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# **Appendix IS-10**

## Energy Calculations



# 100 E. Ocean

## Energy Analysis Spreadsheets

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## 100 East Ocean - Energy Calculations

### Summary of Energy Use During Construction

#### Project

<b>Electricity</b>	
Water Consumption	1,284 kWh
Temporary Power (lighting, tools)	66,730 kWh
<b>Total:</b>	<b>68,013 kWh</b>
<b>Gasoline</b>	
On Road	66,778 Gallons
Off Road	0
<b>Total:</b>	<b>66,778 Gallons</b>
<b>Diesel</b>	
On Road	47,319 Gallons
Off Road	28,865 Gallons
<b>Total:</b>	<b>76,184 Gallons</b>

### Summary of Energy Use During Operations

	<b>Baseline (Buildout)</b>	<b>Project Buildout no PDFs</b>	<b>Project with PDFs and Project Characteristics</b>	<b>Percent Reduction from Project Buildout no PDFs</b>
<b>Electricity</b>				
Electricity (building)	0	4,813,637	4,490,141 kWh/year	-7%
Electricity (water)	0	243,506	199,937 kWh/year	-18%
<b>Electricity Total</b>	0	5,057,143	4,690,078 kWh/year	-7%
<b>Natural Gas</b>	0	15,818,630	15,818,630 cu ft/year	0%
<b>Mobile</b>				
Gasoline	0	656,570	218,310 Gallons/year	-67%
Diesel	0	41,800	13,899 Gallons/year	-67%

**Calculation of Diesel Usage During Construction (Offroad Equipment):**

Phase Name	Off Road Equipment Type	Units	Hours	HP	Load Factor	Avg. Daily Factor	Number of Days	Diesel Fuel Usage
Demolition	Concrete/Industrial Saws	1	8	81	0.73	0.6	25	354.78
Demolition	Crushing/Proc. Equipment	1	8	85	0.78	0.6	25	397.8
Demolition	Excavators	0	8	158	0.38	0.6	25	0
Demolition	Rubber Tired Dozers	1	8	247	0.4	0.6	25	592.8
Demolition	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	25	215.34
Grading	Bore/Drill Rigs	1	8	221	0.5	0.6	20	530.4
Grading	Cranes	1	8	231	0.29	0.6	20	321.552
Grading	Excavators	1	8	158	0.38	0.6	20	288.192
Grading	Graders	0	8	187	0.41	0.6	20	0
Grading	Rubber Tired Dozers	0	8	247	0.4	0.6	20	0
Grading	Rubber Tired Loaders	2	8	203	0.36	0.6	20	701.568
Grading	Tractors/Loaders/Backhoes	0	8	97	0.37	0.6	20	0
Grading	Welders	1	8	46	0.45	0.6	20	99.36
Mat Foundation	Cement and Mortar Mixers	4	8	9	0.56	0.6	3	14.5152
Mat Foundation	Cranes	0	7	231	0.29	0.6	3	0
Mat Foundation	Forklifts	0	8	89	0.2	0.6	3	0
Mat Foundation	Generator Sets	0	8	84	0.74	0.6	3	0
Mat Foundation	Pumps	4	8	84	0.74	0.6	3	179.0208
Mat Foundation	Tractors/Loaders/Backhoes	0	7	97	0.37	0.6	3	0
Mat Foundation	Welders	0	8	46	0.45	0.6	3	0
Mat Foundation	Welders	1	8	46	0.45	0.6	3	14.904
Parking and Podium	Aerial Lifts	1	8	63	0.31	0.6	46	215.6112
Parking and Podium	Cranes	0	7	231	0.29	0.6	46	0
Parking and Podium	Forklifts	0	8	89	0.2	0.6	46	0
Parking and Podium	Generator Sets	0	8	84	0.74	0.6	46	0
Parking and Podium	Pumps	2	8	84	0.74	0.6	46	1372.4928
Parking and Podium	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	46	396.2256
Parking and Podium	Welders	1	8	46	0.45	0.6	46	228.528
Building Construction (She Aerial Lifts		2	8	63	0.31	0.6	451	4227.8544
Building Construction (She Cranes		0	7	231	0.29	0.6	451	0
Building Construction (She Forklifts		2	8	89	0.2	0.6	451	3853.344
Building Construction (She Generator Sets		0	8	84	0.74	0.6	451	0
Building Construction (She Tractors/Loaders/Backhoes		1	8	97	0.37	0.6	451	3884.7336
Building Construction (She Welders		2	8	46	0.45	0.6	451	4481.136
Building Construction (Fini Aerial Lifts		1	8	63	0.31	0.6	211	988.9992
Building Construction (Fini Air Compressors		1	8	78	0.48	0.6	211	1895.9616
Building Construction (Fini Cranes		0	7	231	0.29	0.6	211	0
Building Construction (Fini Forklifts		1	8	89	0.2	0.6	211	901.392
Building Construction (Fini Generator Sets		0	8	84	0.74	0.6	211	0
Building Construction (Fini Tractors/Loaders/Backhoes		0	7	97	0.37	0.6	211	0
Building Construction (Fini Welders		1	8	46	0.45	0.6	211	1048.248
Architectural Coating	Air Compressors	1	6	78	0.48	0.6	109	734.5728
Paving	Cement and Mortar Mixers	0	6	9	0.56	0.6	66	0
Paving	Pavers	0	8	130	0.42	0.6	66	0
Paving	Paving Equipment	1	6	132	0.36	0.6	66	564.5376
Paving	Rollers	1	6	80	0.38	0.6	66	361.152
Paving	Tractors/Loaders/Backhoes	0	8	97	0.37	0.6	66	0
<b>Total Diesel Usage for Construction (Offroad Equipment):</b>								<b>28,865 gallons of diesel fuel</b>

gallons of diesel fuel per horsepower-hour= 0.05

Notes: Equipment assumptions are provide in the CalEEMod output files and fuel usage estimate of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

## Construction Electricity Usage

### Construction Electricity Usage

#### Caterpillar 40-C4.4 Generator<sup>a</sup>

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Peak Power Rating - Prime (kW)	36
Typical Load	70%
Average Output (kW)	25.2
Hours per Day	4
Average Daily Output (kWh)	100.8
Building Construction Phase Duration (days)	662
Total Construction (kWh)	66,730
Total Construction (MWh)	66.7

<sup>a</sup><https://www.albancat.com/content/uploads/2014/06/40-C4.4-Spec-Sheet.pdf>

EMFAC2014 Emissions Inventory

Region Type: Air Basin

Region: South Coast

Calendar Year: 2019

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Region	Veh_Class	Fuel	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	Trips (trips/day)	Fuel_Gas (1000 gallons/day)	Fuel_DSL (1000 gallons/day)	Miles per Gallon
South Coast	LDA	GAS	Aggregate	5980840.2	208813623	37720472.98	7773.185747	0	26.9
South Coast	LDT1	GAS	Aggregate	511602.26	17332147.22	3105638.035	765.2237958	0	22.6
South Coast	LDT2	GAS	Aggregate	2084013.16	78122888.55	13175061.38	3885.932485	0	20.1
						<b>Construction Worker Trip (Composite LDA/LDT1/LDT2):</b>			<b>24.1</b>
South Coast	T7 tractor cnstruction	DSL	Aggregate	3252.62213	288234.1261	0	47.91762982	49.06718655	<b>5.9</b>

Notes: Consistent with CalEEMod, a construction worker trip is assumed to be a composite of 50% LDA , 25% for LDT1, and 25% for LDT2. Used EMFAC 2011 Categories for construction as EMFAC2011 has specific categories for vehicle class T7.

Calculation of Gasoline and Diesel Usage During Construction (Onroad Vehicles):

Phase Name	Daily Woker Trips	Daily Vendor Trips	Days	Total Worker Trips	Total Vendor Trips	Total Haul Trips	Trip Length (miles)			Total Length (miles)			Avg. Daily Factor (worker and vendor)	Gallons of Fuel	
							Worker	Vendor	Haul	Worker	Vendor	Haul		Gasoline	Diesel
Demolition	10	0	25	250	0	1250	14.7	6.9	70	3675	0	87500	0.6	91.41748	14895.46
Grading	13	0	20	260	0	2000	14.7	6.9	70	3822	0	140000	0.6	95.07418	23832.73
Mat Foundation	248	290	3	744	870	0	14.7	13.8	20	10936.8	12006	0	0.6	272.0584	1226.296
Parking and Podium	248	50	46	11408	2300	0	14.7	6.9	20	167697.6	15870	0	0.6	4171.562	1620.966
Building Construction (Shell)	248	15	451	111848	6765	0	14.7	6.9	20	1644166	46678.5	0	0.6	40899.45	4767.755
Building Construction (Finishing)	248	5	211	52328	1055	0	14.7	6.9	20	769221.6	7279.5	0	0.6	19134.78	743.5301
Architectural Coating	50	0	109	5450	0	0	14.7	6.9	20	80115	0	0	0.6	1992.901	0
Paving	5	5	66	330	330	0	14.7	6.9	20	4851	2277	0	0.6	120.6711	232.5734
<b>Total:</b>													<b>66,778</b>	<b>47,319</b>	

Worker Miles per gallon=	24.12 gasoline
Vedor/Haul miles per gallon=	5.87 diesel

Notes: Consistent with CalEEMod worker vehicles are assumed to be gasoline and 50% LDA, 25%LDT1, and 25% LDT2. Vendor and haul trips are assumed to be 100% diesel Heavy Duty Trucks (T7)

**Water Usage for Control of Fugitive Dust during Construction:**

Phase	Days	Average Daily Acentage Distrubed	Gallons Per Year	Electricity (kWhr)
Demolition	25	0	0	0
Grading	20	1.36	82,144	799
Mat Foundation	3	0	0	0
Parking and Podium	46	0	0	0
Building Construction (Shell)	451	0	0	0
Building Construction (Finishing)	211	0	0	0
Architectural Coating	109	0	0	0
Paving	66	0.3	49,830	485
<b>Total:</b>			<b>131,974</b>	<b>1,284</b>

Water application rate= 3020 gal/acre/day

kWhr equivalent= 0.01 kWhr

Notes: 1) Gallons per year of water usage for dust control is calculated based on a minimum control efficiency of 66% (three times daily) with an application rate of 3,020 gal/acre/day (Air & Waste Management Association Air Pollution Engineering Manual (1992 Edition)) and average of 26 construction days per month.

2) CalEEMod Default: Each gallon of delivered potable water in Southern California is associated with 0.009727 kWhr of electricity).



EMFAC2014 Emissions Inventory  
 Region Type: Air Basin  
 Region: South Coast  
 Calendar Year: 2021  
 Season: Annual

Vehicle Classification: EMFAC2007 Categories

Region	CalYr	Season	Veh_Class	Fuel	MdYr	Speed (miles/hr)	Population (vehicles)	VMT (miles/day)	Trips (trips/day)	Fuel_Gas (1000 gallons/day)	Fuel_DSL (1000 gallons/day)			
South Coast	0	Annual	LDA	GAS	Aggregated	Aggregated	5983324.08	203406334.5	37758498	8962.552247	0			
South Coast	0	Annual	LDA	DSL	Aggregated	Aggregated	20560.2331	653396.714	126492.48	0	21.01725148			
South Coast	0	Annual	LDT1	GAS	Aggregated	Aggregated	704120.722	23959701.08	4257214.1	1219.237627	0			
South Coast	0	Annual	LDT1	DSL	Aggregated	Aggregated	1020.64914	34758.83358	5902.6782	0	1.140927592			
South Coast	0	Annual	LDT2	GAS	Aggregated	Aggregated	1998564.65	72973317.94	12574608	4353.005354	0			
South Coast	0	Annual	LDT2	DSL	Aggregated	Aggregated	954.606624	33837.39521	5897.1354	0	1.098922828			
South Coast	0	Annual	LHD1	GAS	Aggregated	Aggregated	306736.83	13172356.63	4569921.4	984.8986766	0			
South Coast	0	Annual	LHD1	DSL	Aggregated	Aggregated	98644.7586	4084184.142	1240826.9	0	212.3005495			
South Coast	0	Annual	LHD2	GAS	Aggregated	Aggregated	31916.6357	1380051.408	475510.3	103.4048579	0			
South Coast	0	Annual	LHD2	DSL	Aggregated	Aggregated	32633.9088	1332547.957	410493.49	0	69.35604242			
South Coast	0	Annual	MCY	GAS	Aggregated	Aggregated	238796.046	1746303.041	477544.32	44.04302905	0			
South Coast	0	Annual	MDV	GAS	Aggregated	Aggregated	1666722.55	56233095.91	10285786	4277.205001	0			
South Coast	0	Annual	MDV	DSL	Aggregated	Aggregated	1685.6707	57417.81391	10215.064	0	1.856437771			
South Coast	0	Annual	MH	GAS	Aggregated	Aggregated	66982.0158	758744.7362	6700.8808	53.05277536	0			
South Coast	0	Annual	MH	DSL	Aggregated	Aggregated	11760.4939	128008.6648	1176.0494	0	14.2877918			
South Coast	0	Annual	OBUS	GAS	Aggregated	Aggregated	7310.31532	274984.626	333849.4	21.94764195	0			
South Coast	0	Annual	OBUS	DSL	Aggregated	Aggregated	6316.4082	510924.915	0	0	74.24454754			
South Coast	0	Annual	SBUS	GAS	Aggregated	Aggregated	1639.46389	58906.75244	6557.8553	5.38281272	0			
South Coast	0	Annual	SBUS	DSL	Aggregated	Aggregated	4756.29946	171589.1691	0	0	23.78263689			
South Coast	0	Annual	T6	GAS	Aggregated	Aggregated	25351.7693	1213525.712	507238.2	91.68377716	0			
South Coast	0	Annual	T6	DSL	Aggregated	Aggregated	88850.1522	5323590.354	0	0	592.7846956			
South Coast	0	Annual	T7	GAS	Aggregated	Aggregated	1715.48341	230951.3207	34323.394	18.14702494	0			
South Coast	0	Annual	T7	DSL	Aggregated	Aggregated	87795.947	13172387.8	0	0	2357.794852			
South Coast	0	Annual	UBUS	GAS	Aggregated	Aggregated	1912.83348	205370.7536	7651.3339	18.70519393	0			
South Coast	0	Annual	UBUS	DSL	Aggregated	Aggregated	7466.92761	800350.4525	29867.709	0	196.6841245			
							<b>Totals</b>		401,916,638.60		20,153.27	3,566.35	<b>16.9</b>	0.06
							<b>Total (GAS)</b>		375,613,644.40	0.93			<b>18.6</b>	0.05
							<b>Total (DSL)</b>		26,302,994.21	0.07			<b>7.375</b>	0.14

**100 East Ocean - Project Buildout with no PDFs  
Los Angeles-South Coast County, Annual**

**Land Use Details**

<i>Land Uses</i>	<i>Size</i>	<i>Metric</i>	<i>Lot Acreage</i>	<i>Floor Surface Area</i>	<i>Population</i>
Enclosed Parking with Elevator	151.00	Space	0.85	40,593.00	0
Hotel	429.00	Room	14.30	446,123.00	0
Quality Restaurant	23.51	1000sqft	0.54	23,152.00	0
Racquet Club	26.85	1000sqft	0.62	26,847.00	0

**Trip Summary Information**

<i>Land Uses</i>	<i>Average Daily Trip Rate</i>			<i>Unmitigated</i>
	<i>Weekday</i>	<i>Saturday</i>	<i>Sunday</i>	
Enclosed Parking with Elevator	0.00	0.00	0.00	0
Hotel	3,586.44	3,595.02	2,612.61	8,228,823
Quality Restaurant	2,637.82	2,767.13	2,116.14	3,675,485
Racquet Club	0.00	0.00	0.00	0
<b>Total</b>	<b>6,224.26</b>	<b>6,362.15</b>	<b>4,728.75</b>	<b>11,904,308</b>

**Unmitigated Gasoline and Diesel Usage**

	<i>Gasoline</i>	<i>Diesel</i>
<i>Miles/Gallon</i>	16.9	18.6
<i>% Fleet Mix</i>	93.5%	6.5%
<b>Total (Gallons):</b>	<b>656,570</b>	<b>41,800</b>

**Energy by Land Use - Natural Gas (Unmitigated)**

<i>Land Uses</i>	<i>kBTU/yr</i>	<i>cu ft/year</i>
Enclosed Parking with Elevator	0	0
Hotel	10,698,000	10,188,571
Quality Restaurant	5,425,630	5,167,267
Racquet Club	485,931	462,791
<b>Total</b>	<b>16,609,561</b>	<b>15,818,630</b>

**Energy by Land Use - Electricity (Unmitigated)**

<i>Land Uses</i>	<i>kWH/yr</i>
Enclosed Parking with Elevator	96,205
Hotel	3,381,610
Quality Restaurant	1,037,820
Racquet Club	298,002
<b>Total</b>	<b>4,813,637</b>

**Water Detail (Unmitigated)**

<i>Land Uses</i>	<i>Indoor Use (Mgal)</i>	<i>Outdoor Use (Mgal)</i>	<i>Electricity Use (kWh/yr)</i>
Enclosed Parking with Elevator	0.00	0.00	0
Hotel	10.88	1.21	132,675
Quality Restaurant	7.14	0.46	83,720
Racquet Club	1.59	0.97	27,111
<b>Total</b>	<b>19.61</b>	<b>2.64</b>	<b>243,506</b>

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

**100 East Ocean - Project Operations**  
**Los Angeles-South Coast County, Annual**

**Land Use Details**

<i>Land Uses</i>	<i>Size</i>	<i>Metric</i>	<i>Lot Acreage</i>	<i>Floor Surface Area</i>	<i>Population</i>
Enclosed Parking with Elevator	151	Space	0.85	40,593.00	0
Hotel	429	Room	14.3	446,123.00	0
Quality Restaurant	23.51	1000sqft	0.54	23,152.00	0
Racquet Club	26.85	1000sqft	0.62	26,847.00	0

**Trip Summary Information**

<i>Land Uses</i>	<i>Average Daily Trip Rate</i>			<i>Mitigated</i>
	<i>Weekday</i>	<i>Saturday</i>	<i>Sunday</i>	
Enclosed Parking with Elevator	0.00	0.00	0.00	0
Hotel	3,586.44	3,595.02	2,612.61	0
Quality Restaurant	2,637.82	2,767.13	2,116.14	2,736,084
Racquet Club	0.00	0.00	0.00	1,222,099
<b>Total</b>	<b>6,224.26</b>	<b>6,362.15</b>	<b>4,728.75</b>	<b>3,958,183</b>

**Mitigated Gasoline and Diesel Usage**

	<i>Gasoline</i>	<i>Diesel</i>
<i>Miles/Gallon</i>	16.9	18.6
<i>% Fleet Mix</i>	93.5%	6.5%
<b>Total (Gallons):</b>	<b>218,310</b>	<b>13,899</b>

**Energy by Land Use - Natural Gas (Mitigated)**

<i>Land Uses</i>	<i>kBTU/yr</i>	<i>cu ft/year</i>
Enclosed Parking with Elevator	0	0
Hotel	10,698,000	10,188,571
Quality Restaurant	5,425,630	5,167,267
Racquet Club	485,931	462,791
<b>Total</b>	<b>16,609,561</b>	<b>15,818,630</b>

**Energy by Land Use - Electricity (Mitigated)**

<i>Land Uses</i>	<i>kWH/yr</i>
Enclosed Parking with Elevator	78,446
Hotel	3,142,940
Quality Restaurant	991,560
Racquet Club	277,195
<b>Total</b>	<b>4,490,141</b>

**Water Detail (Unmitigated)**

<i>Land Uses</i>	<i>Indoor Use (Mgal)</i>	<i>Outdoor Use (Mgal)</i>	<i>Electricity Use (kWh/yr)</i>
Enclosed Parking with Elevator	0.00	0.00	0
Hotel	8.71	1.21	108,492
Quality Restaurant	5.71	0.46	67,862
Racquet Club	1.27	0.97	23,582
<b>Total</b>	<b>15.69</b>	<b>0.97</b>	<b>199,937</b>

Notes: Indoor water results in 0.0111 kWhr of electricity usage per gallon from delivery, treatment, and distribution of water within Southern California (CalEEMod). Outdoor water results in 0.009727 kWhr of electricity usage per gallon from delivery and distribution of water within Southern California (CalEEMod).

## Peak Electricity Demand Calculations

### Electrical Load Factor Equation

Load Factor (%) <sup>1</sup>	52%
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### Project Electricity Demand (Operational)

#### Annual Demand

Building (MWh)	4,490
Water (MWh)	200
Total (MWh)	4,690

#### Average Daily Demand

Building (kWh)	12,302
Water (kWh)	548
Total (kWh)	12,850

#### Average Load

Building (kW)	513
Water (kW)	23
Total (kW)	535

### Peak Load Calculation

Peak Load (kW)	1,009
Systemwide Peak Load (MWh)	5,854
Percent of Peak	0.017%

<sup>1</sup>2017 Report: System Efficiency of California's Electric Grid. California Public Utilities Commission. 2017. Page 11, Figure 6. Visual estimate.