Appendix F

Energy Calculations

Energy Calculations Summary Table

Total and per Capita Energy Use Under the Proposed Plan: 2022, 2035, 2050

	2022 (Baseline)		2035		2050	
Category	**Energy Use**	**Trillion BTU**	**Energy Use**	**Trillion BTU**	**Energy Use**	**Trillion BTU**
Regional Growth and Land Use Change	-	122	-	128	-	134
Electricity (GWh)	17,471	60	21,742	74	23,732	81
Natural Gas (million therms)	622	62	537	54	534	53
Transportation Network Improvements and Programs		142		110		102
Vehicles, Gasoline (million gallons)	1,008	121	769	92	692	83
Vehicles, Diesel (million gallons)	127	17	109	15	118	16
Vehicle, Electricity (GWh)	269	1	1,157	0.0	1,693	0.01
Vehicle, Compressed Natural Gas (million gallons)	8	0.2	6	0.1	3	0.06
Rail, Diesel (million gallons)	3	0.4	1	0.1	0	0.01
Construction Equipment (million gallons)	15	2	15	2	15	2
Total Energy Use	-	264	-	238	-	236
Per Capita Energy Use (metric million BTU/person)		80		70		69
Population:	3,287,306		3,404,362		3,400,250	
Total Energy Use, Percent Change 2022 to Plan Year			-10%		-11%	
Per Capita Energy Use, Percent Change 2022 to Plan Year			-13%		-14%	

Metrics

1 kWh = 3,412 BTU; 1 therm = 99,976 BTU; 1 gallon, gasoline = 120,286 BTU; 1 gallon, diesel = 137,381 BTU.

Energy convert to BTU data source https://www.bts.gov/content/energy-intensity-transit-motor-buses

Energy Consumption Calculation per Emission Category

Values from EPIC Inventory

On-Road Transportation – Passenger Car and Light-Duty Vehicles see tab: on-road summary

On-Road Transportation - Heavy-Duty Trucks and Other Vehicles see tab: on-road summary

Electricity

Table G.8	2022
Electricity Sales – Bundled (MWh)	6,331,771
Electricity Sales – Direct Access (MWh)	3,711,568
Electricity Sales – CCA (MWh)	6,104,049
Transmission and Distribution Loss Factor	0.082
Total 2022 Electrcity (GWh)	17,471
Total Electrcity =Electrcity Sales * (1+Loss Factor)	amount (sales)

loss_multiplier 1.082

Table G.10	2035	2050
Projected Electricity Sales (GWh)		
SDG&E Bundled	4,680	3,334
San Diego Community Power	9,425	11,836
Clean Energy Alliance	1,589	1,996
ESPs for Direct Access	4,400	4,767
Total Electricity Sales (GWh)	20,094	21,933
Total Electricity applying Loss	21,742	23,732

	2022	2035	2050
Total Electricity (GWh)	**17,471**	**21,742**	**23,732**

Natural Gas

Table G.12 and G.13	2022	2035	2050
Sales (Therms)	621,630,424	536,765,682	534,332,373
Natural Gas Sales (MTherms)	**622**	**537**	**534**

Industrial

Table G.14 and G.15	2022	2035	2050	
Total industry San Diego Region MMT CO2e	2	3	3	
Energy Intensity (lbs CO2e/MWh)	641	104	0	Direct Access Energy Provider (Table G.7 and G.9)
Total Electricity (MWh)	8,254,427	53,843,604	0	
Total Electrcity (GWh), considering loss	**8,931**	**58,259**	**0**	

Construction and Mining

Table G.20	2022	2035	2050
GHG Emissions (MT CO2e)	154,900	155,300	155,400
Diesel Gallons	15,171,401	15,210,578	15,220,372
Diesel Million Gallons	**15**	**15**	**15**

Note that construction/mining subcategory was used as a proxy for construction equipment energy

Energy Consumption Calculation per Emission Category

Rail

Table G.41 and G.42	2022	2035	2050
Freight and Other Inter-Regional Diesel Rail (OFFROAD) (MT CO_2e)	2,200	800	600
Freight and Other Inter-Regional Electric Rail (OFFROAD) (MT CO_2e)	0	300	0
Intra-Regional Diesel Light Rail (MT CO_2e)	13,075	4,900	0
Intra-Regional Electric Light Rail (MT CO_2e)	13,110	3,000	--
Total Diesel MTCO2e	15,275	5,700	600
Total Electric MTCO2e	13,110	3,300	0
Total Diesel Gallons	1,496,088	558,276	58,766
Total Electric KWh	56,896,708	14,321,350	0
Total Diesel Gallons (diesel+electric equivalent)	2,894,042	910,152	58,766
Total Diesel Million Gallons (diesel+electric equivalent)	**3**	**1**	**0**
Intra-Regional Light Rail – Diesel Fuel Consumption (gallons)	1,280,613		
Intra-Regional Light Rail – Electric Energy Consumption (kWh)	56,896,708		

kWh equivalent of 1 gallon of diesel	40.7
Diesel Emission Factor (kg CO_2 per gallon)*	10.21
Diesel gallons per MTCO2e	98
2022 GHG Emission intensit	508
MT to lbs	2204.62
CO2e MT/KWh	0.000230425

Energy Consumption Calculation per Emission Category

Water Supply

2022 Upstream Water Supply (Table G.26)

Water Source	Imported Treated Water	Imported Raw Water
Water Demand (Acre-feet)	142,374	270,806
Energy Intensity (kWh/Acre-foot)*	1,873	1,767
Total Upstream Electricity Use (Treated and Raw) (kWh)	266,666,502	478,514,202
Local Water Treatment (Table G.27)		
Local Water Treatment Electricity Use (kWh)	320,869,821	
Total Water Electricity Use (KWh)	1,066,050,525	

Projection Year	**2035**	**2050**
Upstream		
Imported Treated Water (Acre-feet)	112,689	129,277
Imported Raw Water (Acre-feet)	245,436	281,566
Total Upstream Electricity Use (Treated and Raw) (kWh)	655,784,130	752,319,196
Local Treatment		
Water Treated at Local Water Treatment Plants (Acre-feet)	321,595	354,225
Water Further Treated to Potable Reuse (Acre-feet)**	112,562	112,562
Water Treated with Desalinization (Acre-feet)	6,000	6,000
Total Local Treatment Electricity Use (kWh)	565,033,143	603,308,133
Total Water Electricity Use (KWh)	1,220,817,273	1,355,627,329

	2022	2035	2050
Total Water Electricity Use (GWh)	**1,066**	**1,221**	**1,356**

1,862 Energy Intensity (kWh/Acre-foot) imported

1,817 Energy Intensity (kWh/Acre-foot) imported raw water

1,173 kWh/AF energy intensity at pure water facility

1,584 kWh/AF energy intensity at Advanced Water Purification (AWP)

On-Road Energy Consumption Summary

Year 2022

Vehicle Category	Electricity (KWh)	Diesel (gals)	Gasoline (gals)	NG (gals)
Light Duty Vehicles				
LDA	343,844,875	1,810,885	605,180,860	0
LDT1	1,024,023	17,269	71,811,684	0
LDT2	12,658,650	993,505	351,560,914	0
MDV	10,345,570	3,876,500	252,429,029	0
subtotal	367,873,118	6,698,159	1,280,982,487	0
Heavy-Duty Trucks and Vehicles				
subtotal	0	166,998,209	97,081,684	11,475,765
total	367,873,118	173,696,368	1,378,064,171	11,475,765
adjusted total	269,085,159	**127,052,270**	**1,008,001,396**	**8,394,085**

Note: Energy uses are adjusted using ABM VMT to EMFAC VMT ratio for each scenario year.

VMT per day	2022	2035	2050
EMFAC	97,399,642	105,714,741	111,251,276
ABM	71,244,124	73,453,955	73,313,426
adjust factor	0.73	0.69	0.66

2035

	Vehicle Category	Electricity (KWh)	Diesel (gals)	Gasoline (gals)	NG (gals)
Light Duty Vehicles					
	LDA	954,491,096	342,319	489,111,380	0
	LDT1	12,071,002	368	43,137,476	0
	LDT2	103,921,734	864,524	297,708,420	0
	MDV	87,033,171	2,195,281	208,152,422	0
	subtotal	1,157,517,003	3,402,492	1,038,109,698	0
Heavy-Duty Trucks and Vehicles					
	subtotal	507,157,610	154,162,186	68,501,219	9,189,411
	total	1,664,674,613	157,564,677	1,106,610,916	9,189,411
	adjusted total	**1,156,668,715**	**109,480,935**	**768,908,360**	**6,385,094**

2050

	Vehicle Category	Electricity (KWh)	Diesel (gals)	Gasoline (gals)	NG (gals)
Light Duty Vehicles					
	LDA	1,079,084,319	185,924	481,382,945	0
	LDT1	18,692,602	449	35,326,922	0
	LDT2	138,463,581	843,566	286,290,664	0
	MDV	114,277,382	1,788,931	200,478,664	0
	subtotal	1,350,517,884	2,818,870	1,003,479,195	0
Heavy-Duty Trucks and Vehicles					
	subtotal	1,219,084,971	176,057,055	46,234,005	4,294,897
	total	2,569,602,855	178,875,925	1,049,713,200	4,294,897
	adjusted total	**1,693,341,377**	**117,877,362**	**691,750,008**	**2,830,292**

On-Road Fuel Consumption Calculation
Source: EMFAC2021 (v1.0.2) Emissions Inventory
Region Type: MPO
Region: SANDAG
Calendar Year: 2022, 2035, 2050
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

Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption	CO2_TOTEX	CH4_TOTEX	N2O_TOTEX	CO2e (MT/day)	Days	CO2e (MT)	Electricity (kWh)	Diesel (gals)	Gasoline (gals)	NG (gals)	Vehicle Category	Operation Days (days/yr)
2035	All Other Buses	Aggregate	Aggregate	Natural Gas	101.4503332	5213.393453	5213.393453	0	902.908	0	0.663168	5.737502	0.005179	0.00117	5.638634	292	1646.481	0	0	0	193645		
2035	LDA	Aggregate	Aggregate	Gasoline	1110759.184	46347911.89	46347911.89	0	5164619	0	1375.497	13044.22	0.307965	0.329363	11929.55	347	4139554	0	0	4.77E+08	0		
2035	LDA	Aggregate	Aggregate	Diesel	1519.306492	45149.63773	45149.63773	0	6406.123	0	0.986511	11.04349	4.36E-05	0.00174	10.48985	347	3639.976	0	342319.1	0	0		
2035	LDA	Aggregate	Aggregate	Electricity	130716.132	6138023.808	0	6138024	626679.2	2369783.789	0	0	0	0	0	347	0	822314975	0	0	0		
2035	LDA	Aggregate	Aggregate	Plug-in Hybrid	49294.49561	2183801.775	922631.4992	1261170	203832.7	380911.0121	34.04569	322.8648	0.010146	0.00566	294.6583	347	102246.4	132176121	0	11813855	0		
2035	LDT1	Aggregate	Aggregate	Gasoline	93857.68538	3390000.626	3390000.626	0	407965.6	0	123.5656	1171.807	0.041855	0.035057	1073.473	347	372495	0	0	42877274	0		
2035	LDT1	Aggregate	Aggregate	Diesel	0.647733662	29.05996437	29.05996437	0	3.105948	0	0.00106	0.011869	3.82E-08	1.87E-06	0.011274	347	3.911985	0	367.9065	0	0		
2035	LDT1	Aggregate	Aggregate	Electricity	1344.694667	67210.15522	0	67210.16	6574.167	25948.66707	0	0	0	0	0	347	0	9004187.47	0	0	0		
2035	LDT1	Aggregate	Aggregate	Plug-in Hybrid	1036.853104	49528.79652	20266.51075	29262.29	4287.388	8838.082459	0.749862	7.111148	0.000216	0.000122	6.488885	347	2251.643	3066814.61	0	260202	0		
2035	LDT2	Aggregate	Aggregate	Gasoline	564854.8326	23373410.67	23373410.67	0	2615349	0	849.6967	8057.911	0.201982	0.196984	7367.85	347	2556644	0	0	2.95E+08	0		
2035	LDT2	Aggregate	Aggregate	Diesel	2124.456927	88897.51513	88897.51513	0	9911.945	0	2.491423	27.89023	0.000116	0.004394	26.49214	347	9192.774	0	864523.8	0	0		
2035	LDT2	Aggregate	Aggregate	Electricity	15409.83751	531116.4945	0	531116.5	75330.98	205054.8023	0	0	0	0	0	347	0	71154016.4	0	0	0		
2035	LDT2	Aggregate	Aggregate	Plug-in Hybrid	11787.55999	534718.9128	222062.8091	312656.1	48741.56	94431.46195	8.252663	78.26231	0.002431	0.001359	71.4208	347	24783.02	32767717.3	0	2863674	0		
2035	LHD1	Aggregate	Aggregate	Gasoline	34320.5996	1382832.606	1382832.606	0	511325.8	0	126.8769	1203.209	0.020585	0.029988	1100.107	327	359735.1	0	0	41488749	0		
2035	LHD1	Aggregate	Aggregate	Diesel	26680.75033	1039152.429	1039152.429	0	335610.3	0	62.72909	702.2207	0.006486	0.110635	667.1004	327	218141.8	0	20512413	0	0		
2035	LHD1	Aggregate	Aggregate	Electricity	12327.98337	735137.5642	0	735137.6	172166.2	478319.5318	0	0	0	0	0	327	0	156410487	0	0	0		
2035	LHD2	Aggregate	Aggregate	Gasoline	4925.019313	188890.3519	188890.3519	0	73375.45	0	19.68294	186.6589	0.002659	0.004152	170.5169	327	55759.01	0	0	6436323	0		
2035	LHD2	Aggregate	Aggregate	Diesel	12150.49033	468652.3681	468652.3681	0	152837.9	0	33.256	372.2842	0.003058	0.058654	353.6565	327	115645.7	0	10874713	0	0		
2035	LHD2	Aggregate	Aggregate	Electricity	3263.880242	185714.7364	0	185714.7	43252.03	118913.2816	0	0	0	0	0	327	0	38884643.1	0	0	0		
2035	MCY	Aggregate	Aggregate	Gasoline	67054.21067	400554.5443	400554.5443	0	134108.4	0	10.01891	95.0121	0.100087	0.017454	93.1821	347	32334.19	0	0	3476561	0		
2035	MDV	Aggregate	Aggregate	Gasoline	327359.1965	13492450.18	13492450.18	0	1503880	0	594.6012	5638.769	0.126548	0.118367	5150.277	347	1787146	0	0	2.06E+08	0		
2035	MDV	Aggregate	Aggregate	Diesel	4387.313403	168660.2634	168660.2634	0	19765.18	0	6.326458	70.82151	0.000121	0.011158	67.26742	347	23341.8	0	2195281	0	0		
2035	MDV	Aggregate	Aggregate	Electricity	14481.72767	495120.2713	0	495120.3	70609.91	191157.2892	0	0	0	0	0	347	0	66331579.4	0	0	0		
2035	MDV	Aggregate	Aggregate	Plug-in Hybrid	7296.103911	337826.5912	140300.5042	197526.1	30169.39	59658.76548	5.261692	49.8981	0.001512	0.000849	45.53051	347	15799.09	20701591.6	0	1825807	0		
2035	MH	Aggregate	Aggregate	Gasoline	5736.294014	58799.13712	58799.13712	0	573.8589	0	13.31363	126.2569	0.000363	0.001005	114.8182	327	37545.56	0	0	4353556	0		
2035	MH	Aggregate	Aggregate	Diesel	3571.291212	33466.80879	33466.80879	0	357.1291	0	3.576978	40.04247	0.000193	0.006309	38.03581	327	12437.71	0	1169672	0	0		
2035	Motor Coach	Aggregate	Aggregate	Diesel	201.7086987	24395.24784	24395.24784	0	4635.266	0	4.018333	44.98322	5.58E-05	0.007087	42.72531	292	12475.79	0	1173353	0	0		
2035	OBUS	Aggregate	Aggregate	Gasoline	756.7052618	30803.79026	30803.79026	0	15140.16	0	5.892962	55.88461	0.001052	0.000972	50.98432	327	16671.87	0	0	1926999	0		
2035	OBUS	Aggregate	Aggregate	Electricity	132.5179545	11904.72116	0	11904.72	2651.419	13205.71895	0	0	0	0	0	327	0	4318270.1	0	0	0		
2035	PTO	Aggregate	Aggregate	Diesel	0	31790.11507	31790.11507	0	0	0	5.775432	64.65306	2.73E-05	0.010186	61.40663	312	19158.87	0	1801935	0	0		
2035	PTO	Aggregate	Aggregate	Electricity	0	11053.8171	0	11053.82	0	22898.18959	0	0	0	0	0	312	0	7144235.15	0	0	0		
2035	SBUS	Aggregate	Aggregate	Gasoline	276.759639	16522.8023	16522.8023	0	1107.039	0	1.532527	14.53338	0.000912	0.000333	13.29515	327	4347.513	0	0	501136.3	0		
2035	SBUS	Aggregate	Aggregate	Diesel	1621.596239	35557.75102	35557.75102	0	23480.71	0	4.077379	45.64421	6.91E-05	0.007191	43.3534	327	14176.56	0	1333303	0	0		
2035	SBUS	Aggregate	Aggregate	Electricity	435.4153046	13718.93538	0	13718.94	5605.363	14452.28917	0	0	0	0	0	327	0	4725898.56	0	0	0		
2035	SBUS	Aggregate	Aggregate	Natural Gas	28.35701133	659.1718528	659.1718528	0	410.6095	0	0.107835	0.932954	0.002291	0.00019	0.949729	327	310.5613	0	0	0	35262.14		
2035	T6 CAIRP heavy	Aggregate	Aggregate	Diesel	63.2547956	12298.22818	12298.22818	0	1453.595	0	1.124515	12.58838	3.89E-06	0.001983	11.95625	312	3730.349	0	350848.7	0	0		
2035	T6 CAIRP heavy	Aggregate	Aggregate	Electricity	12.16184835	2603.112628	0	2603.113	279.4793	2827.718359	0	0	0	0	0	312	0	882248.128	0	0	0		
2035	T6 CAIRP small	Aggregate	Aggregate	Diesel	49.33669095	2534.668685	2534.668685	0	1133.757	0	0.263823	2.953366	8.77E-07	0.000465	2.80506	312	875.1787	0	82312.78	0	0		
2035	T6 CAIRP small	Aggregate	Aggregate	Electricity	22.88870664	1412.890649	0	1412.891	525.9825	1534.799833	0	0	0	0	0	312	0	478857.548	0	0	0		
2035	T6 instate heavy	Aggregate	Aggregate	Diesel	3027.516521	124657.2383	124657.2383	0	36565.36	0	13.8451	154.9889	8.53E-05	0.024419	147.2069	312	45928.55	0	4319670	0	0		
2035	T6 instate heavy	Aggregate	Aggregate	Electricity	416.4594325	26807.90168	0	26807.9	5031.949	28453.50218	0	0	0	0	0	312	0	8877492.68	0	0	0		
2035	T6 instate heavy	Aggregate	Aggregate	Natural Gas	23.29109761	996.4292234	996.4292234	0	284.5599	0	0.136416	1.180228	0.001137	0.000241	1.161515	312	362.3926	0	0	0	42561.91		
2035	T6 instate small	Aggregate	Aggregate	Diesel	11703.33534	427535.0815	427535.0815	0	144223.2	0	47.43566	531.0184	0.000282	0.083662	504.3556	312	157359	0	14799926	0	0		
2035	T6 instate small	Aggregate	Aggregate	Electricity	3757.908946	169752.3932	0	169752.4	46202.7	180273.9048	0	0	0	0	0	312	0	56245458.3	0	0	0		
2035	T6 instate small	Aggregate	Aggregate	Natural Gas	260.5910005	9199.155149	9199.155149	0	3197.837	0	1.252319	10.83464	0.011143	0.002209	10.67884	312	3331.797	0	0	0	390723.5		
2035	T6 OOS heavy	Aggregate	Aggregate	Diesel	37.13723429	9845.690351	9845.690351	0	853.4136	0	0.865029	9.683564	3E-06	0.001526	9.197298	312	2869.557	0	269889	0	0		
2035	T6 OOS small	Aggregate	Aggregate	Diesel	41.5069133	2249.996547	2249.996547	0	953.8289	0	0.217806	2.438226	8.31E-07	0.000384	2.315791	312	722.5268	0	67955.4	0	0		
2035	T6 Public	Aggregate	Aggregate	Diesel	1739.172739	65639.10892	65639.10892	0	8921.956	0	7.851232	87.8906	0.000104	0.013847	83.47885	312	26045.4	0	2449584	0	0		
2035	T6 Public	Aggregate	Aggregate	Electricity	398.3568006	18804.4455	0	18804.45	2043.57	22206.18017	0	0	0	0	0	312	0	6928328.21	0	0	0		
2035	T6 Public	Aggregate	Aggregate	Natural Gas	21.60710879	823.0737044	823.0737044	0	110.8445	0	0.122172	1.056993	0.001253	0.000215	1.045554	312	326.2129	0	0	0	38117.75		
2035	T6 Utility	Aggregate	Aggregate	Diesel	208.2633706	8500.572283	8500.572283	0	2665.771	0	0.90667	10.14971	3.73E-06	0.001599	9.640053	312	3007.697	0	282881	0	0		
2035	T6 Utility	Aggregate	Aggregate	Electricity	109.7824319	4933.361524	0	4933.362	1405.215	5525.677622	0	0	0	0	0	312	0	1724011.42	0	0	0		
2035	T6TS	Aggregate	Aggregate	Gasoline	2684.411525	154954.0761	154954.0761	0	53709.71	0	29.5905	280.615	0.003934	0.003385	255.574	327	83572.71	0	0	9676094	0		
2035	T6TS	Aggregate	Aggregate	Electricity	706.2989864	63565.59015	0	63565.59	14131.63	74208.18075	0	0	0	0	0	327	0	24266075.1	0	0	0		
2035	T7 CAIRP	Aggregate	Aggregate	Diesel	2202.483349	456145.8311	456145.8311	0	50613.07	0	63.42891	710.0547	0.001448	0.111869	674.4267	312	210421.1	0	19789819	0	0		
2035	T7 CAIRP	Aggregate	Aggregate	Electricity	437.0249698	97203.99405	0	97203.99	10042.83	177487.3074	0	0	0	0	0	312	0	55376039.9	0	0	0		
2035	T7 CAIRP	Aggregate	Aggregate	Natural Gas	1.919688673	395.7140596	395.7140596	0	44.11445	0	0.064036	0.554021	0.000717	0.000113	0.549391	312	171.4099	0	0	0	19979.33		
2035	T7 NNOOS	Aggregate	Aggregate	Diesel	2284.146851	654697.9466	654697.9466	0	52489.69	0	86.21165	965.096	0.001892	0.152051	916.6692	312	286000.8	0	26898033	0	0		
2035	T7 NOOS	Aggregate	Aggregate	Diesel	987.2666183	237840.1346	237840.1346	0	22687.39	0	31.83476	356.3742	0.000796	0.056147	338.4941	312	105610.2	0	9932446	0	0		
2035	T7 Other Port	Aggregate	Aggregate	Diesel	475.4940315	126582.189	126582.189	0	7779.082	0	17.83853	199.6934	0.000148	0.031462	189.6677	312	59176.31	0	5565623	0	0		
2035	T7 Other Port	Aggregate	Aggregate	Electricity	70.82131792	23055.99083	0	23055.99	1158.637	41961.14793	0	0	0	0	0	312	0	13091878.2	0	0	0		
2035	T7 POLA	Aggregate	Aggregate	Diesel	240.4628292	45017.44765	45017.44765	0	3933.972	0	7.009941	78.47276	6.82E-05	0.012363	74.5332	312	23254.36	0	2187102	0	0		
2035	T7 POLA	Aggregate	Aggregate	Electricity	17.68062467	3206.812168	0	3206.812	289.255	5836.293082	0	0	0	0	0	312	0	1820923.44	0	0	0		
2035	T7 Public	Aggregate	Aggregate	Diesel	1349.177884	54669.61024	54669.61024	0	6921.283	0	9.629964	107.8026	0.000233	0.016984	102.3938	312	31946.85	0	3004549	0	0		
2035	T7 Public	Aggregate	Aggregate	Electricity	250.1509846	14223.51049	0	14223.51	1283.275	27914.81366	0	0	0	0	0	312	0	8709421.86	0	0	0		
2035	T7 Public	Aggregate	Aggregate	Natural Gas	10.60390465	439.170013	439.170013	0	54.39803	0	0.092599	0.801137	0.001033	0.000163	0.79436	312	247.8404	0	0	0	28890.97		
2035	T7 Single	Aggregate	Aggregate	Diesel	3139.94377	148567.1152	148567.1152	0	29578.27	0	23.82731	266.7348	0.000383	0.042024	253.3473	312	79044.36	0	7434121	0	0		
2035	T7 Single	Aggregate	Aggregate	Electricity	793.0348008	55669.23241	0	55669.23	7470.388	101493.5934	0	0	0	0	0	312	0	31666001.1	0	0	0		
2035	T7 Single	Aggregate	Aggregate	Natural Gas	246.9062312	11534.2586	11534.2586	0	2325.857	0	1.997572	17.28232	0.021427	0.003523	17.11666	312	5340.398	0	0	0	623242.5		
2035	T7 SWCV	Aggregate	Aggregate	Diesel	194.8507976	12651.90276	12651.90276	0	896.3137	0	5.215096	58.38037	2.51E-05	0.009198	55.44892	312	17300.06	0	1627110	0	0		

Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption	CO2_TOTEX	CH4_TOTEX	N2O_TOTEX	CO2e (MT/day)	Days	CO2e (MT)	Electricity (KWh)	Diesel (gals)	Gasoline (gals)	NG (gals)	Vehicle Category	Operation Days (days/yr)
2035	T7 SWCV	Aggregate	Aggregate	Electricity	238.1485776	15266.15119	0	15266.15	1095.483	28403.44836	0	0	0	0	0	312	0	8861875.89	0	0	0		
2035	T7 SWCV	Aggregate	Aggregate	Natural Gas	987.6303341	64032.42514	64032.42514	0	4543.1	0	12.18483	105.419	0.074955	0.02149	103.1442	312	32180.99	0	0	0	3801666		
2035	T7 Tractor	Aggregate	Aggregate	Diesel	5897.443611	375121.0727	375121.0727	0	85689.86	0	54.97977	615.4709	0.001254	0.096968	584.5887	312	182391.7	0	17153688	0	0		
2035	T7 Tractor	Aggregate	Aggregate	Electricity	546.8080211	42371.0873	0	42371.09	7945.121	77145.45388	0	0	0	0	0	312	0	24069381.6	0	0	0		
2035	T7 Tractor	Aggregate	Aggregate	Natural Gas	82.55869053	5223.480914	5223.480914	0	1199.578	0	0.920769	7.966179	0.010502	0.001624	7.904009	312	2466.051	0	0	0	287279.9		
2035	T7 Utility	Aggregate	Aggregate	Diesel	131.4577192	5404.208165	5404.208165	0	1682.659	0	0.880369	9.855293	7.51E-06	0.001553	9.360504	312	2920.477	0	274675.3	0	0		
2035	T7 Utility	Aggregate	Aggregate	Electricity	27.0410651	1522.323005	0	1522.323	346.1256	2866.22714	0	0	0	0	0	312	0	894262.868	0	0	0		
2035	T7IS	Aggregate	Aggregate	Gasoline	3.23332373	480.1027128	480.1027128	0	64.69234	0	0.105818	1.0035	5.11E-05	6.07E-05	0.927924	327	303.4311	0	0	34602.44	0		
2035	T7IS	Aggregate	Aggregate	Electricity	0.742805557	185.9511685	0	185.9512	14.86205	373.6585949	0	0	0	0	0	327	0	122186.361	0	0	0		
2035	UBUS	Aggregate	Aggregate	Gasoline	179.2514382	18446.75727	18446.75727	0	717.0058	0	1.856877	17.60929	5.48E-05	0.000121	16.00887	327	5234.901	0	0	607198.9	0		
2035	UBUS	Aggregate	Aggregate	Electricity	740.4326744	90624.44581	0	90624.45	2961.731	157980.5322	0	0	0	0	0	327	0	51659634	0	0	0		
2035	UBUS	Aggregate	Aggregate	Natural Gas	536.8488912	65734.82603	65734.82603	0	2147.396	0	11.40074	98.63534	0.325566	0.020107	102.3001	327	33452.13	0	0	0	3728042		
2050	All Other Buses	Aggregate	Aggregate	Diesel	536.4504346	27491.62792	27491.62792	0	4774.409	0	2.748766	30.77105	2.17E-05	0.004848	29.22614	292	8534.033	0	802639.6	0	0		
2050	All Other Buses	Aggregate	Aggregate	Natural Gas	106.0815371	5311.773986	5311.773986	0	944.1257	0	0.65032	5.62635	0.005342	0.001147	5.53536	292	1616.325	0	0	0	189893.5		
2050	LDA	Aggregate	Aggregate	Gasoline	1146207.31	47755582.22	47755582.22	0	5350192	0	1353.24	12833.15	0.243215	0.317496	11733.39	347	4071486	0	0	4.7E+08	0		
2050	LDA	Aggregate	Aggregate	Diesel	770.6086424	28000.90946	28000.90946	0	3407.35	0	0.535803	5.998051	1.16E-05	0.000945	5.697076	347	1976.885	0	185923.8	0	0		
2050	LDA	Aggregate	Aggregate	Electricity	159411.415	6996707.491	0	6996707	749382.7	2701306.561	0	0	0	0	0	347	0	937353377	0	0	0		
2050	LDA	Aggregate	Aggregate	Plug-in Hybrid	53992.45635	2281207.608	928869.1558	1352338	223258.8	408446.5187	34.03108	322.7262	0.010847	0.005933	294.6223	347	102233.9	141730942	0	11808784	0		
2050	LDT1	Aggregate	Aggregate	Gasoline	79440.64221	3062405.871	3062405.871	0	357568.5	0	100.6628	954.6137	0.017337	0.021964	872.3421	347	302702.7	0	0	34930001	0		
2050	LDT1	Aggregate	Aggregate	Diesel	0.900072564	36.28856539	36.28856539	0	4.153715	0	0.001295	0.014493	4.63E-08	2.28E-06	0.013766	347	4.776866	0	449.2453	0	0		
2050	LDT1	Aggregate	Aggregate	Electricity	2434.561036	104184.6679	0	104184.7	11345.1	40223.88063	0	0	0	0	0	347	0	13957686.6	0	0	0		
2050	LDT1	Aggregate	Aggregate	Plug-in Hybrid	1849.505045	76168.13774	30989.52303	45178.61	7647.703	13645.28818	1.143865	10.84759	0.00037	0.000201	9.903573	347	3436.54	4734915	0	396921.3	0		
2050	LDT2	Aggregate	Aggregate	Gasoline	582476.1491	23920932.35	23920932.35	0	2701874	0	814.9864	7728.744	0.159871	0.180394	7063.794	347	2451137	0	0	2.83E+08	0		
2050	LDT2	Aggregate	Aggregate	Diesel	2241.84305	91950.6223	91950.6223	0	10394.56	0	2.431025	27.2141	0.000116	0.004288	25.84997	347	8969.941	0	843565.5	0	0		
2050	LDT2	Aggregate	Aggregate	Electricity	23794.5107	723757.2214	0	723757.2	111930.7	279430.0224	0	0	0	0	0	347	0	96962217.8	0	0	0		
2050	LDT2	Aggregate	Aggregate	Plug-in Hybrid	16114.25388	667925.8206	271936.8512	395989	66632.44	119600.4711	10.05875	95.38992	0.003229	0.00176	87.08523	347	30218.57	41501363.5	0	3490386	0		
2050	LHD1	Aggregate	Aggregate	Gasoline	23526.90479	954197.3898	954197.3898	0	350515.8	0	83.25116	789.494	0.010494	0.016634	720.952	327	235751.3	0	0	27223129	0		
2050	LHD1	Aggregate	Aggregate	Diesel	18897.2583	725721.1834	725721.1834	0	237703.7	0	42.75098	478.5757	0.003206	0.0754	454.6131	327	148658.5	0	13979571	0	0		
2050	LHD1	Aggregate	Aggregate	Electricity	35904.84914	1659414.522	0	1659415	499722.9	1078838.794	0	0	0	0	0	327	0	352780286	0	0	0		
2050	LHD2	Aggregate	Aggregate	Gasoline	3362.222203	128756.9681	128756.9681	0	50092.1	0	12.66287	120.0855	0.001296	0.002141	109.548	327	35822.2	0	0	4140759	0		
2050	LHD2	Aggregate	Aggregate	Diesel	9410.853147	342734.3586	342734.3586	0	118376.7	0	23.64981	264.7478	0.001858	0.041711	251.4936	327	82238.4	0	7733489	0	0		
2050	LHD2	Aggregate	Aggregate	Electricity	9874.99119	437064.401	0	437064.4	130645.9	279736.1468	0	0	0	0	0	327	0	91473720	0	0	0		
2050	MCY	Aggregate	Aggregate	Gasoline	66182.70845	391981.6642	391981.6642	0	132365.4	0	9.585707	90.90394	0.08656	0.015977	88.74909	347	30795.94	0	0	3326240	0		
2050	MDV	Aggregate	Aggregate	Gasoline	337243.7802	13848443.39	13848443.39	0	1554527	0	571.2646	5417.462	0.093881	0.106593	4945.586	347	1716118	0	0	1.98E+08	0		
2050	MDV	Aggregate	Aggregate	Diesel	3765.778405	150832.8851	150832.8851	0	17153.98	0	5.155421	57.71235	6.51E-05	0.009093	54.81536	347	19020.93	0	1788931	0	0		
2050	MDV	Aggregate	Aggregate	Electricity	21869.33269	655562.6726	0	655562.7	102319.5	253101.2982	0	0	0	0	0	347	0	87826150.5	0	0	0		
2050	MDV	Aggregate	Aggregate	Plug-in Hybrid	10285.53373	425727.2686	173340.4758	252386.8	42530.68	76228.33376	6.483703	61.48677	0.002058	0.001121	56.12955	347	19476.95	26451231.8	0	2249845	0		
2050	MH	Aggregate	Aggregate	Gasoline	4120.045831	48347.38263	48347.38263	0	412.1694	0	10.94551	103.7994	0.000167	0.000958	94.42811	327	30877.99	0	0	3579183	0		
2050	MH	Aggregate	Aggregate	Diesel	2767.492476	28038.49172	28038.49172	0	276.7492	0	3.009948	33.69485	0.000121	0.005309	32.00535	327	10465.75	0	984252.9	0	0		
2050	Motor Coach	Aggregate	Aggregate	Diesel	210.1975667	26475.43327	26475.43327	0	4830.34	0	4.142003	46.36764	5.73E-05	0.007305	44.04024	292	12859.75	0	1209465	0	0		
2050	OBUS	Aggregate	Aggregate	Gasoline	403.625802	17180.30827	17180.30827	0	8075.745	0	3.060407	29.02269	0.000373	0.000499	26.47244	327	8656.488	0	0	1000753	0		
2050	OBUS	Aggregate	Aggregate	Electricity	322.7398386	23339.41599	0	23339.42	6457.379	25890.04512	0	0	0	0	0	327	0	8466044.75	0	0	0		
2050	PTO	Aggregate	Aggregate	Diesel	0	28827.79068	28827.79068	0	0	0	4.871266	54.53138	2.02E-05	0.008591	51.79313	312	16159.46	0	1519835	0	0		
2050	PTO	Aggregate	Aggregate	Electricity	0	33231.49677	0	33231.5	0	68839.66925	0	0	0	0	0	312	0	21477976.8	0	0	0		
2050	SBUS	Aggregate	Aggregate	Gasoline	222.6130928	13139.84331	13139.84331	0	890.4524	0	1.127886	10.69606	0.000721	0.000168	9.765091	327	3193.185	0	0	368818.8	0		
2050	SBUS	Aggregate	Aggregate	Diesel	1055.801782	21642.14053	21642.14053	0	15288.01	0	2.361759	26.43871	1.58E-05	0.004165	25.11124	327	8211.376	0	772295.3	0	0		
2050	SBUS	Aggregate	Aggregate	Electricity	1232.463333	37036.60928	0	37036.61	15505.47	39016.42308	0	0	0	0	0	327	0	12758370.3	0	0	0		
2050	SBUS	Aggregate	Aggregate	Natural Gas	21.91977118	448.253471	448.253471	0	317.3983	0	0.071576	0.61925	0.001392	0.000126	0.627477	327	205.1849	0	0	0	23405.3		
2050	T6 CAIRP heavy	Aggregate	Aggregate	Diesel	74.7780979	14833.41701	14833.41701	0	1718.401	0	1.308841	14.65182	4.54E-06	0.002308	13.91607	312	4341.813	0	408358.4	0	0		
2050	T6 CAIRP heavy	Aggregate	Aggregate	Electricity	23.40548995	4793.93279	0	4793.933	537.8582	5207.570204	0	0	0	0	0	312	0	1624761.9	0	0	0		
2050	T6 CAIRP small	Aggregate	Aggregate	Diesel	38.0039685	2059.194457	2059.194457	0	873.3312	0	0.20685	2.315586	6.53E-07	0.000365	2.199306	312	686.1834	0	64537.31	0	0		
2050	T6 CAIRP small	Aggregate	Aggregate	Electricity	56.01733417	3140.346237	0	3140.346	1287.278	3411.306377	0	0	0	0	0	312	0	1064327.59	0	0	0		
2050	T6 instate heavy	Aggregate	Aggregate	Diesel	2612.276559	119880.1787	119880.1787	0	31507.57	0	12.21074	136.6931	6.49E-05	0.021536	129.8295	312	40506.81	0	3809752	0	0		
2050	T6 instate heavy	Aggregate	Aggregate	Electricity	1532.517984	79973.19843	0	79973.2	18646.11	84927.36906	0	0	0	0	0	312	0	26497339.1	0	0	0		
2050	T6 instate heavy	Aggregate	Aggregate	Natural Gas	21.1678118	961.8776665	961.8776665	0	256.4318	0	0.124862	1.080266	0.001066	0.00022	1.063713	312	331.8785	0	0	0	38957.01		
2050	T6 instate small	Aggregate	Aggregate	Diesel	8968.644852	336630.0217	336630.0217	0	110510.5	0	35.16121	393.6121	0.000176	0.062014	373.8478	312	116640.5	0	10970298	0	0		
2050	T6 instate small	Aggregate	Aggregate	Electricity	11310.83583	456199.8914	0	456199.9	139386.5	484513.4951	0	0	0	0	0	312	0	151168210	0	0	0		
2050	T6 instate small	Aggregate	Aggregate	Natural Gas	161.5384859	6005.93594	6005.93594	0	1989.488	0	0.790388	6.838168	0.007058	0.001394	6.740413	312	2103.009	0	0	0	246601		
2050	T6 OOS heavy	Aggregate	Aggregate	Diesel	47.59592496	12968.28326	12968.28326	0	1093.754	0	1.093965	12.24638	3.85E-06	0.001929	11.63143	312	3629.005	0	341317	0	0		
2050	T6 OOS small	Aggregate	Aggregate	Diesel	54.45275867	2963.590315	2963.590315	0	1251.324	0	0.279818	3.13242	9.3E-07	0.000494	2.975123	312	928.2384	0	87303.17	0	0		
2050	T6 Public	Aggregate	Aggregate	Diesel	1178.758971	44219.94697	44219.94697	0	6047.034	0	4.975822	55.70183	3.59E-05	0.008776	52.90515	312	16506.41	0	1552456	0	0		
2050	T6 Public	Aggregate	Aggregate	Electricity	1065.353127	43545.55954	0	43545.56	5465.262	51422.97552	0	0	0	0	0	312	0	16043968.4	0	0	0		
2050	T6 Public	Aggregate	Aggregate	Natural Gas	15.57958105	582.9997384	582.9997384	0	79.92325	0	0.085813	0.742429	0.000876	0.000151	0.734309	312	229.1044	0	0	0	26773.79		
2050	T6 Utility	Aggregate	Aggregate	Diesel	130.9627064	5450.276786	5450.276786	0	1676.323	0	0.562352	6.295244	2.32E-06	0.000992	5.979133	312	1865.49	0	175453.7	0	0		
2050	T6 Utility	Aggregate	Aggregate	Electricity	199.5450904	8469.213301	0	8469.213	2554.177	9486.055742	0	0	0	0	0	312	0	2959649.39	0	0	0		
2050	T6TS	Aggregate	Aggregate	Gasoline	1739.080311	98058.36322	98058.36322	0	34795.52	0	17.67155	167.5843	0.002269	0.002206	152.6778	327	49925.63	0	0	5778597	0		
2050	T6TS	Aggregate	Aggregate	Electricity	1877.261899	133033.1301	0	133033.1	37560.26	155306.4565	0	0	0	0	0	327	0	50785211.3	0	0	0		
2050	T7 CAIRP	Aggregate	Aggregate	Diesel	3408.266725	725522.0513	725522.0513	0	78321.97	0	98.03824	1097.489	0.002243	0.17291	1042.421	312	325235.3	0	30587930	0	0		
2050	T7 CAIRP	Aggregate	Aggregate	Electricity	968.7188493	213204.3727	0	213204.4	22261.16	389295.4237	0	0	0	0	0	312	0	121460172	0	0	0		
2050	T7 CAIRP	Aggregate	Aggregate	Natural Gas	2.893876301	616.0037439	616.0037439	0	66.50128	0	0.097931	0.847263	0.001101	0.000173	0.840283	312	262.1684	0	0	0	30554.38		

Calendar Year	Vehicle Category	Model Year	Speed	Fuel	Population	Total VMT	CVMT	EVMT	Trips	Energy Consumption	Fuel Consumption	CO2_TOTEX	CH4_TOTEX	N2O_TOTEX	CO2e (MT/day)	Days	CO2e (MT)	Electricity (KWh)	Diesel (gals)	Gasoline (gals)	NG (gals)	Vehicle Category	Operation Days (days/yr)
2050	T7 NNOOS	Aggregate	Aggregate	Diesel	3805.085998	1110592.348	1110592.348	0	87440.88	0	142.6436	1596.823	0.003151	0.25158	1516.698	312	473209.7	0	44504795	0	0		
2050	T7 NOOS	Aggregate	Aggregate	Diesel	1634.746382	403458.4726	403458.4726	0	37566.47	0	52.40184	586.6122	0.001319	0.092421	557.1809	312	173840.5	0	16349374	0	0		
2050	T7 Other Port	Aggregate	Aggregate	Diesel	523.2925872	124364.7613	124364.7613	0	8561.067	0	17.1234	191.6878	0.000156	0.0302	182.0643	312	56804.06	0	5342501	0	0		
2050	T7 Other Port	Aggregate	Aggregate	Electricity	120.648649	31321.50867	0	31321.51	1973.812	57004.1196	0	0	0	0	0	312	0	17785285.3	0	0	0		
2050	T7 POLA	Aggregate	Aggregate	Diesel	219.1301207	40455.58229	40455.58229	0	3584.969	0	5.594163	62.62384	6.05E-05	0.009866	59.48008	312	18557.78	0	1745379	0	0		
2050	T7 POLA	Aggregate	Aggregate	Electricity	42.49919761	7768.677529	0	7768.678	695.2869	14138.73858	0	0	0	0	0	312	0	4411286.44	0	0	0		
2050	T7 Public	Aggregate	Aggregate	Diesel	968.4468911	39064.73665	39064.73665	0	4968.133	0	6.375761	71.37344	0.000113	0.011245	67.79144	312	21150.93	0	1989237	0	0		
2050	T7 Public	Aggregate	Aggregate	Electricity	712.7371892	32420.78054	0	32420.78	3656.342	63628.45854	0	0	0	0	0	312	0	19852079.1	0	0	0		
2050	T7 Public	Aggregate	Aggregate	Natural Gas	8.716412293	352.7207804	352.7207804	0	44.7152	0	0.071967	0.622637	0.000826	0.000127	0.617894	312	192.7828	0	0	0	22453.81		
2050	T7 Single	Aggregate	Aggregate	Diesel	2725.618771	134881.6421	134881.6421	0	25675.33	0	20.36394	227.964	0.000325	0.035916	216.5224	312	67555	0	6353548	0	0		
2050	T7 Single	Aggregate	Aggregate	Electricity	2914.459514	167360.4602	0	167360.5	27454.21	305123.9215	0	0	0	0	0	312	0	95198663.5	0	0	0		
2050	T7 Single	Aggregate	Aggregate	Natural Gas	208.7987991	10300.874	10300.874	0	1966.885	0	1.72009	14.88164	0.018227	0.003034	14.73392	312	4596.984	0	0	0	536668.1		
2050	T7 SWCV	Aggregate	Aggregate	Diesel	31.30015766	1933.154325	1933.154325	0	143.9807	0	0.758562	8.491719	6.17E-06	0.001338	8.065382	312	2516.399	0	236671.3	0	0		
2050	T7 SWCV	Aggregate	Aggregate	Electricity	680.9434999	44010.08497	0	44010.08	3132.34	81882.99463	0	0	0	0	0	312	0	25547494.3	0	0	0		
2050	T7 SWCV	Aggregate	Aggregate	Natural Gas	759.7361312	49330.69912	49330.69912	0	3494.786	0	8.882964	76.85239	0.022328	0.015667	74.46112	312	23231.87	0	0	0	2771485		
2050	T7 Tractor	Aggregate	Aggregate	Diesel	8692.718002	581672.9908	581672.9908	0	126305.2	0	78.06358	873.8826	0.001839	0.137681	830.0356	312	258971.1	0	24355838	0	0		
2050	T7 Tractor	Aggregate	Aggregate	Electricity	1764.410886	127565.1634	0	127565.2	25636.89	232259.1431	0	0	0	0	0	312	0	72464852.6	0	0	0		
2050	T7 Tractor	Aggregate	Aggregate	Natural Gas	117.116667	7832.608901	7832.608901	0	1701.705	0	1.308029	11.31662	0.015074	0.002307	11.23181	312	3504.326	0	0	0	408105		
2050	T7 Utility	Aggregate	Aggregate	Diesel	91.34631715	3759.911009	3759.911009	0	1169.233	0	0.579351	6.485544	5.11E-06	0.001022	6.159939	312	1921.901	0	180757.5	0	0		
2050	T7 Utility	Aggregate	Aggregate	Electricity	74.61737927	3416.972794	0	3416.973	955.1025	6433.470511	0	0	0	0	0	312	0	2007242.8	0	0	0		
2050	T7IS	Aggregate	Aggregate	Gasoline	2.452446189	341.6065336	341.6065336	0	49.06854	0	0.071519	0.678237	3.48E-05	4.38E-05	0.627912	327	205.3271	0	0	23386.8	0		
2050	T7IS	Aggregate	Aggregate	Electricity	2.55717681	426.7081175	0	426.7081	51.16399	857.4463762	0	0	0	0	0	327	0	280384.965	0	0	0		
2050	UBUS	Aggregate	Aggregate	Gasoline	235.9001055	24773.53236	24773.53236	0	943.6004	0	2.425498	23.00168	6.46E-05	0.000134	20.90443	327	6835.748	0	0	793137.9	0		
2050	UBUS	Aggregate	Aggregate	Electricity	1768.082969	215734.8	0	215734.8	7072.332	376078.4213	0	0	0	0	0	327	0	122977644	0	0	0		