Agenda
Sustainability Task Force

A Committee of the Chico City Council

Meeting of Wednesday, June 10, 2015 – 5:30 p.m.
Municipal Center - 421 Main Street, Conference Room No. 1 in the Council Chambers

1. **CALL TO ORDER AND ROLL CALL**

2. **APPROVE APRIL 9, 2015 MEETING MINUTES**
   Draft 04/09/15 minutes attached.

3. **UPDATE ON SUSTAINABILITY WEBSITE (STF Member RossMerz)**

4. **STATUS OF STF 2015 WORK PLAN (Principal Planner Vieg)**
   Status update for 2015 STF Work Plan attached.

5. **CITY-WIDE GHG EMISSION INDICATOR 2005-2012 (Principal Planner Vieg and Fletcher Alexander, CSU, Chico Institute for Sustainable Development)**
   City-Wide GHG Emission Indicator 2005-2012 attached.

6. **BUSINESS FROM THE FLOOR**
   Members of the public may address the Task Force at this time on any matter not already listed on the agenda, with comments being limited to three minutes. The Task Force cannot take any action at this meeting on requests made under this section of the agenda.

7. **REPORTS & COMMUNICATIONS**
   These items are provided for the Task Force's information. Although the Task Force may discuss the items, no action can be taken at this meeting. Should the Task Force determine that action is required, the item or items may be included for action on a subsequent posted agenda.

8. **ADJOURNMENT**
   Next meeting will be Thursday, July 30, 2015.

ATTACHMENTS: Draft 04/09/15 STF Meeting Minutes
STF 2015 Work Plan Status
City-Wide GHG Emission Indicator 2005-2012

Agenda available from the City's website at www.ci.chico.ca.us.under ***"Meetings/Agendas"***

Prepared: *06/03/15*
Posted: *06/03/15*
Prior to: 5:30 p.m.

Community Development Department
421 Main Street, 2nd Floor, Chico, CA 95928
(530) 879-6800

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Sustainability Task Force Members:

Cheri Chastain, Dave Donnan, Ryne Johnson, William Loker
Lucas RossMerz, Mike Rubio, Vice Chair, Mark Stemen, Chair

CITY OF CHICO SUSTAINABILITY TASK FORCE
MINUTES OF THE MEETING OF
April 9, 2015

Municipal Center
421 Main Street
Council Chambers, Conference Rm. 1

STF Members Present:	Mark Stemen, Chair Mike Rubio, Vice Chair Cheri Chastain Dave Donnan William Loker Lucas RossMerz
STF Members Absent:	Ryne Johnson
Staff Members Present:	Brendan Vieg, Principal Planner
Guests Present:	Pete Bonacich, Cal Water, Acting District Manager Roseanna Moreno, Cal Water, Assistant District Manager

1. CALL TO ORDER

Chair Stemen called the meeting to order at 6:30 pm. STF members and City staff were present as noted.

2. APPROVE DECEMBER 11, 2014 MEETING MINUTES

The 02/26/15 minutes were approved (4-0, Donnan and Merz late arrivals).

3. DISCUSSION REGARDING CAL WATER'S WATER EFFICIENCY PROGRAMS, EFFORTS AND OPPORTUNITIES, AND IMPLEMENTATION OF THE CAP – STF RECOMMENDATIONS

Principal Planner Vieg provided background on the agenda topic and introduced Pete Bonacich and Roseanna Moreno from Cal Water.

Mr. Bonacich and Ms. Moreno gave a verbal presentation to the STF regarding Cal Water's efforts to promote water conservation and reduce water use, the status of CAP Actions involving Cal Water, and an update on the Governor's recent directive to reduce water use state-wide. Key topics included:

- Cal Water's free audits, rebates, and other programs for residences and businesses to reduce water use and waste, and how information is made available to the community (e.g., website,

presentations, local building departments, community events, etc.)

- Cal Water's underdevelopment programs, including a conservation demonstration garden and turf removal buy-back program. The turf removal program is a new concept with a big potential to reduce water use. Participants would be paid to take turf out.
- Availability of free residential water conservation kits that include fixtures and hardware to significantly reduce water use.
- Details on a variety of rebate programs – smart irrigation controllers, water sprinkler nozzles (ideal for park strips), rotating nozzles for residences.
- Free water use efficiency program for residences – a free audit that details how you use water and recommendations for reducing use.
- Cal Water leads the Urban Water Conservation Group that includes the City, Hignell, Sierra Nevada, CSUC, CUSD, and others to share information and implement initiatives to reduce water use.
- Cal Water has implemented a successful solar project that provides 90% of its administrative office needs.
- Groundwater levels in Cal Water's wells are at historic lows, with groundwater levels on average 15' down. Cal Water's wells are between 500' and 800' deep. While Cal Water is confident that the return of wet years will result in recharge and healthier groundwater levels, the duration and severity of the drought is extremely concerning. While it takes more energy to pump water from deeper depths, overall production is down (due to reduced demand) so there hasn't been a significant increase in energy use.
- Cal Water participates and shares data with the County's Water Conservation Department. Cal Water also has a Drought Task Force. These groups are coordinating a variety of efforts to monitor and address the impacts of the drought.
- Cal Water is funding a study to determine if there is an opportunity to utilize Butte County's water allocation from the Feather River in the Chico area.
- Cal Water has completed its residential water meter program and all customers are now metered. The program was completed 5 years ahead of the state directive.
- Cal Water provided an overview of the Governor's directive to reduce water use, and how they are seeking to implement it. Admittedly, much of the detail of how the directive will be implemented is yet to be worked out.
- Cal Water is not currently pursing grey water options (as identified in a CAP Phase II Action), but given the state of the drought, Cal Water acknowledged that all options are worth considering.

STF members asked what the City could do to assist Cal Water with its efforts, and received the following feedback:

- Direct any inquiries to Cal Water directly.
- Continue to regulate and enforce the use of irrigation controllers consistent with AB 1881.

- Continue staff-to-staff meetings to coordinate Governor's directive to reduce water use.
- Be ready to adopt a resolution, if requested, to reduce community water use, and be available to assist with enforcement.

Cal Water agreed to look into its energy use over the past few years and provide data to the STF.

The STF offered to provide exposure for all of Cal Water's programs and rebates on the City's Sustainability Website.

4. UDPATE REGARDING THE 2015 SUSTAINABLE BUSINESS SERIES

STF member Chastain and Principal Planner Vieg provided an update to the STF on the success of first workshop and plans for the second workshop of the 2015 Sustainable Business Series. The series is a joint collaboration between the STF, Sierra Nevada Brewery, Chico Chamber, and the DCBA to engage and connect the business community with information (e.g., rebates), inspiration, and motivation to incorporate sustainable business practices. The second session is focused on alternative transportation, and will be held Thursday, May 14th @ 8a.m. at Sierra Nevada's Big Room.

4B. DISCUSSION REGARDING UPCOMING AGENDA ITEMS

The STF discussed and identified the following future agenda items: GHG Emission Indicator, status of STF Work Plan, and an update on the City's Sustainability Website.

5. BUSINESS FROM THE FLOOR

None.

6. REPORTS & COMMUNICATIONS

None.

7. ADJOURNMENT

There being no further business from the STF, the meeting adjourned at 6:40pm to the meeting of **Thursday, June 11, 2015.**

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Date Approved Brendan Vieg, Principal Planner

2015 STF Work Plan/Status Update

At its first meeting in 2015, the STF developed a work plan to focus its 2015 efforts. Below are the work plan components, the proposed timeframes, and a status:

- Review and evaluate key Phase I CAP actions to determine if projected GHG emission reductions have been achieved (6 months). **Status: Incomplete.**
- Continue to meet with key sustainability partners, specifically PG&E and Cal-Water, to discuss relevant energy-related CAP actions, identify areas of mutual support, and assist the STF in its development of additional recommendations for Council's consideration (6 months). **Status: Generally Complete.**
- Maximize use of the City's Sustainability website as an information hub for how residents and businesses can implement sustainable practices (ongoing). **Status: Ongoing.**
- Investigate social media options (e.g., Facebook) to further connect with the community, and highlight educational material and funding opportunities (6 months). **Status: Incomplete.**
- Finalize a metric for tracking annual community-wide GHG emissions based on four key variables: electricity consumption, natural gas consumption, fuel consumption, and waste sent to the landfill (3 months). **Status: Complete.**
- Workshop Series – STF members and City staff will partner with the Chamber of Commerce, DCBA, BCAG, PG&E, Cal Water, Chico Velo, and others to engage local contractors, large employers (Enloe, CUSD, CSUC, etc.), and key commercial hubs (Chico Mall area, Hegan Lane Business Park, North Valley Plaza Mall, large grocery complexes, etc.) in a series of workshops to provide information, inspiration, and motivation to incorporate sustainable business practices. Workshops would proceed in the following order: 1) energy efficiency, 2) alternative transportation, 3) water conservation, and 4) solid waste. The workshops will be venues to share information, provide testimonials, and highlight rebates, tools and special programs available to businesses to save money (2 workshops in first 6 months/2 workshops in last 6 months). **Status: Complete and Ongoing.**

City of Chico, CA
Community-Wide Greenhouse Gas Emissions Inventory
2005 - 2012

Prepared by the Institute for Sustainable Development at California State University, Chico
Summer 2015

ABSTRACT

This report summarizes results of a high-level community-wide greenhouse gas emissions inventory for the years 2005 – 2012. Its results include emissions from the Transportation, Energy and Waste Sectors across the City of Chico Urban Area.

ACKNOWLEDGEMENTS

Report Prepared by:

Fletcher Alexander, CSU, Chico Institute for Sustainable Development

Contributors:

Brendan Vieg, City of Chico Community Development Department

Linda Herman, City of Chico Public Works Department

Armando Navarro, Pacific Gas & Electric Green Communities Division

Dr. Jim Pushnik, CSU, Chico Institute for Sustainable Development

Courtney Kassis, State of California Board of Equalization

Steve Rodowick, Butte County Recycling Program

INSTITUTE FOR
SUSTAINABLE
DEVELOPMENT

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SECTION I: EXECUTIVE SUMMARY

I.I CITY OF CHICO GREENHOUSE GAS EMISSIONS TRACKING

The City of Chico has an adopted Climate Action Plan (CAP) that outlines strategies, organized within a flexible ten-year framework, for a significant reduction of greenhouse gas (GHG) emissions that are directly and indirectly generated by local activities. The CAP includes actions to reduce transportation fuel, energy and water consumption, and to reduce waste sent to the landfill. CAP implementation is intended to help the City achieve its GHG reduction goal of 25% below 2005 emission levels by the end of 2020.

A key facet of CAP implementation is evaluating progress towards meeting the GHG reduction goal. To help gauge success in achieving the City's GHG reduction goal, a community-wide GHG emission indicator has been developed that will be evaluated on an annual basis. The indicator is a combination of estimates of GHG emissions associated with activity in three Sectors – Energy, Transportation and Waste – and includes primary data from seven Sub-Sectors: community-wide sales of gasoline and diesel fuel, commercial and residential electricity use, natural gas consumption, and tonnage of waste sent to the landfill.

Emissions factors (EF) used to convert the primary inputs (i.e., gallons of fuel, kWh's of electricity, therms of natural gas, tonnage of waste) into estimates of metric tons of carbon dioxide equivalent emissions (MT CO2e – the standard metric for measuring GHG emissions) are based on established and best available data. With the exception of the EF for electricity, which is based on current utility grid mix, the factors do not change year-to-year. The methodology used in this inventory is intended to be transparent, consistent, and easily replicable. It was designed to establish a mechanism for the City to capture a high-level estimate of community-wide GHG emissions on an annual basis with limited data gathering and analysis required.

I.II COMMUNITY-WIDE GHG EMISSIONS OVERVIEW 2005 - 2012

During the eight year period covered in this inventory community-wide GHG emissions decreased by 11.5% - from 666,314 MT CO2e in 2005 to 589,922 MT CO2e in 2012. Of the seven Sub-Sectors included in the inventory scope, four – gasoline, diesel fuel, commercial natural gas and waste to landfill – saw decreases in emissions while the other three – residential natural gas, residential electricity and commercial electricity – saw increases in emissions.

Figure 1, on the following page, illustrates this reduction in the context of a number of other key emissions estimates. These include a 'Business as Usual' emissions projection made from the 2005 base year at a 2% annual aggregate growth rate, the CAP's 2015 target emissions level of 10% below 2005 baseline levels and 2020 target of 25% below 2005 baseline levels, and a 'Reduction to Target' emissions projection made from 2012 levels to the 2020 target level. The results of this inventory show 2012 total emissions levels are slightly below the 2015 interim target level, however, a continuation of that trend is uncertain.

Figure 2, on the following page, shows annual emissions levels by contributing Sub-Sector. While total emissions decreased by 11.5% between 2005 and 2012 the relative contribution of each Sub-Sector did not change significantly and has generally trended in the same direction as net emissions from the Sub-Sector. Emissions from the Transportation Sector – both gasoline and diesel fuel –make by far the biggest contribution to aggregate emissions levels: 63.7% in 2005 and 57.7% in 2012. Emissions from the Energy Sector – commercial and residential electricity and natural gas – comprised 32.6% of the total in 2005 and 38.7% in 2012. The contribution of the Waste Sector to aggregate emissions levels remains below 4%. **Table 1**, on the following page, shows total change in GHG emissions by Sub-Sector from 2005 – 2012.

Figure 1 - 2005 Baseline, Business As Usual Projection, CAP Targets, Annual GHG Emissions Estimates and Reduction to Target Projection (all values MT CO2e)

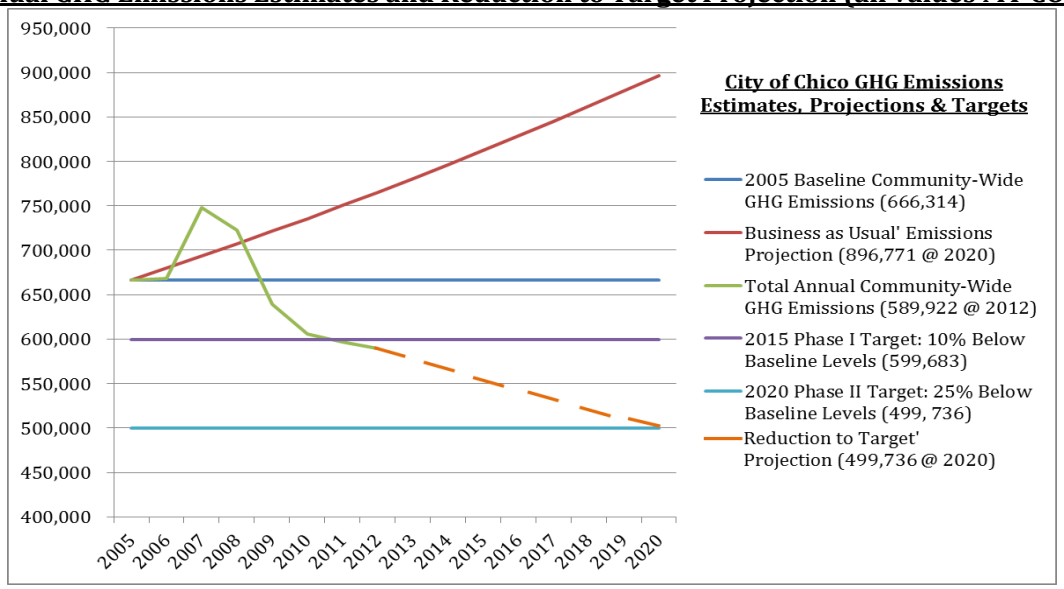


Figure 2 – Community-Wide GHG Emissions, Totals by Sub-Sector, 2005 – 2012 (MT CO2e)

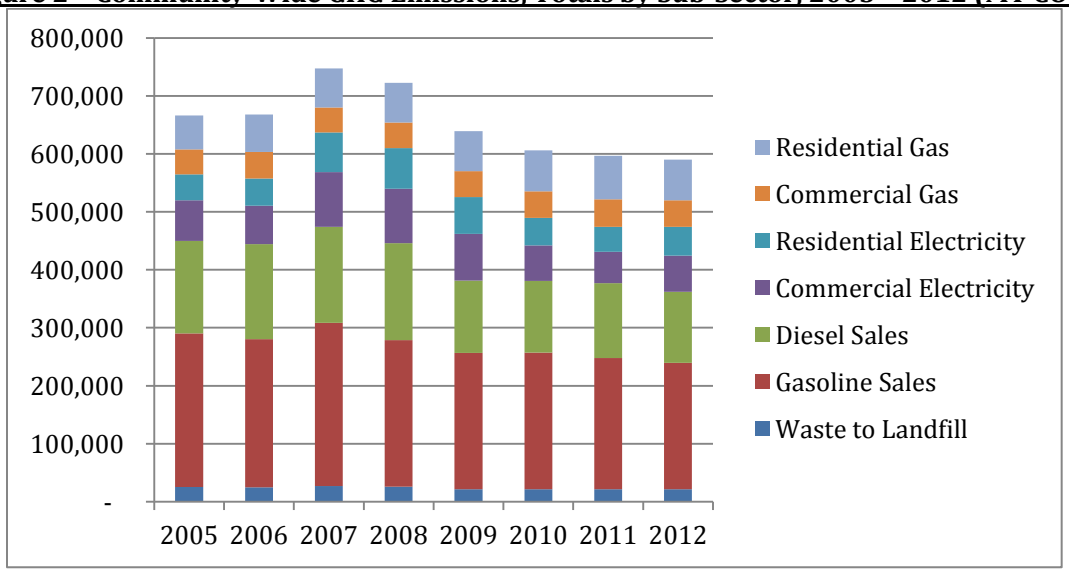


Table 1 – % Change in GHG Emissions Levels by Sub-Sector 2005 - 2012

Sector	Sub-Sector	% Change in GHG Emissions 2005-'12
Transportation	Gasoline Sales	-17.7%
	Diesel Fuel Sales	-23.3%
Energy	Residential Natural Gas	+19.9%
	Commercial Natural Gas	+6.0%
	Residential Electricity	+10.2%
	Commercial Electricity	-10.6%
Waste	Waste to Landfill	-15.2%

I.III CITY OF CHICO GREENHOUSE GAS EMISSIONS IN CONTEXT

In considering community-wide GHG emissions levels and comparing them year to year it is useful to contextualize them, both in terms of population growth and economic activity. In **Table 2** and **Figures 3-6** below, population, sales tax revenue, and annual GHG emissions from the 2005 base year to 2012 are provided for additional context. Between 2005 and 2012 the population of the City of Chico increased by 10.8% - from 79,091 to 87,671 residents. Some of this increase, particularly during 2005-2007 was the result of City annexation of residential County areas. Per capita GHG emissions over that time decreased by 20.1% – from 8.42 to 6.73 MT CO2e / person. Over the same time period local sales tax revenues decreased substantially – in line with the global economic recession – but have mostly recovered. The net decrease between 2005 and 2012 was 2.2%. Emissions per dollar of sales tax revenue decreased by 9.5% over that time – from 0.0382 to 0.0346 MT CO2e / $.

Table 2 – Total Annual Community-Wide GHG Emissions, Population and Sales Tax Revenue 2005 - 2012

Year	2005	2006	2007	2008	2009	2010	2011	2012	% +/- '05-'12
Total Annual Community-Wide GHG Emissions (MT CO2e)	666,314	668,113	747,630	722,321	639,134	605,795	596,731	589,922	-11.5%
Population	79,091	84,491	86,949	87,637	86,103	86,900	87,500	87,671	10.8%
GHG Emissions Per Capita	8.42	7.91	8.60	8.24	7.42	6.97	6.82	6.73	-20.1%
City Sales Tax Revenue	$17.4 M	$17.1 M	$16.4 M	$14.4 M	$14.2 M	$14.8 M	$16.5 M	$17.0 M	-2.2%
GHG Emissions Per $ STR	0.0382	0.0390	0.0457	0.0502	0.0451	0.0409	0.0362	0.0346	-9.5%

Figure 3 – Population, City of Chico

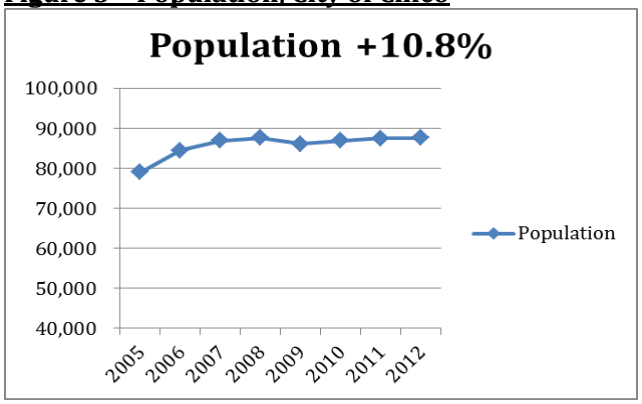


Figure 4 – GHG Emissions Per Capita

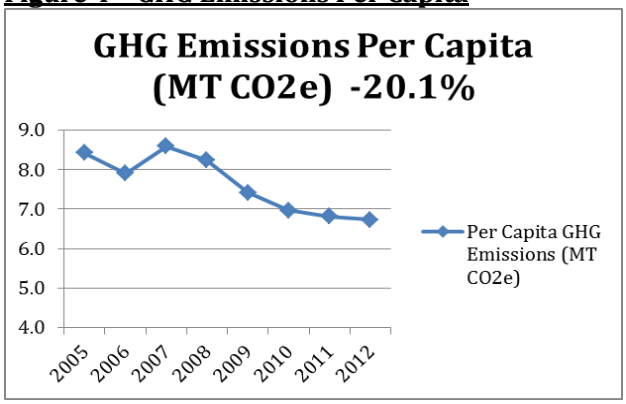


Figure 5 – Sales Tax Revenue, City of Chico

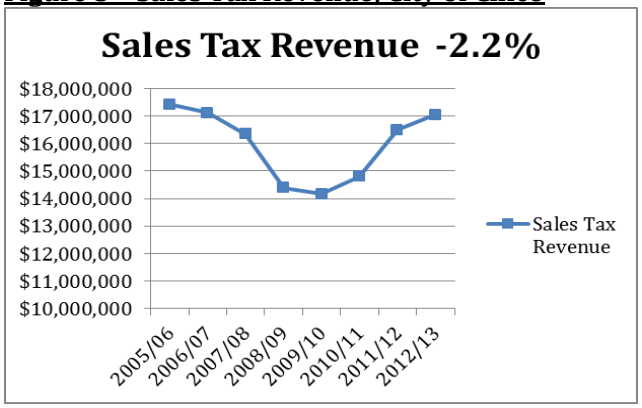
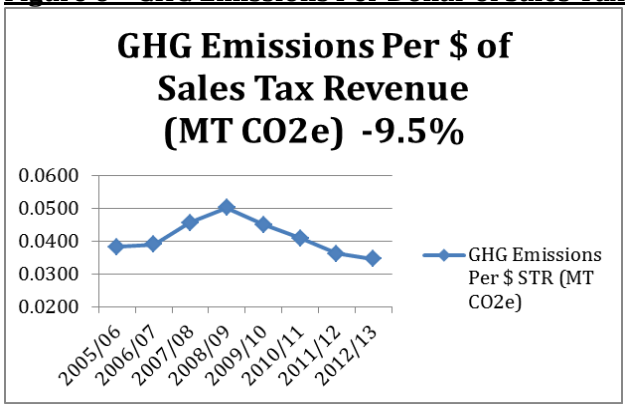


Figure 6 – GHG Emissions Per Dollar of Sales Tax



SECTION II: METHODOLOGY & RESULTS

This section provides an overview of the inventory inputs and results by Sector and Sub-Sector, including data sources for primary form inputs and emissions factors used in calculations. It also includes a statement on the gross change in emissions for each Sub-Sector compared to the total net change in emissions levels and on the relative contribution of each to total emissions levels. The scope of the data collected for each Sub-Sector is the City of Chico. A full list of annual emissions estimates for each Sub-Sector in each year from 2005 – 2012 can be found in **Appendix A-3**.

II.I TRANSPORTATION SECTOR – GASOLINE & DIESEL FUEL SALES

Between 2005 and 2012 annual gasoline sales by volume within the City of Chico decreased by 17.7%. This resulted in a gross decrease in GHG emissions of 37,149 MT CO2e – out of a net decrease of community-wide GHG emissions levels of 76,392 MT CO2e. This was the second largest decrease of any Sub-Sector over that time period. Gasoline consumption generated 39.8% of total community-wide GHG emissions during the base year of 2005 and 37.0% of the total in 2012. **Figure 7** below shows estimates of annual GHG emissions generated by gasoline consumption community-wide from 2005 – 2012.

Over the same time period annual diesel fuel sales by volume within the City of Chico decreased by 23.3%. This resulted in a gross decrease in GHG emissions of 46,875 MT CO2e – the single largest decrease of any Sub-Sector over that time period. Diesel fuel consumption generated 23.9% of total community-wide GHG emissions during the base year of 2005 and 20.7% of the total in 2012. **Figure 8** below shows estimates of annual GHG emissions generated by diesel fuel consumption community-wide from 2005 – 2012.

Figure 7 – GHG Emissions: Gasoline Sales

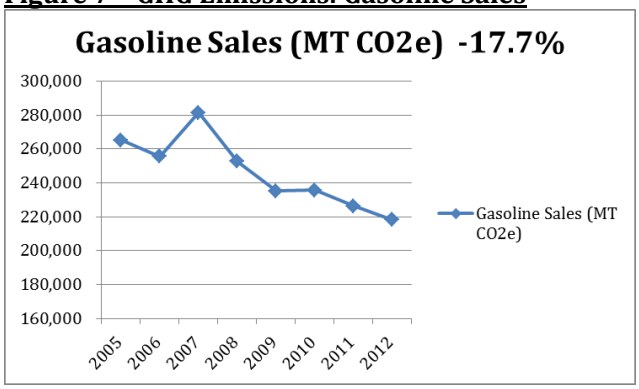
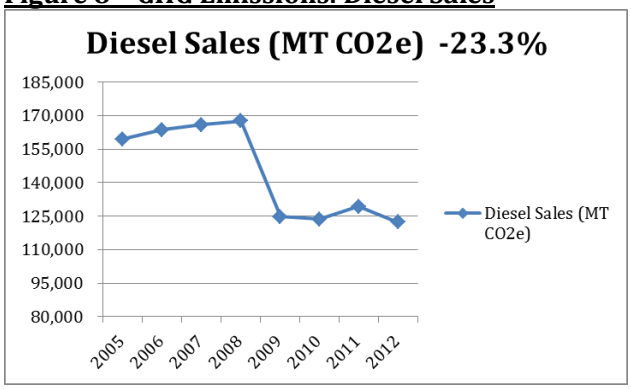


Figure 8 – GHG Emissions: Diesel Sales



Primary Input Data Source: Tax Analysis Section of the CA State Board of Equalization
For primary input data by year see **Appendix A-1**

Emissions Factor Source: *EPA's Emissions Factors for Greenhouse Gas Inventories (updated 4/2014)*
For emissions factor values see **Appendix A-2a**

II.II ENERGY SECTOR – RESIDENTIAL & COMMERCIAL NATURAL GAS

Between 2005 and 2012 annual residential natural gas consumption within the City of Chico increased by 19.9%. This resulted in a gross increase in GHG emissions of 11,652 MT CO2e – compared to a net decrease of community-wide GHG emissions levels of 76,392 MT CO2e. This was the single largest increase of any Sub-Sector over that time period. Residential natural gas consumption generated 8.8% of total community-wide GHG emissions during the base year of 2005 and 11.9%% of the total in 2012. **Figure 9** below shows estimates of annual GHG emissions generated by residential natural gas consumption community-wide from 2005 –2012.

Over the same time period annual commercial natural gas consumption within the City of Chico increased by 6.0%. This resulted in a gross increase in GHG emissions of 2,594 MT CO2e. This Sub-Sector generated 6.5% of total community-wide GHG emissions during the base year of 2005 and 7.8% of the total in 2012. **Figure 10** below shows estimates of annual GHG emissions generated by residential natural gas consumption community-wide from 2005 – 2012.

Figure 9 – GHG Emissions: Residential Natural Gas

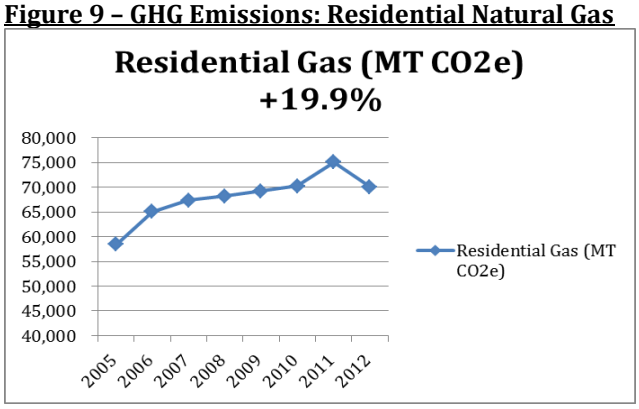
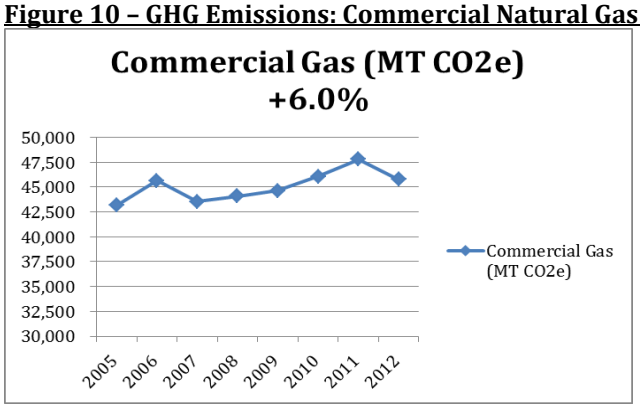


Figure 10 – GHG Emissions: Commercial Natural Gas



Primary Input Data Source: Incorporated City of Chico PG&E Energy Overview 2005 – 2012
For primary input data by year see **Appendix A-1**

Emissions Factor Source: *PG&E's City of Chico Community Energy Use & GHG Data*
For emissions factor values see **Appendix A-2a**

II.III ENERGY SECTOR – UTILITY GRID MIX & ELECTRICITY EMISSIONS FACTORS

The emissions factors used for converting kilowatt hours (kWh) of electricity consumption into an estimate of MT CO2e were provided by *Pacific Gas & Electric's Community Energy Use and GHG Data Report*. These factors change year-to-year based on the makeup of PG&E's grid mix – the annual total of the different types of electricity generation that the utility uses. **Figure 11** below shows PG&E's emissions factors for electricity from 2005 – 2012. GHG emissions associated with PG&E's grid mix decreased by 9.2% over this time period.

Figure 12 below shows the makeup of PG&E's grid mix, or 'power content label' by year from 2005 – 2012. Over that time period the largest changes to PG&E's grid mix have come in the form of decreased reliance on natural gas and increased reliance on 'unspecified' purchases – electricity generated by another party that is not traceable to specific generation sources by an auditable contract trail. Changes to the annual contribution of nuclear have been minimal; the contribution of large hydroelectric, however, PG&E's other large-scale generation source, have been decreasing and will continue to decrease in subsequent years. Contributions of biomass, geothermal, small hydroelectric, solar and wind in aggregate have increased from 12% to 19%. Contributions from coal have decreased from between 3% and 8% annually to 0%.

Figure 11 – PG&E Emissions Factors for Electricity

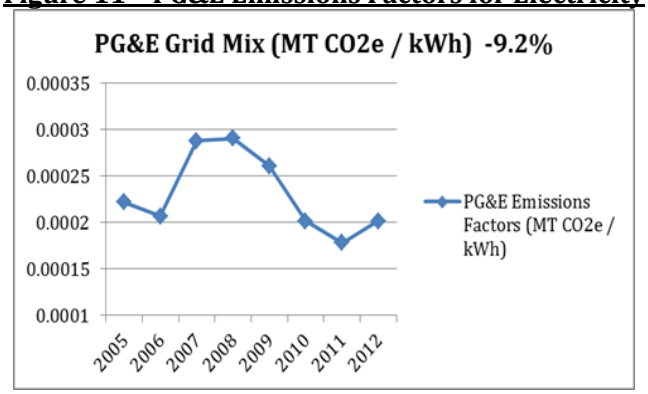
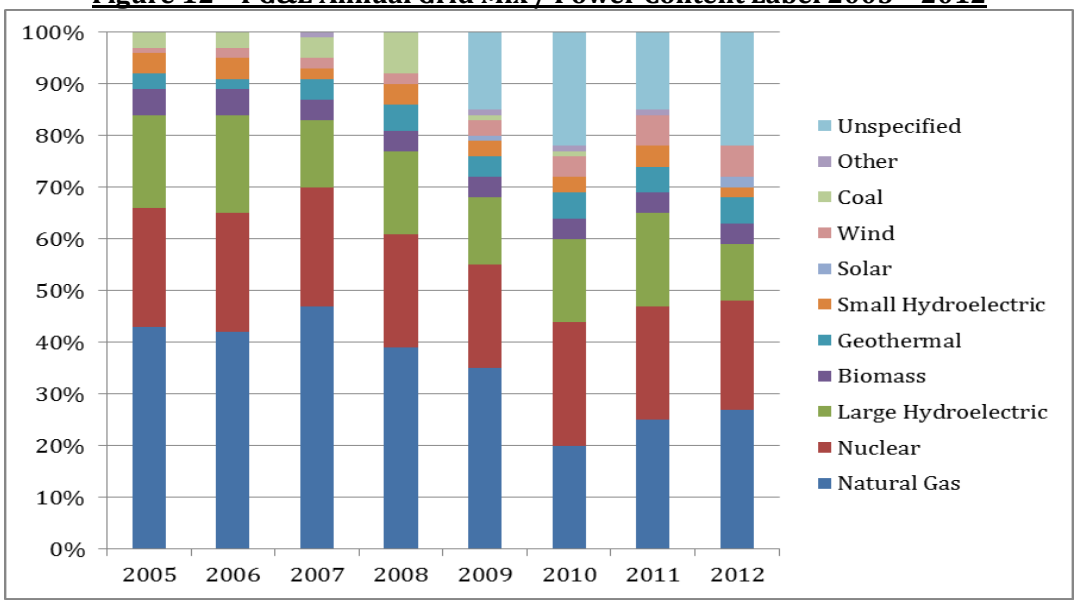


Figure 12 – PG&E Annual Grid Mix / Power Content Label 2005 – 2012



II.IV ENERGY SECTOR – RESIDENTIAL & COMMERCIAL ELECTRICITY

Between 2005 and 2012 annual residential electricity consumption within the City of Chico increased by 21.4%. Over this same period, however, due to changes in PG&E's grid mix, total GHG emissions associated with residential electricity usage increased by only 10.2%. This correlates to a gross increase in GHG emissions of 4,589 MT CO2e – compared to a net decrease of community-wide GHG emissions levels of 76,392 MT CO2e. This was the second largest increase of any Sub-Sector over that time period. Residential electricity consumption generated 6.8% of total community-wide GHG emissions during the base year of 2005 and 8.4% of the total in 2012. **Figure 13** below shows total annual community-wide residential electricity consumption from 2005 – 2012. **Figure 14** below shows estimates of annual GHG emissions associated with residential electricity consumption community-wide from 2005 – 2012.

Between 2005 and 2012 annual commercial electricity consumption within the City of Chico decreased by 1.5%, however, again due to changes in PG&E's grid mix, total GHG emissions associated with commercial electricity usage decreased by 10.6%. This correlates to a gross decrease in GHG emissions of 7,399 MT CO2e. This Sub-Sector generated 10.5% of total community-wide GHG emissions during the base year of 2005 and 10.6% of the total in 2012. **Figure 15** below shows total annual community-wide commercial electricity consumption from 2005 – 2012. **Figure 16** below shows estimates of annual GHG emissions associated with commercial electricity consumption community-wide from 2005 – 2012.

Figure 13 – Residential Electricity Consumption

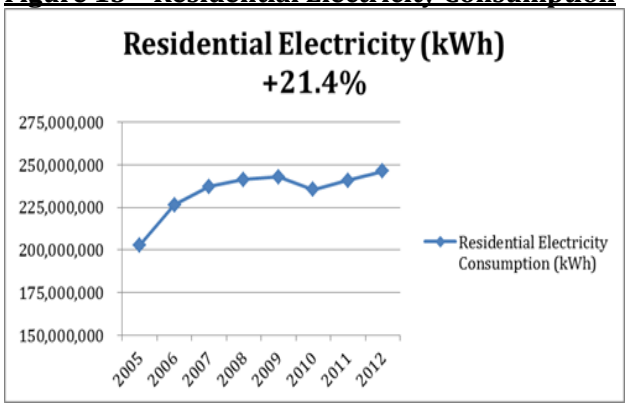


Figure 14 – GHG Emissions: Residential Electricity

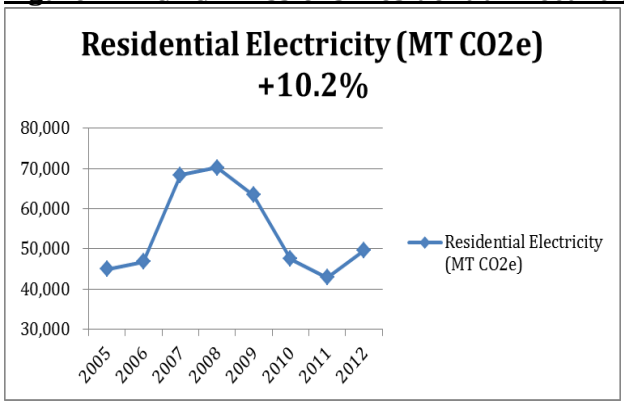


Figure 15 – Commercial Electricity Consumption

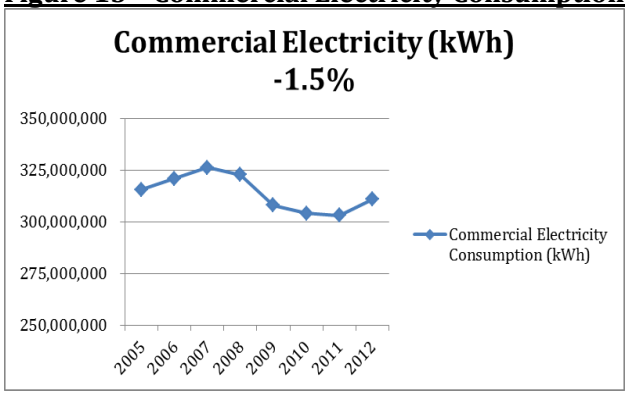
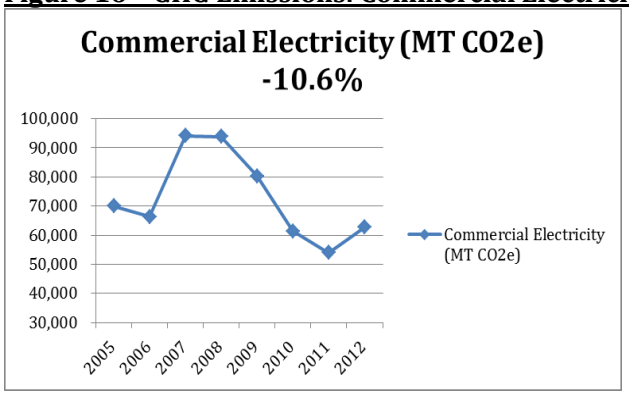


Figure 16 – GHG Emissions: Commercial Electricity



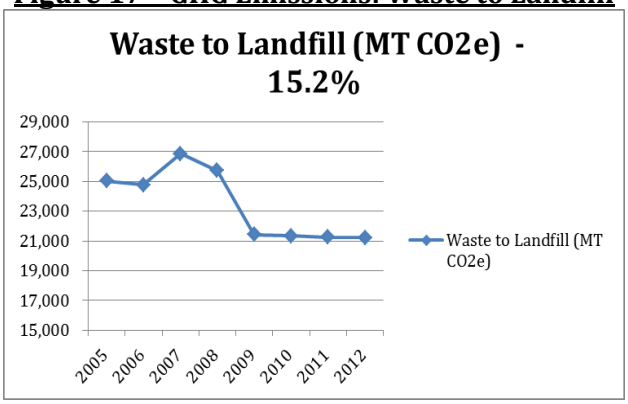
Primary Input Data Source: Incorporated City of Chico PG&E Energy Overview 2005–2012 (See **Ap. A-1**)

Emissions Factor Source: *PG&E's City of Chico Community Energy Use & GHG Data* (See **Ap. A-2b**)

II.V WASTE SECTOR – WASTE TO LANDFILL

Between 2005 and 2012 annual tonnage of waste to landfill generated within the City of Chico decreased by 15.5%. This resulted in a gross decrease in GHG emissions of 3,804 MT CO2e – out of a net decrease of community-wide GHG emissions levels of 76,392 MT CO2e. This Sector generated 3.8% of total community-wide GHG emissions during the base year of 2005 and 3.6% of the total in 2012. Emissions from waste to landfill are relatively low in part because the methane emissions generated at the Neal Road Landfill are captured. The emissions factor used here takes that capture, and average system efficiencies, into account. **Figure 17** below shows estimates of annual GHG emissions generated by waste sent to the landfill community-wide from 2005 – 2012.

Figure 17 – GHG Emissions: Waste to Landfill



Primary Input Data Source: City of Chico Department of Public Works & Butte County Recycling
For primary input data by year see **Appendix A-1**

Emissions Factor Source: *ICLEI's Community Protocol V1-1, Appendix E – Solid Waste Emissions Activities and Sources*
For emissions factor values see **Appendix A-2a**

SECTION III: INVENTORY RESULTS SUMMARY

Total community-wide GHG emissions decreased by 11.5% between the City's baseline year of 2005 and 2012 – the most recent year for which inventory data is available. Of the three primary Sectors included within the scope of the inventory, Transportation and Waste saw reductions, while the Energy Sector saw increases.

Gasoline sales within the City of Chico, and associated emissions, decreased by 17.7%, while diesel sales and associated emissions decreased by 23.3%. Some of this is likely attributable to increases in average vehicle fuel efficiency – called for by the State of California and taken into consideration in the City of Chico's CAP. Much of this reduction, however, is likely attributable to the global economic recession that occurred during the interim years. As the nation and the state recover from that recession, and especially considering sharp decreases in fuel costs during 2014 – 2015, some of these reductions will likely be reversed.

Energy consumed by the Commercial Sector did not change significantly – electricity consumption decreased 1.5% while natural gas consumption, and associated emissions, increased by 6.0%. Given changes in the grid mix of PG&E – again, called for by the State and considered in the City's CAP – emissions associated with electricity consumption decreased by 9.2% overall, resulting in a 10.6% reduction in emissions from commercial electricity consumption.

Energy consumed by the Residential Sector increased significantly, in contrast to the other Sectors contributing to community-wide GHG emissions. Part of this increase is likely due to population spikes resulting from City annexation of residential County areas between 2005 and 2007. Electricity consumption increased by 21.4% while natural gas consumption, and associated emissions, increased by 19.9%. Changes in PG&E's grid mix offset some of the increase in residential electricity consumption, resulting in an increase in associated emissions of 10.2%.

Waste generated in the City of Chico and sent to the landfill decreased by 15.2%, and so did associated emissions. This is a reflection of trends of expanded recycling and material reuse in both the Commercial and Residential Sectors. Looking at these results as an indicator of progress in implementing the City's CAP, a few important trends stand out:

1. Overall, GHG emissions have been decreasing community-wide as a result of utility-level actions and macro-economic conditions, but also a result of local actions taken by a range of independent actors in the community and the City itself. These decreases occurred despite population growth of 10.8% during the eight year period inventoried, and have continued despite a rebound in economic activity illustrated by City sales tax revenues. This inventory shows the City appears to be on track to meet the CAP's 2015 interim target of 10% below 2005 levels, however, data for 2013 and 2014 will help determine if the trend holds.

2. Although the Transportation Sector has seen significant decreases in fuel consumption and associated emissions, a substantial portion of these reductions is likely due to larger economic conditions and may be reversed in subsequent years. The Transportation Sector still contributes a majority of total community-wide emissions and therefore requires special priority and attention.

3. Despite decreases in emissions in other Sectors, emissions from the Residential Energy Sub-Sectors have increased significantly, and therefore it also requires special priority and attention.

A-1 Inventory Input Data - Primary Form

Year	Population	Waste Sector	Transportation Sector		Energy Sector			
		Waste to Landfill (tons)	Gasoline Sales (gallons)	Diesel Sales (gallons)	Commercial Electricity (kWh)	Residential Electricity (kWh)	Commercial Gas (therms)	Residential Gas (therms)
2005	79,091.0	88,307.0	30,167,879.0	15,604,197.0	315,745,514.0	202,942,451.0	8,133,681.0	11,007,290.0
2006	84,491.0	87,413.4	29,086,753.0	16,017,892.0	320,968,364.0	226,585,923.0	8,604,247.0	12,255,141.0
2007	86,949.0	94,758.5	32,014,382.0	16,237,030.0	326,417,568.0	237,137,075.0	8,208,145.0	12,692,043.0
2008	87,637.0	90,747.1	28,750,856.0	16,393,090.0	322,805,491.0	241,421,670.0	8,309,927.0	12,847,934.0
2009	86,103.0	75,536.6	26,776,961.0	12,213,811.0	308,010,913.0	242,887,779.0	8,411,096.0	13,040,424.0
2010	86,900.0	75,295.3	26,806,872.0	12,094,927.0	304,103,106.0	235,458,985.0	8,679,168.0	13,235,049.0
2011	87,500.0	74,983.6	25,755,939.0	12,647,934.0	303,130,440.0	240,758,000.0	9,007,071.0	14,143,971.0
2012	87,671.0	74,889.9	24,834,712.0	11,969,633.0	311,008,187.0	246,295,688.0	8,622,453.0	13,202,811.0
% +/- 05-12:	10.8%	-15.2%	-17.7%	-23.3%	-1.5%	21.4%	6.0%	19.9%

A-2a Inventory Emissions Factors

Inventory Sector	Unit of Measurement	Emissions Factor	
WTLF	Tonnage	0.283500	MT CO2e / Wet Short Ton w/ Methane Capture
Gasoline	Gallons	0.008789	MT CO2e / Gallon
Diesel Fuel	Gallons	0.010221	MT CO2e / Gallon
Electricity	Kilowatt Hours	(See Table to Right)	
Natural Gas	Therms	0.005307	MT CO2e / Therm

A-2b PG&E Electricity Emissions Factors by Year

Year	MT CO2e / kWh	Year	MT CO2e / kWh
2005	0.0002218	2009	0.0002608
2006	0.0002068	2010	0.0002019
2007	0.0002884	2011	0.0001783
2008	0.0002908	2012	0.0002014

A-3 Inventory Results - MT CO2e

Year	Per Capita	Per $ Sales Tax Revenue	Waste Sector	Transportation Sector		Energy Sector				Total
			Waste to Landfill	Gasoline Sales	Diesel Sales	Commercial Electricity	Residential Electricity	Commercial Gas	Residential Gas	
2005	8.4	0.0382	25,035.0	265,157.4	159,489.3	70,035.2	45,014.5	43,166.1	58,416.6	666,314.1
2006	7.9	0.0390	24,781.7	255,654.9	163,717.7	66,389.2	46,867.1	45,663.5	65,039.1	668,113.1
2007	8.6	0.0457	26,864.0	281,387.0	165,957.5	94,123.0	68,378.9	43,561.3	67,357.8	747,629.5
2008	8.2	0.0502	25,726.8	252,702.6	167,552.5	93,857.5	70,194.7	44,101.5	68,185.1	722,320.8
2009	7.4	0.0451	21,414.6	235,353.3	124,836.4	80,334.9	63,349.6	44,638.4	69,206.6	639,133.8
2010	7.0	0.0409	21,346.2	235,616.2	123,621.3	61,383.4	47,527.6	46,061.1	70,239.5	605,795.3
2011	6.8	0.0362	21,257.9	226,379.1	129,273.6	54,037.1	42,918.4	47,801.3	75,063.3	596,730.6
2012	6.7	0.0346	21,231.3	218,282.1	122,340.7	62,636.1	49,603.2	45,760.1	70,068.4	589,922.0
% +/- 05-12:	-20.1%	-9.5%	-15.2%	-17.7%	-23.3%	-10.6%	10.2%	6.0%	19.9%	-11.5%