



## 4 – GREENHOUSE GAS EMISSIONS FORECAST AND REDUCTION TARGETS



## GHG EMISSIONS FORECAST AND REDUCTION TARGETS

After conducting a 2006 baseline GHG emissions inventory, the County prepared a GHG emissions forecast for key target years. A GHG emissions forecast demonstrates the anticipated future conditions in comparison to the 2006 baseline year. As the County implements GHG reduction measures, it will be possible to compare actual emissions to projected emissions to track reduction progress.

The County selected 2020 as the forecast year or planning horizon for implementation of this Plan and achievement of the GHG reduction target. Selection of 2020 as the forecast year is also consistent with the State’s forecast year established in [AB 32](#). Emissions forecasting is conducted for emissions from community-wide and County government operations.

### COMMUNITY-WIDE FORECAST

The community-wide GHG emissions have been forecast to the year 2020 for consistency with state legislation (AB 32). For consistency with other County and regional planning efforts, a second reduction forecast year of 2035 is included in forecasts. The basis for all growth scenarios is a “business-as-usual” (BAU) projection. The BAU projection forecasts emissions to reflect the County’s desired growth projections without regulatory or technical intervention to reduce GHG emissions. The BAU projection is then used as a starting point for the County to determine the level of emissions reductions needed to reach the reduction target.

#### Indicators Used to Determine Future Emissions

Future emissions forecasts are modeled based on projected growth trends in employment, population, vehicle miles traveled (VMT), and households, among other indicators. The forecast relies on the San Luis Obispo Council of Governments (SLOCOG) Long-Range Planning Projections Data for 2020 and 2035 population and employment growth, as well as the projected land use patterns in the unincorporated areas of the county. **Table 4-1** shows the growth indicators used to determine community-wide emissions growth for each sector by 2020 and 2035. These indicators are then applied to the 2006 GHG emissions inventory to determine a business-as-

Why Forecast?  
Future emissions forecasts are modeled based on projected growth trends in employment, population, vehicle miles traveled, and households to determine future GHG emissions levels in 2020 and 2035.

usual growth scenario. Under the business-as-usual scenario, community-wide emissions will grow by approximately 11% by the year 2020 and by 28% by 2035 (refer to **Table 4-2** and **Figure 4-1**).

**Table 4-1.** San Luis Obispo County Growth Indicators

Growth Indicator	Source	2006	2020	2035	Sector	Percent Change from Baseline
Service Population	SLOCOG Long-Range Planning Projections	117,570	137,870	160,300	Waste Transportation	36%
Households	SLOCOG Long-Range Planning Projections	45,360	54,770	63,440	Residential Energy	40%
Employment	SLOCOG Long-Range Planning Projections	15,680	18,790	22,640	Commercial & Industrial Energy	44%
Agricultural Land	SLO County Crops Report	22,630	22,630	22,630	Crop Fertilization	0%
Livestock Population	SLO County Crops Report	101,210	89,160	89,160	Livestock	-12%
Aircraft Landings & Take-Offs	SLO County Regional Airport Environmental Impact Report	74,950	79,010	80,170	Aircraft	6%

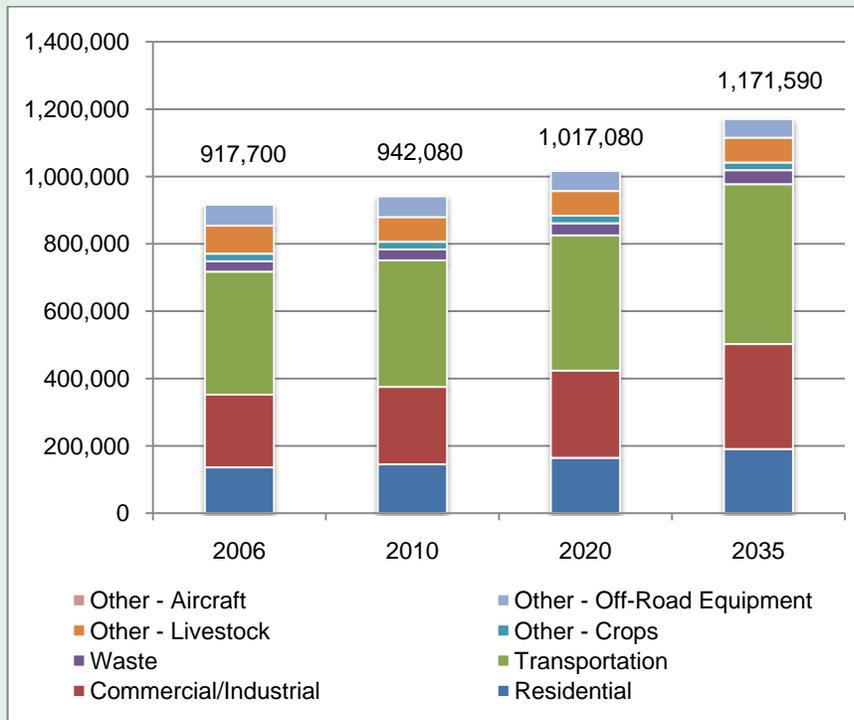
**Table 4-2.** Community Wide Business-as-Usual GHG Emissions Forecast (MTCO<sub>2e</sub>)

Sector/Source		2006	2020	2035	Percent Change from Baseline
Residential	Electricity & Natural Gas	136,360	164,640	190,710	40%
Commercial/Industrial	Electricity & Natural Gas	215,970	258,830	311,870	44%
Transportation	On-Road Vehicles	365,260	401,790	474,840	30% <sub>1</sub>
Waste	Landfill Waste	30,540	35,810	41,640	36%
Crops	Acres	22,630	22,630	22,630	0%
Livestock	Head of Livestock	83,420	73,490	73,490	-12%

Sector/Source		2006	2020	2035	Percent Change from Baseline
Off-Road Equipment <sup>2</sup>	Ag Equipment Vehicles	63,280	59,640	56,160	-11%
Aircraft	Landings & take-offs	240	250	250	6%
<b>Total</b>		<b>917,700</b>	<b>1,017,080<sup>3</sup></b>	<b>1,171,590</b>	<b>28%</b>

1. Transportation Emissions Factors are derived from the California Air Resources Board's EMFAC 2007 Software. While VMT is anticipated to grow 36%, EMFAC predicts slightly lower GHG emissions per mile of travel by 2035 due to regular turnover of vehicles resulting in just a 30% increase in transportation related GHG emissions
2. Off-Road Equipment is forecasted using the California Air Resources Board's Off-Road Software
3. Due to rounding, the sum of these numbers may not equal the total.

**Figure 4-1. Community-Wide Business-as-Usual Emissions Forecast by Sector**



## INCORPORATION OF STATE REDUCTIONS INTO FORECASTS

State-led or state-induced reduction strategies included in the AB 32 Scoping Plan are factored into the adjusted 2020 and 2035 emissions forecast. Strategies include all state actions that are

approved, programmed, and/or adopted and require no additional local action. Incorporating them into the forecast and reduction assessment to create an adjusted business-as-usual forecast provides a more accurate picture of future emissions growth and the responsibility of local governments once state measures to reduce GHG emissions have been implemented. A brief description of each of these items is provided below and summarized in **Table 4-3**. For more details on how State programs will affect the unincorporated County’s GHG emissions, see Appendix E.

**Table 4-3.** Summary of State Reductions Applied to Community-wide Emissions

State Reductions Summary	2010 (MTCO <sub>2</sub> e)	2020 (MTCO <sub>2</sub> e)	2035 (MTCO <sub>2</sub> e)
Pavley Reductions	0	-53,800	-100,660
LCFS Reductions	0	-23,840	-24,530
RPS Reductions	-3,570	-25,950	-44,010
CSI Reductions	-760	-1,180	-1,090
Title 24 Reductions	0	-12,560	-43,650
Total State Reductions	-4,330	-117,310 <sup>1</sup>	-213,940

1. Due to rounding, the sum of these numbers may not equal the total.

In addition to influencing community-wide GHG emissions, State Programs and policies will influence County operations GHG emissions, See **Table 4-4**. The renewable portfolio standard will reduce GHG emissions from all electricity use at County buildings, water and wastewater treatment facilities, irrigation controllers, and streetlights and traffic signals. The Clean Car Standards will reduce GHG emissions from the purchase of more fuel efficient vehicles for both the County fleet as well as employee vehicles used for commuting.

**Table 4-4.** Summary of State Reductions Applied to County Operations Emissions

State Reductions Summary	2010 (MTCO <sub>2</sub> e)	2020 (MTCO <sub>2</sub> e)	2035 (MTCO <sub>2</sub> e)
Pavley Reductions	0	-2,370	-3,620
RPS Reductions	-150	-910	-1,510
Total State Reductions	-150	-3,280	-5,130

**California’s Pavley Standards**

Adopted in 2002, the Clean Car Standards, know as the Pavley Standard requires new vehicles sold in California starting in 2012 will be subject to higher fuel efficiency standards.

**Clean Car Standards, AB 1493 (Pavley)**

Signed into law in 2002, AB 1493 requires carmakers to reduce GHG emissions from new passenger cars and light trucks beginning in 2011. Regulations adopted by the California Air Resources Board (CARB) in 2004 and took effect in 2009 with the release of a waiver from the U.S. Environmental Protection Agency (EPA) granting California the right to implement the bill. CARB anticipates that the Pavley standards will reduce GHG emissions from new California passenger vehicles by about 22% in 2012 and about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.<sup>1</sup>

**Low Carbon Fuel Standard**

Established in 2007 under an executive order from Governor Schwarzenegger, the Low Carbon Fuel Standard (LCFS) directs California Environmental Protection Agency, the California Energy Commission, and the California Air Resources Board to develop protocols for measuring the life-cycle carbon intensity of transportation fuels to be included as part of the State's early action item for implementing AB 32. LCFS will reduce the carbon intensity of transportation fuels by 10%.<sup>2</sup>

**Renewable Portfolio Standard**

California's Renewable Portfolio Standard (RPS) is one of the most ambitious renewable energy standards in the country, mandating that 33% of electricity delivered in California is generated by renewable sources like solar, wind and geothermal by 2020. The California RPS was first codified in 2002 by Senate Bill 1078 (requiring 20% renewable electricity mix by 2010) and further strengthened in April 2011 with the adoption of Senate Bill X 1-2 (requiring 33% renewable electricity mix by 2020).<sup>3</sup> The RPS intends to boost the economy and establish California as a center for the development and use of renewable energy. Only Hawaii's

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<sup>1</sup> California Air Resources Board 2010.

<sup>2</sup> California Air Resources Board 2011.

<sup>3</sup> California Public Utilities Commission 2011.

electricity standard of 40% renewable by 2030 trumps California renewable energy standards.

Despite the 2020 goal of California's RPS, technological and political challenges may prevent some investor-owned utilities from meeting the 33% target by 2020. In 2010, the California Public Utilities Commission reported that 18% of California's electricity came from renewable sources in 2010, missing the 20% goal by 2%. California utilities have more than enough renewable electricity under consideration to meet the 33% target by 2020. However, due to contract and transmission limitations, not all of this new electricity may be available by 2020.<sup>4</sup> Taking these issues into account, this document assumes a more conservative forecast of a 28% renewable mix by 2020.

### **California Building Codes, Title 24**

Title 24 of the California Code of Regulations (CCR) mandates how each new home and business is built in California. It includes requirements for the structural, plumbing, electrical and mechanical systems of buildings, and for fire and life safety, energy conservation, green design and accessibility in and about buildings. The 2010 triennial edition Title 24 applies to all occupancies that applied for a building permit on or after January 1, 2011, and remains in effect until the effective date of the 2013 triennial edition. This Plan focuses on two sections of Title 24: Part 6, the California Energy Code; and Part 11, the California Green Building Standards Code or CALGreen Code. These two sections require direct electricity, natural gas, and water savings for every new home or business built in California. Title 24 is a statewide standard applied at the local level by local agencies through project review.

### ***Part 6, 2008 Building Energy Efficiency Standards***

The most recent update to Title 24 Part 6, the California Energy Code, went into effect on January 1, 2010 for both residential and nonresidential new construction. Part 6 also includes requirements for lighting and insulation upgrades to nonresidential buildings undergoing a major retrofit.

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<sup>4</sup> California Public Utilities Commission 2011.

***Part 11, 2010 California Green Building Code***

California is the first state in the nation to adopt a mandatory green building code, the California Green Building Standards Code, or CALGreen. The CALGreen Code was updated in 2010, and became a mandatory code beginning January 1, 2011. The Code takes a holistic approach to green building by including minimum requirements in the areas of planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. All local governments must adopt the minimum requirements of the CALGreen code and may elect to adopt one of the two additional tiers. Local governments can adopt a Tier 1 or Tier 2 standard in order to achieve greater energy, water, and health benefits.

Mandatory CALGreen standards do not require explicit reductions in energy consumption beyond the minimum Title 24 Part 6 standards. However, if a local government elects to adopt either of the tiers of CALGreen, additional prerequisites and electives must be implemented by new development projects subject to CALGreen. For the voluntary energy efficiency prerequisites, Tier 1 is a 15 % improvement and Tier 2 is a 30 % improvement over minimum Title 24 Part 6 requirements.

The GHG forecast in this Plan incorporates the net energy benefit of new Title 24 requirements that did not exist in the baseline year. These estimates are based on California Energy Commission studies that compare each new update of Title 24 to its former version. The AB 32 Scoping Plan calls for on-going triennial updates to Title 24 that will yield regular increases in the mandatory energy and water savings for new construction. As such, the GHG forecast also includes a conservative estimate of the energy and water reductions due to future updates of Title 24 based on historic growth rates. The energy reductions quantified in the forecast from Part 6 Energy Code updates are based on the assumption that the triennial updates to the code will yield regular decreases in the maximum allowable amount of energy used from new construction. The County has adopted the minimum requirements of CALGreen and is currently preparing a Green Building Ordinance which will go beyond those minimum requirements and is described in more detail in **Chapter 5**.

**California Solar Initiative**

The California Solar Initiative (CSI) was authorized in 2006 under Senate Bill (SB) 1 and allows the California Public Utilities Commission (CPUC) to provide incentives to install solar technology on existing residential, commercial, nonprofit, and governmental buildings if they are customers of the state's investor-owned utilities (IOUs): Pacific Gas & Electric (PG&E), San Diego Gas & Electric (SDG&E), or Southern California Edison (SCE). The CSI program has a budget of \$2.167 billion to be expended by 2016 with a goal to reach 1,940 MW of installed power through out the state by that time.<sup>5</sup> The CSI program has several components including the Research and Development, Single-family Affordable Solar Housing (SASH), Multi-family Affordable Solar Housing (MASH), and Solar Water Heating Pilot Program, each of which provides incentives to further the development and installation of new solar technology on California's buildings.

**COUNTY OPERATIONS FORECAST**

County government operations are more difficult to forecast separately due to a lack of reasonable growth indicators. In the absence of known growth indicators for sectors, the business-as-usual projection reflects baseline year emissions through 2020 and 2035. The forecast reflects changes in energy and transportation sectors to show anticipated changes to energy use related to water and wastewater treatment and distribution and changes to the County's employee population.

Other than water and wastewater emissions, where the County is anticipating the expansion or additional development of these facilities, a significant increase in emissions is not expected in County government operations emissions. Emissions from employee commute behaviors are directly tied to the number of County employees. Future GHG emissions associated with County employee vehicle miles traveled (VMT) were adjusted to reflect the anticipated changes in the number of employee as estimated by the Human Resources Department. Water and wastewater emissions were forecast to incorporate the Lopez Water Treatment Plant and

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<sup>5</sup> California Energy Commission and California Public Utilities Commission 2011.

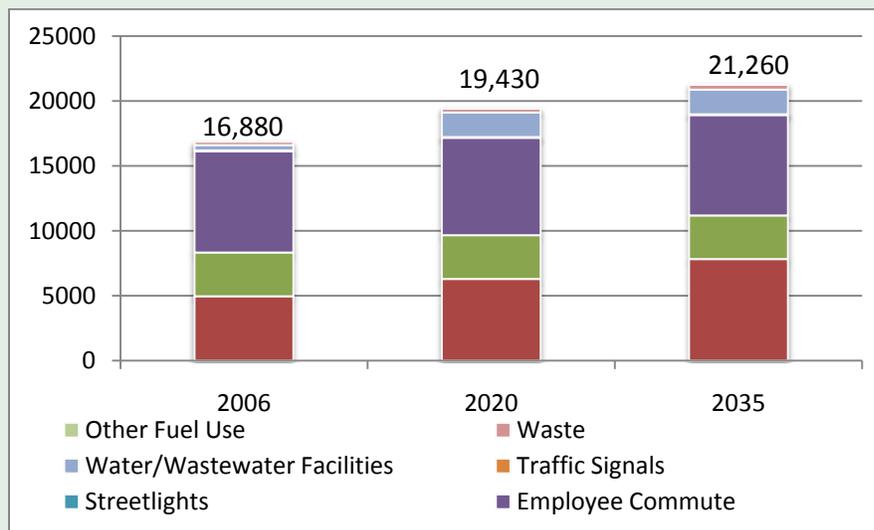
the Los Osos Wastewater Treatment Plant, both of which are anticipated to come on line within the next ten years. The forecast also reflects the potential change in operational control of the California Men’s Colony wastewater treatment plant from the State of California to San Luis Obispo County. A summary of the projected future emissions of the County operations emissions in 2020 and 2035 is provided below in **Table 4-5** and **Figure 4-2**.

**Table 4-5. Business-as-Usual Projected Growth in County Operations Emissions, 2006–2035 (MTCO<sub>2e</sub>)**

Sector/Source		2006	2020	2035
Buildings	Electricity & Natural Gas	4,970	5,820	6,840
Vehicle Fleet	Gasoline & Diesel Fuel	3,360	3,360	3,360
Employee Commute	VMT	7,800	7,500	7,730
Streetlights	Electricity	50	50	50
Traffic Signals	Electricity	20	20	20
Water/Wastewater	Electricity	410	1,890	1,890
Waste	Landfill Waste	270	310	380
Other Fuel Use	Propane Fuel	<10	<10	<10
<b>Total</b>		<b>16,880<sup>1</sup></b>	<b>18,950<sup>1</sup></b>	<b>20,270</b>

1. Due to rounding, the sum of these numbers may not equal the total.

**Figure 4-2. Business-as-Usual Projected Growth in County Operations Emissions, 2006–2035 (MTCO<sub>2e</sub>)**



## GHG EMISSIONS REDUCTION TARGETS

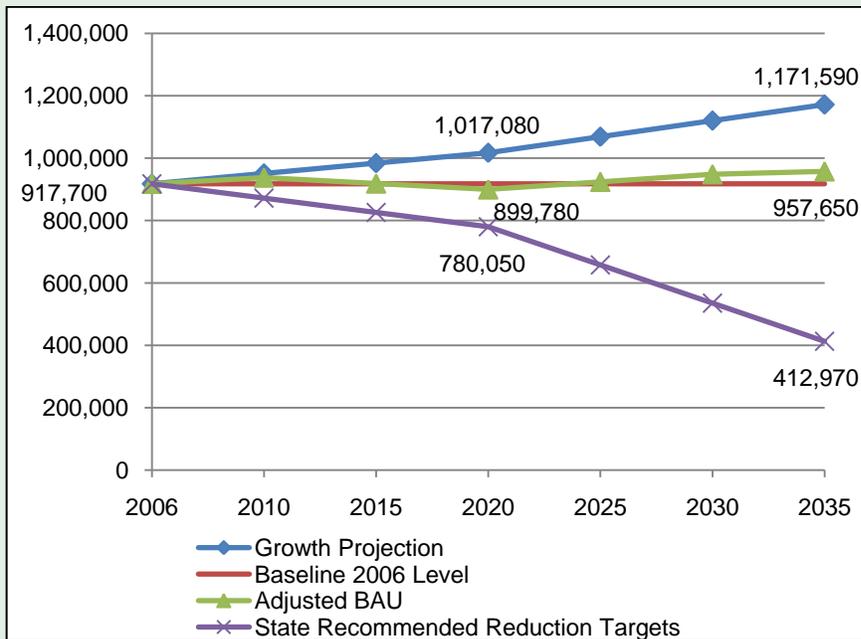
### **Community-Wide Reduction Targets**

#### ***Compliance with AB 32***

For consistency with the State's GHG reduction target as outlined in AB 32, the County set an emissions reduction target of 15% below 2006 levels by 2020. The County adopted the emissions reduction target in 2010 as part of the COSE. The County has not set reduction targets for other target years. The State's long-term goal to reduce emissions by 80% below 1990 emissions by 2050 is included in forecasts. **Figure 4-3** provides a comparison of the BAU forecast, the adjusted BAU forecast, and the emissions reduction targets for 2020 and 2035 to the 2006 baseline emissions to demonstrate the additional emissions reductions that will need to be achieved through implementation of local actions and programs.

**Figure 4-3** demonstrates how emissions will continue to increase along the adjusted BAU scenario. Achieving the reduction target will require an actual 28% decrease in emissions by 2020. By 2035, the gap between adjusted BAU emissions levels and the reduction target will grow to 52% as the target moves toward an 80% reduction in baseline emissions levels by 2050.

**Figure 4-3.** Comparison of Forecasts to Baseline and Reduction Target



***Compliance with Other Adopted COSE Goals for Specific Sectors***

In addition to state-recommended reduction targets, the COSE includes the following goals and strategies that direct emissions reduction efforts for both community-wide and County operations emissions.

- Air Quality Goal 1: Per capita vehicle miles traveled countywide will be substantially reduced consistent with statewide targets.
- Air Quality Goal 4: Greenhouse gas emissions from County operations and community-wide sources will be reduced from baseline levels by a minimum of 15% by 2020.
- Energy Goal 5: Waste reduction, reuse, and recycling will achieve as close to zero waste as possible.
- Implementation Strategy E 5.1.1: Achieve Waste Diversion Rate. Create a waste reduction, reuse, and recycling program aimed at achieving a diversion rate of at least 70% by 2015 for the unincorporated county.

- Water Resources Goal 4: Per capita potable water use in the county will decline by 20% by 2020.

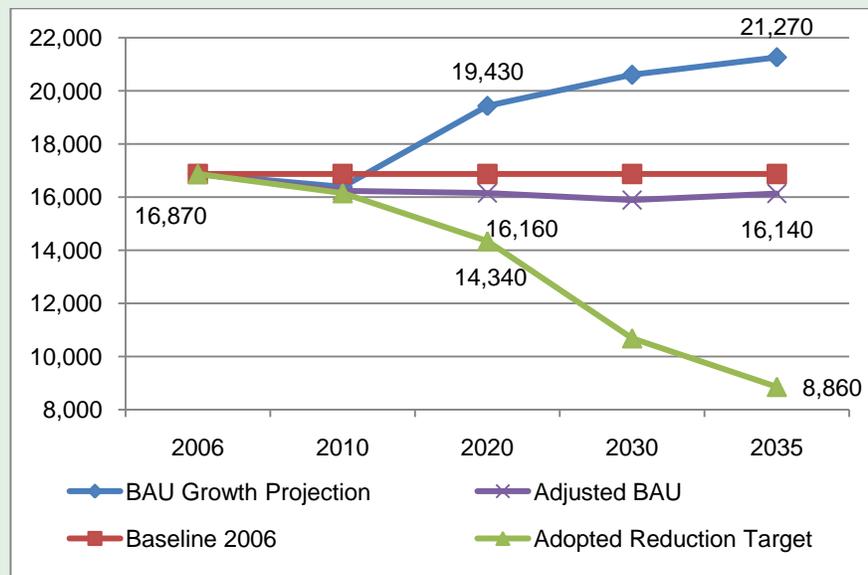
**County Operations Reduction Targets**

While the State has not directed local governments to reduce emissions from their own operations separate from community-wide emissions, the County has adopted an emissions reduction target consistent with the statewide goal of 15% below baseline levels by 2020 (COSE Air Quality Goal 4).

**Figure 4-4** depicts the emissions reductions needed from County BAU to achieve the adopted reduction target. While County operations emissions decreased between 2006 and 2010 primarily due to a reduction in the number of employees, 2020 and 2035 emissions are still expected to grow beyond baseline levels under the business-as-usual scenario.

In order to meet the 15% below baseline levels by 2020 target, the County will need to reduce emissions by 4,6 MTCO<sub>2</sub>e from BAU emissions, or a 27% reduction in overall County operations emissions.

**Figure 4-4. Comparison of County Operations Forecast to Baseline and Reduction Target**



Implementation of the Local measures included in this Plan will help the County to reach GHG reduction targets for Community-wide and County operations by 2020.

***Adopted COSE Policies Related to County Operations***

In addition to the COSE air quality goal to reduce emissions from County operations baseline levels by a minimum of 15% by 2020, the COSE also includes an energy goal to reduce energy consumption at County facilities.

- Air Quality Goal 4: Greenhouse gas emissions from County operations and community-wide sources will be reduced from baseline levels by a minimum of 15% by 2020.
- Energy Goal 2: Energy consumption at County facilities will be reduced by 20% from 2006 levels by 2020.

The baseline inventory, emissions forecast, and reduction target, including COSE goals and policies, provide the framework for the GHG reduction measures provided in **Chapter 5**.

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