PLACEWORKS

MEMORANDUM

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TO Jody London, Sustainability Coordinator, Contra Costa County

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SUBJECT Climate Action Plan Update – Summary of updates to GHG emissions inventory, forecasts, state reduction actions, and reduction targets

This memo summarizes the results of the updated 2017 greenhouse gas (GHG) emissions inventory, emissions forecasts, assessment of state GHG emissions reduction activities, and reduction targets. This work is prepared as part of the existing conditions analysis for the Contra Costa County General Plan Update, and it will support an update to the Climate Action Plan (CAP).

Greenhouse Gas Emissions Inventory

The first step to preparing an updated CAP is to prepare an updated GHG inventory, which is a measurement of the GHG emissions that are attributed to the unincorporated areas of Contra Costa County. The inventory identifies the major sources of the community's emissions and establishes a foundation for the forecast and other climate action planning activities. Contra Costa County's adopted CAP includes a 2005 (baseline) inventory, which sets the "starting conditions" for measuring GHG emission changes, and a 2013 (interim) inventory, which shows how emissions have changed since the baseline year. For the CAP update, the team has prepared a second interim inventory for 2017, which is the most recent calendar year with available data.

The 2017 GHG inventory identifies emissions from the following sources, or sectors, in the unincorporated areas of Contra Costa County:

- Residential energy: Electricity (both PG&E and MCE) and heating fuels (natural gas, propane, kerosene, and wood) used in residential buildings
- Nonresidential energy: Electricity and heating fuels used in nonresidential buildings, including offices, retail stores and restaurants, industrial sites, and government and institutional facilities.
- Solid waste: Waste thrown away by community members.
- Landfill: Waste that has accumulated in landfills.
- On-road transportation: Personal and commercial on-road vehicle trips.
- BART: Energy use from BART trips taken by community members.
- Off-road equipment: Fuel use from equipment and vehicles not used for on-road transportation, such as construction vehicles or landscaping equipment.
- Water and wastewater: Energy used to transport and treat water and wastewater, and direct emissions associated with wastewater treatment.
- Agriculture: Fertilizer use for crops, fuel use for agricultural equipment, and activities associated with raising livestock.

This inventory also includes stationary sources, which are large, non-mobile sources of GHG emissions such as power plants, oil refineries, manufacturing sites, and other large industrial facilities. While these emissions occur within the unincorporated areas of Contra Costa County, local government has little control over these facilities once they are constructed. Instead, these emissions are regulated at the state level by the California Air Resources Board (CARB) through programs such as the state's cap and trade program. The Bay Area Air Quality Management District (BAAQMD) also regulates these facilities by issuing permits and enforcing air quality standards. The inventory reports the emissions from these sources, but does not include them in the total, and these emissions do not affect projections of future emissions or GHG reduction targets. Consistent with community GHG inventory protocol, these sources are called "informational sources", because they are reported but excluded from the community-wide inventory as they do not affect Contra Costa County's local climate action efforts. This allows the CAP update to focus on local GHG emission sources that the County can influence more directly. The CAPs of many other communities with large industrial facilities, such as the City of Richmond, the City of Benicia, the City of Torrance, and the City of Santa Clara, similarly exclude the emissions from these sites.

The 2017 inventory mostly follows the same methods as used in the 2005 and 2013 inventories to allow for a more accurate comparison with previous years. Changes have been made to the methods to account for new best practices, and for data that are currently available but may not have been in 2015 when the adopted CAP was prepared. These changes include:

- Adding emissions from burning propane, kerosene, and wood as a residential home heating fuel.
- Modeling off-road equipment emissions using updated software.
- Using new data on BART ridership that allows emissions to be assigned based on the communities where riders originate, rather than the communities where the stations are located.
- Adding emissions from landfill flaring.

The 2017 inventory, along with previous year inventories, follows the guidance in the *U.S. Community Protocol for the Accounting and Reporting of Greenhouse Gas Emissions*, which the Governor's Office of Planning and Research recommends for community-wide GHG inventories in California.

Excluding the stationary sources, on-road transportation is the largest source of unincorporated Contra Costa County's 2017 GHG emissions, accounting for almost half (47%) of the inventoried emissions. Residential energy is the next largest source of emissions (22%), followed by landfill emissions (17%). These three sectors collectively account for approximately 86% of Contra Costa County's emissions. The other sectors are nonresidential energy (6%), agriculture (4%), solid waste (2%), off-road equipment (2%), water and wastewater (less than 1%), and BART (less than 1%).

Due to its interpretation of state privacy regulations, PG&E has not released most of the nonresidential energy use data, particularly energy use associated with large facilities. Based on previously-released data, the PlaceWorks team estimates that approximately 60% of nonresidential electricity use and at least 95% of nonresidential natural gas use is not included in the data provided by PG&E. This is a challenge for many communities in the region, and this year the East Bay Energy Watch plans to explore ways to estimate these missing data in a regionally

consistent way. As an interim measure, the PlaceWorks team has used the nonresidential electricity and natural gas use numbers from 2013 as a proxy for 2017 data. The 2013 data were the last set of information before PG&E changed its interpretation of state privacy regulations, and so there is greater confidence in the accuracy of the data.

Table 1 shows the GHG emissions for unincorporated Contra Costa County by sector. All emissions are measured in metric tons of carbon dioxide equivalent ($MTCO_2e$), a standard unit of measurement in climate planning. The 2017 GHG emissions are lower than the 2005 and 2013 emissions reported in the adopted CAP. Table 2 shows the 2017 emissions compared to those from previous years.

Table 1: Unincorporated Contra Costa County 2017 GHG Emissions

SECTOR	2017 $MTCO_2E$	PERCENT OF TOTAL
Residential energy	252,730	21%
Nonresidential energy	122,040 *	10%
Solid waste	25,570	2%
Landfill	197,710	16%
On-road transportation	550,490	45%
BART	1,350	<1%
Off-road equipment	17,580	1%
Water and wastewater	5,690	<1%
Agriculture	46,180	4%
Total	1,219,340	100%
Stationary sources (informational)	*17,889,770*	-

* 2013 nonresidential electricity and natural gas data is used as a proxy.

Table 2: Unincorporated Contra Costa County GHG Emissions – 2005, 2013, and 2017

Sector	2005 $MTCO_2E$	2013 $MTCO_2E$	2017 $MTCO_2E$	Percent Change, 2005 - 2017
Residential energy	274,690	258,420	252,730	-8%
Nonresidential energy	118,740	125,350	122,040*	3%
Solid waste	48,450	26,540	25,570	-47%
Landfill	193,950	196,500	197,710	2%
On-road transportation	628,200	651,130	550,490	-12%
BART	2,300	2,680	1,350	-41%
Off-road equipment	71,880	66,230	17,580	-76%
Water and wastewater	8,080	7,400	5,690	-30%
Agriculture	57,320	58,200	46,180	-19%
Total	**1,403,610**	**1,392,450**	**1,219,340**	**-13%**
Stationary sources (informational)	*17,327,030*	*16,900,060*	*17,889,770*	*28%*

* 2013 nonresidential electricity and natural gas data is used as a proxy.

Most sectors showed significant decreases in GHG emissions from 2005 levels, due to several factors:

- Nonresidential energy emissions are based on current emissions factors and 2013 nonresidential electricity and natural gas use numbers as a proxy for 2017 data. PG&E's increased its use of renewable energy resources in 2017 compared to 2005 and 2013 which resulted in a small decrease in associated GHG emissions since 2005.
- On-road transportation emissions declined due to improved vehicle fuel efficiency, although total vehicle miles traveled have increased.
- BART emissions declined due to changes in how BART trips are attributed to individual communities, although overall BART ridership has increased.
- Off-road equipment emissions have fallen in large part because the 2017 inventory estimated these emissions using updated CARB software, and the updated software calculates emissions at a lower rate than the previous version. This also accounts for the decline in agricultural emissions, as the agriculture sector includes agricultural off-road equipment.
- Community members are producing less trash and using less water, causing declines in the solid waste and water and wastewater sectors.

The on-road transportation emissions are based on the data modeled as part of the 2015 CAP, updated for 2017. As part of the General Plan update, the PlaceWorks team will prepare traffic data that uses more updated models. The inventory will be revised to use these new traffic data when they become available.

Greenhouse Gas Emissions Forecast

After completing the GHG inventory, the next step in preparing the CAP update is to project future GHG emissions, called a forecast, for the calendar years 2020, 2030, and 2050. The forecast shows how unincorporated Contra Costa County's GHG emissions are expected to change, assuming there is no action taken to reduce emissions and all changes in emissions are due to changes in the community's demographics. This approach is sometimes called a Business as Usual (BAU) forecast. The forecast uses unincorporated Contra Costa County's 2017 demographics as reported by the California Department of Finance and estimates of future demographics as projected by the Association of Bay Area Governments (ABAG). These are the same demographic indicators being used throughout the Envision Contra Costs 2040 General Plan update. Table 3 shows the demographic indicators used in the forecast.

Table 3: Unincorporated Contra Costa County Demographic Indicators, 2017 – 2050

Demographic Indicator	2017	2020	2030	2050	Sources
Population	172,080	169,380	184,590	214,770	CA Department of Finance and ABAG
Households	59,760	59,480	64,200	71,330	CA Department of Finance and ABAG
Jobs	37,910	38,460	39,900	42,320	US Census and ABAG
Service population *	209,990	207,840	224,490	257,090	
** Service population is the number of residents plus the number of jobs.*					

If no action is taken, unincorporated Contra Costa County's GHG emissions are forecasted to increase by approximately 11 percent by 2050 relative to 2017 emission levels. The forecast assumes that each person in the unincorporated area will continue to contribute the same amount of GHGs in future years as they did in 2017, so the level of GHG emissions changes in proportion to the amount of demographic change. The one exception is the off-road equipment sector, which is driven in part by the rate of new housing construction.

The forecasted decrease in the residential and nonresidential energy sectors is due to MCE, which provided a very limited amount of electricity to the community in 2017 but became much more widespread in 2018. During MCE's 2017-2018 enrollment period, most electricity customers in the unincorporated areas of Contra Costa County switched from PG&E to MCE, and the forecast assumes full implementation of MCE throughout the community (except for the approximately 10 percent of customers who opted to remain with PG&E). As electricity from MCE is significantly less carbon-intensive than electricity from PG&E, emissions associated with electricity (and by extension the energy sectors) are lower in future years than in 2017. The decrease in off-road equipment emissions is due to a projected decrease in the rate of new construction. Agricultural emissions are kept constant, as agricultural activities and resulting emissions are driven by market forces that are difficult to feasibly predict in the long term.

This is a draft forecast, meant to help inform early discussions of the CAP update and existing conditions reports for the General Plan update. PlaceWorks will revise the forecasts when updated VMT, land use, and demographic projections become available later in the planning process.

Table 4 shows unincorporated Contra Costa County's forecasted community-wide GHG emissions.

Table 4: Unincorporated Contra Costa County Business-as-Usual GHG Emissions Forecast, 2017 – 2050

Sector	2017 $MTCO_2E$	2020 $MTCO_2E$	2030 $MTCO_2E$	2050 $MTCO_2E$	Percent Change, 2017 – 2050
Residential energy	252,730	202,550	218,630	242,900	-3%
Nonresidential energy	122,040*	95,030	98,580	104,570	-28%
Solid waste	25,570	25,310	27,330	31,310	22%
Landfill	197,710	200,560	203,170	222,570	13%
On-road transportation	550,490	544,850	588,500	673,960	22%
BART	1,350	1,340	1,440	1,650	22%
Off-road equipment	17,580	11,260	15,990	16,700	-5%
Water and wastewater	5,690	5,640	6,080	6,970	22%
Agriculture	46,180	46,180	46,180	46,180	0%
Total	**1,219,340**	**1,132,720**	**1,205,900**	**1,346,810**	**10%**

* 2013 nonresidential electricity and natural gas data is used as a proxy.

Notes: The forecast includes customers who have switched from PG&E to MCE once community-wide enrollment began in April of 2018. It also assumes MCE's opt-out rate does not change and that MCE's energy sources are consistent.

Due to rounding, totals may not equal the sum of the individual numbers.

State GHG Emissions Reductions

The State has adopted and implemented policies and programs that decrease GHG emissions from several different sectors. Many of these policies are included in the State's Scoping Plan, which was first adopted in 2008 by CARB in response to the California Global Warming Solutions Act of 2006 (also called AB 32). The Scoping Plan presents regulatory and market-based solutions to achieve California's GHG reduction goals. CARB adopted updates to the Scoping Plan in 2014 and 2017, which contain revisions to these state policies and identify additional opportunities to reduce GHG emissions. The 2017 Update includes actions to achieve the State's 2030 GHG reduction goal adopted by SB 32.

While there are numerous policies, programs, and projects to reduce statewide GHG emissions, the adopted CAP focuses on those that have the most direct and apparent benefit to unincorporated Contra Costa County. The updated CAP will continue this approach. The

PlaceWorks team has identified four state efforts that have direct local benefits that Contra Costa County can receive "credit" for in the CAP. These four actions are:

- The Renewables Portfolio Standard (RPS), which mandates a minimum percent of electricity from renewable and carbon-free sources.
- Clean Car Standards, which increase the fuel efficiency of new vehicles and decreases the carbon intensity of vehicle fuels. This includes a forecasted increase in the adoption of electric vehicles.
- Improvements to the Title 24 standards that require new buildings to be more energy efficient, and in some cases to include renewable energy systems.
- The Low Carbon Fuel Standard (LCFS), which reduces the carbon intensity of fuels used in off-road equipment.

The Clean Car Standards have the largest GHG reduction benefit of any of the state actions as cars in the unincorporated areas of Contra Costa County are replaced with zero-emission or more fuel-efficient models. The RPS savings are relatively small at first because PG&E and MCE have already made progress in meeting their short- and mid-term goals, but there is greater long-term reduction potential after RPS mandates carbon-free electricity by 2045. The Title 24 standards, which strengthen energy efficiency standards every three years and will work toward new buildings being zero-net energy for electricity, contribute meaningfully toward mid- and long-term reductions. The LCFS also has a substantive impact in reducing off-road equipment emissions. Table 5 shows the GHG reductions from these state actions and their contribution toward reducing the County's total GHG emissions.

Table 5: GHG Reductions from State Actions, 2017 – 2050

	2017 $MTCO_2E$	2020 $MTCO_2E$	2030 $MTCO_2E$	2050 $MTCO_2E$	Percent Change 2017 to 2050
Community emissions without state actions	1,219,340	1,132,720	1,205,900	1,346,810	10%
Reductions from RPS	-	180	5,230	69,880	-
Reductions from clean car standards	-	42,080	177,040	261,420	-
Reductions from Title 24	-	0	7,880	21,300	-
Reductions from LCFS (off-road only)	-	830	1,190	1,230	-
Reductions from all state actions	**-**	**43,100**	**191,340**	**353,830**	**-**
Community emissions with state actions	**1,219,340**	**1,090,450**	**1,015,750**	**994,210**	**-18%**
Note: Due to rounding, totals may not equal the sum of the individual numbers.					

GHG Reduction Targets

Contra Costa County's currently adopted CAP establishes GHG reduction goals for the community:

- 15 percent below 2005 levels by 2020, and
- 50 percent below the 2020 target by 2035.

The 2020 target is consistent with AB 32 and CARB's guidance. The 2035 target is consistent with the executive orders that were in place at the time the CAP was adopted. These executive orders established a goal of 40 percent below the 2020 target by 2030, and 80 percent below the 2020 target by 2050. Since the CAP was adopted, the 2030 target of 40 percent below the 2020 target has been formally codified into state law. The targets in the adopted CAP remain consistent with state law. The updated CAP can convert the 2035 target to a 2030 one for better alignment with state and regional efforts and can identify a 2050 target as a long-term GHG reduction goal.

The California 2017 Climate Change Scoping Plan presents how the state will achieve the 2030 target and recommends that local governments adopt per-capita targets of 6.0 $MTCO_2e$ per person by 2030 and 2.0 $MTCO_2e$ by 2050. Communities can use percent reduction or per-capita targets or adopt both. Table 6 shows the percent reduction targets compared to unincorporated Contra Costa County's forecasted GHG emissions with the benefit of state actions. Table 7 shows the per-capita targets compared to Contra Costa County's projected emissions.

Table 6: GHG Reduction Targets (Percent Reduction), 2020 – 2050Targets

	2020 $MTCO_2E$	2030 $MTCO_2E$	2050 $MTCO_2E$
Forecasted emissions with existing State actions	1,090,450	1,015,750	994,210
Updated percent reduction targets consistent with State targets	1,193,070	715,840	238,610
Remaining emissions to reduce	**-**	**299,910**	**755,600**

Table 7: GHG Reduction Targets (Per-Capita), 2020 – 2050

TARGETS	2020 $MTCO_2E$	2030 $MTCO_2E$	2050 $MTCO_2E$
Forecasted per-capita emissions with existing State actions	6.4	5.5	4.6
Updated per-capita targets consistent with State targets	-	6.0	2.0
Remaining per-capita emissions to reduce	**-**	**-**	**2.6**

Regardless of which set of targets the County includes in the updated CAP, Contra Costa County will need to reduce its remaining GHG emission to meet the 2030 and 2050 targets. The County can revise and combine existing measures in the adopted CAP to increase participation and incorporate new best practices, and add new measures to address reductions that were not considered in the adopted CAP.

The next step will be to identify the GHG reductions from existing and planned local and regional efforts. These actions will help close the gap between Contra Costa County's projected GHG emissions and targets and will serve as a foundation for new measure development.