.4	8.7	6	5	0.2	0.3

From TIA	
231	employees
15	trucks