

# Tehama County GHG Inventory and Forecast Summary

Tehama County Planning Department

Tehama County Air Pollution Control District

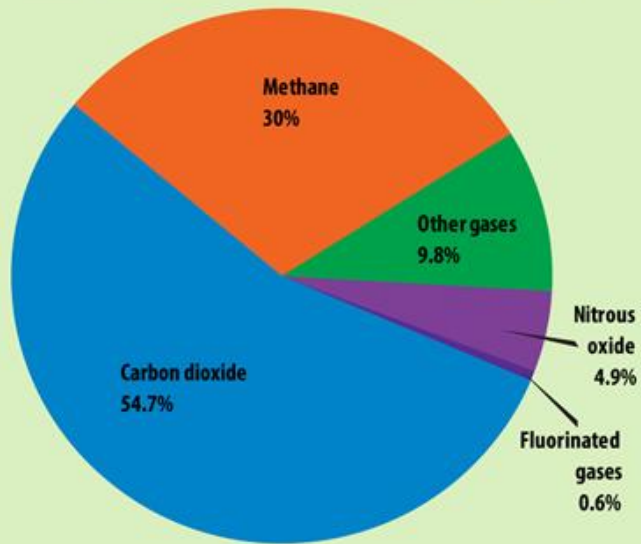
Pacific Municipal Consultants

# Purpose of Greenhouse Gas (GHG) Inventory

- ▶ AB32 California Global Warming Solutions Act of 2006
  - ▶ Identifies local governments as strategic partners to achieve GHG reductions
  - ▶ Actual percentage reduction goal is undefined.
- ▶ SB97 and California Environmental Quality Act (CEQA)
  - ▶ SB97 signed into law in 2007 and went into effect in 2010
  - ▶ Requires projects to estimate GHG emissions as part of CEQA
  - ▶ Jurisdictions with a Qualified GHG Reduction Strategy can streamline CEQA review process for projects compliant with the strategy
  - ▶ This inventory provides information for Tehama County to develop a Qualified GHG Reduction Strategy

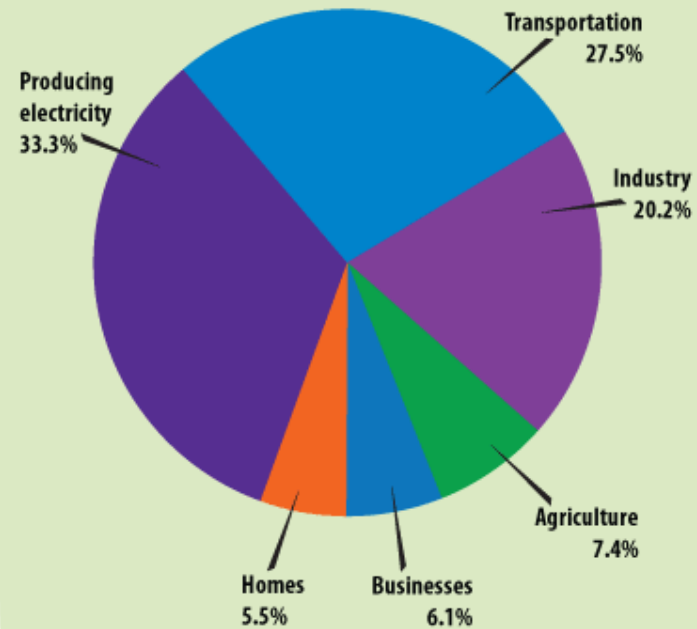
# What gases are Greenhouse Gases? Where do they come from?

**Major Greenhouse Gases from People's Activities**



**Sources of U.S. Greenhouse Gas Emissions (2009)**

(not including U.S. territories)



# Project Timeline, General Plan

- ▶ Tehama County General Plan (2008-2028) Adopted in 2009
  - ▶ Policy OS-2.7 of General Plan authorized Tehama County Planning Department staff to work with Tehama County Air Pollution Control District staff to develop a Climate Action Plan, as follows:
    - ▶ Tehama County shall work with the Tehama County Air Pollution Control District, California Air Resources Board and/or other agencies to prepare a Climate Action Plan. The Climate Action Plan shall include at a minimum:
      - ▶ An inventory of current (2008) GHG emissions within the Tehama County Air Pollution Control District consistent with methodologies developed by the International Environmental Agency for Local Governments (ICLEI) and the California Air Resources Board (ARB).
      - ▶ An inventory of 1990 GHG emission levels within the Tehama County Air Pollution Control District consistent with methodologies developed by ICLEI and ARB.
      - ▶ Estimated inventory of 2020 GHG emission levels within the Tehama County Air Pollution Control District consistent with methodologies developed by ICLEI and ARB.
      - ▶ Specific targets for reductions of the current and projected 2020 GHG emissions inventory from those sources reasonable attributable to the County's discretionary land use decisions and the County's internal government operations.
      - ▶ Specific and general tools and strategies to reduce the current and projected 2020 GHG inventories and to meet the Plan's target for GHG reductions by 2020.

# Project Timeline, General Plan

- ▶ *Sierra Club and Citizens Alliance for Rural Environmental Sustainability v County of Tehama* challenged, among other things, that the General Plan pledged to create a Climate Action Plan at a future time rather than as part of the General Plan process.
- ▶ Appellate Court ruled in favor of County- *“Appellants argue the EIR failed to quantify greenhouse gas (GHG) emissions generated by the project and failed to adopt all feasible mitigation measures. Appellants say their argument is that the County failed to proceed in a manner required by law, which presents a question of law subject to de novo review. However, we agree with the County and the trial court, that appellants actually challenge the adequacy of the analysis and mitigation, which present factual matters subject to substantial evidence review. Appellants challenge factual determinations made by the Board regarding the methodology for quantifying GHG emissions, determining their significance, and the feasibility of mitigation measures. Under either standard of review, we conclude appellants fail to show grounds for reversal.”*

# Phase 1, Inventory Development

- ▶ Tehama County Board of Supervisors authorized the Planning Department to enter into a contract with Pacific Municipal Consultants on December 16, 2013 for \$15,910 to develop a GHG inventory for the unincorporated county based on 2008 emissions data
  - ▶ Staff and financial support of \$10,910 was provided by the Tehama County Air Pollution Control District.
  - ▶ Staff and financial support of \$5,000 was provided by the Tehama County Planning Department.
- ▶ At the start of the project, estimating 1990 levels of GHG emissions with any degree of certainty was determined to be infeasible.
- ▶ Local jurisdictions including Butte and Shasta Counties had recently developed CAPs based on 2006 and 2008 inventories.

# Inventory Process

- ▶ Baseline Inventory of emissions in 2008 was calculated from the following sectors:
  - ▶ Residential Built (residential energy use)
  - ▶ Nonresidential Built (commercial and industrial energy use)
  - ▶ Transportation (On-road trips that begin and end in unincorporated Tehama County)
  - ▶ Off-road Equipment (construction, lawn and garden)
  - ▶ Solid Waste (material deposited in landfills)
  - ▶ Water and Wastewater (energy and emissions to treat and pump water and wastewater, including septic)
  - ▶ Agriculture (fertilizer, manure, enteric emissions)
  - ▶ Stationary Sources (includes only sources that don't get captured in Nonresidential Built)

# Inventory Process (Continued) and Post Inventory Process

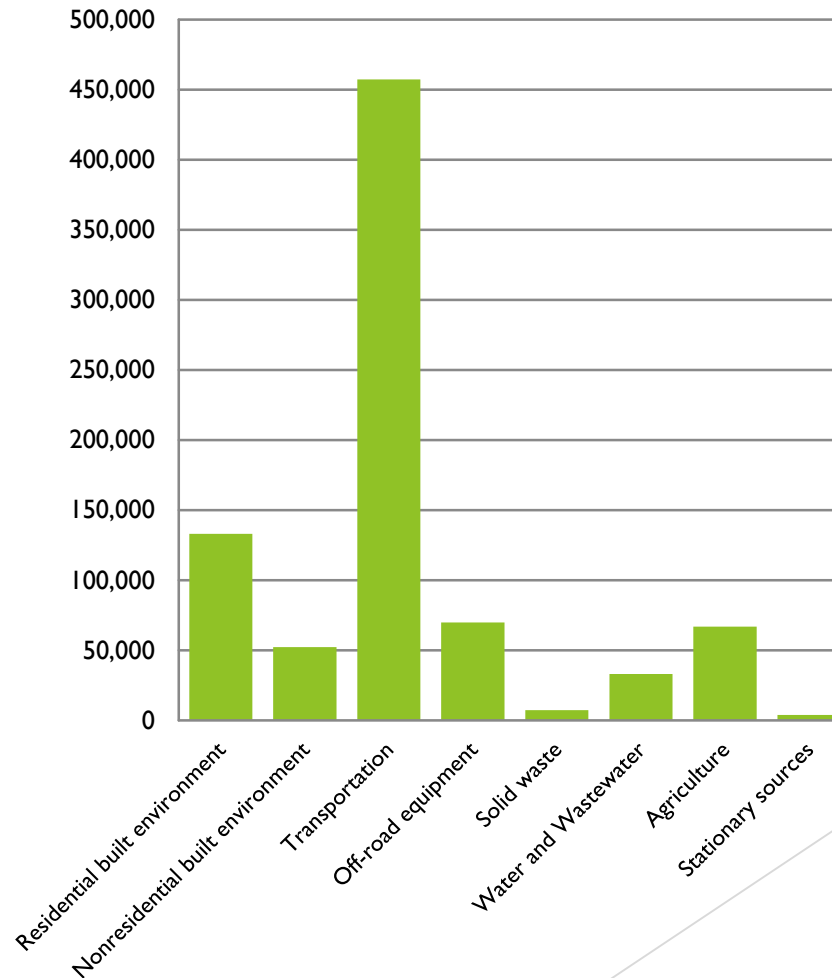
- ▶ After 2008 Baseline Inventory is completed, calculate “Business as Usual (BAU)” estimates for each sector for 2020 and 2028 based on projected population growth and other factors.
- ▶ Next, look at current local, state and federal regulations that affect future emissions patterns, and recalculate estimates (“Adjusted Business as Usual (ABAU)”) for 2020 and 2028.
  - ▶ This is where the current process ends
- ▶ With the Baseline, Business as Usual, and Adjusted Business as Usual emissions estimates, Board of Supervisors can direct staff to provide potential policies, activities, or projects for Board consideration, in order to meet a stated long term emissions goal.



# 2008 Baseline Community Wide Emissions

Sector	MTCO <sub>2</sub> e	Percentage
Residential built environment	133,110	16%
Nonresidential built environment	52,210	6%
Transportation	457,260	56%
Off-road equipment	69,800	8%
Solid waste	7,260	1%
Water and wastewater	33,020	4%
Agriculture	65,010	8%
Stationary sources	3,900	<1%
<b>Total</b>	<b>821,570</b>	<b>100%</b>

Note: Due to rounding, totals may not equal the sum of the component parts.

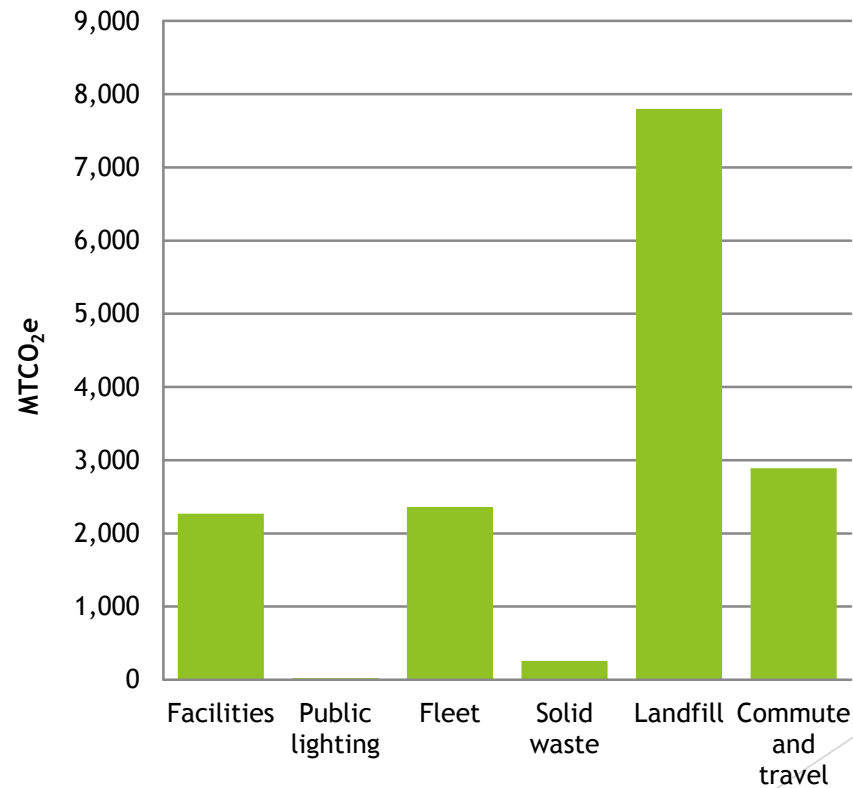


# Government Operations

- ▶ Government operations inventory includes emissions generated by government operations primarily within the unincorporated area with the exception of county facilities in incorporated areas
  - ▶ Facilities: Energy use in County government buildings and facilities
  - ▶ Public Lighting: electricity used for public lights operated by the County, including streetlights and traffic signals
  - ▶ Fleet: use of County-owned vehicles
  - ▶ Solid Waste: Solid Waste generated by County operations
  - ▶ Landfill: Emissions from Landfill (flare and non flare emissions)
  - ▶ Commute and travel: Vehicle use of County employees not covered under Fleet

# 2008 Government Operations Summary

Sector	MTCO <sub>2</sub> e	Percentage
Facilities	2,270	15%
Public lighting	20	<1%
Fleet	2,360	15%
Solid waste	260	2%
Landfill	7,800	50%
Commute and travel	2,890	19%
<b>Total</b>	<b>15,600</b>	<b>100%</b>



# Activity Data- Electricity, 2008

- ▶ PG&E reported electricity use in unincorporated area in 2008
  - ▶ Residential
  - ▶ Nonresidential
  - ▶ Government Facilities
  - ▶ Public Lighting
- ▶ PG&E reported an emission factor for 2008 blended electricity, which was then used to calculate GHG emissions

Sector/Subsector	Total kWh	MTCO <sub>2</sub> e	Percentage of MTCO <sub>2</sub> e
<b>Community inventory</b>			
Residential	172,672,340	50,500	66%
Nonresidential	89,568,140	26,190	34%
<b>Community total</b>	<b>262,240,480</b>	<b>76,690</b>	<b>100%</b>
<b>Government operations inventory</b>			
Facilities	4,959,010	1,450	99%
Public lighting	58,830	20	1%
<b>Government operations total</b>	<b>5,017,840</b>	<b>1,470</b>	<b>100%</b>

# Activity Data, Heating Fuels, 2008

- ▶ Natural Gas usage in unincorporated area provided by PG&E for 2008
- ▶ No reliable data exists for usage of propane, wood, and other fuels for heating
  - ▶ Data and model from Propane Education and Research Council was used to estimate residential propane use
  - ▶ Wood use was calculated using data on statewide use of wood for heating

Sector/ Subsector	Activity Data	Units	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Community inventory</b>				
Residential natural gas	1,131,310	Therms	6,020	6%
Residential propane	3,604,780	Gallons	21,650	20%
Residential wood	35,380	Tons	54,940	51%
Nonresidential natural gas	4,891,690	Therms	26,020	24%
<b>Community total</b>	<b>—</b>	<b>—</b>	<b>108,630</b>	<b>100%</b>
<b>Government operations inventory</b>				
<b>Government operations natural gas</b>	<b>154,600</b>	<b>Therms</b>	<b>820</b>	<b>100%</b>

# Activity Data, Transportation 2008

- ▶ Includes all trips that began and ended in unincorporated area.
- ▶ Includes proportion of trips that began or ended outside of unincorporated area.
- ▶ Does not include trips that began and ended outside unincorporated area.
- ▶ Total Vehicle Miles Travelled (VMT) provided by CalTrans.
- ▶ Total VMT reduced by percentage of nonattributable trips comparable to percentages from Butte and Shasta Climate Action Plans.

Sector/ Subsector	Total VMT	MTCO <sub>2e</sub>	Percentage of MTCO <sub>2e</sub>
<b>Community inventory</b>			
Internal-internal	538,331,370	389,230	85%
Internal-external <sup>1</sup>	94,091,750	68,030	15%
<b>Total transportation</b>	<b>632,423,130</b>	<b>457,260</b>	<b>100%</b>

# Government Operations Transportation, 2008

- ▶ Includes 2 sectors: Fleet, and commute/travel.
- ▶ Fleet data (Vehicle types, miles, fuel usage) provided by individual departments.
- ▶ Commute/travel data generated through employee survey for travel using employee owned vehicles.
- ▶ “VMT” is “Vehicle Miles Travelled.”

Sector/ Subsector	Activity Data	Units	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Government operations inventory</b>				
County fleet	180,150	Gallons	2,360	45%
Employee commute <sup>1</sup>	5,260,590	VMT	2,100	40%
Employee business travel <sup>1</sup>	1,971,150	VMT	790	15%
<b>Government operations total</b>	—	—	<b>5,250</b>	<b>100%</b>

# Off-Road Equipment

- ▶ Off-Road Equipment sector includes equipment and vehicles that don't travel on roads as part of their normal operations.
- ▶ Includes lawn and garden, construction, and agricultural.
- ▶ Emissions are estimates only, rather than soliciting activity data from individual users.
- ▶ Emission estimates calculated via CARB OFFROAD modeling software.

Sector/Subsector	Allocation Method	MTCO <sub>2</sub> e	Percentage of MTCO <sub>2</sub> e
<b>Community inventory</b>			
Agricultural equipment	% of agricultural land in the unincorporated county	44,510	64%
Construction equipment	% of new houses built in the unincorporated county	4,150	6%
Entertainment equipment <sup>1</sup>	% of households in the unincorporated county	20	0%
Industrial equipment <sup>2</sup>	% of industrial land in the unincorporated county	2,510	4%
Lawn and garden equipment	% of households in the unincorporated county	520	1%
Light commercial equipment	% of jobs in the unincorporated county	630	1%
Logging equipment	Only occurs in the unincorporated county	10,900	16%
Oil drilling equipment <sup>3</sup>	Only occurs in the unincorporated county	1,050	2%
Pleasure craft	Only occurs in the unincorporated county	1,620	2%
Recreational equipment	Only occurs in the unincorporated county	1,120	2%
Transport refrigeration units	% of countywide miles of Interstate 5 in the unincorporated county	2,770	4%
<b>Community total</b>	—	<b>69,800</b>	<b>100%</b>



# Solid Waste and Landfills

- ▶ Community level estimated emissions from solid waste generated in unincorporated area.
- ▶ Government operations inventory included estimates of waste generated by county operations, landfill gas flared from landfill, and landfill gas escaped via leaks.
- ▶ Analysis assumes 75% of landfill gas is flared.

Sector/Subsector	Activity Data	Units	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Community inventory</b>				
Municipal solid waste	23,270	Tons	6,090	84%
Alternative daily cover	5,420	Tons	1,180	16%
<b>Community total</b>	<b>28,690</b>	<b>Tons</b>	<b>7,270</b>	<b>100%</b>
<b>Government operations inventory</b>				
Government-generated MSW	1,220	Tons	260	3%
Waste in place	1,260,990	Tons in place	7,780	97%
Flared methane	90,552	MMBtu	20	<1%
<b>Government operations total</b>	<b>—</b>	<b>—</b>	<b>8,060</b>	<b>100%</b>

# Water Use and Wastewater Disposal

- ▶ Estimates relied primarily on 2003 study of water usage in Tehama County by the Tehama County Flood Control and Water Conservation District, with scaled increases due to population changes.
- ▶ Emission factors were used to convert acre-feet of water to electricity usage based on type of water, such as stream diversion, CVP, groundwater, etc.
- ▶ Also includes emissions from septic systems
- ▶ APCD staff believes most of these emissions are already incorporated into other sectors, but supports separately identifying them for tracking purposes.

Sector/Subsector	Activity Data	Units	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Community inventory</b>				
Water use	103,667,980	kWh	30,320	92%
Wastewater treatment	180,510	kWh	50	0%
Wastewater process	190	MG	10	0%
Septic tanks	29,010	Population served	2,640	8%
<b>Community total</b>	—	—	<b>33,020</b>	<b>100%</b>

# Agriculture

- ▶ Agricultural emissions were estimated from three different sources: fertilizer use, enteric fermentation, manure management (feedlots and dairies).
- ▶ Farm equipment was included in off-road equipment sector.
- ▶ Based on 53,320 acres of fertilized land, and approximately 35,000 annual head of cattle.
- ▶ Emissions from crop burning were calculated and included as a supplement for tracking purposes, but not in inventory

Sector/ Subsector	Activity Data	Units	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Community inventory</b>				
Fertilizer use	53,230	Acres	8,130	13%
Calves	3,510	Average annual heads	0	0%
Dairy cattle	3,900	Average annual heads	24,860	38%
Feedlot cattle	1,670	Average annual heads	2,240	3%
Other cattle	26,020	Average annual heads	29,780	46%
<b>Community total</b>	<b>—</b>	<b>—</b>	<b>65,010</b>	<b>100%</b>

# Other Stationary Sources

- ▶ This estimate includes sources that don't generate emissions based on electrical or natural gas usage.
- ▶ Includes stationary diesel engines and natural gas extraction equipment.

Sector/Subsector	MTCO <sub>2</sub> e	% of MTCO <sub>2</sub> e
<b>Community inventory</b>		
Emergency generators	150	4%
Natural gas extraction engines	560	14%
Wastewater process	3,100	79%
Industrial diesel	80	2%
<b>Community total</b>	<b>3,900</b>	<b>100%</b>

# Informational Items

- ▶ Not included in inventory
  - ▶ Crop burning residue- 13,690 acres of agricultural burning and prescribed burning for approximately 17,160 MTCO<sub>2</sub>e
  - ▶ Industrial Sector Natural Gas refers to emissions from PG&E compressor facility, which staff believes are not included in nonresidential natural gas usage- 14,110 MTCO<sub>2</sub>e

# 2020 and 2028 Forecasting

- ▶ 2020 chosen to align with AB32.
- ▶ 2028 chosen to align with 20 year build out of Tehama County General Plan.
- ▶ Two types of forecasts- Business as Usual (BAU) and Adjusted Business as Usual (ABAU).
  - ▶ BAU forecast assumes no action at local, state, or federal level to reduce emissions. Forecast uses predictions of changes in population, jobs, homebuilding, transportation growth, agriculture, etc.
  - ▶ ABAU forecast incorporates expected reductions due to current and known future local, state, and federal actions. Uses growth indicators (above) in BAU.
    - ▶ Includes expected reductions due to Clean Car and Low Carbon Fuel Standard, Renewable Portfolio Standard, and Title 24 Energy Efficiency Standards.

# BAU Forecast, 2020 and 2028

## Community Emissions

Sector	2008 MTCO <sub>2</sub> e	2020 MTCO <sub>2</sub> e	2028 MTCO <sub>2</sub> e	MTCO <sub>2</sub> e % Change, 2008-2028
Residential built environment	133,110	193,230	230,200	73%
Nonresidential built environment	52,210	58,750	64,650	24%
Transportation	457,260	503,720	552,730	21%
Off-road equipment	69,800	81,520	81,700	17%
Solid waste	7,260	9,310	10,980	51%
Water and wastewater	33,020	42,350	49,940	51%
Agriculture	65,010	66,280	66,700	3%
Other stationary sources	3,900	3,900	3,900	0%
<b>Total</b>	<b>821,570</b>	<b>959,060</b>	<b>1,060,800</b>	<b>29%</b>
<b>Percentage Change from 2008</b>	<b>—</b>	<b>17%</b>	<b>29%</b>	<b>29%</b>

## Government Emissions

Sector	2008 MTCO <sub>2</sub> e	2020 MTCO <sub>2</sub> e	2028 MTCO <sub>2</sub> e	MTCO <sub>2</sub> e % Change, 2008-2028
Facilities	2,270	2,400	2,400	6%
Public lighting	20	20	20	0%
Fleet	2,360	2,330	2,330	-1%
Solid waste	260	260	260	0%
Landfill	7,800	8,740	9,400	21%
Commute and travel	2,890	2,860	2,860	-1%
<b>Total</b>	<b>15,600</b>	<b>16,610</b>	<b>17,270</b>	<b>11%</b>
<b>Percentage Change from 2008</b>	<b>—</b>	<b>6%</b>	<b>11%</b>	<b>11%</b>

# ABAU Forecast, 2020 and 2028

## Community Emissions

Sector	2008 MTCO <sub>2</sub> e	2020 MTCO <sub>2</sub> e	2028 MTCO <sub>2</sub> e	MTCO <sub>2</sub> e % Change, 2008-2028
Residential built environment	133,110	173,270	194,330	46%
Nonresidential built environment	52,210	53,330	55,420	6%
Transportation	457,260	392,780	409,020	-11%
Off-road equipment	69,800	81,520	81,700	17%
Solid waste	7,260	9,310	10,980	51%
Water and wastewater	33,020	36,080	39,330	19%
Agriculture	65,010	66,280	66,700	3%
Other stationary sources	3,900	3,900	3,900	0%
<b>Total</b>	<b>821,570</b>	<b>816,470</b>	<b>861,380</b>	<b>5%</b>
<b>Percentage Change from 2008</b>	<b>—</b>	<b>-1%</b>	<b>5%</b>	<b>5%</b>

## Government Emissions

Sector	2008 MTCO <sub>2</sub> e	2020 MTCO <sub>2</sub> e	2028 MTCO <sub>2</sub> e	MTCO <sub>2</sub> e % Change, 2008- 2028
Facilities	2,270	2,140	2,050	-10%
Public lighting	20	20	20	0%
Fleet	2,360	1,730	1,590	-33%
Solid waste	260	260	260	0%
Landfill	7,800	8,740	9,400	21%
Commute and travel	2,890	2,040	1,860	-36%
<b>Total</b>	<b>15,600</b>	<b>14,930</b>	<b>15,180</b>	<b>-3%</b>
<b>Percentage Change from 2008</b>	<b>—</b>	<b>-4%</b>	<b>-3%</b>	<b>-3%</b>



# ABAU Included reductions from state policies

	2020 Reductions (MTCO <sub>2</sub> e)	2028 Reductions (MTCO <sub>2</sub> e)
<b>Community inventory</b>		
Pavley/LCFS	110,940	143,710
RPS	22,820	38,270
Title 24	8,840	17,440
<b>Community total</b>	<b>142,600</b>	<b>199,420</b>
<b>Government operations inventory</b>		
Pavley LCFS	250	350
RPS	1,200	1,470
Title 24	20	0
<b>Government operations total</b>	<b>1,470</b>	<b>1,820</b>

# Reduction Targets

- ▶ Final aspect of document presents opportunity for Board to provide direction to staff regarding future reduction targets.
- ▶ Setting reduction target, plus follow up staff work to identify ways to achieve the target, would complete General Plan requirement to complete a Climate Action Plan.
- ▶ Table to right shows reduction targets adopted by other Northern California counties

County	2020 Reduction Goal
Butte County	15% below baseline
Humboldt County	1990 levels
Solano County	20% below baseline
Shasta County	15% below baseline
Sutter County	1990 levels
Yolo County	1990 levels

# Reduction Targets, cont

- ▶ Table to the right shows what different reduction targets would look like.
- ▶ Keep in mind that 2014 is halfway from 2008 to 2020.
- ▶ With the transportation sector comprising approximately 56% of emissions, transportation would likely need majority of reductions

	15% Reduction	10% Reduction	5% Reduction
	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e	MTCO <sub>2</sub> e
2008 baseline	821,570	821,570	821,570
2020 BAU forecast	959,060	959,060	959,060
2020 ABAU forecast	816,470	816,470	816,470
2020 reduction goal	698,330	739,413	780,491
Reduction from baseline	-123,240	-82,157	-41,079
Reduction from BAU forecast	-260,730	-219,647	-178,569
Reduction from ABAU forecast	-118,140	-77,057	-35,979

# Reduction Targets, cont

- ▶ Potential areas of long term emission reduction that could be identified in a Climate Action Plan include the following:
  - ▶ Energy efficiency, including lighting, HVAC, wood stove replacements
  - ▶ Transportation infrastructure, including public transit and alternatively fueled vehicles.
  - ▶ Policies to encourage alternative energy generation such as wind and solar.
  - ▶ Policies to encourage alternative transportation such as bicycling.
  - ▶ Increases to recycling and waste diversion.

# Conclusion, Recommended Actions

- ▶ Are there any questions?
  
- ▶ Recommended Actions

  - ▶ a) *Request acceptance of the Tehama County Greenhouse Gas Inventory and Forecast Summary, as prepared by Pacific Municipal Consultants.*
  
  - ▶
  
  - ▶ b) *Discussion and possible direction to staff regarding the further development of a Climate Action Plan in accordance with Policy OS-2.7 of the Tehama County General Plan, including potential targets for GHG emissions reductions and tools and strategies to meet those targets.*