Appendix B

Energy Calculations

Oxnard U-Haul

Last Updated: 4/11/2022

Compression-Ignition Engine Brake-Specific Fuel Consumption (BSFC) Factors **[1]**:

HP: 0 to 100	0.0588	HP: Greater than 100	0.0529

Values above are expressed in gallons per horsepower-hour/BSFC.

CONSTRUCTION EQUIPMENT

Construction Equipment	#	Hours per Day	Horsepower	Load Factor	Construction Phase	Fuel Used (gallons)
Rubber Tired Dozers	0	8	247	0.4	Demolition Phase	0
Tractors/Loaders/Backhoes	0	8	97	0.37	Demolition Phase	0
Scrapers	0	8	367	0.48	Demolition Phase	0
Tractors/Loaders/Backhoes	4	8	97	0.37	Site Preparation Phase	675
Excavators	0	8	158	0.38	Site Preparation Phase	0
Rubber Tired Dozers	3	8	247	0.4	Site Preparation Phase	1,253
Scrapers	0	8	367	0.48	Site Preparation Phase	0
Graders	1	8	187	0.41	Grading Phase	648
Excavators	0	8	158	0.38	Grading Phase	0
Rubber Tired Dozers	1	8	247	0.4	Grading Phase	836
Tractors/Loaders/Backhoes	1	8	97	0.37	Grading Phase	337
Scrapers	0	8	367	0.48	Grading Phase	0
Cranes	1	7	231	0.29	Building Construction Phase	5,701
Forklifts	3	8	89	0.2	Building Construction Phase	5,774
Generator Sets	1	8	84	0.74	Building Construction Phase	6,721
Tractors/Loaders/Backhoes	3	7	97	0.37	Building Construction Phase	10,187
Welders	1	8	46	0.45	Building Construction Phase	2,238
Aerial Lifts	0	8	63	0.31	Building Construction Phase	0
Air Compressors	1	6	78	0.48	Architectural Coating Phase	264
Forklifts	0	8	89	0.2	Architectural Coating Phase	0
Pavers	2	8	130	0.42	Paving Phase	924
Paving Equipment	0	8	132	0.36	Paving Phase	0
Rollers	2	8	80	0.38	Paving Phase	572
Tractors/Loaders/Backhoes	0	8	97	0.37	Paving Phase	0
					Total Fuel Used	**36,130 (Gallons)**

Construction Phase	Days of Operation
Demolition Phase	0
Site Preparation Phase	10
Grading Phase	20
Building Construction Phase	230
Paving Phase	20
Architectural Coating Phase	20
Total Days	300

WORKER TRIPS

Constuction Phase	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
Demolition Phase	24.1	0	10.8	0.00
Site Preparation Phase	24.1	18	10.8	80.66
Grading Phase	24.1	15	10.8	134.44
Building Construction Phase	24.1	98	10.8	10100.91

Paving Phase	24.1	15	10.8	134.44
Architectural Coating Phase	24.1	20	10.8	179.25
			Fuel	**10,629.71**

HAULING AND VENDOR TRIPS

Trip Class	MPG [2]	Trips	Trip Length (miles)	Fuel Used (gallons)
		HAULING TRIPS		
Demolition Phase	7.5	0	20.0	0.00
Site Preparation Phase	7.5	0	20.0	0.00
Grading Phase	7.5	0	20.0	0.00
Building Construction Phase	7.5	0	20.0	0.00
Paving Phase	7.5	0	20.0	0.00
Architectural Coating Phase	7.5	0	20.0	0.00
			Fuel	**-**
		VENDOR TRIPS		
Demolition Phase	7.5	0	14.7	0.00
Site Preparation Phase	7.5	0	14.7	0.00
Grading Phase	7.5	0	14.7	0.00
Building Construction Phase	7.5	39	7.3	8730.80
Paving Phase	7.5	0	14.7	0.00
Architectural Coating Phase	7.5	0	14.7	0.00
			Fuel	**8,730.80**

Total Gasoline Consumption (gallons)	**10,630**
Total Diesel Consumption (gallons)	**44,861**

Sources:

[1] United States Environmental Protection Agency. 2021. *Exhaust and Crankcase Emission Factors for Nonroad Compression-Ignition Engines in MOVES3.0.2* . September. Available at: https://www.epa.gov/system/files/documents/2021-08/420r21021.pdf.
[2] United States Department of Transportation, Bureau of Transportation Statistics. 2021. *National Transportation Statistics* . Available at: https://www.bts.gov/topics/national-transportation-statistics.

Oxnard U-Haul

Last Updated: 4/11/2022

Populate one of the following tables (Leave the other blank):

Annual VMT		OR	Daily Vehicle Trips	
Annual VMT:	1,119,018		Daily Vehicle Trips:	
			Average Trip Distance:	

Fleet Class	Fleet Mix
Light Duty Auto (LDA)	0.604810
Light Duty Truck 1 (LDT1)	0.038204
Light Duty Truck 2 (LDT2)	0.185149
Medium Duty Vehicle (MDV)	0.108513
Light Heavy Duty 1 (LHD1)	0.015498
Light Heavy Duty 2 (LHD2)	0.004981
Medium Heavy Duty (MHD)	0.012268
Heavy Heavy Duty (HHD)	0.020156
Other Bus (OBUS)	0.002083
Urban Bus (UBUS)	0.001571
Motorcycle (MCY)	0.005363
School Bus (SBUS)	0.000620
Motorhome (MH)	0.000785

Fuel Economy (MPG) [1]	
Passenger Vehicles	24.1
Light-Med Duty Trucks	17.6
Heavy Trucks/Other	7.5
Motorcycles	44

Fleet Mix

Vehicle Type	Percent	Fuel Type	Annual VMT: VMT	Vehicle Trips: VMT	Fuel Consumption (Gallons)
Passenger Vehicles	*60.48%*	*Gasoline*	676,793	0.00	28,083
Light-Medium Duty Trucks	*33.19%*	*Gasoline*	371,364	0.00	21,100
Heavy Trucks/Other	*5.80%*	*Diesel*	64,861	0.00	8,648
Motorcycle	*0.54%*	*Gasoline*	6,001	0.00	136
			1119019		

Total Gasoline Consumption (gallons)	**49,319**
Total Diesel Consumption (gallons)	**8,648**

Sources:

[1] United States Department of Transportation, Bureau of Transportation Statistics. 2021. National Transportation Statistics. Available at: https://www.bts.gov/topics/national-transportation-statistics.

Equipment	Horsepower	Load Factor
Aerial Lifts	63	0.31
Air Compressors	78	0.48
Bore/Drill Rigs	221	0.5
Cement and Mortar Mixers	9	0.56
Concrete/Industrial Saws	81	0.73
Cranes	231	0.29
Crawler Tractors	212	0.43
Crushing/Proc. Equipment	85	0.78
Dumpers/Tenders	16	0.38
Excavators	158	0.38
Forklifts	89	0.2
Generator Sets	84	0.74
Graders	187	0.41
Off-Highway Tractors	124	0.44
Off-Highway Trucks	402	0.38
Other Construction Equipment	172	0.42
Other General Industrial Equipment	88	0.34
Other Material Handling Equipment	168	0.4
Pavers	130	0.42
Paving Equipment	132	0.36
Plate Compactors	8	0.43
Pressure Washers	13	0.3
Pumps	84	0.74
Rollers	80	0.38
Rough Terrain Forklifts	100	0.4
Rubber Tired Dozers	247	0.4
Rubber Tired Loaders	203	0.36
Scrapers	367	0.48
Signal Boards	6	0.82
Skid Steer Loaders	65	0.37
Surfacing Equipment	263	0.3
Sweepers/Scrubbers	64	0.46
Tractors/Loaders/Backhoes	97	0.37
Trenchers	78	0.5
Welders	46	0.45

Energy Unit Conversion Sheet

Gasoline

Gallons (gal.)	49,319.00	Barrels (bbl.)	1.00	Btu	1.00
	49319.00 gal.		42.00 gal.		0.00 gal.
	49.32 Thousand gallons		0.04 Thousand gallons		0.00 Thousand gallons
	0.05 Million gallons		0.00 Million gallons		0.00 Million gallons
	1174.26 bbl.		1.00 bbl.		0.02 bbl.
	1.17 Thousand bbl.		0.00 Thousand bbl.		0.00 Thousand bbl.
	0.00 Million bbl.		0.00 Million bbl.		0.00 Million bbl.
	58237.19 U.S. Therms		49.59 U.S. Therms		0.00 U.S. Therms
	5414544924.60 British thermal units (Btu)		4611019.83 British thermal units (Btu)		1.00 British thermal units (Btu)
	5414.54 Million Btu (MMBtu)		4.61 Million Btu (MMBtu)		0.00 Million Btu (MMBtu)

Diesel

Gallons (gal.)	8,648.00	Barrels (bbl.)	1.00	Btu	1.00
	8,648.00 gal.		42.00 gal.		0.00 gal.
	8.65 Thousand gallons		0.04 Thousand gallons		0.00 Thousand gallons
	0.01 Million gallons		0.00 Million gallons		0.00 Million gallons
	205.90 bbl.		1.00 bbl.		0.02 bbl.
	0.21 Thousand bbl.		0.00 Thousand bbl.		0.00 Thousand bbl.
	0.00 Million bbl.		0.00 Million bbl.		0.00 Million bbl.
	11,855.72 U.S. Therms		57.58 U.S. Therms		0.00 U.S. Therms
	1,102,274,080.00 British thermal units (Btu)		5,353,320.00 British thermal units (Btu)		1.00 British thermal units (Btu)
	1,102.27 Million Btu (MMBtu)		5.35 Million Btu (MMBtu)		0.00 Million Btu (MMBtu)

Electricity

Kilowatt-Hours (kWh)	1.00	U.S. Therm	1.00	Btu	1.00
	1.00 Kilowatt-Hours		27.25 Kilowatt-Hours		0.00 Kilowatt-Hours
	0.00 Megawatt-Hours		0.03 Megawatt-Hours		0.00 Megawatt-Hours
	0.00 Gigawatt-Hours		0.00 Gigawatt-Hours		0.00 Gigawatt-Hours
	0.04 U.S. Therms		1.00 U.S. Therms		0.00 U.S. Therms
	3,412.00 British thermal units (Btu)		92,974.00 British thermal units (Btu)		1.00 British thermal units (Btu)
	0.00 Million Btu (MMBtu)		0.09 Million Btu (MMBtu)		0.00 Million Btu (MMBtu)

Natural Gas

Thousand Cubic Feet (Mcf)	1.00	U.S. Therm	1.00	Btu	1.00
	1,000.00 Cubic Feet (cf)		89.66 Cubic Feet (cf)		0.00 Cubic Feet (cf)
	1.00 Thousand Cubic Feet (Mcf)		0.09 Thousand Cubic Feet (Mcf)		0.00 Thousand Cubic Feet (Mcf)
	0.00 Million Cubic Feet (MMcf)		0.00 Million Cubic Feet (MMcf)		0.00 Million Cubic Feet (MMcf)
	11.15 U.S. Therms		1.00 U.S. Therms		0.00 U.S. Therms
	1,037,000.00 British thermal units (Btu)		92,974.00 British thermal units (Btu)		1.00 British thermal units (Btu)
	1.04 Million Btu (MMBtu)		0.09 Million Btu (MMBtu)		0.00 Million Btu (MMBtu)

Sources:

U.S. Energy Information Administration (EIA). May 2017. "Frequently Asked Questions: What are Ccf, Mcf, Btu, and therms? How do I convert natural gas prices in dollars per Ccf or Mcf to dollars per Btu or therm?" https://www.eia.gov/tools/faqs/faq.php?id=45&t=8. (accessed February 5, 2018).

Schremp, Gordon. 2017. Senior Fuels Specialist, California Energy Commission. Personal communication via phone and email regarding fuel consumption in California by County and by source with Lance Park, Associate Planner, Rincon Consultants, Inc. August 22, 2017.