Appendix E
Energy Appendix

ESA

Mt. Etna Community Plan Amendment and Rezone Project
Energy Summary

Construction Fuel Consumption Summary

	gallons		
Year	**Diesel**	**Gas**	**# Years**
Total Compressed	***66,442***	***23,610***	1.75
Annual Average	37,967	13,491	

*Note: Mitigated and unmitigated construction emissions of CO_2 are identical

*Note: 10 years is used rather than 20 (buildout time) because the worst case scenario assumes 10% construction per year)

State Usage (2018)[1,2]	3,073,917,507	15,517,383,271	
Project % State	0.0012%	0.0001%	
County Usage[3]	92,000,000	1,208,000,000	
Project % County	0.0413%	0.0011%	
Construction	Total Gallons	Annual Comp	
Onsite Equipment	39,369	22,497	diesel
Onsite Equipment	0	0	gasoline
Haul Trucks	7,336	4,192	diesel
Vendor Trucks	19,737	11,278	diesel
Worker Trips	23,610	13,491	gasoline

Mt. Etna Community Plan Amendment and Rezone Project

Unmitigated Fuel Conversion - Construction

	Total CO_2 MT/yr	Fuel Type	Factor $KGCO_2$/gal	Gallons
Offroad				
Demolition	25.68	diesel	10.16	2,528
Site Preparation	57.47	diesel	10.16	5,657
Grading	39.97	diesel	10.16	3,934
Drainage/Utilities/Trenching	32.06	diesel	10.16	3,156
Foundations/ Concrete Pour	20.94	diesel	10.16	2,061
Building Construction	41.23	diesel	10.16	4,058
BC 2022	114.59	diesel	10.16	11,278
Architectural Coating	4.77	diesel	10.16	470
AC 2022	36.14	diesel	10.16	3,558
Paving	27.13	diesel	10.16	2,671

Onroad	*source: 2020 EMFAC2017 Caleemod and Const.xls*			
	Hauling	Vendor	Worker	gallons
Demolition	5,240	0	95	gallons
Site Preparation	667	0	167	gallons
Grading	667	0	167	gallons
Drainage/Utilities/Trenching	0	0	276	gallons
Foundations/ Concrete Pour	762	0	800	gallons
Building Construction	0	19,737	17,348	gallons
Architectural Coating	0	0	4,574	gallons
Paving	0	0	183	gallons
Total	7,336	19,737	23,610	

Estimated Fuel Savings from Anti-Idling Regulation (64% based on CARB emissions reductions)

	Gallons	% Idling	Gallons Idle	
Annual Haul	4,192.00	1.03	43	
Annual Vendor	11,278.29	8.80	992	
Total	15,470		1,036	
Savings			373	Annual

Source: California Air Resources Board (CARB), 2004. Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling, Appendix F, July 2004, https://www.arb.ca.gov/regact/idling/idling.htm, accessed November 2016.

Mt. Etna Community Plan Amendment and Rezone Project
Unmitigated Fuel Conversion - Construction

Construction Water Energy Estimates

Source	Acres	Daily Use (Mgal)	days of Project	Total Use (Mgal)	Total Electricity Demand (kWh)	Annual Electricity Demand (kWh)
Project	4.09	0.01227	432	5.301	69,020	69,020

CalEEMod Water Electricity Factors

Electricity Intensity Factor To Supply (kWh/Mgal)	Electricity Intensity Factor To Treat (kWh/Mgal)	Electricity Intensity Factor To Distribute (kWh/Mgal)	Electricity Intensity Factor For Wastewater Treatment (kWh/Mgal)
9727	111	1272	1,911

	kWh
Annual Project	69,020
SDG&E	18,767,000,000
%SSDG&E	0.000368%

Sources:

Electricity Intensity Factors - California Emissions Estimator Model (CalEEMod).

Estimated construction water use assumed to be generally equivalent to landscape irrigation, based on a factor of 20.94 gallons per year per square foot of

landscaped area within the Los Angeles area (Mediterranean climate), which assumes high water demand landscaping materials and an irrigation system efficiency of 85%.

Factor is therefore (20.94 GAL/SF/year) x (43,560 SF/acre) / (365 days/year) / (0.85) = 2,940 gallons/acre/day, rounded up to 3,000 gallons/acre/day.

(U.S. Department of Energy, Energy Efficiency & Renewable Energy, Federal Energy Management Program. “Guidelines for Estimating Unmetered Landscaping Water Use." July 2010. Page 12, Table 4 - Annual Irrigation Factor – Landscaped Areas with High Water Requirements).

Mt. Etna Community Plan Amendment and Rezone Project

Total On-Road Fuel Consumption

		gal/mile	gal/min
2021Hauling	Hauling	0.15878662	5.48894E-05
2021Vendor	Vendor	0.13316957	5.4387E-05
2021Worker	Worker	0.03676531	1.00645E-06

Construction Phase	Daily One-Way Trips	Haul Days per Phase (days)	Work Hours per Day (hours/day)	One-Way Trip Distance per Day (miles)	Idling per Day (minutes)
Demolition	2021				
Total Haul Trips	1639				
Hauling	110	15	8	20	15
Vendor	0	15	8	7.3	15
Worker	16	15	8	10.8	0
Site Preparation	2021				
Total Haul Trips	200				
Hauling	7	30	8	20	15
Vendor	0	30	8	7.3	15
Worker	14	30	8	10.8	0
Grading	2021				
Total Haul Trips	200				
Hauling	7	30	8	20	15
Vendor	0	30	8	7.3	15
Worker	14	30	8	10.8	0
Building Construction	2021				
Total Haul Trips	0				
Hauling	0	257	8	20	15
Vendor	79	257	8	7.3	15
Worker	170	257	8	10.8	0
Paving	2021				
Total Haul Trips	0				
Hauling	0	23	8	20	15
Vendor	0	23	8	7.3	15
Worker	20	23	8	10.8	0
Architectural Coating	2021				
Total Haul Trips	0				
Hauling	0	240	8	20	15
Vendor	0	240	8	7.3	15
Worker	48	240	8	10.8	0
Drainage/Utilities/Trench	2021				
Total Haul Trips	0				
Hauling	0	29	8	20	15
Vendor	0	29	8	7.3	15
Worker	24	29	8	10.8	0
Foundations/Concrete	2021				
Total Haul Trips	200				
Hauling	5	48	8	20	15
Vendor	0	48	8	7.3	15
Worker	42	48	8	10.8	0

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Tc **Total On-Road Fuel Consumption**

Construction Phase	Regional Emissions			
	gal/mile	gal/min	gal/day	Total Gallons
Demolition				
Total Haul Trips				
Hauling	0.16	5.49E-05	349	5,240
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	6	95
Site Preparation				
Total Haul Trips				
Hauling	0.16	5.49E-05	22	667
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	6	167
Grading				
Total Haul Trips				
Hauling	0.16	5.49E-05	22	667
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	6	167
Building Construction				
Total Haul Trips				
Hauling	0.16	5.49E-05	0	0
Vendor	0.13	5.44E-05	77	19,737
Worker	0.04	1.01E-06	68	17,348
Paving				
Total Haul Trips				
Hauling	0.16	5.49E-05	0	0
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	8	183
Architectural Coating				
Total Haul Trips				
Hauling	0.16	5.49E-05	0	0
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	19	4,574
Drainage/Utilities/Trench				
Total Haul Trips				
Hauling	0.16	5.49E-05	0	0
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	10	276
Foundations/Concrete				
Total Haul Trips				
Hauling	0.16	5.49E-05	16	762
Vendor	0.13	5.44E-05	0	0
Worker	0.04	1.01E-06	17	800

Mt Etna Community Plan Amendment and Rezone Project
Operational Energy Analysis
Building Energy

Source	Natural Gas demand (MMBtu/yr)	Building Electricity demand (GWh/yr)	Water Electricity demand (million kWh/yr)	Total Electricity Demand
Mt Etna Affordable Hosuing	6,310	1.92	0.56	2.48

Source	CalEEMod Indoor Water Use (Mgal/yr)	CalEEMod Outdoor Water Use (Mgal/yr)	Total Water Use (Mgal/yr)	Electricity Demand from water Demand (million kWh)
Mt Etna Affordable Hosuing	26.32	16.59	42.92	0.56

CalEEMod Water Electricity Factors	Electricity Intensity Factor To Supply (kWh/Mgal)	Electricity Intensity Factor To Treat (kWh/Mgal)	Electricity Intensity Factor To Distribute (kWh/Mgal)	Electricity Intensity Factor For Wastewater Treatment (kWh/Mgal)
Mt Etna Affordable Hosuing	9,727	111	1,272	1,911

Source: California Emissions Estimator Model (CalEEMod).

Mt. Etna Community Plan Amendment and Rezone Project
Operational Vehicle Fuel Consumption

	2022
Unmitigated CO_2e (MT/year)	1,998
Mitigated CO_2e (MT/year)	1,998

Op year 1

Summary	Unmitigated	Mitigated
Gasolilne	187,528	187,528
Diesel	30,615	30,615
Natural Gas	389	389

Existing — 2022

Unmitigated Calculations

	% Emissions	CO_2e (MT)	CO_2e (kg)	CO_2e (lbs)	kg CO2/gallo	Gallons	Mcf	MBTU	GWh
Gasoline	0.834345114	0	0	NA	8.89	0	NA	NA	NA
Diesel	0.155668952	0	0	NA	10.16	0	NA	NA	NA
Natural Gas	0.009985934	0	0	NA	NA	NA	0.00	0.00	NA

Mitigated Calculations

	% Emissions	CO_2e (MT)	CO_2e (kg)	CO_2e (lbs)	kg CO2/gallo	Gallons	Mcf	MBTU	GWh
Gasoline	0.834345114	0	0	NA	8.89	0	NA	NA	NA
Diesel	0.155668952	0	0	NA	10.16	0	NA	NA	NA
Natural Gas	0.009985934	0	0	NA	NA	NA	0.00	0.00	NA

Operational Year 1 — 2022

Unmitigated Calculations

	% Emissions	CO_2e (MT)	CO_2e (kg)	CO_2e (lbs)	kg CO2/gallo	Gallons	Mcf	MBTU	GWh
Gasoline	0.834345114	1667.12308	1,667,123	NA	8.89	187,528	NA	NA	NA
Diesel	0.155668952	311.045512	311,046	NA	10.16	30,615	NA	NA	NA
Natural Gas	0.009985934	19.9531106	19,953	NA	NA	NA	375.62	389.15	NA

Mitigated Calculations

	% Emissions	CO_2e (MT)	CO_2e (kg)	CO_2e (lbs)	kg CO2/gallo	Gallons	Mcf	MBTU	GWh
Gasoline	0.834345114	1667.12308	1,667,123	NA	8.89	187,528	NA	NA	NA
Diesel	0.155668952	311.045512	311,046	NA	10.16	30,615	NA	NA	NA
Natural Gas	0.009985934	19.9531106	19,953	NA	NA	NA	375.62	389.15	NA

Emissions Percentage

	2021	2022
Gasoline	0.837591539	0.83434511
Diesel	0.153256872	0.15566895
Natural Gas	0.009151589	0.00998593

Conversion Factors:

1000	kg/MT		
8.89	kg CO_2/gallon gasoline	https://www.eia.gov/environment/emissions/co2_vol_mass.php	Feb. 2016
10.16	kg CO_2/gallon diesel	https://www.eia.gov/environment/emissions/co2_vol_mass.php	Feb. 2016
53.12	kg CO_2/ thousand cubic feet	https://www.eia.gov/environment/emissions/co2_vol_mass.php	Feb. 2016
1036	btu/cubic foot		
0.907185	MT/ton		
2000	lbs/ton		