EXECUTIVE SUMMARY

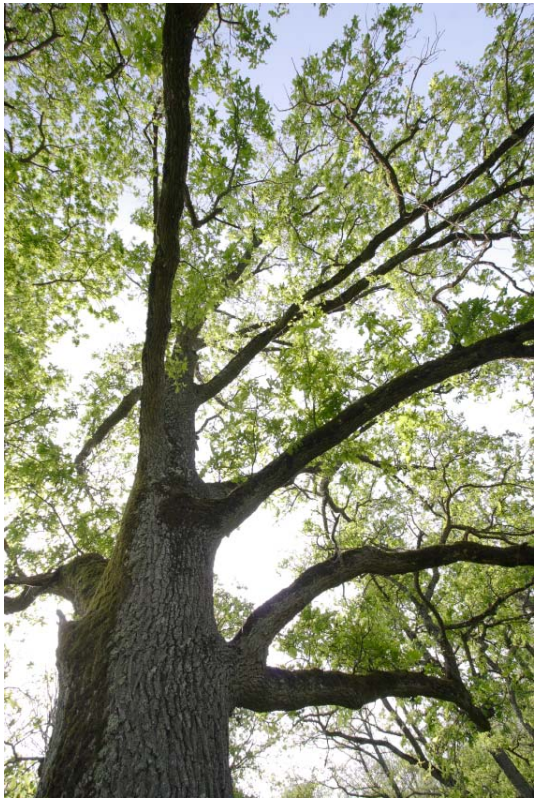
CLIMATE ACTION CONTEXT

Yolo County has a strong commitment to the reduction of greenhouse gas (GHG) emissions, which is balanced with its strong commitment to agriculture and the role of agriculture in reducing GHG emissions. This is the result of the County's long-term advocacy of responsible growth, agricultural and open space preservation and energy conservation. With regard to climate change, this history goes back to 1982, when the County adopted a countywide Energy Plan, one of the first of its kind in the State. More recently, in 2007, the Board of Supervisors unanimously approved a resolution to participate in the Cool Counties Climate Stabilization Declaration and committed to reduce GHG emissions by 80% by 2050.

The 2030 Yolo County General Plan expanded on this established tradition and contains more than 350 climate change-focused policies and actions. General Plan Action CO-A117 calls for the development of a GHG Emissions Reduction Plan and/or Climate Action (CAP) for the County, to reduce GHG emissions, and to address economic and social adaptation to the effects of climate change. The CAP builds on the General Plan's vision and outlines detailed strategies and measures to achieve these goals and contribute to State and international climate protection efforts.

Although agriculture contributes a small proportion of overall GHG emissions, it has an unrecognized yet essential value that greatly outweighs its minor impact on climate change. The inventories show that each acre of agriculture and open space conserved saves nearly 100 times the amount of GHG emissions that would result if the land were converted to urban use. Thus, the protection of farmland and open space limits the spread of urban development, thereby avoiding uses that create significantly higher levels of GHG emissions.

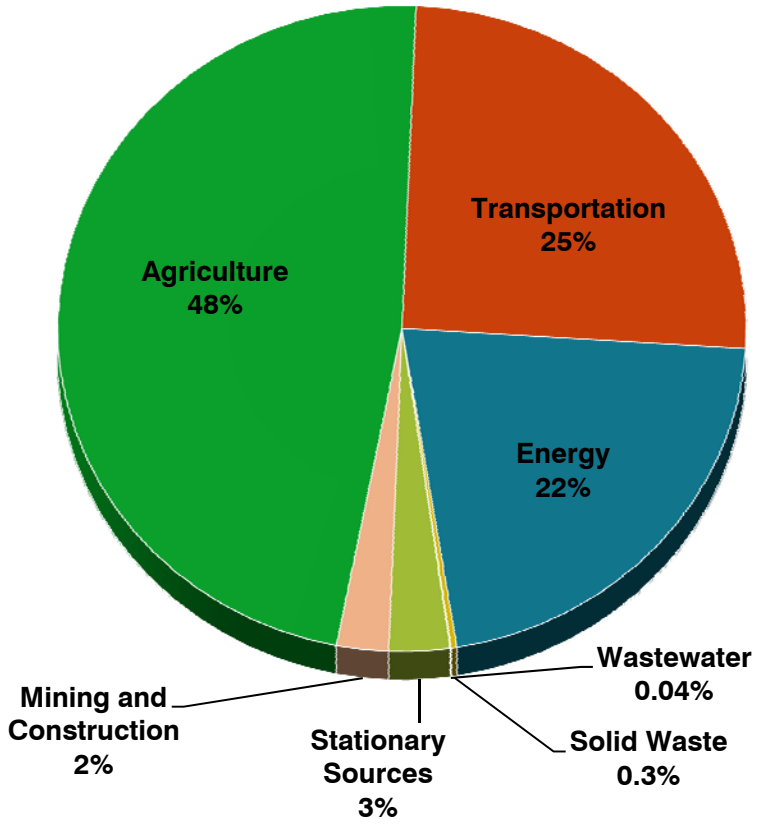
The CAP recognizes the valuable contributions made by farmland and open space in providing a positive alternative to more adverse land use patterns. It includes measures that will create potential funding and incentives to assist farmers in



voluntarily reducing their share of overall emissions. In the future, the CAP may provide new opportunities for farmers that have hedgerows, permanent crops, riparian areas, and new oak woodlands to sell carbon sequestration credits. These efforts will strengthen the agricultural economy, maintaining an economically viable alternative to urban development, and thereby preventing higher GHG levels. By emphasizing its historic agricultural traditions, Yolo County will continue to provide climate change solutions for an increasingly urbanized region.

As a part of this continuing commitment, the CAP is intended to be an evolving document. The study of climate change is a relatively new field; one which is expanding and being refined at a rapid pace. The CAP is not being adopted as a part of the County General Plan, in order to provide the flexibility needed to allow it to be modified to reflect new research, changing technology, and economics. Progress on the CAP will be reviewed by the Board of Supervisors biennially, while the inventories will be updated every five

Figure ES-1: 1990 Unincorporated Yolo County Greenhouse Gas Emissions by Sector



years. Adoption of the CAP establishes an ongoing process by which the County will enhance its approach to reducing climate change and adapt to future challenges.

EMISSIONS INVENTORIES AND PROJECTIONS

The County prepared community GHG emissions inventories for both 1990 and 2008. The 1990 historic inventory allows an understanding of the level of emission reductions required to comply with State requirements. The 2008 inventory provides insight regarding emissions growth over the last two decades and aligns with the General Plan baseline year.

1990 Historic Emissions Inventory

In 1990, the unincorporated portions of Yolo County generated approximately 613,651 metric tons (MT) of carbon dioxide equivalent (CO_2e) emissions. The breakdown of 1990 GHG emissions by sector within the unincorporated area is shown in Figure ES-1. The historic 1990 inventory does not include emissions from the four cities, UC Davis, tribal lands, special districts, and/or federal and State-owned lands. Each of these entities is responsible for adopting their own inventories and climate action plans.

Since the CAP only looks at the unincorporated area, it can give a distorted perspective on the relative contributions of the various sectors, particularly agriculture. Instead, a better picture can be provided by looking at countywide GHG emissions in 1990, as shown in Figure ES-2. Here it can be seen that the entire farming sector was approximately equivalent to the City of West Sacramento in terms of GHG emissions, and was equal to only about half of the GHG emissions of Woodland and two-thirds those of Davis. Thus, while farming is the largest source of emissions within the unincorporated area, it plays a much more modest role within the county as a whole.

A countywide inventory was not prepared for 2008. However, given the growth in the four cities over the past twenty years and the improvements made to farm practices (e.g., reduced nitrogen fertilizer use, more efficient irrigation, conversion to solar power for small pumps), it is likely that agriculture's relative contribution to total emissions has decreased significantly.

2008 Existing Emissions Inventory

In 2008, the unincorporated portions of Yolo County generated approximately 651,740 MT CO_2e. The breakdown of 2008 emissions by sector within the unincorporated area is shown in Figure ES-3. The total emissions inventory increased by only 6% between 1990 and 2008, even as the unincorporated population grew by 9.8%. The two biggest changes during this time period were energy and transportation. The emissions associated with energy went up 38%, as households increased their energy demand by building larger houses and filling them with multiple televisions, computers, cell phone chargers, kitchen appliances, spa tubs, and other consumer goods. By contrast, transportation emissions went down 32%, primarily due to improved fuel efficiency and air quality standards.

Figure ES-2: Greenhouse Gas Emissions by Jurisdiction in 1990

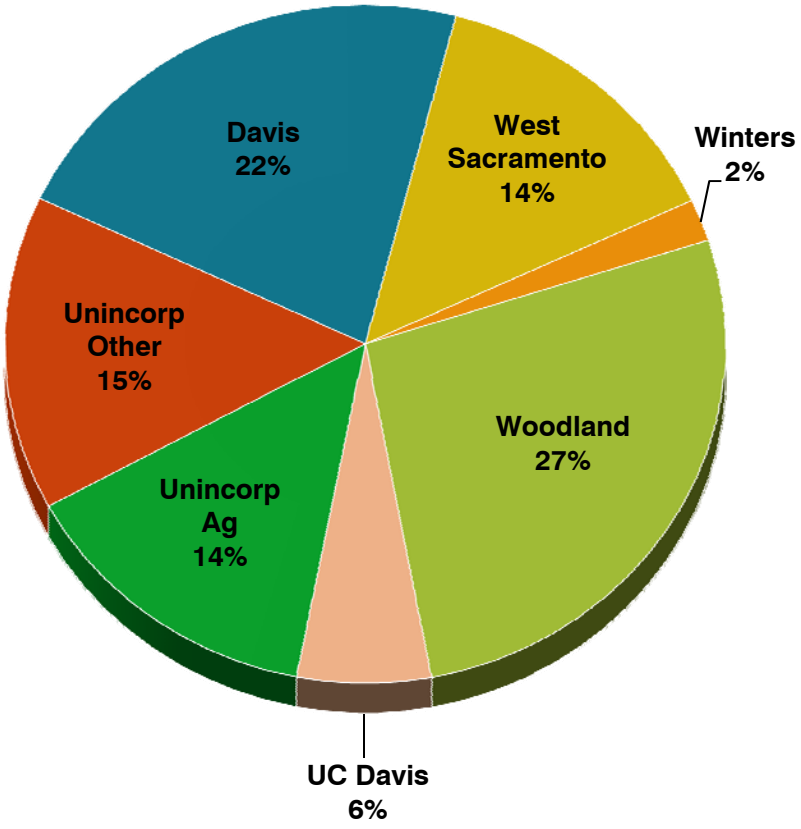
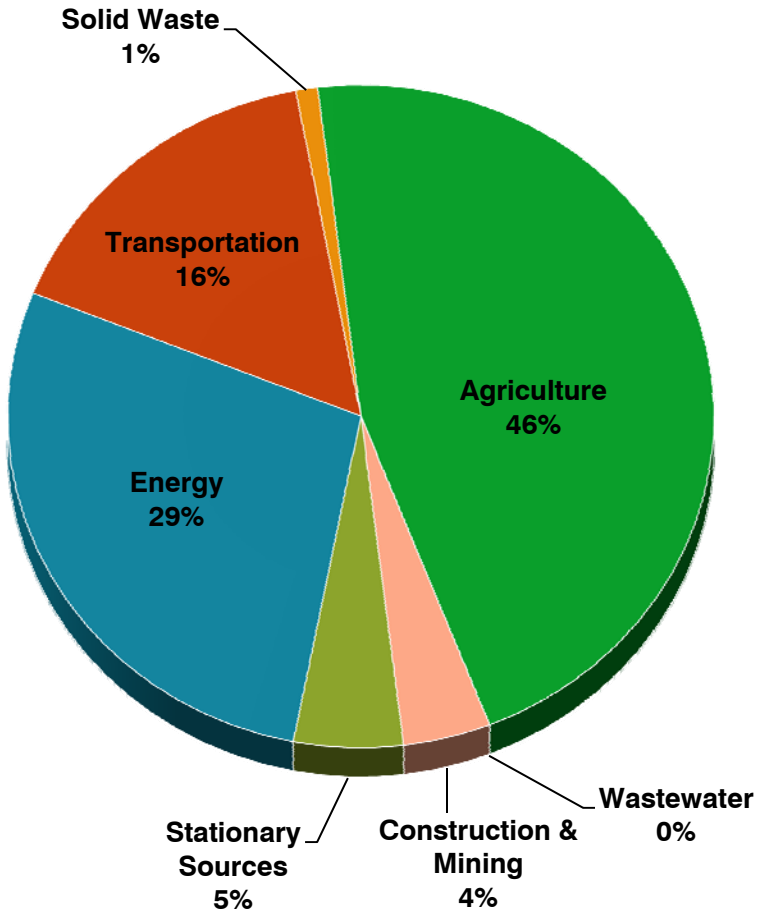


Figure ES-3: Unincorporated Greenhouse Gas Emissions by Sector in 2008

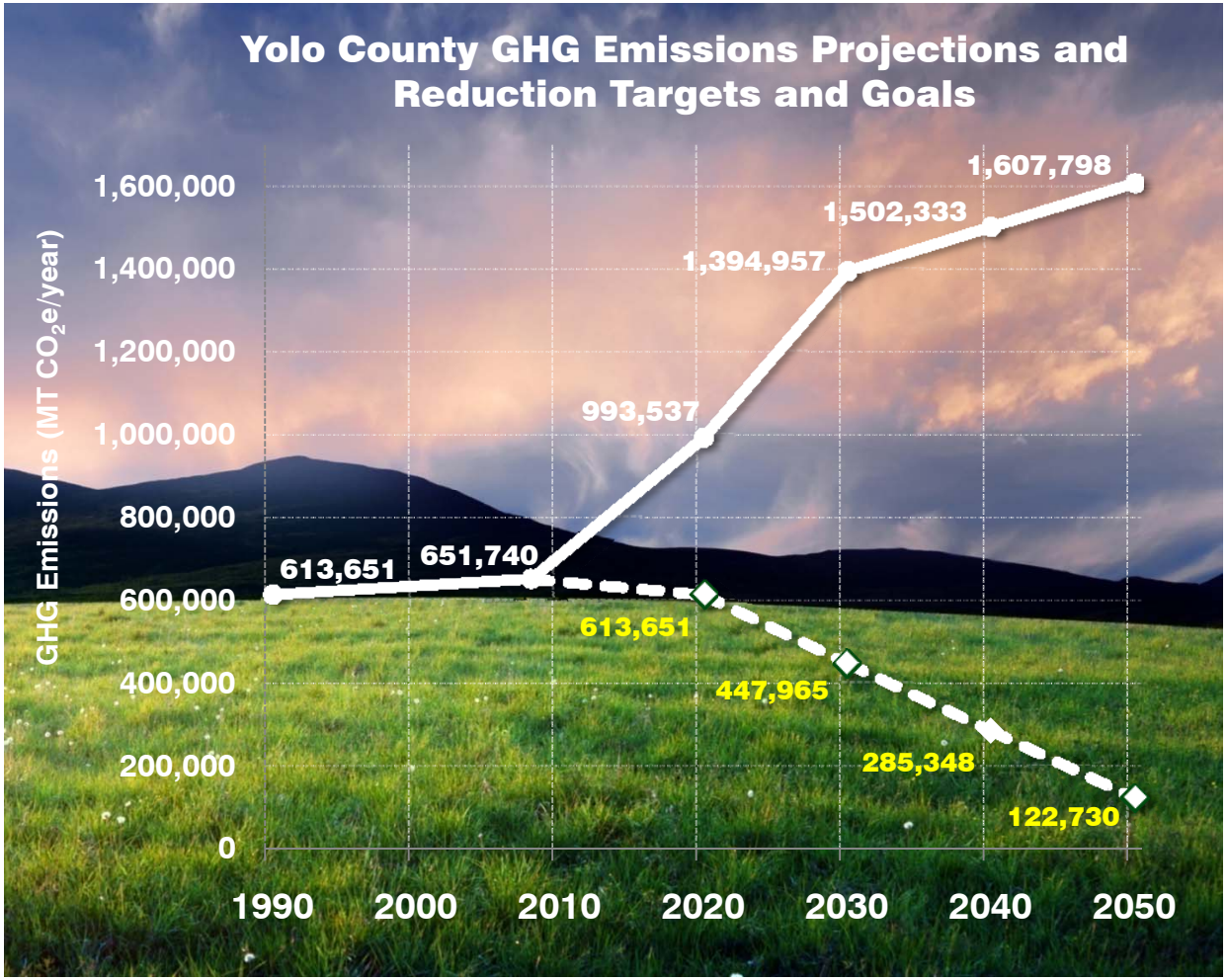



TIMELINE + TARGETS
1982
Yolo County adopts Energy Plan
1997
Kyoto Protocol
2006
California Global Warming Solutions Act (AB-32) adopted
2007
Yolo County signs Cool Counties Climate Stabilization Declaration
2009
Yolo County General Plan adopted
2010
Yolo County Establishes Energy Watch Partnership
2011
Yolo County Climate Action Plan adopted
2020
Yolo County GHG reduction target: 1990 levels
2030
Yolo County GHG reduction goal: 27% below 1990 levels
2050
Yolo County GHG reduction goal: 80% below 1990 levels

Emission Projections

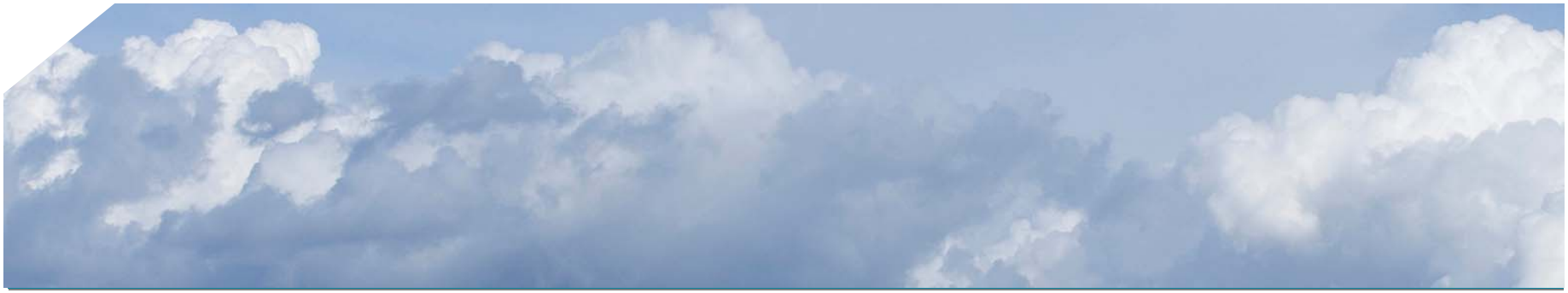
Emission projections estimate future emissions levels and provide insight regarding the scale of reductions necessary to achieve an emissions target. The County prepared projections for 2020, 2030, and 2050 based on population and employment growth forecasts. Projected jurisdictional emissions for unincorporated Yolo County (assuming no implementation of the CAP) would be as follows:

- 2020 – 62% higher than 1990 levels (993,537 MT CO_2e)
- 2030 – 127% higher than 1990 levels (1,394,957 MT CO_2e)
- 2040 – 145% higher than 1990 levels (1,502,333 MT CO_2e)
- 2050 – 162% higher than 1990 levels (1,607,798 MT CO_2e)



EMISSION REDUCTION GOALS

Yolo County has made considerable effort to select emission reduction targets and goals that are both ambitious and practical. Reaching these targets will contribute to



both California's GHG reduction goals and international climate protection efforts. Yolo County seeks to reduce GHG emissions to:

- 1990 levels by 2020 (mandatory target)
- 27% below 1990 levels by 2030 (goal)
- 53% below 1990 levels by 2040 (goal)
- 80% below 1990 levels by 2050 (goal)

The figure on page ix illustrates the difference in future GHG emissions levels for the unincorporated area of Yolo County, depending on whether or not the CAP is implemented. Between 1990 and 2008, the line showing total emissions rises gradually, reflecting the County's slow population growth during this period (0.05% annual increase on average).

Beginning with the adoption of the General Plan, however, the projected future emissions begin to climb rapidly, as growth planned in the Dunnigan and Madison Specific Plans, and in Esparto starts to build out. Without the CAP, this development would occur without increased building construction standards, without the expansion of solar technology, or without an emphasis on smart growth and alternative transportation. As a result, GHG emissions are projected to more than double by 2030.

With implementation of the CAP, total emissions begin to go down in 2008, even as Dunnigan, Madison, and Esparto expand. Homes and businesses will be built with higher insulation values, water conservation features, Energy Star appliances, solar water heaters, and photovoltaic systems. Communities will incorporate higher densities and mixed uses, with neighborhoods that are interconnected by pathways and complete streets. Between 2008 and 2030, the CAP will cut GHG emissions by about 30%, even as the unincorporated population more than doubles in size.

CAP REDUCTION POTENTIAL

The CAP contains 15 primary measures that will help the unincorporated area achieve GHG reductions and successfully adapt to climate change. To ensure implementation of these measures, specific action steps, performance targets, responsible parties, timeframes, and estimates of emission reduction potential are provided. The CAP also contains 19 supporting measures, which provide important climate protection benefits, but at the time of plan preparation, could not be counted toward reduction targets.

The CAP defines a mandatory 2020 reduction target, and 2030, 2040, and 2050 GHG reduction goals for unincorporated Yolo County. Estimates of GHG reduction potential in 2020 are important to demonstrate the County's contribution toward implementation of Assembly Bill (AB) 32 addressing climate protection requirements. The goals for 2030, 2040, and 2050 achieve the thresholds set by the Governor's Executive Order S-3-05, as well as the County's own commitment as detailed in the Cool Counties initiative. Table ES-1 shows the reduction potential by CAP strategy for 2020 and 2030. Table ES-2 identifies the specific actions the County will rely on to reduce GHG

By 2020, County actions combined with State and federal programs have the potential to reduce emissions in the unincorporated area by about 382,624 MT CO_2e/yr, or 0.4% below 1990 emission levels. By 2030, the reductions are expected to increase to 946,992 MT CO_2e/yr, or 27% below 1990 levels.

Table ES-1: GHG Reduction Strategies and Associated Reductions

Strategy	2020 (MT CO_2e/yr)	2030 (MT CO_2e/yr)
Agriculture Strategy	*29,603*	*104,010*
Transportation and Land Use Strategy	*42,018*	*84,035*
Building Energy Strategy	*180,425*	*283,033*
Solid Waste and Wastewater Strategy	*9,366*	*13,649*
Supporting Measures	*Not included in 2020 target*	*209,244*
State Level Reductions	*121,212*	*253,021*
TOTAL GHG REDUCTIONS	**382,624 0.4% below 1990 levels**	**946,992 27% below 1990 levels**

emissions, in descending order by reduction potential for 2020 and 2030.

2020 Reduction Potential

Table ES-1 shows that in 2020, State and federal legislation and implementation of the CAP measures have the potential to reduce emissions in the unincorporated area by about 382,624 MT CO_2e/yr, or 0.4% below 1990 emission levels. This level of reduction meets the County's established 2020 target and complies with recommended reduction levels for local governments.

2030 Reduction Potential

State and federal legislation combined with County actions have the potential to reduce emissions in the unincorporated area by 946,992 MT CO_2e/yr, or 27% below 1990 levels. This meets the County's 2030 goal and puts the County on a successful trajectory toward achieving the 2050 goal.

Reduction Strategies

The range of feasible and practical actions available to the County for reducing GHG emissions is fairly limited. Metropolitan areas that have allowed urban sprawl over the past several decades have very high GHG emissions, but they also have a greater array of options for reducing emissions through density, infill, mixed use development, improved energy conservation standards, public education, and alternative transportation. In contrast, Yolo County has historically followed a pattern of managed growth and agricultural/open space preservation.

Table ES-2: County Actions by 2020 (Primary Measures)

Performance Indicator	MT CO_2e/yr	Percent of Total
Community choice aggregation program results in 50% of county relying on 50% renewable, and 25% of county relying on 100% renewable	**117,285**	**45%**
100% of Dunnigan, 60% of Madison, 50% of Esparto, 33% of Elkhorn, and 25% of Knights Landing achieve 44 VMT	**42,018**	**16%**
Require 97.5% of new buildings (residential over 3,500 square feet [excluding affordable housing] and non-residential [after 2013]) to be 15% above Title 24 2% of new buildings (residential and non-residential) at 30% above Title 24 0.5% of new buildings (residential and non-residential) at zero-net energy consumption	**31,852**	**12%**
Require 90% of new (excluding affordable housing) and 5% of existing homes to have photovoltaic systems Require all new (after 2013) and 200,000 square feet of existing commercial to have photovoltaic systems Require 90% of new (excluding affordable housing) and 15% of existing residential units to install solar water heaters Require all new (after 2013) and 5% of existing commercial to install solar water heaters	**24,870**	**10%**
Reduce 90% of manure methane emissions from 100% of confined livestock	**12,370**	**5%**
Convert 40% of irrigation return pumps to solar electric energy and improve 10% of groundwater pumps to reduce energy 33%	**9,396**	**4%**
Landfill captures 90% of methane	**9,366**	**4%**
Reduce nitrogen application rates by 6%	**4,132**	**2%**
Retrofit 20% of residential units to reduce energy 15% Retrofit 10% of non-residential buildings to reduce energy 20%	**3,948**	**2%**
Restore 1,100 acres of riparian forest Establish 50 miles of new hedgerow Establish new orchards: 537 acres almonds, 446 acres walnuts, 1,340 acres olives	**2,527**	**1%**
Improve water fixture/fixture fitting efficiency by 15% in 100% of residential units built prior to 1994 Reduce water consumption by 6% through leak repair in 40% of existing residential units and commercial buildings	**2,103**	**1%**
5% of farm equipment improves fuel efficiency by 6% and 25% of farm equipment improves fuel efficiency by 5%	**1,142**	**<1%**
Generate 1MW of renewable energy on farms in unincorporated County (excluding solar water pumps)	**316**	**<1%**
Reduce landscape water consumption by 20% in 2% of residential units Reduce landscape water consumption by 20% in 5% of commercial buildings	**51**	**<1%**
Eliminate methyl bromide application	**36**	**<1%**
Total	**261,412**	**100%**

Table ES-2 Continued: County Actions by 2030 (Primary Measures)

Performance Indicator	MT CO_2e/yr	Percent of Total
Community choice aggregation program results in 75% of county relying on 50% renewable, and 25% of county relying on 100% renewable	**145,884**	**30%**
100% of Dunnigan, 60% of Madison, 50% of Esparto, 33% of Elkhorn, and 25% of Knights Landing achieve 44 VMT	**84,035**	**17%**
Require 86% of new buildings (residential over 3,500 square feet [excluding affordable housing] and non-residential [after 2013]) to be 15% above Title 24 12% of new buildings (residential and non-residential) at 30% above Title 24 2% of new buildings (residential and non-residential) at zero-net energy consumption	**67,200**	**14%**
Restore 2,000 acres of riparian forest Establish 100 miles of new hedgerow Establish new orchards: 1,146 acres almonds, 891 acres walnuts, 2,860 acres olives	**60,033**	**12%**
Require 100% of new (excluding affordable housing) and 10% of existing homes to have photovoltaic systems Require 100% of new (after 2013) and 300,000 square feet of existing commercial to have photovoltaic systems Require 100% of new (excluding affordable housing) and 40% of existing residential units to install solar water heaters Require 100% of new (after 2013) and 10% of existing commercial to install solar water heaters	**52,032**	**11%**
Convert 90% of irrigation return pumps to solar electric energy and improve 10% of groundwater pumps to reduce energy 33%	**18,949**	**4%**
Landfill captures 90% of methane	**13,649**	**3%**
Retrofit 70% of residential units to reduce energy 15% Retrofit 30% of non-residential buildings to reduce energy 20%	**12,322**	**3%**
Reduce 90% of manure methane emissions from 100% of confined livestock	**12,035**	**2%**
Reduce nitrogen application rates by 15%	**10,054**	**2%**
Improve water fixture/fixture fitting efficiency by 20% in 100% of residential units built prior to 1994	**4,100**	**1%**
5% of farm equipment improves fuel efficiency by 6% through operation and maintenance 75% of farm equipment improves fuel efficiency by 5% through improvements to equipment	**2,903**	**1%**
Reduce landscape water consumption by 20% in 25% of residential units Reduce landscape water consumption by 20% in 50% of commercial buildings	**862**	**<1%**
Generate 2MW of renewable energy on farms in unincorporated County (excluding solar water pumps)	**632**	**<1%**
Eliminate methyl bromide application	**36**	**<1%**
Total	**484,727**	**100%**

While this has resulted in a very small increase in GHG emissions since 1990 (only 6% over 18 years), it also leaves us with few opportunities for improvement, particularly for the dramatic decrease needed to comply with long-term targets to reduce emissions to 80% below 1990 levels by 2050.

With dispersed, low-density rural communities, significant reductions in the energy and transportation sectors are unachievable. Agriculture represents nearly half of the GHG output, but any large emission reductions would require extensive shifts in cropping patterns and operations that would have widespread economic impacts to the County's primary industry. As a result, the focus of the CAP's efforts is directed toward the building energy sector. Figure ES-4 demonstrates that energy conservation and alternative energy measures achieve the majority of the anticipated reductions in both 2020 (47%) and 2030 (30%). In particular, the Community Choice Aggregation program is the single most important measure in the CAP, accounting by itself for 31% of GHG reductions in 2020 and 15% in 2030.

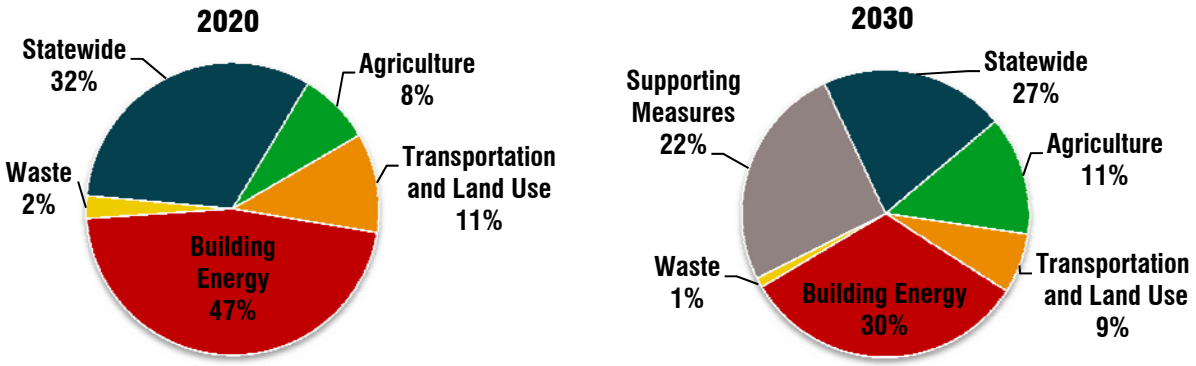
The smart growth policies contained throughout the General Plan including the VMT policy in the Circulation Element are expected to reduce vehicle emissions and provide approximately 11% of total reductions in 2020 and 9% in 2030.

The third largest source of GHG reductions (approximately 8% in 2020 and 11% in 2030) will occur within the agriculture sector. Measures that reduce use of nitrogen fertilizer, field equipment fuel consumption, and irrigation-related energy use provide the primary reductions.

The solid waste measure provides 2% of reductions in 2020 and approximately 1% in 2030 by increasing methane capture within the County landfill.

State and federal actions will provide about one-third of overall reductions in 2020, and more than one-quarter in 2030. Improving light and medium duty vehicle fuel efficiency, increasing use of lower carbon fuels, and implementing the renewable energy portfolio standard for utility electricity generation will provide most of these statewide reductions.

Figure ES-4: Greenhouse Gas Reductions by Strategy Area



Ensuring that the measures translate to on-the-ground results is critical to the success of the CAP. Each primary measure identifies responsible departments and specific actions the County will need to implement.

Supporting measures provide about 22% of total reductions in 2030.

ADAPTATION

Two types of responses to climate change are available: mitigation and adaptation. Most of the CAP addresses mitigation, or reducing GHG emissions to help limit future human activity-induced climate change. Adaptation (i.e., preparing for and managing risks associated with climate change) is addressed in a separate section. Anticipated climate change effects in Yolo County include temperature rise, change in precipitation patterns, impacted water resources, increased risk of wildfires, sea level rise in the Delta, and extreme weather events. There is a large scientific consensus about general categories of climate change effects and their likely consequences over continent-scale geography; however, understanding of the magnitude, timing and region-scale geographic effects and the interrelationships between them is still evolving.

Adaptation measures establish a basic framework for integrating climate change risk assessment and management into current planning processes, culminating in an adaptation planning framework to guide preparation for the effects of climate change in Yolo County. Measures address agriculture, water resources, sea level rise, and health risks. Where appropriate, strategies highlight GHG reduction measures that also address adaptation.

IMPLEMENTATION

Ensuring that the measures translate to on-the-ground results is critical to the success of the CAP. To facilitate this, each primary measure identifies responsible departments and specific actions the County will implement. Each primary measure also describes performance targets for both 2020 and 2030 that enable staff, the Board of Supervisors, and the public to monitor the effectiveness of each measure as well as the overall CAP. The identified County departments will be responsible for implementing assigned actions upon adoption of the CAP.

MONITORING

The CAP represents the County's best efforts to address the threat of global climate change through a well organized and comprehensive response within the unincorporated County. The CAP lays out a broad-based strategy to significantly reduce GHGs and improve sustainability. County staff will evaluate plan performance over time and make recommendations to alter or amend the plan if it is not achieving the proposed reduction targets. The Planning Division will monitor overall CAP effectiveness and report to the Board of Supervisors every two years beginning in 2013, to ensure that emission reduction targets are being met. Updates to the inventories will occur every five years, beginning in 2015.

The County will amend the General Plan to incorporate key components of this CAP and its measures and actions by reference. As a part of the General Plan, the CAP will become a fundamental consideration in land use decisions. However, by adopting the CAP as a stand-alone implementation document, it will retain the flexibility needed to respond to changing circumstances.