

APPENDIX H

GREENHOUSE GAS EMISSIONS INVENTORY SUMMARY

This page intentionally left blank

2014 GHG Reduction Plan and 2016 ICLEI Inventory Update Summary

BAU Forecasts

	2010	%	2020	2035	2050	2056
Motor Vehicles	1,899,799	51%	2,383,023	3,107,859	3,832,694	4,122,629
Electricity - Residential	327,813	9%	390,488	469,524	548,921	583,447
Electricity - Commercial	361,836	10%	415,012	509,781	626,137	679,888
Natural Gas - Residential	362,832	10%	476,679	573,160	670,082	712,228
Natural Gas - Commercial	394,417	11%	514,647	632,169	776,459	843,115
Waste	123,945	3%	147,628	177,508	207,525	220,578
Offroad Equipment	1,051	0%	1,138	1,314	1,314	1,314
Ozone Depleting Substance Substitutes	273,422	7%	576,784	694,734	812,214	863,300
Total	3,745,115		4,905,399	6,166,049	7,475,346	8,026,499

ABAU Forecasts

	2010	2020	2035
Motor Vehicles	1,795,666	1,748,773	1,745,843
Electricity - Residential	289,745	209,178	258,766
Electricity - Commercial	319,817	230,591	290,861
Natural Gas - Residential	400,169	468,696	506,670
Natural Gas - Commercial	448,706	497,117	553,452
Waste	123,945	147,628	177,508
Offroad Equipment	1,051	1,138	1,314
Ozone Depleting Substance Substitutes	273,422	288,392	347,367
Total	3,652,521	3,591,513	3,881,781
Target (below 2010)		-15%	-58%
Target		3,183,348	1,591,674
Reduction Needed		408,165	2,290,107

Local Reductions

	2020	2035
Motor Vehicles	1,681,383	1,646,902
Electricity - Residential	203,203	249,785
Electricity - Commercial	230,591	290,861
Natural Gas - Residential	468,696	506,670
Natural Gas - Commercial	497,117	553,452
Waste	72,742	87,465
Offroad Equipment	1,138	1,314
Ozone Depleting Substance Substitutes	288,392	347,367
Total	3,443,262	3,683,816
Target (below 2010)	-15%	-58%
Target	3,183,348	1,591,674
Reduction Needed	259,914	2,092,142

General Plan Land Use Plan + Transportation Demand Management (Rule 9410)
 Achieve mandated water reductions and General Plan policy objectives (20%/2020 and 25%/2035)
 Achieve 75% diversion/recycling mandate

ICLEI 2010 & 2016 Inventory

	2010	2016	%
Transportation	1,900,850	1,520,052	52%
Residential Energy	651,891	479,371	16%
Commercial Energy	713,481	524,838	18%
Industrial Energy		10,055	0%
Solid Waste	123,945	119,167	4%
Fugitive Emissions	295,469	270,130	9%
Agriculture		20	0%
Total	3,685,636	2,923,633	100%

Demographics	2015	2020	2025	2030	2035	2040	2045	2050
Population	574,590	624,040	676,820	725,120	772,030	816,980	859,410	903,790
Households	181,830	198,420	212,740	223,700	233,120	243,160	254,770	268,260
Employment - All	231,560	248,500	266,150	278,370	291,470	303,650	314,730	326,450
Employment - Mfg./Mining + Other Industrial	47,870	50,570	53,120	55,490	57,930	60,200	62,060	64,070
Employment - Others	183,690	197,930	213,030	222,880	233,540	243,450	252,670	262,380

Source: https://www.fresnocog.org/wp-content/uploads/publications/Demographics/Fresno_COG_2050_Projections_Final_Report_050417.pdf

	2015-2020 Annual Growth Rate	2020-2030 Change	2030-2035 Change
Population	0.016648614	0.161976796	0.064692741
Households	0.017616128	0.127406511	0.042109969
Employment	0.014220934	0.120201207	0.047059669
Employment - Mfg./Mining + Other Industrial	0.011034336	0.097290884	0.043971887
Employment - Others	0.015044827	0.126054666	0.047828428

BAU Forecast	2016	2020	2030	2035 Forecast Indicator
Transportation	1,520,052	2,384,161	2,845,827	3,109,173 Use BAU from 2014 Plan as VMT growth is not available
Residential Energy	479,371	514,053	579,546	603,951 Households
Commercial Energy	524,838	557,142	627,373	657,379 Employment - Others
Industrial Energy	10,055	10,506	11,528	12,035 Employment - Mfg./Mining + Other Industrial
Solid Waste	119,167	127,303	147,923	157,493 Population
Fugitive Emissions	270,130	288,573	335,316	357,008 Population
Agriculture	20	20	20	20 Assuming no growth
Total	2,923,633	3,881,759	4,547,533	4,897,059
Target	-	3,132,791	1,879,674	1,566,395
Target Met?	-	No	No	No

Statewide Measures Reductions	2020	2030	2035 Reduction Measures
Motor Vehicles	634,250	1,055,703	1,362,016 Pavley, LCFS, etc.
Residential Electricity	181,310	172,040	167,584 RPS, Title 24
Commercial Electricity	184,421	170,820	164,400 RPS, Title 24
Residential Natural Gas	7,983	10,762	12,496 RPS
Commercial Natural Gas	17,530	12,933	11,108 RPS
Refrigerants	144,287	167,658	178,504 Refrigerant Management Regulations
Total	1,169,781	1,589,915	1,896,108

ABAU Forecast	2020	2030	2035 Statewide Reductions
Transportation	1,749,911	1,790,124	1,747,157 Motor Vehicles
Residential Energy	324,760	396,744	423,871 Residential Electricity + Residential Natural Gas
Commercial Energy	355,191	443,620	481,871 Commercial Electricity + Commercial Natural Gas
Industrial Energy	10,506	11,528	12,035 None
Solid Waste	127,303	147,923	157,493 None
Fugitive Emissions	144,287	167,658	178,504 Refrigerants
Agriculture	20	20	20 None
Total	2,711,978	2,957,618	3,000,951
Target	3,132,791	1,879,674	1,566,395
Target Met?	Yes	No	No

Local Measures Reductions	2020	2030	2035 Notes
Motor Vehicles	67,390	87,053	98,941 General Plan Land Use Plan + Transportation Demand Management (Rule 9410)
Water Electricity	5,975	7,840	8,981 Achieve mandated water reductions and General Plan policy objectives (20%/2020 and 25%/2035)
Waste	-	84,677	90,043 Achieve 75% diversion/recycling mandate in 2030 and 2035
Total	73,365	179,570	197,965

Emissions with Statewide and Local Measures	2020	2030	2035 Local Reductions
Transportation	1,682,521	1,703,071	1,648,216 Motor Vehicles
Residential Energy	324,760	396,744	423,871 None
Commercial Energy	355,191	443,620	481,871 None
Industrial Energy	4,531	3,688	3,054 Water Electricity
Solid Waste	127,303	63,246	67,450 Waste
Fugitive Emissions	144,287	167,658	178,504 Solid Waste (in 2030 and 2035)
Agriculture	20	20	20 None
Total	2,638,613	2,778,048	2,802,986
Target	3,132,791	1,879,674	1,566,395
Target Met?	Yes	No	No

Target Setting		Percent below 1990 Emission Levels	Percent below 2010 Emission Levels
2010 (From 2010 Inventory Update by ICLEI)	3,685,636		
2020	3,132,791	0.0%	15.0%
2021	3,007,479	4.0%	18.4%
2022	2,882,167	8.0%	21.8%
2023	2,756,856	12.0%	25.2%
2024	2,631,544	16.0%	28.6%
2025	2,506,232	20.0%	32.0%
2026	2,380,921	24.0%	35.4%
2027	2,255,609	28.0%	38.8%
2028	2,130,298	32.0%	42.2%
2029	2,004,986	36.0%	45.6%
2030	1,879,674	40.0%	49.0%
2031	1,817,019	42.0%	50.7%
2032	1,754,363	44.0%	52.4%
2033	1,691,707	46.0%	54.1%
2034	1,629,051	48.0%	55.8%
2035	1,566,395	50.0%	57.5%
2036	1,503,739	52.0%	59.2%
2037	1,441,084	54.0%	60.9%
2038	1,378,428	56.0%	62.6%
2039	1,315,772	58.0%	64.3%
2040	1,253,116	60.0%	66.0%
2041	1,190,460	62.0%	67.7%
2042	1,127,805	64.0%	69.4%
2043	1,065,149	66.0%	71.1%
2044	1,002,493	68.0%	72.8%
2045	939,837	70.0%	74.5%
2046	877,181	72.0%	76.2%
2047	814,526	74.0%	77.9%
2048	751,870	76.0%	79.6%
2049	689,214	78.0%	81.3%
2050	626,558	80.0%	83.0%

Demographics	2015	2020	2025	2030	2035	2040	2045	2050
Population	574,590	624,040	676,820	725,120	772,030	816,980	859,410	903,790
Households	181,830	198,420	212,740	223,700	233,120	243,160	254,770	268,260
Employment - All	231,560	248,500	266,150	278,370	291,470	303,650	314,730	326,450
Employment - Mfg./Mining + Other Industrial	47,870	50,570	53,120	55,490	57,930	60,200	62,060	64,070
Employment - Others	183,690	197,930	213,030	222,880	233,540	243,450	252,670	262,380
Source: https://www.fresnocog.org/wp-content/uploads/publications/Demographics/Fresno_COG_2050_Projections_Final_Report_050417.pdf								
	2015-2020 Annual Growth Rate	2020-2030 Change	2030-2035 Change					
Population	0.016648614	0.161976796	0.064692741					
Households	0.017616128	0.127406511	0.042109969					
Employment	0.014220934	0.120201207	0.047059669					
Employment - Mfg./Mining + Other Industrial	0.011034336	0.097290884	0.043971887					
Employment - Others	0.015044827	0.126054666	0.047828428					

	2014-2042		2014-2042 Annual Growth Rate with RTP/SCS
	2014 RTP/SCS	2042 With 2018 RTP/SCS	
Daily VMT	23,556,578	33,612,320	0.012087267
Source: Fresno COG 2018 RTP/SCS PEIR, Table 4-5, https://www.fresnocog.org/wp-content/uploads/Manual%20Upload/Fresno%20COG%202018%20RTP%20SCS%20DPEIR%20040418%20GV01.pdf			

BAU Forecast	2016	2020	2030	2035	Forecast Indicator
Transportation	1,520,052	1,594,888	1,798,498	1,909,852	2018 RTP/SCS
Residential Energy	479,371	514,053	579,546	603,951	Households
Commercial Energy	524,838	557,142	627,373	657,379	Employment - Others
Industrial Energy	10,055	10,506	11,528	12,035	Employment - Mfg./Mining + Other Industrial
Solid Waste	119,167	127,303	147,923	157,493	Population
Fugitive Emissions	270,130	288,573	335,316	357,008	Population
Agriculture	20	20	20	20	Assuming no growth
Total	2,923,633	3,092,486	3,500,204	3,697,738	
Target	-	3,183,348	1,910,009	1,591,674	
Target Met?	-	Yes	No	No	

Statewide Measures Reductions	2020	2030	2035	Reduction Measures
Transportation	424,559	667,463	836,897	Pavley, LCFS, etc. Assume same percent reduction from BAU as 2014 Plan.
Residential Electricity	164,477	299,049	363,843	RPS (33% by 2020, 60% by 2030, 73% by 2035)
Residential Natural Gas	16,833	79,525	102,708	Title 24 (zero net energy homes by 2030)
Commercial Electricity	174,877	317,958	386,849	RPS (33% by 2020, 60% by 2030, 73% by 2035)
Commercial Natural Gas	9,614	5,532	4,196	Title 24
Residential Natural Gas	7,983	10,762	12,496	Title 24
Commercial Natural Gas	17,530	12,933	11,108	Title 24
Refrigerants	144,287	167,658	178,504	Refrigerant Management Regulations
Total	960,160	1,560,880	1,896,602	

ABAU Forecast	2020	2030	2035	Statewide Reductions
Transportation	1,170,329	1,131,034	1,072,955	Motor Vehicles
Residential Energy	324,760	190,210	124,904	Residential Electricity + Residential Natural Gas
Commercial Energy	355,121	290,950	255,226	Commercial Electricity + Commercial Natural Gas
Industrial Energy	10,506	11,528	12,035	None
Solid Waste	127,303	147,923	157,493	None
Fugitive Emissions	144,287	167,658	178,504	Refrigerants
Agriculture	20	20	20	None
Total	2,132,326	1,939,325	1,801,137	
Target	3,183,348	1,910,009	1,591,674	
Target Met?	Yes	No	No	

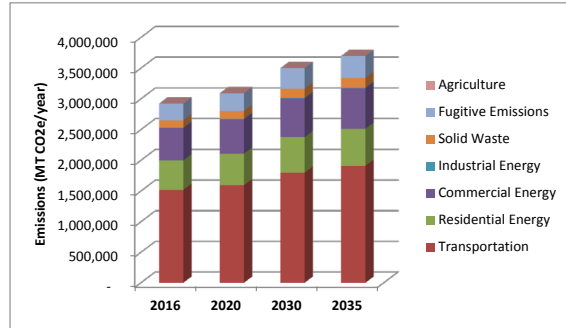
Local Measures Reductions	2020	2030	2035	Notes
Motor Vehicles	45,184	66,191	80,114	General Plan Land Use Plan + Transportation Demand Management (Rule 9410). Assume same percent reduction from BAU as 2014 Plan.
Commercial Energy	-	70,230	100,237	Zero net energy commercial buildings by 2030
Water Electricity	5,975	7,840	8,981	Achieve mandated water reductions and General Plan policy objectives (20%/2020 and 25%/2035)
Waste	-	84,677	90,043	Achieve 75% diversion/recycling mandate
Total	51,159	228,939	279,375	

Emissions with Statewide and Local Measures	2020	2030	2035	Local Reductions
Transportation	1,125,145	1,064,843	992,841	Motor Vehicles
Residential Energy	324,760	190,210	124,904	None
Commercial Energy	355,121	220,720	154,989	Commercial Energy
Industrial Energy	4,531	3,688	3,054	Water Electricity
Solid Waste	127,303	63,246	67,450	Waste
Fugitive Emissions	144,287	167,658	178,504	None
Agriculture	20	20	20	None
Total	2,081,167	1,710,386	1,521,762	
Target	3,183,348	1,910,009	1,591,674	
Target Met?	Yes	Yes	Yes	

Target Setting	Percent below 1990 Emission Levels	Percent below 2010 Emission Levels
2010 (From 2010 Inventory Update by FCS)	3,745,115	
2020	3,183,348	0.0%
2021	3,056,014	4.0%
2022	2,928,680	8.0%
2023	2,801,346	12.0%
2024	2,674,012	16.0%
2025	2,546,678	20.0%
2026	2,419,344	24.0%
2027	2,292,010	28.0%
2028	2,164,676	32.0%
2029	2,037,343	36.0%
2030	1,910,009	40.0%
2031	1,846,342	42.0%
2032	1,782,675	44.0%
2033	1,719,008	46.0%
2034	1,655,341	48.0%
2035	1,591,674	50.0%
2036	1,528,007	52.0%
2037	1,464,340	54.0%
2038	1,400,673	56.0%
2039	1,337,006	58.0%
2040	1,273,339	60.0%
2041	1,209,672	62.0%
2042	1,146,005	64.0%
2043	1,082,338	66.0%
2044	1,018,671	68.0%
2045	955,004	70.0%
2046	891,337	72.0%
2047	827,670	74.0%
2048	764,003	76.0%
2049	700,337	78.0%
2050	636,670	80.0%

BAU Forecast	2016		2020		2030		2035	
Transportation	1,520,052	52%	1,594,888	52%	1,798,498	51%	1,909,852	52%
Commercial Energy	524,838	18%	557,142	18%	627,373	18%	657,379	18%
Residential Energy	479,371	16%	514,053	17%	579,546	17%	603,951	16%
Fugitive Emissions	270,130	9%	288,573	9%	335,316	10%	357,008	10%
Solid Waste	119,167	4%	127,303	4%	147,923	4%	157,493	4%
Industrial Energy	10,055	0%	10,506	0%	11,528	0%	12,035	0%
Agriculture	20	0%	20	0%	20	0%	20	0%
Total	2,923,633	100%	3,092,486	100%	3,500,204	100%	3,697,738	100%
			5.8%		19.7%		26.5%	

BAU Forecast	2016	2020	2030	2035
Transportation	1520052	1594888.362	1798497.748	1909851.953
Residential Energy	479371	514052.7451	579546.4121	603951.0934
Commercial Energy	524838	557142.3353	627372.7262	657378.9774
Industrial Energy	10055	10506.20077	11528.35833	12035.282
Solid Waste	119167	127303.252	147923.425	157492.9967
Fugitive Emissions	270130	288573.4093	335315.6057	357008.0912
Agriculture	20	20	20	20
Total	2923633	3092486.304	3500204.275	3697738.393



	2010	2016	2020	2030	2035
BAU	3,745,115	2,923,633	3,092,486	3,500,204	3,697,738
ABAU			2,132,326	1,939,325	1,801,137
ABAU			(960,160)	(1,560,880)	(1,896,602)
Target			3,183,348	1,910,009	1,591,674
Reduction Needed				(29,316)	(209,463)

