

## **Appendix G Energy Calculations**

## **IPCP2 Project—Energy Consumption Summary**

Date of Last Revision: January 26, 2024

### **Summary of Energy Use During Construction**

Construction On-Road Vehicle Fuel (D)  
Construction On-Road Vehicle Fuel (G)  
Construction On-Road Vehicle Fuel (E)  
Construction Off-Road Equipment Fuel

Annual Fuel Use  
2,799,195 gallons (diesel)  
2,890,526 gallons (gasoline)  
2,278,498 kWh  
1,224,265 gallons (diesel)

### **Summary of Energy Use During Operations**

Operational On-Road Vehicle Fuel (D)  
Operational On-Road Vehicle Fuel (G)  
Operational On-Road Vehicle Fuel (E)  
Operational Off-Road Equipment + Generators (D)  
Operational Off-Road Equipment (E)  
Industrial Building Electricity (unmitigated)  
Water and Wastewater Treatment Electricity Use  
Industrial Building Natural Gas (unmitigated)

Annual Fuel Use  
4,110,188 gallons (diesel)  
3,209,770 gallons (gasoline)  
14,497,278 kWh  
55,147 gallons (diesel)  
1,804,031 kWh  
67,864,803 kWh  
135,443 kWh  
58,322,343 kBTU



**Construction On-Road Vehicle Fuel Calculations**

IPC2 Project

**Construction Schedule**

Project Phase	Construction Phase Name	Start Date	End Date	Number of Days	Start Year
P1&2	Site Preparation	7/27/2026	7/27/2026	1	2026
	Grading	7/27/2026	7/27/2026	1	2026
	Building Construction	7/27/2026	7/27/2026	1	2026
	Paving	7/27/2026	7/27/2026	1	2026
	Architectural Coating	7/27/2026	7/27/2026	1	2026
P3	Site Preparation	9/22/2030	9/22/2030	1	2030
	Grading	9/22/2030	9/22/2030	1	2030
	Building Construction	9/22/2030	9/22/2030	1	2030
	Paving	9/22/2030	9/22/2030	1	2030
	Architectural Coating	9/22/2030	9/22/2030	1	2030

**Construction Trips and VMT**

Phase Name	Trips per Day			Construction Trip Length in Miles			Number of Days per Phase	Trips per Phase			VMT per Phase		
	Worker Trip Number	Onsite Truck Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Onsite Truck Trip Length		Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trips	Onsite Truck Trips	Hauling Trips
P1&2 Site Preparation	75	0	0	15.5	15.5	0	40	7,000	0	0	108,900	0	0
P1&2 Grading	2,173	0	0	15.5	15.5	0	105	16,365	0	0	1,611,150	0	0
P1&2 Building Construction	1,069	0	0	15.5	15.5	0	105	16,365	0	0	1,611,150	0	0
P1&2 Paving	543	0	0	15.5	15.5	0	72	39,094	0	0	605,961	0	0
P1&2 Architectural Coating	105	0	0	15.5	15.5	0	40	4,200	0	0	65,100	0	0
P3 Site Preparation	1,722	0	0	15.5	15.5	0	105	14,715	0	0	219,713	0	0
P3 Grading	89	0	0	15.5	15.5	0	72	6,480	0	0	100,440	0	0
P3 Building Construction	344	0	0	15.5	15.5	0	72	24,792	0	0	384,271	0	0
P3 Paving													
P3 Architectural Coating													
<b>TOTALS</b>													

Phase Name	Gasoline			Diesel			Electric Consumption (kWh)
	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
P1&2	43,959,988	42,150,350	1,552,455,06	1,930,5124	6,199,526,607	1,839,243.5	632,883
P3	16,687,840	2,807,532	300,993,6111	1,386,430.74	1,621,921,844	1,936,774.89	199,283,8869
<b>TOTALS</b>	61,386,137	44,957,882	1,853,448,671	3,316,943.18	7,821,448,451	3,776,018.39	832,166,770

Phase Name	Gasoline			Diesel			Electric Consumption (kWh)
	Worker Trips	Vendor Trips	Hauling Trips	Worker Trips	Vendor Trips	Hauling Trips	
P1&2	27,184,893	26,184,893	952,155,824	1,579,519.6	5,056,346.64	1,579,519.6	608,349,7042
P3	14,199,244	2,672,639	168,292,787	1,737,423.5	1,165,180.16	1,165,180.16	138,837,1767
<b>TOTALS</b>	41,384,137	28,857,532	1,120,448,611	3,316,943.18	6,221,526.80	2,744,699.82	747,186,8809

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Total Project Construction VMT (miles)

100,288,281

Total Project Fuel Consumption (gallons)

#REF!

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Source: EMFAC2021 (v1.0.2) Emissions Inventory  
 Region: San Joaquin  
 Calendar Year: 2026, 2031  
 Season: Annual

Vehicle Classification: EMFAC2007 Categories  
 Units: miles/day for CVMT and EVMT, trips/day for Trips, kWh/day for Energy Consumption, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

VTM = Vehicle Miles Traveled  
 FE = Fuel Economy

Given

Calculations

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	VMT (mi/day)	% of Fleet	Energy Consumption (kWh/day)	Fuel Consumption (1000 gallons/day)	FE (mil/gallon)/(mi/kWh)	VMT*FE
San Joaquin	2026	HHDT	Aggregate	Aggregate	Gasoline	0.7168474	49.35429542	0.00%	0	0	0.012107907	201.1782
San Joaquin	2026	HHDT	Aggregate	Aggregate	Diesel	9478.1152	1260022.511	99.01%	0	0	203.3641982	4.0762037
San Joaquin	2026	HHDT	Aggregate	Aggregate	Electricity	107.14721	12546.41001	0.99%	23055.13492	0	0	6.1958915
San Joaquin	2026	LDA	Aggregate	Aggregate	Gasoline	248954.35	10081616.22	93.83%	0	0	330.9884835	0.5441916
San Joaquin	2026	LDA	Aggregate	Aggregate	Diesel	575.66423	1828.729038	0.07%	0	0	0.416391319	43.91852
San Joaquin	2026	LDA	Aggregate	Aggregate	Electricity	13715.479	64191.3237	6.00%	248711.1767	0	2.5901198	803150.7
San Joaquin	2026	LD1	Aggregate	Aggregate	Gasoline	20548.595	6929.704437	99.64%	0	0	25.368107	17579349
San Joaquin	2026	LD1	Aggregate	Aggregate	Electricity	52.436503	2475.247542	0.01%	955.6498446	0	2.5901198	1185.754
San Joaquin	2026	LD1	Aggregate	Aggregate	Gasoline	108965.88	441819.45	98.93%	0	0	25.074066	1.11E+08
San Joaquin	2026	LD2	Aggregate	Aggregate	Electricity	326.57413	14345.45726	0.32%	0	0	2.5901198	6411.188
San Joaquin	2026	LD2	Aggregate	Aggregate	Electricity	967.64995	33362.08647	0.75%	12880.5189	0	2.5901198	86411.8
San Joaquin	2026	LD2	Aggregate	Aggregate	Gasoline	9286.2172	330876.2233	53.30%	0	0	34.508806	495041.7
San Joaquin	2026	LD2	Aggregate	Aggregate	Diesel	8223.2698	281945.2979	45.41%	0	0	9.705269	3232935
San Joaquin	2026	LD2	Aggregate	Aggregate	Electricity	121.14398	8008.304774	1.29%	5221.234481	0	1.5337563	12283.1
San Joaquin	2026	LD2	Aggregate	Aggregate	Gasoline	1106.2693	38648.46441	25.70%	0	0	6.696795	336229.3
San Joaquin	2026	LD2	Aggregate	Aggregate	Electricity	3071.3447	109795.1081	73.02%	1228.621772	0	1.5337563	12283.1
San Joaquin	2026	LD2	Aggregate	Aggregate	Gasoline	91590.449	3218634.995	97.37%	0	0	15.881587	2982.92
San Joaquin	2026	MDV	Aggregate	Aggregate	Gasoline	1387.0906	50484.50119	1.53%	0	0	19.949232	64202907
San Joaquin	2026	MDV	Aggregate	Aggregate	Electricity	1056.3115	3637.92754	1.0%	14029.4373	0	2.5901198	94119.57
San Joaquin	2026	MDV	Aggregate	Aggregate	Gasoline	570.44702	27374.27298	8.74%	0	0	4.8572546	132478.1
San Joaquin	2026	MDV	Aggregate	Aggregate	Diesel	6034.6945	282095.1111	89.69%	0	0	8.7676296	2456098
San Joaquin	2026	MDV	Aggregate	Aggregate	Electricity	88.562756	4907.52434	1.57%	5336.785659	0	0.193542	4512.884
San Joaquin	2031	HHDT	Aggregate	Aggregate	Gasoline	0.7406272	64.11997194	0.00%	0	0	0.014263559	288.3414
San Joaquin	2031	HHDT	Aggregate	Aggregate	Diesel	10390.929	137133.615	94.60%	0	0	6.7496906	9025462
San Joaquin	2031	HHDT	Aggregate	Aggregate	Electricity	665.99486	76196.51253	5.39%	140093.039	0	0.5493136	41445.41
San Joaquin	2031	LDA	Aggregate	Aggregate	Gasoline	25842.87	10289598.84	91.18%	0	0	33.154384	3.41E+08
San Joaquin	2031	LDA	Aggregate	Aggregate	Diesel	368.1709	11592.31032	0.10%	0	0	46.78174	542308.4
San Joaquin	2031	LDA	Aggregate	Aggregate	Electricity	22599.16	983420.0409	8.71%	379681.3019	0	2.5901198	2547176
San Joaquin	2031	LD1	Aggregate	Aggregate	Gasoline	19088.659	695911.7681	98.84%	0	0	27.06203	18272567
San Joaquin	2031	LD1	Aggregate	Aggregate	Diesel	0.1059406	4.937664829	0.00%	0	0	28.892129	142.6996
San Joaquin	2031	LD1	Aggregate	Aggregate	Electricity	164.88915	7744.94948	1.16%	2990.189725	0	27.505996	137E+08
San Joaquin	2031	LD2	Aggregate	Aggregate	Gasoline	124540.2	4981602.037	98.15%	0	0	2.5901198	20000.35
San Joaquin	2031	LD2	Aggregate	Aggregate	Diesel	418.37268	17631.31343	0.35%	0	0	17.46475	654841.1
San Joaquin	2031	LD2	Aggregate	Aggregate	Electricity	2385.1838	76290.52989	1.50%	29454.44114	0	2.5901198	197601.6
San Joaquin	2031	LD2	Aggregate	Aggregate	Gasoline	8475.1113	300607.7565	51.48%	0	0	16.101943	3713788
San Joaquin	2031	LD2	Aggregate	Aggregate	Electricity	7022.749	230642.2474	39.50%	0	0	15.347703	80797.17
San Joaquin	2031	LD2	Aggregate	Aggregate	Gasoline	922.51133	52644.47026	9.02%	34301.20532	0	9.1903064	309806.7
San Joaquin	2031	LD2	Aggregate	Aggregate	Electricity	893.54786	33655.75345	23.66%	0	0	1.5615535	19292.67
San Joaquin	2031	LHD1	Aggregate	Aggregate	Gasoline	2860.759	96215.36122	67.65%	7911.858235	0	26.581924	1154739
San Joaquin	2031	LHD1	Aggregate	Aggregate	Electricity	225.31494	1235.479028	8.69%	0	0	5.1030611	127969.5
San Joaquin	2031	MDV	Aggregate	Aggregate	Gasoline	89093.501	3132841.854	96.33%	0	0	2.5901198	196665
San Joaquin	2031	MDV	Aggregate	Aggregate	Electricity	1277.0389	43440.74334	1.34%	29314.83372	0	9.0538047	2500049
San Joaquin	2031	MDV	Aggregate	Aggregate	Gasoline	2394.7614	75928.92995	2.33%	0	0	0.9235542	35986.87
San Joaquin	2031	WHDT	Aggregate	Aggregate	Gasoline	462.15686	25077.00799	7.37%	0	0	0.9235542	35986.87
San Joaquin	2031	WHDT	Aggregate	Aggregate	Diesel	6265.6867	276132.412	81.20%	42085.42862	0	0.9235542	35986.87
San Joaquin	2031	WHDT	Aggregate	Aggregate	Electricity	716.09889	38868.17556	11.43%	0	0	0.9235542	35986.87

Worker (LDA, LD1, LD2, MDV)	2026	2031
diesel	elec	gas
Sum of VMT*FE (Column BI)	1855476.29	565378354
Total VMT	83165.37769	19063354.5
Weighted Average Fuel Economy	30.69654036	29.6575517
Percentage	0%	94%
Vendor (HHDT, LHD1, LHD2, MDV)	3701743.567	16714887
Sum of VMT*FE (Column BI)	26606.50427	3571714.09
Total VMT	1951768.129	369404.649
Weighted Average Fuel Economy	8.373099629	9.9378628
Percentage	82%	14%
Onsite Trucks (LHD1, LHD2, MDV)	6778360.98	109385.5908
Sum of VMT*FE (Column BI)	442224.9072	46260.61498
Total VMT	16.20322286	2.36455116
Weighted Average Fuel Economy	11%	87%
Percentage	11%	9%
Haul (HHDT)	201.178162	780682.79
Sum of VMT*FE (Column BI)	126022.511	64.1309219
Total VMT	4.076203709	0.544191567
Weighted Average Fuel Economy	0%	0%
Percentage	0%	0%

**Construction Off-Road Equipment Fuel Calculation**

IPCP2 Project

**Construction Schedule**

Project Phase	Construction Phase Name	Start Date	End Date	Number of Days	Start Year
P1 & 2	Site Preparation	1/1/2026	2/25/2026	40	2026
	Grading	2/26/2026	7/22/2026	105	
	Building Construction	6/12/2030	6/12/2030	1015	
	Paving	9/21/2030	9/21/2030	72	
	Architectural Coating	9/22/2030	12/31/2030	72	
P3	Site Preparation	1/1/2031	2/25/2031	40	2031
	Grading	2/26/2031	7/22/2031	105	
	Building Construction	7/23/2031	6/12/2035	1015	
	Paving	6/13/2035	9/20/2035	72	
	Architectural Coating	9/21/2035	12/31/2035	72	

**Construction Equipment**

Project Phase	Equipment Name	Standardized Equipment Type	HP Bin	Equipment Type + HP Bin	Amount	Use Hours per	Horse Power	Load Factor	Number of Days	HP Hours	Fuel (gallons/HP-)	Diesel Fuel Usage	
P1 & 2	Site Preparation	Rubber Tired Dozers	600	Rubber Tired Dozers 600	15	8	367	0.4	40	704,640.00	0.044630784	31448.63545	
	Site Preparation	Tractors/Loaders/backhoes	100	Tractors/Loaders/Backhoes 100	20	8	84	0.37	40	198,912.00	0.057270255	11391.74091	
	Grading	Graders	175	Graders 175	5	8	148	0.41	105	254,856.00	0.055591357	14167.79077	
	Grading	Excavators	50	Excavators 50	10	8	36	0.38	105	114,912.00	0.056459456	6487.869064	
	Grading	Tractors/Loaders/backhoes	100	Tractors/Loaders/Backhoes 100	10	8	84	0.37	105	261,072.00	0.057270255	14951.65994	
	Grading	Scrapers	600	Scrapers 600	10	8	423	0.48	105	1,705,536.00	0.047369886	80791.04629	
	Grading	Rubber Tired Dozers	600	Rubber Tired Dozers 600	5	8	367	0.4	105	616,560.00	0.044630784	27517.55601	
	Grading	Other Construction Equipment	100	Other Construction Equipment 100	8	8	82	0.42	105	144,648.00	0.076429978	11055.4434	
	Building Construction	Rough Terrain Forklifts	100	Rough Terrain Forklifts 100	15	8	82	0.2	1015	1,997,520.00	0.059493711	118839.8779	
	Building Construction	Generator Sets	75	Generator Sets 75	5	8	14	0.74	1015	420,616.00	0.016164589	6799.084899	
	Building Construction	Cranes	600	Cranes 600	5	7	367	0.29	1015	3,780,925.75	0.051827181	195984.7244	
	Building Construction	Welders	50	Welders 50	5	8	46	0.45	1015	840,420.00	0.025812659	21693.47458	
	Building Construction	Tractors/Loaders/backhoes	100	Tractors/Loaders/Backhoes 100	15	7	84	0.37	1015	3,312,351.00	0.057270255	189699.1855	
	Paving	Pavers	100	Pavers 100	10	8	81	0.42	72	195,955.20	0.057210977	11210.78837	
	Paving	Paving Equipment	100	Paving Equipment 100	10	8	89	0.36	72	184,550.40	0.061117771	11279.29789	
	Paving	Rollers	50	Rollers 50	10	8	36	0.38	72	78,796.80	0.061280547	4828.711034	
	Architectural Coating	Air Compressors	50	Air Compressors 50	5	6	37	0.48	72	38,361.60	0.027574502	1057.802026	
	P3	Site Preparation	Rubber Tired Dozers	600	Rubber Tired Dozers 600	9	8	367	0.4	40	422,784.00	0.047446853	20059.55901
		Site Preparation	Tractors/Loaders/backhoes	100	Tractors/Loaders/Backhoes 100	12	8	84	0.37	40	119,347.20	0.060172706	7181.443974
		Grading	Graders	175	Graders 175	3	8	148	0.41	105	152,913.60	0.058337746	8920.634772
Grading		Excavators	50	Excavators 50	6	8	36	0.38	105	68,947.20	0.059551623	4105.917677	
Grading		Tractors/Loaders/backhoes	100	Generator Sets 75	6	8	84	0.37	105	156,643.20	0.017065134	2673.137198	
Grading		Scrapers	600	Scrapers 600	6	8	423	0.48	105	1,023,321.60	0.048819085	49957.62439	
Grading		Rubber Tired Dozers	600	Rubber Tired Dozers 600	3	8	367	0.4	105	369,936.00	0.047446853	17552.11414	
Grading		Other Construction Equipment	100	Other Construction Equipment 100	3	8	82	0.42	105	86,788.80	0.102605503	8905.008437	
Building Construction		Rough Terrain Forklifts	100	Rough Terrain Forklifts 100	9	8	82	0.2	1015	1,198,512.00	0.063672469	76312.21846	
Building Construction		Generator Sets	75	Generator Sets 75	3	8	14	0.74	1015	252,369.60	0.017065134	4306.721041	
Building Construction		Cranes	600	Cranes 600	3	7	367	0.29	1015	2,268,555.45	0.051531	116900.9312	
Building Construction		Welders	50	Welders 50	3	8	46	0.45	1015	504,262.00	0.025774348	12996.76665	
Building Construction		Tractors/Loaders/backhoes	100	Tractors/Loaders/Backhoes 100	9	7	84	0.37	1015	1,987,410.60	0.060172706	119587.8737	
Paving		Pavers	100	Pavers 100	6	8	81	0.42	72	117,573.12	0.060141026	7070.968012	
Paving		Paving Equipment	100	Paving Equipment 100	6	8	89	0.36	72	110,730.24	0.064282823	7118.657028	
Paving		Rollers	50	Generator Sets 75	6	8	36	0.38	72	47,278.08	0.017065134	806.8067705	
Architectural Coating		Air Compressors	50	Air Compressors 50	3	6	37	0.48	72	23,016.96	0.02755679	634.2735248	

Notes:  
 Source of usage estimates: California Air Resource Board (CARB) 2023. OFFROAD2021 (v1.0.4) Emissions Inventory  
 Website: <https://arb.ca.gov/enfac/emissions-inventory/>. Accessed October 17, 2023.

1,224,265.34

0.03

Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory

Region Type: County

Region: San Joaquin

Calendar Year: 2026, 2031

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	CalYr	Vehicle Class + HP Bin	Model Year	Fuel	Fuel Consumption (gallons/year)	Horsepower Hours (HP- hours/year)	Fuel (gallons/HP- hour)
San Joaquin	2026	Cranes 100	Aggregate	Diesel	2914.883091	33686.0615	0.086530837
San Joaquin	2026	Cranes 175	Aggregate	Diesel	22412.33126	349644.5362	0.064100333
San Joaquin	2026	Cranes 25	Aggregate	Diesel	147.9841863	95.98875453	1.541682534
San Joaquin	2026	Cranes 300	Aggregate	Diesel	68493.29108	1251500.714	0.054728927
San Joaquin	2026	Cranes 50	Aggregate	Diesel	282.4987847	2744.882384	0.102918357
San Joaquin	2026	Cranes 600	Aggregate	Diesel	93708.27028	1808091.197	0.051827181
San Joaquin	2026	Cranes 75	Aggregate	Diesel	1187.580151	11625.77933	0.102150584
San Joaquin	2026	Excavators 100	Aggregate	Diesel	76637.20266	1352454.506	0.056665272
San Joaquin	2026	Excavators 175	Aggregate	Diesel	430163.9317	8521276.092	0.050481164
San Joaquin	2026	Excavators 25	Aggregate	Diesel	3.237448439	57.72863006	0.056080465
San Joaquin	2026	Excavators 300	Aggregate	Diesel	459877.903	9142043.867	0.05030362
San Joaquin	2026	Excavators 50	Aggregate	Diesel	123978.0818	2195878.06	0.056459456
San Joaquin	2026	Excavators 600	Aggregate	Diesel	528841.9048	10564922.49	0.050056392
San Joaquin	2026	Excavators 75	Aggregate	Diesel	97906.01692	1737995.051	0.056332736
San Joaquin	2026	Graders 100	Aggregate	Diesel	3548.010753	52973.02497	0.066977688
San Joaquin	2026	Graders 175	Aggregate	Diesel	52631.53876	946757.5899	0.055591357
San Joaquin	2026	Graders 300	Aggregate	Diesel	167683.3112	3283998.978	0.051060707
San Joaquin	2026	Graders 50	Aggregate	Diesel	424.0301498	6549.439025	0.064742972
San Joaquin	2026	Graders 600	Aggregate	Diesel	40288.91873	799006.1691	0.050423789
San Joaquin	2026	Graders 75	Aggregate	Diesel	1488.097964	20323.23385	0.073221515
San Joaquin	2026	Pavers 100	Aggregate	Diesel	10769.37833	188239.7218	0.057210977
San Joaquin	2026	Pavers 175	Aggregate	Diesel	35796.97846	707844.1752	0.050571834
San Joaquin	2026	Pavers 300	Aggregate	Diesel	43321.71913	859635.7357	0.050395438
San Joaquin	2026	Pavers 50	Aggregate	Diesel	2043.307089	34131.26528	0.05986614
San Joaquin	2026	Pavers 600	Aggregate	Diesel	7587.270081	153833.5903	0.049321283
San Joaquin	2026	Pavers 75	Aggregate	Diesel	9966.755804	173096.7233	0.057579113
San Joaquin	2026	Paving Equipment 100	Aggregate	Diesel	6226.733909	101881.0076	0.06111771
San Joaquin	2026	Paving Equipment 175	Aggregate	Diesel	39735.66542	783200.926	0.050734957
San Joaquin	2026	Paving Equipment 300	Aggregate	Diesel	17871.10804	353731.4115	0.050521688
San Joaquin	2026	Paving Equipment 50	Aggregate	Diesel	5021.823411	87293.29525	0.057528169
San Joaquin	2026	Paving Equipment 600	Aggregate	Diesel	42178.94465	841474.0093	0.050125071
San Joaquin	2026	Paving Equipment 75	Aggregate	Diesel	3712.288064	64631.4879	0.057437763
San Joaquin	2026	Rollers 100	Aggregate	Diesel	31153.98396	516706.662	0.060293366
San Joaquin	2026	Rollers 175	Aggregate	Diesel	172545.6333	3390616.828	0.050889157
San Joaquin	2026	Rollers 300	Aggregate	Diesel	14907.14291	289683.5996	0.051460086
San Joaquin	2026	Rollers 50	Aggregate	Diesel	51024.22615	832633.329	0.061280547
San Joaquin	2026	Rollers 600	Aggregate	Diesel	11804.27145	243694.1846	0.048438872
San Joaquin	2026	Rollers 75	Aggregate	Diesel	20214.43263	338590.2704	0.059701753
San Joaquin	2026	Rough Terrain Forklifts 100	Aggregate	Diesel	43978.81184	739217.8266	0.059493711
San Joaquin	2026	Rough Terrain Forklifts 175	Aggregate	Diesel	275183.1014	5430601.819	0.050672671
San Joaquin	2026	Rough Terrain Forklifts 300	Aggregate	Diesel	2362.00026	45862.92551	0.051501299
San Joaquin	2026	Rough Terrain Forklifts 50	Aggregate	Diesel	1531.076762	27301.42754	0.056080465
San Joaquin	2026	Rough Terrain Forklifts 600	Aggregate	Diesel	667.8758445	13225.08437	0.050500687
San Joaquin	2026	Rough Terrain Forklifts 75	Aggregate	Diesel	61231.73088	1076428.308	0.05688417
San Joaquin	2026	Rubber Tired Dozers 100	Aggregate	Diesel	2148.612142	35627.13672	0.060308303
San Joaquin	2026	Rubber Tired Dozers 175	Aggregate	Diesel	6520.062202	128560.9347	0.050715734
San Joaquin	2026	Rubber Tired Dozers 300	Aggregate	Diesel	8095.743507	161307.5001	0.050188265
San Joaquin	2026	Rubber Tired Dozers 50	Aggregate	Diesel	598.6475641	4995.546391	0.119836254
San Joaquin	2026	Rubber Tired Dozers 600	Aggregate	Diesel	42764.82421	958191.1999	0.044630784
San Joaquin	2026	Rubber Tired Dozers 75	Aggregate	Diesel	1097.589289	15999.52383	0.068601372
San Joaquin	2026	Scrapers 100	Aggregate	Diesel	1123.088134	17671.58044	0.06355335
San Joaquin	2026	Scrapers 175	Aggregate	Diesel	9563.672625	178949.5613	0.053443398
San Joaquin	2026	Scrapers 300	Aggregate	Diesel	133535.2257	2549695.151	0.052373016



Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory

Region Type: County

Region: San Joaquin

Calendar Year: 2026, 2031

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	CalYr	Vehicle Class + HP Bin	Model Year	Fuel	Fuel Consumption (gallons/year)	Horsepower Hours (HP- hours/year)	Fuel (gallons/HP- hour)
San Joaquin	2031	Cranes 100	Aggregate	Diesel	3089.874334	34561.35187	0.089402589
San Joaquin	2031	Cranes 175	Aggregate	Diesel	23099.44314	353633.9471	0.065320208
San Joaquin	2031	Cranes 25	Aggregate	Diesel	148.2814796	85.04728498	1.743518087
San Joaquin	2031	Cranes 300	Aggregate	Diesel	69067.43838	1260659.155	0.054786766
San Joaquin	2031	Cranes 50	Aggregate	Diesel	455.3206199	2738.464299	0.166268598
San Joaquin	2031	Cranes 600	Aggregate	Diesel	94112.12615	1826320.581	0.051531
San Joaquin	2031	Cranes 75	Aggregate	Diesel	1353.574745	11762.74379	0.115073045
San Joaquin	2031	Excavators 100	Aggregate	Diesel	78153.58892	1333859.532	0.058592068
San Joaquin	2031	Excavators 175	Aggregate	Diesel	428512.7196	8412580.148	0.050937134
San Joaquin	2031	Excavators 25	Aggregate	Diesel	74.14073981	52.54537845	1.410984981
San Joaquin	2031	Excavators 300	Aggregate	Diesel	454968.9622	9088799.519	0.050058202
San Joaquin	2031	Excavators 50	Aggregate	Diesel	128533.1792	2158348.879	0.059551623
San Joaquin	2031	Excavators 600	Aggregate	Diesel	521554.4769	10469045.19	0.049818724
San Joaquin	2031	Excavators 75	Aggregate	Diesel	98117.53002	1699930.064	0.057718569
San Joaquin	2031	Graders 100	Aggregate	Diesel	4136.480731	55050.27607	0.075140054
San Joaquin	2031	Graders 175	Aggregate	Diesel	56709.96067	972097.2177	0.058337746
San Joaquin	2031	Graders 300	Aggregate	Diesel	168623.6364	3290926.182	0.05123896
San Joaquin	2031	Graders 50	Aggregate	Diesel	747.8907651	7183.774328	0.104108332
San Joaquin	2031	Graders 600	Aggregate	Diesel	40112.78913	797578.9941	0.050293187
San Joaquin	2031	Graders 75	Aggregate	Diesel	2046.981882	21021.71091	0.097374657
San Joaquin	2031	Pavers 100	Aggregate	Diesel	11412.94683	189769.7409	0.060141026
San Joaquin	2031	Pavers 175	Aggregate	Diesel	35897.20892	698814.9787	0.051368688
San Joaquin	2031	Pavers 300	Aggregate	Diesel	42938.97873	853644.2192	0.05030079
San Joaquin	2031	Pavers 50	Aggregate	Diesel	2551.798306	34244.41809	0.074517204
San Joaquin	2031	Pavers 600	Aggregate	Diesel	7604.034288	153078.0805	0.04967422
San Joaquin	2031	Pavers 75	Aggregate	Diesel	10880.85958	172174.9861	0.063196518
San Joaquin	2031	Paving Equipment 100	Aggregate	Diesel	6612.713537	102860.3224	0.064288283
San Joaquin	2031	Paving Equipment 175	Aggregate	Diesel	39682.89302	777732.3332	0.051023844
San Joaquin	2031	Paving Equipment 300	Aggregate	Diesel	17857.85381	353547.7769	0.05051044
San Joaquin	2031	Paving Equipment 50	Aggregate	Diesel	5392.582536	86032.90646	0.062680464
San Joaquin	2031	Paving Equipment 600	Aggregate	Diesel	41795.51403	832010.2386	0.050234375
San Joaquin	2031	Paving Equipment 75	Aggregate	Diesel	4061.199639	64697.90347	0.062771735
San Joaquin	2031	Rollers 100	Aggregate	Diesel	33437.10784	523043.2024	0.063928004
San Joaquin	2031	Rollers 175	Aggregate	Diesel	173379.9395	3364062.892	0.051538852
San Joaquin	2031	Rollers 300	Aggregate	Diesel	15184.36422	295312.6801	0.051417922
San Joaquin	2031	Rollers 50	Aggregate	Diesel	60677.84943	827806.0931	0.073299593
San Joaquin	2031	Rollers 600	Aggregate	Diesel	12061.01745	246260.5978	0.048976643
San Joaquin	2031	Rollers 75	Aggregate	Diesel	21485.6129	335140.0514	0.064109356
San Joaquin	2031	Rough Terrain Forklifts 100	Aggregate	Diesel	47384.00138	744183.5058	0.063672469
San Joaquin	2031	Rough Terrain Forklifts 175	Aggregate	Diesel	278184.2159	5385533.177	0.051653979
San Joaquin	2031	Rough Terrain Forklifts 300	Aggregate	Diesel	2365.318432	46214.51523	0.051181288
San Joaquin	2031	Rough Terrain Forklifts 50	Aggregate	Diesel	1717.672685	26991.10205	0.063638479
San Joaquin	2031	Rough Terrain Forklifts 600	Aggregate	Diesel	655.9029806	13002.85838	0.050442984
San Joaquin	2031	Rough Terrain Forklifts 75	Aggregate	Diesel	61590.30361	1056341.714	0.058305284
San Joaquin	2031	Rubber Tired Dozers 100	Aggregate	Diesel	2334.984492	35929.59166	0.064987783
San Joaquin	2031	Rubber Tired Dozers 175	Aggregate	Diesel	6740.56278	128764.0115	0.052348189
San Joaquin	2031	Rubber Tired Dozers 300	Aggregate	Diesel	8292.836951	165428.9698	0.050129291
San Joaquin	2031	Rubber Tired Dozers 50	Aggregate	Diesel	577.7952595	4970.869081	0.116236266
San Joaquin	2031	Rubber Tired Dozers 600	Aggregate	Diesel	49291.49691	1038889.051	0.047446353
San Joaquin	2031	Rubber Tired Dozers 75	Aggregate	Diesel	1254.876998	16311.40296	0.076932499
San Joaquin	2031	Scrapers 100	Aggregate	Diesel	1180.530736	17828.00621	0.066217766
San Joaquin	2031	Scrapers 175	Aggregate	Diesel	10497.60543	190872.6285	0.054997961
San Joaquin	2031	Scrapers 300	Aggregate	Diesel	138467.2621	2663491.907	0.051987116



Operational Fuel Calculation—Project-Generated Operational Trips (Page 2 of 2)

Total Operational VMT  
 IPOP2 Project

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
Unrefrigerated Warehouse-No Rail	8,332	8,332	8,332	3,041,126	246,478	246,478	246,478	89,964,413
General Heavy Industry	2,611	2,611	2,611	953,015	77,240	77,240	77,240	28,192,662
Refrigerated Warehouse-No Rail	2,482	2,482	2,482	905,931	73,424	73,424	73,424	26,799,782
Manufacturing	1,273	1,273	1,273	464,645	37,659	37,659	37,659	13,745,407

Total Annual VMT 158,702,264

Vehicle Type	Fraction of 1	Annual VMT	Gas VMT	Gas Consumption	Diesel VMT	Diesel Consumption	Electric VMT	Electric Consumption
Passenger Cars (LDA)	0.7404	117,503,166	105,151,895	3,001,737	78,750	1,555	122,725,136	4,738,202
Medium Duty Truck (MHD)	0.1259	19,980,615	1,097,634	207,846	13,622,166	1,452,921	52,008,151.14	5,685,388
Heavy/Heavy Diesel Trucks (HHDT)	0.1336	21,202,623	865	187	18,987,677	2,652,761	221,4080.32	4,073,553
Brine Truck Off-hauling (HHDT)		700	0	0	627	88	73.10	134
TRUs								
Total	0.9999	158,687,094	106,250,395	3,209,770	32,689,219	4,110,188	19,747,480	14,497,278

\*Note: Fleet mix provided in TIA

13,629,998,406

3,067,876,790

158,687,094

Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory

Region Type: County

Region: San Joaquin

Calendar Year: 2036

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Year	Vehicle Category	Model Year	Horsepower Bin	Fuel	Fuel Consumption	Total_Activity_hpy	Total_Population	Horsepower_Hours_hpy	gallons/hour for entire fleet
San Joaquin	2036	Transport Refrigeration Unit - Instate Trailer	Aggregate	25	Diesel	593715.7	904852.04	507.91	0	0.656147
San Joaquin	2036	Transport Refrigeration Unit - Instate Trailer	Aggregate	50	Diesel	735418.57	995503.56	558.89424	0	0.73874
San Joaquin	2036	Transport Refrigeration Unit - Instate Trailer	Aggregate	Aggregate	Diesel	1329134.27	1900355.6	1066.80424	0	0.699413

Hours per day

3.3

Full Project Buildout - Operational Year of 2036

# Daily Trips	# TRUs	Total Hours	Fuel Consumption
2482	1241	4095.3	2864.307909

**Operational Equipment Fuel Calculation**

IPCP2 Project

Diesel Fueled										
Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of Days per Year	HP Hours	HP Bin	Equipment Type + HP	Fuel (gallons/HP-hour)	Diesel Fuel Usage
Tractors/Loaders/Backhoes	20	4	84	0.37	365	907,536.00	100	Tractors/Loaders/Backhoes 100	0.06040323	54,818.10

Electricity Fueled							
Offroad Equipment Type	Amount	Usage Hours	Horse Power	kW	Number of Days per Year	kWhr/yr	MWhr/yr
Tractors/Loaders/Backhoes	20	4	84	61.7819	365	1,804,031.33	1,804.03

Notes:

Source of usage estimates: California Air Resource Board (CARB), 2023. OFFROAD2021 (v1.0.4) Emissions Inventory  
 Website: <https://arb.ca.gov/emfac/emissions-inventory/>. Accessed October 19, 2023.

Stationary Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of Days per Year	HP Hours	HP Bin	Equipment Type + HP	Fuel Efficiency (gallons/HP-hour)	Diesel Fuel Usage
Emergency Generator	5	2	100	0.73	25	18,250.00	100	Generators 100	0.018015849	328.79

Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory

Region Type: County

Region: San Joaquin

Calendar Year: 2036

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Y	Vehicle Category	Model Yea	Horsepowe	Fuel	Fuel Consumpti	Horsepower_Hours_	Fuel (gallons/HP-hour)
San Joaqui	2036	Tractors/Loaders/Backhoes 100	Aggregate	100	Diesel	542052.6848	8973902.679	0.060403227
San Joaqui	2036	Industrial - Misc - Other General Industrial Equipment	Aggregate	15	Diesel	8.012501416	0	0
San Joaqui	2036	Light Commercial - Misc - Pumps	Aggregate	15	Diesel	10923.21784	0	0
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	100	Diesel	2422.71307	42610.0802	0.056857745
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	175	Diesel	7453.701348	148391.8082	0.050229871
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	300	Diesel	4824.252831	97097.3347	0.049684709
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	50	Diesel	6815.178149	108929.9018	0.062564806
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	600	Diesel	16878.49286	340867.1051	0.049516344
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	75	Diesel	3397.207254	58946.71346	0.057631835
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	750	Diesel	3653.503608	73010.4138	0.050040856
San Joaqui	2036	Industrial - Other General Industrial Equipment	Aggregate	9999	Diesel	5837.100281	117942.8419	0.049490924

Model Output: OFFROAD2021 (v1.0.5) Emissions Inventory

Region Type: County

Region: San Joaquin

Calendar Year: 2036

Scenario: All Adopted Rules - Exhaust

Vehicle Classification: OFFROAD2021 Equipment Types

Units: tons/day for Emissions, gallons/year for Fuel, hours/year for Activity, Horsepower-hours/year for Horsepower-hours

Region	Calendar Y	Vehicle Category	Model Yea	Horsepowe	Fuel	Fuel Consumpti	Horsepower_Hours_	Fuel (gallons/HP-hour)
San Joaqui	2036	Portable Equipment - Non-Rental Generator	Aggregate	100	Diesel	35133.90143	1950166.303	0.018015849
San Joaqui	2036	Portable Equipment - Rental Generator	Aggregate	100	Diesel	152067.8958	8440784.375	0.018015849

Energy  
 From CalEEMod Results Tab 5.11.1

Industrial Building Land Use	Electricity (kWh/yr)	Natural Gas (kBTU/yr)
Unrefrigerated Warehouse-No Rail	41,947,418	22,330,436
General Heavy Industry	5,536,857	22,221,814
Refrigerated Warehouse-No Rail	13,114,464	2,659,186
Manufacturing	2,768,429	11,110,907
Parking Lot	917,980	-
Parking Lot	3,579,655	-
Other Asphalt Surfaces	-	-
<b>Totals*</b>	<b>67,864,803</b>	<b>58,322,343</b>

\*total does not include other industrial uses which account for water and wastewater treatment energy requirements. These energy requirements are included separately.

Treatment Systems Land Use	Electricity (kWh/yr)
Water and Wastewater Treatment System Energy*	135,443

\*Source: Kier and Wright. 2023. IPCII Water & Wastewater Annual Power Costs.

**ICP II  
 Water & Wastewater Annual Power Costs**

System	Demand (gpm)	TDH (feet)	HP	KW	Hours	kwh	Cost
1 Well Water	60	450	10.49	7.81	8760	68,457	\$ 11,638
2 Brine Disposal A (RO)	6	350	0.82	0.61	8760	5,324	\$ 905
3 Brine Disposal B (evap)	0.75		(Volume based)				\$ 78,840
4 Fire Well	1200	500	233.10	173.66	130	22,576	\$ 5,644
5 fire pump	2000	185	143.59	106.97	130	13,907	\$ 3,477
6 Reclaimed Wastewater	20	350	2.72	2.03	8760	17,748	\$ 3,017
7 water pump station	60	187	4.36	3.25	8760	28,455	\$ 4,837
8 recycled water pump station	277.35	233	25.13	18.72	2750	51,490	\$ 8,753
9 wastewater lift station	20	25	0.19	0.14	8760	1,268	\$ 216
10 Storm Pump Station	5386	25	52.31	38.97	240	9,353	\$ 1,590
<b>Total</b>				<b>313.20</b>		<b>135,443</b>	<b>\$ 103,521</b>

Well Pump	
TDH	Feet
PWL	250
Op press	175
Mics	25
<b>Total</b>	<b>450</b>

Assume  
 Cost of power 0.17  
 IX Efficiency 95%  
 RO Double Treatment 3 gpm x 2  
 RO Concentrate 25%  
 Evaaporator \$200 per 1k gallon