Appendix D

Greenhouse Gas Backcast and Forecast Methodologies

This section describes the tools and methods used to estimate 1990 and 2020 GHG emissions for community-based and government-based sectors. [Note that "Government-based" emissions are a subset of "Community Based" Facilities (see *City of Merced 2008 Baselilne GHG Emission Inventory)].*

The results of the emission backcast and forecast estimation are summarized in Table 1. The emission forecast represents "Business As Usual" activities, and therefore does not account for any emission reductions that will result from implementation of the City's Climate Action Plan. The forecast amounts in this table are the result of calculations of the applied growth factors into ICLEI's Clean Air and Climate Protection 2009 Software.

Based on the Air Resources Board Department interpretations of the AB 32 Scoping Plan and its supporting documents, the "baseline year" of greenhouse gas emission inventories is understood as any year between 2005 and 2008. If the baseline GHG Emission Inventory occurred between 2005 and 2008, then per this interpretation, a 15% reduction below 2005-2008 emission levels is understood to equal the 1990 emissions equivalent and such method would satisfy the guidelines of AB 32. Unless otherwise described in this index, a 15% reduction below the 2008 emission inventory was utilized to determine the 1990 emission levels for all community and government sectors.

Table 1: City of Merced Total Emissions by Benchmark Years

Emission Sources		Benchmark Years		
Category	**Sector**	**1990**	**2008**	**2020**
Community	Residential	88,788	104,457	132,476
	Commercial/Industrial	125,778	147,974	166,741
	Transportation	123,729	145,563	188,832
	Solid Waste	11,686	7,754	9,847
Government	Commercial & Industrial	10,525	12,382	12,382
	Transportation	4,148	4,880	4,880

Community-Based Emissions

RESIDENTIAL

City Staff researched for and gathered data concerning changes in population and housing units. This data is presented in Table 2, and is the source from which growth rate factors were figured. Estimates, either provided in the data set or determined from the set, are shown in italics.

Table 2:
Compilation of City of Merced Population and Housing Units

Data Source	1990		2008		2010		2020	
	Pop.	Housing Units	Pop.	Housing Units	Pop.	Housing Units	Pop.	Housing Units
1					81,500	27,167	107,600	*35,866*
2			**80,608**	**28,066**				
3					78,958*	27,446		
4	**56,216**	**18,282**						

*The California Department of Finance estimated the City's population at 79,259 on January 1, 2011.

DATA SOURCE

1. Merced County Association of Governments (MCAG), July 2010.
2. Census Data, California State Department of Finance, Jan 1, 2008.
3. Census Data, California State Department of Finance, April 1, 2010.
4. Merced Vision 2015 General Plan, 1997.

2020 (Forecast)

The 2020 forecast was determined by use of growth rate factor that was figured from the estimated change in number of residential dwellings between 2008 and 2020. Table 2 depicts the data set utilized by staff to figure growth rates. In order to achieve this growth in housing units between 2010 and 2020, a growth factor of 2% was utilized.

1990 (Backcast)

A 15% reduction below the 2008 emission level was utilized to estimate the 1990 emission levels.

COMMERCIAL / INDUSTRIAL

2020 (Forecast)

City Staff researched for and gathered data concerning anticipated changes in commercial, industrial, and institutional floor area. Based on information received from the sources below, staff used an annual growth rate factor of 1%.

Sources
2010 Forecast Report for Northern and Central Valley by Gubb & Ellis PG&E and MID
July 2011 California and Metro Forecast, University of the Pacific.
Conversation with Frank Quintero, Director of Economic Development
David L. Spaur, CEcD, President – CEO, Merced County Economic Development Corporation

1990 (Backcast)

A 15% reduction below the 2008 emission level was utilized to estimate the 1990 emission levels.

TRANSPORTATION

2020 (Forecast)

Matt Fell, Senior Planner with the Merced County Association of Governments (MCAG), estimated the growth in vehicle miles travelled from 2008 to 2020 to be 2.65% per year. This growth rate was applied to both gasoline and diesel powered heavy duty vehicles, light trucks and passenger cars to estimate the 2020 forecast of 188,832 tons of carbon dioxide equivalent emissions. The 2008 Emission level was 145,563 carbon dioxide equivalent.

1990 (Backcast)

A 15% reduction below the 2008 emission level was utilized to estimate the 1990 emission levels.

WASTE

2020 (Forecast)

The 2020 forecast was determined by use of growth rate factor that was figured from the estimated change in tonnage of wastes between 2008 and 2020. According to Dan Arnold, Public Works Manager Internal Services, the City experiences on average a 2% annual increase in waste tonnage. This 2% growth rate factor was used to estimate the 2020 greenhouse gas emissions for the solid waste sector.

The 2008 City of Merced Emission Inventory assumed a total refuse amount of 49,332 tons, not including 3,536 tons of recycled goods and 9,516 tons of green waste. These amounts were diverted from the landfill. Landfill related emissions in 2008 were estimated to be 7,438 tons of carbon dioxide

equivalent. Applying a 2% annual growth rate to the 2008 refuse tonnage results in 62,565 tons of land-filled waste, with an associated 9,847 tons of annual carbon dioxide equivalent emissions.

1990 (Backcast)

According to the Source Reduction and Recycling Element (SRRE) for the City of Merced as required by AB939, Merced City's 1990 waste tonnage figure sent to the landfill was 74,506 tons. According to Stan Murdock, Public Works Director of Operations, there was no diversion program of any size in 1990 either in the City or at the landfill, so this amount represents all sources of waste from city collection and private disposal. Therefore, to determine 1990 emissions, Staff used the 74,506 total waste tonnage figure that showed higher greenhouse gas emissions than what occur today.