

# Appendix F

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## Energy Calculations



# AllVision

Draft EIR

Appendix F

## Energy Analysis Spreadsheets

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## Metro TCN

### Summary of Energy Use During Construction

	Demo	One Structure	Project Total
<b>Electricity</b>			
Water Consumption	2,938	94	8,202 kWh
Temporary Power (lighting, tools)	0	151	8,467 kWh
<b>Total:</b>	<b>2,938</b>	<b>245</b>	<b>16,669 kWh</b>
<b>Gasoline</b>			
On Road	137	12	788 Gallons
Off Road	0	0	0 Gallons
<b>Total:</b>	<b>137</b>	<b>12</b>	<b>788 Gallons</b>
<b>Diesel</b>			
On Road	8,037	279	23,675 Gallons
Off Road	14,073	629	49,284 Gallons
<b>Total:</b>	<b>22,110</b>	<b>908</b>	<b>72,959 Gallons</b>
<b>Total Mobile</b>	<b>22,247</b>	<b>920</b>	<b>73,747</b>
	Number of Structures	56	

### Summary of Energy Use During Operations

	Baseline (Buildout)	Buildout Without Project Features	Buildout With Project Features	Percent Reduction due to Project Features	Project Without Project Features - Baseline (Buildout)	Project (Buildout - Baseline (Buildout))	Reduction (%)	Units
<b>Electricity</b>								
Electricity (Signs)	1,000,000	3,288,690	3,288,690	0%	2,288,690	2,288,690	0%	kWh/year
<b>Electricity Total</b>	<b>1,000,000</b>	<b>3,288,690</b>	<b>3,288,690</b>	<b>0%</b>	<b>2,288,690</b>	<b>2,288,690</b>	<b>0%</b>	<b>kWh/year</b>
<b>Mobile</b>								
Gasoline	0	0	0	0%	0	0	0%	Gallons/year
Diesel	3,660	732	732	0%	-2,928	-2,928	0%	Gallons/year
<b>Mobile Total</b>	<b>3,660</b>	<b>732</b>	<b>732</b>	<b>0%</b>	<b>-2,928</b>	<b>-2,928</b>	<b>0%</b>	<b>Gallons/year</b>

## 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	2
Average Daily Output (kWh)	50.4
Building Construction Phase Duration (days)	3
Total Construction (kWh)	151
Total Construction (MWh)	0.2

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

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	Aerial Lifts	1	8	63	0.31	0.6	1	5	
Demolition	Concrete/Industrial Saws	1	8	81	0.73	0.6	1	14	
Demolition	Cranes	1	8	231	0.29	1.6	1	43	
Demolition	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	1	9	
Grading/Excavation	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	5	43	
TCN Structure Foundation	Bore/Drill Rigs	1	8	221	0.5	0.6	2	53	
TCN Structure Foundation	Cement and Mortar Mixers	1	8	9	0.56	0.6	2	2	
TCN Structure Foundation	Concrete/Industrial Saws	1	8	81	0.73	0.6	2	28	
TCN Structure Construction	Aerial Lifts	1	8	63	0.31	0.6	6	28	
TCN Structure Construction	Cranes	1	8	231	0.29	0.6	6	96	
TCN Structure Construction	Rubber Tired Loaders	1	8	203	0.36	0.6	6	105	
TCN Structure Construction	Tractors/Loaders/Backhoes	1	8	97	0.37	0.6	6	52	
TCN Structure Construction	Trenchers	1	8	78	0.5	0.6	6	56	
TCN Structure Construction	Welders	2	8	46	0.45	0.6	6	60	
Paving/Landscaping	Paving Equipment	1	8	132	0.36	0.6	3	34	
<b>Total Diesel Usage for Construction (Offroad)</b>								<b>628.8</b>	<b>gallons of diesel fuel</b>

gallons of diesel fuel per horsepower-hour=

0.05

Notes: Equipment assumptions are provided 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.

EMFAC2021 Emissions Inventory

Region Type: County

Region: Los Angeles

Calendar Year: 2023

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	Gasoline	Aggregate	3,441,157	137,073,184	16,009,115	4,845	0	28.3
South Coast	LDT1	Gasoline	Aggregate	323,318	11,785,010	1,422,834	498	0	23.7
South Coast	LDT2	Gasoline	Aggregate	1,558,893	64,432,894	7,331,380	2,817	0	22.9
<b>Construction Worker Trip (Composite LDA/LDT1/LDT2):</b>									<b>25.8</b>
South Coast	HHDT	Diesel	Aggregate	51,746	6,735,516	804,221	0	1127.8	<b>6.0</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 Worker 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	2	5	1	2	5	0	14.7	80	20	29.4	400	0	0.6	0.7	40.2
Grading/Excavation	2	5	5	10	25	0	14.7	80	20	147	2000	0	0.6	3.4	200.9
TCN Structure Foundation	2	5	2	4	10	0	14.7	6.9	20	58.8	69	0	0.6	1.4	6.9
TCN Structure Construction	2	5	6	12	30	0	14.7	6.9	20	176.4	207	0	0.6	4.1	20.8
Paving/Landscaping	2	5	3	6	15	0	14.7	6.9	20	88.2	103.5	0	0.6	2.1	10.4
<b>Total:</b>													<b>11.6</b>	<b>279.2</b>	

Worker Miles per gallon= 25.78 gasoline  
 Vendor/Haul miles per gallon= 5.97 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 Acreage Disturbed	Gallons Per Year	Electricity (kWhr)
Demolition	1	0.5	1,510	15
Grading/Excavation	5	0.5	7,550	73
TCN Structure Foundation	2	0.1	604	6
TCN Structure Construction	6	0	0	0
Paving/Landscaping	3	0	0	0
<b>Total:</b>			<b>9,664</b>	<b>94</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).



**AllVision - Existing Operations Buildout Year  
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>
General Light Industry	1	1000sqft	0.02	1,000	0
Other Asphalt Surfaces	1	1000sqft	0.02	1000	0

**Trip Summary Information**

<i>Land Uses</i>	<i>Average Daily Trip Rate</i>			<i>Annual VMT</i>
	<i>Weekday</i>	<i>Saturday</i>	<i>Sunday</i>	
General Light Industry	10	0	0	31631
Other Asphalt Surfaces	0	0	0	0
<b>Total</b>	<b>10.00</b>	<b>0.00</b>	<b>0.00</b>	<b>31,631</b>

**Gasoline and Diesel Usage**

	<i>Buildout Year</i>		<i>Existing (Baseline) Year</i>	
	<i>Gasoline</i>	<i>Diesel</i>	<i>Gasoline</i>	<i>Diesel</i>
<i>Miles/Gallon</i>	24.7	8.6	23.5	8.2
<i>% Fleet Mix</i>	0.0%	100.0%	0.0%	100.0%
<b>Total (Gallons):</b>	<b>0</b>	<b>3,660</b>	<b>0</b>	<b>3,854</b>

**Energy by Land Use - Natural Gas**

<i>Land Uses</i>	<i>kBTU/yr</i>	<i>cu ft/year</i>
<b>Total</b>	<b>0</b>	<b>0</b>

**Energy by Land Use - Electricity**

<i>Land Uses</i>	<i>kWH/yr</i>
Sign Lighting	1,000,000
<b>Total</b>	<b>1,000,000</b>

**Water Detail**

<i>Land Uses</i>	<i>Indoor Use</i>		<i>Outdoor Use</i>	<i>Electricity Use</i>
	<i>(Mgal)</i>	<i>Use (Mgal)</i>	<i>(Mgal)</i>	<i>(kWh/yr)</i>
<b>Total</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0</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).

**AllVision - Buildout Operations Without Project Features  
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>
General Light Industry	1	1000sqft	0.02	1,000	0
Other Asphalt Surfaces	1	1000sqft	0.02	1000	0

**Trip Summary Information**

<i>Land Uses</i>	<i>Average Daily Trip Rate</i>			<i>Annual VMT</i>
	<i>Weekday</i>	<i>Saturday</i>	<i>Sunday</i>	
General Light Industry	2.0	0.0	0.0	6,326
Other Asphalt Surfaces	0.0	0.0	0.0	0
<b>Total</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>6,326</b>

**Gasoline and Diesel Usage**

	<i>Gasoline</i>	<i>Diesel</i>
<i>Miles/Gallon</i>	24.7	8.6
<i>% Fleet Mix</i>	0.0%	100.0%
<b>Total (Gallons):</b>	<b>0</b>	<b>732</b>

Note: Fleet mix is 92.3% gasoline @ 30.6 miles/gallon and 7.7% diesel @ 12.1 miles/gallon.

**Energy by Land Use - Natural Gas**

<i>Land Uses</i>	<i>kBTU/yr</i>	<i>cu ft/year</i>
<b>Total</b>	<b>0</b>	<b>0</b>

**Energy by Land Use - Electricity**

<i>Land Uses</i>	<i>kWH/yr</i>
Displays	3,288,690
<b>Total</b>	<b>3,288,690</b>

**Water Detail (Unmitigated)**

<i>Land Uses</i>	<i>Indoor Use (Mgal)</i>	<i>Outdoor Use (Mgal)</i>	<i>Electricity Use (kWh/yr)</i>
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0</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).

**AllVision - Buildout 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>
General Light Industry	1	1000sqft	0.02	1,000	0
Other Asphalt Surfaces	1	1000sqft	0.02	1000	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>	
General Light Industry	2.0	0.0	0.0	6,326
Other Asphalt Surfaces	0.0	0.0	0.0	0
<b>Total</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>6,326</b>

**Mitigated Gasoline and Diesel Usage**

	<i>Gasoline</i>	<i>Diesel</i>
<i>Miles/Gallon</i>	24.7	8.6
<i>% Fleet Mix</i>	0.0%	100.0%
<b>Total (Gallons):</b>	<b>0</b>	<b>732</b>

Note: Fleet mix is 92.3% gasoline @ 30.6 miles/gallon and 7.7% diesel @ 12.1 miles/gallon.

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

<i>Land Uses</i>	<i>kBTU/yr</i>	<i>cu ft/year</i>
<b>Total</b>	<b>0</b>	<b>0</b>

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

<i>Land Uses</i>	<i>kWH/yr</i>
Displays	3,288,690
<b>Total</b>	<b>3,288,690</b>

Note: Reduction in electricity usage reflects 2019 Title 24 energy efficiency standards which assumes exceeding 2016 Title 24 requirements by 10 percent for energy efficiency and 25% for lighting.

**Water Detail (Unmitigated)**

<i>Land Uses</i>	<i>Indoor Use (Mgal)</i>	<i>Outdoor Use (Mgal)</i>	<i>Electricity Use (kWh/yr)</i>
	0.000	0.000	0
<b>Total</b>	<b>0.00</b>	<b>0.00</b>	<b>0</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). The City of Los Angeles Green Building Code (Chapter IX, Article 9, of the LAMC) requires newly constructed non-residential and high-rise residential buildings to reduce indoor water use by at least 20 percent by: (1) using water saving fixtures or flow restrictions; and/or (2) demonstrating a 20 percent reduction in baseline water

## Peak Electricity Demand Calculations

### Electrical Load Factor Equation

$$f_{Load} = \frac{\text{Average load}}{\text{Maximum load in given time period}}$$

Load Factor (%)<sup>1</sup> **52%**

### Project Electricity Demand (Operational)

	Baseline (Existing)	Project	Net Increase
<b>Annual Demand</b>			
Building (MWh)	1,000	3,289	2,289
Water (MWh)	0	0	0
Total (MWh)	1,000	3,289	2,289

### Average Daily Demand

Building (kWh)	2,740	9,010	6,270
Water (kWh)	0	0	0
Total (kWh)	2,740	9,010	6,270

### Average Load

Building (kW)	114	375	261
Water (kW)	0	0	0
Total (kW)	114	375	261

### Peak Load Calculation

Peak Load (kW)	220	722	502
Systemwide Peak Load (MW)	5,820	5,820	5,820
Percent of Peak		0.012%	0.009%

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

**EMFAC Emission inventories for County**

EMFAC2021 (v1.0.1) Emissions Inventory

Region Type: County

Region: Los Angeles

Calendar Year: **2023** (Construction Start Year)

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Fuel_Gasoline (1000 gallons/day)	Fuel_DSL (1000 gallons/day)
Los Angeles	2023	HHDT	Aggregatec	Aggregatec	Diesel	0.00	1127.80
Los Angeles	2023	HHDT	Aggregatec	Aggregatec	Gasoline	0.82	0.00
Los Angeles	2023	LDA	Aggregatec	Aggregatec	Diesel	0.00	7.39
Los Angeles	2023	LDA	Aggregatec	Aggregatec	Gasoline	4845.08	0.00
Los Angeles	2023	LDT1	Aggregatec	Aggregatec	Diesel	0.00	0.12
Los Angeles	2023	LDT1	Aggregatec	Aggregatec	Gasoline	497.89	0.00
Los Angeles	2023	LDT2	Aggregatec	Aggregatec	Diesel	0.00	6.82
Los Angeles	2023	LDT2	Aggregatec	Aggregatec	Gasoline	2816.72	0.00
Los Angeles	2023	LHDT1	Aggregatec	Aggregatec	Diesel	0.00	118.37
Los Angeles	2023	LHDT1	Aggregatec	Aggregatec	Gasoline	379.01	0.00
Los Angeles	2023	LHDT2	Aggregatec	Aggregatec	Diesel	0.00	62.09
Los Angeles	2023	LHDT2	Aggregatec	Aggregatec	Gasoline	62.66	0.00
Los Angeles	2023	MCY	Aggregatec	Aggregatec	Gasoline	23.59	0.00
Los Angeles	2023	MDV	Aggregatec	Aggregatec	Diesel	0.00	18.92
Los Angeles	2023	MDV	Aggregatec	Aggregatec	Gasoline	1944.85	0.00
Los Angeles	2023	MH	Aggregatec	Aggregatec	Diesel	0.00	5.69
Los Angeles	2023	MH	Aggregatec	Aggregatec	Gasoline	32.88	0.00
Los Angeles	2023	MHDT	Aggregatec	Aggregatec	Diesel	0.00	288.96
Los Angeles	2023	MHDT	Aggregatec	Aggregatec	Gasoline	163.55	0.00
Los Angeles	2023	OBUS	Aggregatec	Aggregatec	Diesel	0.00	24.73
Los Angeles	2023	OBUS	Aggregatec	Aggregatec	Gasoline	31.50	0.00
Los Angeles	2023	SBUS	Aggregatec	Aggregatec	Diesel	0.00	5.64
Los Angeles	2023	SBUS	Aggregatec	Aggregatec	Gasoline	7.17	0.00
Los Angeles	2023	UBUS	Aggregatec	Aggregatec	Diesel	0.00	1.18
Los Angeles	2023	UBUS	Aggregatec	Aggregatec	Gasoline	6.81	0.00
Los Angeles	2023	LDA	Aggregatec	Aggregatec	Plug-in Hybrid	75.01	0.00
Los Angeles	2023	LDT1	Aggregatec	Aggregatec	Plug-in Hybrid	0.27	0.00
Los Angeles	2023	LDT2	Aggregatec	Aggregatec	Plug-in Hybrid	9.96	0.00
Los Angeles	2023	MDV	Aggregatec	Aggregatec	Plug-in Hybrid	5.25	0.00
						3,979,596,395	608,715,539
Fuel Usage for Project Construction						788	72,959
Percentage of County for Construction						0.0000%	0.012%

**EMFAC Emission inventories for County**

EMFAC2021 (v1.0.1) Emissions Inventory

Region Type: County

Region: Los Angeles

Calendar Year: **2025** (Operational Start Year)

Season: Annual

Vehicle Classification: EMFAC2011 Categories

Region	CalYr	VehClass	MdlYr	Speed	Fuel	Fuel_Gasoline (1000 gallons/day)	Fuel_DSL (1000 gallons/day)
Los Angeles	2025	HHDT	Aggregatec	Aggregatec	Diesel	0.00	1135.88
Los Angeles	2025	HHDT	Aggregatec	Aggregatec	Gasoline	0.66	0.00
Los Angeles	2025	LDA	Aggregatec	Aggregatec	Diesel	0.00	6.07
Los Angeles	2025	LDA	Aggregatec	Aggregatec	Gasoline	4510.33	0.00
Los Angeles	2025	LDT1	Aggregatec	Aggregatec	Diesel	0.00	0.09
Los Angeles	2025	LDT1	Aggregatec	Aggregatec	Gasoline	467.87	0.00
Los Angeles	2025	LDT2	Aggregatec	Aggregatec	Diesel	0.00	7.24
Los Angeles	2025	LDT2	Aggregatec	Aggregatec	Gasoline	2812.39	0.00
Los Angeles	2025	LHDT1	Aggregatec	Aggregatec	Diesel	0.00	130.34
Los Angeles	2025	LHDT1	Aggregatec	Aggregatec	Gasoline	365.06	0.00
Los Angeles	2025	LHDT2	Aggregatec	Aggregatec	Diesel	0.00	68.74
Los Angeles	2025	LHDT2	Aggregatec	Aggregatec	Gasoline	59.76	0.00
Los Angeles	2025	MCY	Aggregatec	Aggregatec	Gasoline	24.45	0.00
Los Angeles	2025	MDV	Aggregatec	Aggregatec	Diesel	0.00	18.74
Los Angeles	2025	MDV	Aggregatec	Aggregatec	Gasoline	1916.15	0.00
Los Angeles	2025	MH	Aggregatec	Aggregatec	Diesel	0.00	6.12
Los Angeles	2025	MH	Aggregatec	Aggregatec	Gasoline	31.92	0.00
Los Angeles	2025	MHDT	Aggregatec	Aggregatec	Diesel	0.00	291.43
Los Angeles	2025	MHDT	Aggregatec	Aggregatec	Gasoline	152.44	0.00
Los Angeles	2025	OBUS	Aggregatec	Aggregatec	Diesel	0.00	24.49
Los Angeles	2025	OBUS	Aggregatec	Aggregatec	Gasoline	27.83	0.00
Los Angeles	2025	SBUS	Aggregatec	Aggregatec	Diesel	0.00	5.27
Los Angeles	2025	SBUS	Aggregatec	Aggregatec	Gasoline	7.44	0.00
Los Angeles	2025	UBUS	Aggregatec	Aggregatec	Diesel	0.00	0.93
Los Angeles	2025	UBUS	Aggregatec	Aggregatec	Gasoline	6.64	0.00
Los Angeles	2025	LDA	Aggregatec	Aggregatec	Plug-in Hybrid	81.26	0.00
Los Angeles	2025	LDT1	Aggregatec	Aggregatec	Plug-in Hybrid	0.55	0.00
Los Angeles	2025	LDT2	Aggregatec	Aggregatec	Plug-in Hybrid	13.39	0.00
Los Angeles	2025	MDV	Aggregatec	Aggregatec	Plug-in Hybrid	7.56	0.00
						3,789,776,363	618,800,887
Net Fuel Usage for Project Operation						0	-2,928
Percentage of County for Operation						0.0000%	-0.0005%