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## Memorandum

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Date: August 3, 2010  
To: Anna Lowe, County of San Diego, Advanced Planning, DPLU  
From: John Bridges, Principal, [john.bridges@aecom.com](mailto:john.bridges@aecom.com)  
Subject: County Draft Climate Action Plan Review – Tasks 1 and 2

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Distribution: Anna Lowe

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### Introduction

AECOM has completed a peer review of the San Diego County April 2010 Draft Climate Action Plan (CAP). The purpose of the review is to ensure the Draft CAP contains industry best practices and conforms to guidance provided by the State of California. The scope of the review covers two primary tasks: (1) a review of the content and structure of the Draft CAP; and (2) a review of the methodologies and assumptions used to establish the emission inventories and forecasts, and to quantify the greenhouse gas (GHG) emission reductions potential of CAP measures.

The state of the art in preparing climate action plans is evolving, and while the Draft CAP provides a foundation of work that can be built upon, the County may wish to include additional components that are found within leading climate action plans and/or encouraged by State agencies. A second consideration regards the defensibility or quality of the methodologies used in GHG emission reduction quantification for the draft measures. These considerations are described in detail in the following sections.

### TASK 1: Review of Climate Action Plan Content and Structure

In reviewing the County's Draft CAP, AECOM used its extensive experience in preparing climate action plans within California and across the nation, its knowledge of State agency protocols and guidance, and its knowledge of best practices from leading climate action plans implemented around the world. Using this experience, AECOM examined the content and structure of the Draft CAP. Overall, the current draft provides a large amount of valuable information that will be useful for the completion of the CAP. AECOM does, however, recommend a number of additions and revisions to the Draft CAP that will increase the quality and defensibility of the plan. The recommended additions and revisions are described below.

***Addition of Language Describing State Legislation and Recommendations***

The Draft CAP does not discuss California's legislative and regulatory approach to addressing climate change. The document should describe, at a minimum, the requirements of Assembly Bill (AB) 32, Executive Order (EO) S-3-05, Senate Bill (SB) 97, SB 375 and guidance from the State Attorney General's office and Air Resources Board. The document should provide specific discussion regarding how the legislation and regulations relate to the development of climate action plans and how the County is conforming to these requirements. The CAP should also address any relevant local or regional regulations.

***Revised Discussion of Emission Forecast and Targets***

As presented, the discussion of the GHG emission forecasts and targets is comingled and incomplete. The forecast and target discussions should be separated into distinct sections. Additionally government operation forecasts and targets should be described separately from community emissions forecasts and targets. The discussion of growth factors used to project future year emissions appears incomplete, in that the growth factor of expected increase in energy consumption is not mentioned.

***Revisions to Community GHG Emissions Reduction Target***

The Draft CAP identifies two reduction targets for community emissions, 9% below 2005 baseline emission levels by 2020 and 80% below 1990 levels by 2050. AECOM recommends the County revise its 2020 community target to strive to achieve a reduction of 15% or greater. The State has provided guidance that a jurisdiction's GHG reduction target should conform with and contribute to the State's overall GHG reduction efforts. The Climate Change Scoping Plan recommends that local jurisdictions reduce emissions to 15% below baseline by 2020. Recently, the Bay Area Air Quality Management District (BAAQMD) reiterated this level of reduction when it established its CEQA Threshold Guidelines. The Guidelines identify a 15% reduction in mass emissions as the minimum acceptable level of reduction for a plan not to be cumulatively considerable. While San Diego County is not located within the jurisdiction of BAAQMD, it is expected that other air quality districts will adopt similar CEQA thresholds in the near future.

The County's 2050 community target was developed to conform with the reduction goals of Executive Order S-3-05, which calls on the State to reduce GHG emission to 80% below 1990 levels by 2050. While 1990 is used as the target year in the Executive Order, AECOM also recommends that the County revise its 2050 community reduction target to utilize 2005 as the benchmark year due to challenges that would exist if 1990 were used. The rationale behind this recommendation is that the existing 1990 emissions inventory, developed by the Energy Policy Initiatives Center (EPIC) uses a different methodology than was used in the preparation of the 2005 baseline inventory, prepared by the International Council for Local Environmental Initiatives (ICLEI). The different methodologies prevent meaningful comparisons of emissions levels in the two inventories. If the 2020 target is based on the 2005 inventory and corresponding methodology, then the 2050 target should use the same benchmark. Furthermore, development of a robust 1990 inventory would be a challenging and costly endeavor. The County should adjust the targeted level of reductions to maintain conformance with the goals of EO S-3-05.

The same change to benchmark year and reduction level should be made to the 2050 government operations target. The 2020 government operations reductions target is sufficient in its current form.

The existing reduction targets contained in the Draft CAP are also contained within the County's draft General Plan. Should the County choose to modify its reduction targets as recommended above, the targets identified in the Draft General Plan should also be revised.

***Addition of Language Describing the Role of Statewide Reductions***

The Draft CAP does not address the potential of State legislation to reduce the County's GHG emissions, nor does it address the dampening effect the statewide reductions will have on the GHG reduction potential of the County's measures. To implement AB 32, the State of California has established companion legislation that will reduce statewide generation of GHG emissions. AB 1493 mandates increases in vehicle fuel efficiency. EO S-1-07 establishes performance standards that will reduce the carbon intensity of transportation fuels. SB 107 requires utilities to increase the percentage of renewable energy generation within their electricity generation portfolios. These State initiatives and others will reduce GHG emission generation within San Diego County. The CAP should describe the reduction potential of these actions.

The State actions will have a dampening effect on the GHG reduction potential of the transportation and building energy measures contained within the Draft CAP. The CAP should analyze the impact of statewide reductions on the County's reduction measures.

***Addition of Language Describing Plan Implementation***

The Draft CAP does not provide sufficient detail regarding how the County will implement its GHG reduction measures. Ensuring that the recommended measures translate to on-the-ground results is critical to the success of a climate action plan. For each measure, the County should identify performance targets and a list of specific actions that will implement the measure over the planning horizon. The plan should define an implementation timeframe and a responsible department/agency for each action.

AECOM recommends that the CAP provide the measure action steps, performance targets, timeframes, and responsible in a format that will facilitate effective implementation by County staff. This information could be provided in tables within each measure description or in a master implementation matrix.

***Addition of Language Describing Plan Monitoring and Plan Evolution***

The Draft CAP neglects to describe how the County will monitor the effectiveness of the plan and its component measures over time. The plan should describe a method to evaluate GHG emission levels at regular intervals (e.g., every three years) during the implementation period. These inventories will provide important feedback regarding emissions levels and overall CAP effectiveness. The plan should also describe a method to evaluate the performance of the individual measures. AECOM recommends that all measures contain progress indicators and performance targets that staff, the Board of Supervisors, and the public can use to track measure implementation and monitor progress.

The CAP should also add a section that describes how the planning process will evolve over time. The section should identify how the CAP will adapt if future inventories indicate that the County is not achieving its reduction target. The section should also identify how the plan will incorporate new information on climate change science, new GHG reduction technologies, new financing options, and advances in State and federal legislation.

***Addition of Summary Table***

In its current form, the Draft CAP does not provide a concise summary of proposed measures. The reader has to read through the entire document to understand the content of the plan. AECOM recommends that that CAP provide a table of all measures and their corresponding GHG reduction potential. If the County chooses to create action steps and performance targets for each measure, then these should also be provided with in the table. AECOM has found that summary tables facilitate the public's and policy makers' comprehension of plan content.

***Revision and Addition of Graphics***

Graphs, maps, and other graphics can increase a reader's comprehension of a climate action plan's content. Some of the existing graphics contained in the Draft CAP are unclear. AECOM recommends that the County revise a number of the existing graphics (i.e., emissions forecast and target) and add additional graphics to increase reader comprehension of the plan.

***Revision of Appendices***

In their current form, the appendices are incomplete and hard to understand. Text narrative should be added to facilitate the readers comprehension of methodologies used for establishing the GHG inventory and projections and quantifying the reduction measures.

**TASK 2A: GHG Emission Inventories and Forecasts**

AECOM understands that ICLEI developed the 2005 GHG emissions inventory and forecasts. As a standard practice, AECOM typically adds to and refines some analyses contained in the ICLEI inventories. AECOM reviewed the baseline and projected GHG inventory in order to understand the quantification methods and sources used to develop the basis of the Draft CAP. Following the review of the GHG inventory and methods, AECOM has some comments and questions as they relate to the inventory and reduction measures. The comments have been organized by emission sector.

***Transportation***

AECOM proposes a variety of revisions to the transportation sector inventory and forecasts. These are described individually below.

- The baseline inventory appears to include state highway vehicle trips that neither originate nor terminate within the unincorporated areas of the County (pass-through trips) in the total of vehicle miles traveled (VMT) used to establish the on-road transportation emissions. AECOM recommends that these pass-through trips be

removed from the inventory as the CAP will have no ability to affect these trips or their emissions. This change should also be reflected in future year forecasts.

- The baseline inventory does not present the emissions for the on-road emissions. AECOM would like to confirm that EMFAC2007 and San Diego County was used to quantify on-road transportation emissions.
- The projected on-road transportation emissions were calculated using projected VMT growth from San Diego Regional Planning Agency's (SANDAG) transportation model. AECOM agrees that VMT is appropriately projected using SANDAG data. However, EMFAC2007 contains projected 2020 emission factors, which reflect business-as-usual vehicle turnover that could be used to calculate business-as-usual emissions. The method currently employed for projections could overestimate 2020 transportation emissions and overestimate emission reductions by assuming the current vehicle fleet composition remains static.
- The on-road transportation sector does not include calculations for nitrous oxide (N<sub>2</sub>O), which has a global warming potential of 310. AECOM believes that for consistency purposes, the N<sub>2</sub>O emission should be added with methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>) to calculate carbon dioxide equivalent emissions (CO<sub>2</sub>e).
- It should be noted that the off-road transportation sector was calculated using a top-down approach, which varies from the method used for the energy and on-road emission sectors. Although AECOM agrees that this top-down approach is the most accurate method to obtain off-road transportation emissions attributable to the County; this distinction should be acknowledged for planning purposes.

***Solid Waste***

The solid waste sector is comprised of the fugitive CH<sub>4</sub> emissions associated with County landfills. No emissions have been quantified for flaring of captured methane or CO<sub>2</sub> decomposition emissions. AECOM acknowledges that fugitive CH<sub>4</sub> are a bulk of the solid waste emissions.

***Wastewater***

The wastewater emission sector was quantified using a top-down approach from County-wide emissions. AECOM believes that a bottom-up quantification of wastewater emissions is possible given that the required data sources are available from wastewater treatment facilities. AECOM recommends further investigation into the potential for a bottom-up quantification.

***Potable Water***

The baseline and projected inventory do not describe emissions resulting from the conveyance, treatment and delivery of potable water. AECOM believes that because potable water is a scarce and an energy intensive resource in San Diego County, this sector should be developed in order to apply and implement emission reduction measures. Water conservation and reduction measures should be a section of the CAP.

## ***Fire and Agriculture***

The fire and agriculture sector appears to include biogenic emissions from wildfires. The combustion of biomass and biomass-based fuels emit CO<sub>2</sub> emissions, but these CO<sub>2</sub> emissions are distinct from Scope 1 emissions generated by combusting fossil fuels. Because of this biogenic origin, IPCC guidelines direct inventories to separate these biogenic emissions from Scope 1 emissions. AECOM recommends removing the fire-related emissions from the County's inventory. The Draft CAP reports agriculture-related emissions as they were quantified in the EPIC inventory. AECOM cannot comment on the methodology used in the EPIC inventory, as it was not available at the time of this review. AECOM recommends further review of these methods. Experienced gained in working in agricultural communities leads us to recommend that the County develop a bottom-up inventory to determine the extent of agriculture-related emissions in the unincorporated areas.

## ***Growth Factors Used in Forecasts***

The forecast methodology does not appear to utilize a growth factor for energy consumption.

## **Task 2B - GHG Emission Reduction Quantification**

AECOM performed a review of the methodologies and assumptions used to quantify the greenhouse gas (GHG) emission reductions potential of CAP measures. During this process, the review team encountered issues regarding the methodologies and assumptions used within the plan. A summary of the primary issues is provided as well as detailed critiques of specific calculations, methodologies and assumptions.

### **Summary of Quantification Issues**

AECOM identified six primary categories of issues found with the quantification of the Draft CAP measures. These include the following:

- **Emission Factors:** In some measures, the quantification calculations utilize emissions factors that are different from those used in the GHG inventory. An example of this occurs in energy sector measures where the inventory uses San Diego Gas and Electric (SDG&E)-specific emissions factors for residential, commercial, and industrial activities, but the reduction calculations use Energy Information Administration (EIA) factors (see Community Energy – General Comment).
- **Data Source:** Many of spreadsheets did not contain adequate information about the sources of information, data, or assumptions used in the GHG reduction calculations. This prevented a more thorough review.
- **Assumptions:** In some calculations, the review team encountered assumptions that varied considerably from assumptions found in peer reviewed literature or that are available from leading organizations and agencies (i.e., ICLEI, US EPA, US DOE, CEC, etc).

- **Equation Logic:** A small number of measures contained equations that appear to be over simplified (i.e., CE-2.3 Urban Albedo Increase).
- **Errors:** In a few calculations, there were mathematical errors that caused the GHG reduction estimates to be inaccurate.
- **Double Counting:** Some measures need to be refined to avoid double counting with the reductions created by other measures.

Additionally, the Draft CAP estimates the GHG reduction potential of measure for 2020 and 2050. AECOM believes that estimating GHG reductions in 2050 is too speculative as changes in emission factors, technologies, community conditions, and other factors could considerably change and alter the reduction potential. For this reason, AECOM would recommend excluding 2050 GHG emission reduction estimates.

### **Analysis of Individual Measures**

AECOM examined the methodology and assumptions used to quantify each measure. Only measures containing potential issues are discussed in this section. A description of the issue encountered is provided. A summary of the formula used and the equation variables are provided for the readers reference and understanding of the equation.

## ***GE - Government Energy Measures***

### **Measure GE 1.1: General Comment**

**Description:** AECOM recommends providing supporting information for assumptions and calculations within the appendices for all calculations. AECOM also recommends that the SDG&E electricity consumption emission factor be used to quantify the emission reductions associated with this measure, which would result in fewer emission reductions.

### **Measure GE 1.2: General Comment**

**Description:** AECOM recommends that the assumptions used with the calculations be fully disclosed. AECOM recommends that the SDG&E emission factor be used to calculate the emission reductions, which would result in fewer emission reductions.

### **Measure GE 1.3: Building Controls Tune-Up**

**Description:** AECOM feels that this tune-up measure could be overestimated because tune-up practices would only affect a portion of building energy emissions (e.g., heating and cooling). Therefore, by applying the percent reduction to the total municipal energy emissions, the measure is affecting a larger portion of emissions than possible. In addition, AECOM recommends providing the background and sources used to calculate the percent reduction.

### **Reduction Calculations:**

(Total municipal energy emissions) × (Percent reduction from tune-up).



**Variables:**

Percent reduction = Assumed that 1% of building energy is reduced from controls tune-up.

**Measure GE 1.3: Maintain Proper Heating**

**Description:** Please see Description for Measure 1.3 Building Controls Tune-Up. AECOM feels that this measure could be double-counting the emission reductions achieved by Measure 1.3 Building Controls Tune-Up.

**Reduction Calculations:**

(Total municipal energy emissions) × (Percent reduction from proper heating).

**Variables:**

Percent reduction = Assumed that 0.5% of building energy is reduced from proper heating.

**Measure GE 1.3: Decrease Average Street Lighting**

**Description:** AECOM recommends providing supporting information for assumptions and calculations.

**Reduction Calculations:**

Formula available, but without descriptors and variables are not defined.

**Variables:**

Not Available.

**Measure GE 1.3: Install Occupancy Sensors**

**Description:** AECOM recommends providing supporting information for assumptions and calculations.

**Reduction Calculations:**

Not available.

**Variables:**

Not Available.

**Measure GE 1.3: Institute Lights-Out-At-Night Policy**

**Description:** AECOM feels that this measure could be overestimating the emission reductions. It is anticipated that this measure would only affect those emissions associated with street lights and other lights that will be turned out at night as a result of this policy. Therefore, applying the percent reduction to the total municipal energy emissions would overestimate the amount of emissions that could be affected by this measure.

**Reduction Calculations:**

(Total municipal energy emissions) × (Percent reduction from lights-out-at-night).



**Variables:**

Percent reduction = Assumed that 1% of building energy is reduced from lights-out-at-night.

**Measure GE 1.4: Install Reflective Roofing**

**Description:** Please see Description for Measure 1.2: ENERGY STAR Computers.

**Reduction Calculations:**

(Electricity EF) × (Energy savings from reflective roof) × (Area of reflective roof).

**Variables:**

Electricity EF = Represents EIA electricity emission factor.

Energy savings from reflective roof = Represents the kWh saved per year per square foot of reflective roof installed.

Area of reflective roof = Assumed to be 350,000 square feet of reflective roof by 2020.

**Measure GE 3.1: Install Renewable Energy System**

**Description:** AECOM recommends providing supporting information for assumptions and calculations.

**Reduction Calculations:**

Formula available, but without descriptors and variables are not defined.

**Variables:**

Not Available.

**Measure GE 3.1: New Building Renewables**

**Description:** AECOM recommends providing supporting information for assumptions and calculations.

**Reduction Calculations:**

Formula available, but without descriptors and variables are not defined.

**Variables:**

Not Available.

**Goal GE-4: Education Campaigns**

**Description:** AECOM feels that this measure could be overestimating the emission reductions.

The measure assumed that the energy savings from education variable, which is a percent of energy *savings*, would apply to all energy *emissions* whether it is electricity or natural gas. AECOM feels that reductions in electricity would differ in its emission reductions from reductions in natural gas. AECOM recommends calculating the electricity and natural gas saving separately for this measure, which could result in fewer emission reductions.

See CE-4.1 for the proposed change to formula.

**Reduction Calculations:**

(Total municipal energy emissions) × (Percent energy savings from education) × (Years).

**Variables:**

Energy savings from education = Percent of energy savings from educational programs.

Years: Assumes the educational programs will be implemented from 2013 to 2020 (7 years total).

***GT - County Vehicle Fleet Reduction Measures*****Measure GT 1.1: Hybrid vehicles for newly purchased passenger vehicles.**

**Description:** This measure could be overestimating the number of vehicles that would be replaced per year (i.e., 50 vehicles) and the number of vehicles that would be replaced from 2012 to 2020 (i.e., 400 vehicles). This measure assumes that 50 gasoline-fueled municipal passenger vehicles would be replaced with hybrid vehicles each year from 2012 to 2020. The emissions reductions associated with each municipal passenger vehicle replaced was calculated assuming an average of 8,000 VMT each year and a fuel efficiency increase from 25 miles per gallon (mpg) for gasoline-fueled vehicles to 45 mpg for hybrid vehicles.

**Reduction Calculations:**

(MT CO<sub>2</sub>e/yr/vehicle replaced) × (Number of vehicles per year) × (Number of years of commitment).

**Variables:**

MT CO<sub>2</sub>e/yr/vehicle = calculated annual metric tons of carbon dioxide equivalent saved by replacing a gasoline-fueled (non-hybrid) passenger vehicle with a hybrid vehicle

**Measure GT 1.2: Replace old and underused passenger vehicles.**

**Description:** This measure could be strengthened by replacing the old vehicles with new hybrid vehicles that achieve 45 mpg rather than a marginal increase from 21 mpg to 25 mpg. This measure assumes that 15 old and underused gasoline-fueled municipal passenger vehicles would be replaced with newer gasoline-fueled vehicles each year from 2012 to 2020. The emission reductions associated with each municipal passenger vehicle replaced was calculated assuming an average of 8,000 VMT each year and fuel efficiency increase from 21 mpg for old gasoline-fueled vehicles to 25 mpg for newer gasoline vehicles.

**Reduction Calculations:**

(MT CO<sub>2</sub>e/yr/vehicle replaced) × (Number of vehicles per year) × (Number of years of commitment).

**Variables:**

MT CO<sub>2</sub>e/yr/vehicle = calculated annual metric tons of carbon dioxide equivalent saved by replacing a gasoline-fueled (non-hybrid) passenger vehicle with a newer gasoline-fueled (non-hybrid) passenger vehicle.

**Measure GT 1.3: Fuel-efficient parking enforcement vehicles.**

**Description:** The calculation does not account for the emissions associated with the replacement vehicles, which would also generate GHG emissions. This measure is likely overestimating the emission reductions associated with its implementation. This measure assumes that 5 gasoline-fueled parking enforcement vehicles would be completely eliminated from use each year from 2012 to 2020. The emission reductions assume that the parking enforcement vehicles would not be replaced with another GHG-generating vehicle (e.g., gasoline-fueled or hybrid).

**Reduction Calculations:**

(MT CO<sub>2</sub>e/yr/vehicle replaced) × (Number of vehicles per year) × (Number of years of commitment).

**Variables:**

MT CO<sub>2</sub>e/yr/vehicle = calculated annual metric tons of carbon dioxide equivalent generated by a gasoline-fueled vehicle.

**Measure GT 1.4: Enforce no idling.**

**Description:** The measure is likely overestimating the potential reduction capabilities of the measure by assuming all idling would be eliminated. Idling is still likely to occur from vehicles waiting at intersections and commercial vehicles in operation, among others. This measure assumes that implementation would eliminate all idling emissions within the jurisdiction. In addition, the measure assumes that idling emissions compose 3% of the total transportation-related GHG emissions. Although this could be the case for the County, no documentation for the percent of idling emissions from the total transportation emissions has been provided.

**Reduction Calculations:**

(Idling percent) × (Total transportation emissions).

**Variables:**

Idling percent = Percent of idling emissions from total transportation emissions.

**Measure GT 1.5: Encourage video conferencing.**

**Description:** This measure assumes that 10% of the municipal VMT is associated with commute trips. The measure also assumes that 15% of all commute trips could be eliminated due to video conferencing. AECOM suggests that the reasoning and support behind the 15% be provided. This percentage should take into account the participation rate of employees and the frequency where a full work day could be completed using video conferencing (i.e., eliminate a commute trip). AECOM also recommends providing a source for the 10% commute trips of total trips. Finally, AECOM suggests that the percentages used in this calculation are fully disclosed for their sources and significance.

**Reduction Calculations:**

(Total transportation emissions) × (Percent VMT savings by video conferencing) × (Percent of VMT affected by measure).

**Variables:**

Percent VMT savings = Percent of commute VMT that would be reduced by video conferencing.  
Percent VMT affected = Percent of total VMT that could be affected by measure.

**Measure GT 1.6: Improve vehicle maintenance.**

**Description:** The percent fuel-use saved should not be directly applied to the total transportation emissions, which include idling, starts, and stops emissions, but rather to the fuel usage of municipal vehicles. This measure would only affect the running emissions or fuel efficiency of municipal vehicles. Therefore, it is anticipated that this measure is overestimating emission reductions. This measure assumes that 100% of the municipal vehicle fleet would participate in improved vehicle maintenance.

**Reduction Calculations:**

(Total transportation emissions) × (Percent of fuel-use saved).

**Variables:**

Percent fuel-use saved = Percent of fuel saved from regular maintenance.

**Measure GT 1.7: Scheduling and routing efficiency.**

**Description:** This measure assumes that 10% of the municipal VMT is associated with commute trips. The measure also assumes that 15% of all commute trips could be eliminated due to scheduling and routing efficiency. AECOM suggests that the reasoning and support behind the 15% be provided. This percentage should take into account the participation rate of employees and percent of VMT that can be reduced by scheduling and routing efficiency. AECOM also recommends providing a source for the 10% commute trips of total trips. Finally, AECOM suggests that the percentages used in this calculation are fully disclosed for their sources and significance.

**Reduction Calculations:**

(Total transportation emissions) × (Percent VMT savings by scheduling and routing efficiency) × (Percent of VMT affected by measure).

**Variables:**

Percent VMT savings = Percent of commute VMT that would be reduced by scheduling and routing efficiency.

Percent VMT affected = Percent of total VMT that could be affected by measure.

**Measure GT 1.8: Employee educational programs.**

**Description:** See CT-5.1 for the proposed change to formula.

**Reduction Calculations:**

(Total transportation emissions) × (Percent emissions reduced) × (Number of years of commitment).

**Variables:**

Percent emissions reduced = Percent of total emissions that would be reduced with implementation of the measure.

**Measure GT 2.1: Mass transit ridership.**

**Description:** The measure accounts for the participation rate, vehicle type composition, different fuel efficiencies, and different emission factors. AECOM feels that the quantification of this measure accurately captures all the variables involved in its mechanism.

**Reduction Calculations:**

(Total employees) × (Participation rate) × (MT CO<sub>2</sub>e reduced/vehicle type) × (Percent vehicle type of total employee vehicles).

**Variables:**

MT CO<sub>2</sub>e reduced/vehicle type = Calculated by allocating the total annual employee VMT and vehicle count by vehicle type (i.e., passenger, light truck/sports utility vehicle [SUV], and diesel truck). Fuel consumption per vehicle was then calculated assuming fuel efficiencies of 25, 20, and 20 mpg for passenger, light truck/SUV, and diesel trucks, respectively. Fuel efficiency was used to calculate annual gallons of fuel consumed, which was then converted to MT CO<sub>2</sub>e per year per vehicle type. Percent vehicle type = Assumes the employee vehicles are made up of 66% passenger vehicles, 33% light trucks and SUVs, and 1% diesel trucks.

**Measures GT 2.2 to 2.5**

**Description:** Similar to the Measure 1.1, AECOM feels that the quantification of these measures accurately captures all the variables involved in their mechanisms.

**Reduction Calculations:**

(Total employees) × (Participation Rate) × (MT CO<sub>2</sub>e reduced/vehicle type) × (Percent vehicle type of total employee vehicles).

**Variables:**

Participation rate = The participation rate for Measures 1.2 to 1.5 vary depending on the measure.

MT CO<sub>2</sub>e reduced/vehicle type = Remains constant.

Percent vehicle type = Remains constant.

Other variables = Other variables include factors to calculate the reduction associated with 1 or 2 days of reductions. For example, Measure 1.3 is intended to promote telecommuting to eliminate 2 employee commute trips per week and Measure 1.4 is intended to promote alternative work schedules to eliminate 1 employee commute trip per week.

***CE - Community Energy Measures***

**General Comment:** The baseline (2005) and projected (2020) inventory was performed using San Diego Gas and Electric (SDG&E)-specific emissions factors for residential, commercial, and industrial land uses. Emission factors for direct access consumption were obtained from Western Electricity



Coordinating Council (WECC) California region from the California Climate Action Registry's (CCAR) General Reporting Protocol Version 3.1. However, quantification of electricity-related reduction measures was calculated using Energy Information Administration (EIA) data from 2000. AECOM feels that the reduction measures should also use SDG&E-specific emission factors to calculate emission reductions. It is anticipated that using more specific emission factors will reduce the emission reductions because of the cleaner electricity production portfolio.

### **Measure CE 1.1: Retrofit and Financing**

**Description:** AECOM feels this calculation contains an error. The number of occupied units existing in 2005 should be used instead of the total 2005 baseline energy emissions. The correct formula should be as follows:

$(\# \text{ of occupied residential units in 2005}) \times (\text{Participation rate}) \times (\text{Emission reduction per household})$

This correction would considerably reduce the reduction potential of this measure.

#### **Reduction Calculations:**

$(\text{Baseline [2005] residential energy emissions}) \times (\text{Participation rate}) \times (\text{Emission reduction per household})$ .

#### **Variables:**

Baseline [2005] residential energy emissions = Only includes baseline (2005) residential energy emissions because measure would only affect existing buildings.

Participation rate = Assumes 20% of all occupied residential units would participate in energy retrofit.

Emission reduction = Amount of MT CO<sub>2</sub>e/yr per unit saved by retrofit.

### **Measure CE 1.2: Turn-In**

**Description:** AECOM believes the 250 lbs CO<sub>2</sub>e per year per bulb replaced is incorrect and overestimated the reduction potential of the measure. It appears the equation uses lifetime emissions reduction value rather than an annual reduction value. The annual reduction is likely to be more like 0.015 MT [33lbs] per light bulb per year (ICLEI) or 0.036 MT [79 lbs] per light bulb per year (EPA household calculator).

#### **Reduction Calculations:**

$(\text{lbs of CO}_2\text{e per light bulb per year}) \times (\text{MT/lbs}) \times (\text{Number of light bulbs replaced})$ .

#### **Variables:**

Number of lights replaced = Assumes 500,000 light bulbs would be replaced.

Lbs of CO<sub>2</sub>e = Amount of CO<sub>2</sub>e/yr per light replaced saved.

**Measure CE 2.1: Green Building Ordinance: 15% above Title 24 2008**

**Description:** AECOM questions why the measure is applied to only 50% of new construction. If the measure is to be mandatory it should apply to 100% of new construction. AECOM recommends increasing participation rate to 100%. This would double the reductions associated with this measure.

**Reduction Calculations:**

(Energy emissions 2020-2010) × (Participation rate) × (Percent increase in energy efficiency).

**Variables:**

Residential Energy emissions from new development = Total energy emissions from new development from 2010 to 2020.

Participation rate = Assumes that 50% of new residential, commercial, and industrial buildings would participate in Tier I Green Building Ordinance (15% above Title 24).

Percent increase in energy efficiency = 15% above Title 24 as described by Tier I of Green Building Ordinance.

**Measure CE 2.2: Streamline Energy Efficiency Projects**

**Description:** AECOM questions why Measure 2.2 uses a different calculation than Measure 2.1 to define residential energy emissions associated with new construction. Measure 2.2 uses 2020-2005 and Measure 2.1 uses 2020-2010. We would recommend using the same calculation as is in 2.1. Additionally the equation needs to be adjusted to avoid is double counting with Measure 2.1.

**Reduction Calculations:**

(Energy emissions from new development) × (Participation rate) × (Percent increase in energy efficiency).

**Variables:**

Residential Energy emissions from new development = Total energy emissions from new development from 2005 to 2020.

Participation rate = Assumes that 10% of new residential, commercial, and industrial uses would participate in energy efficiency projects.

Percent increase in energy efficiency = Assumed that all uses would increase energy efficiency by 10%.

**Measure CE 2.3: Cool Paving**

**Description:** AECOM recommends providing supporting information for assumptions and calculation methodology. AECOM believes this equation may be oversimplified. Further review is warranted.

**Reduction Calculations:**

Formula available, but does not contain descriptors and variables are not defined.

**Variables:**

Not Available.

**Measure CE 2.3: Green/Reflective roofing**

**Description:** AECOM recommends the equation use a SDG&E electricity emission factor instead of an EIA derived emission factor. AECOM would recommend further examination of the energy savings factor (e.g., 0.7 KWh per square foot). Ideally, this equation would only be applied to hot inland portions of the County.

**Reduction Calculations:**

(Electricity EF) × (Energy savings from reflective roof per year) × (Area of reflective roof).

**Variables:**

Electricity EF = Represents EIA electricity emission factor.

Energy savings from reflective roof = Represents the kWh saved per year per square foot of reflective roof installed.

Area of reflective roof = Assumed to be 250,000 square feet of reflective roof by 2020.

**Measure CE 3.1: Renewables in New Residences and Businesses**

**Description:** The measure suggests that renewable energy will reduce 1% of the community's 2020 total energy emissions, but only talks about photovoltaic systems. Total energy contains electricity and natural gas. Photovoltaic is unlikely to replace natural gas to same extent. Additionally AECOM recommends calculating the emission reduction potential using a bottom-up approach that describes the estimated amount of square footage of solar photovoltaic, the number of buildings with solar hotwater heaters, the number of wind turbines, that are likely to be established in the community to achieve this 1% goal. This would add more credibility in terms of implementation.

**Reduction Calculations:**

(Total energy emissions) × (Percent energy replaced with renewable energy).

**Variables:**

Total energy emissions = Total community 2020 energy emissions.

Percent energy replaced with renewable energy = Assumed that 1% of building energy for residential, commercial, and industrial would be produced from renewable sources.

**Measure CE 4.1: Public Outreach**

**Description:** The estimated 0.5% reduction needs a source. Also assumes constant impact from public outreach. It is also unclear if the equation means to use 5% or 0.5%.

The equation should be changed to use the following structure: = (0.5% \* 2010 Energy Emissions) \* (1 + 0.5%)<sup>10</sup>.

**Reduction Calculations:**

No equation was provided. However, using the variables provided does not calculate out to 6,400. (0.005 × 1,240,320 = 6,202).

**Variables:**

Total energy emissions = Total community 2020 energy emissions.

Percent reduction = Assumes that public outreach would reduce emissions by 0.5%.

### ***CT- Community Transportation Measures***

#### **General Comment:**

The transportation reduction measures use 95% for many of the emission reduction calculations to represent the on-road percent of total transportation emissions. However, the 95% includes both local roadway and state highway VMT and emissions. AECOM feels that many of the transportation reduction measures would affect only local roadway emissions and not state highway VMT. Therefore, all reduction measures that use the 95% should be evaluated to determine if the measure do indeed affect both local roadway and state highway VMT. Local roadway VMT and emissions are approximately 31% of total on-road emissions. Therefore, a number of the transportation emission reductions could be reduced by 69% (i.e., 1 – 31%).

#### **Measure CT 1.1: Trade in old vehicles.**

**Description:** AECOM feels that this measure is likely overestimating emission reductions. The total emission reductions are calculated assuming all of the commute-related emissions associated with trade-in vehicles would be eliminated as a result of Measure 1.1. In reality, the measure would replace older vehicles with newer vehicles, which would still generate some amount of emissions. The emissions from the newer vehicles should be subtracted from the reduction from removing the older vehicles. In addition, the VMT assumptions are based on commute distances per capita and not necessarily per vehicle that will be removed. Therefore, the measure is quantifying the reduction if 8,000 employees (1,000 employees each year from 2012 to 2020) stopped driving to work.

#### **Reduction Calculations:**

(MT CO<sub>2</sub>e reduced/capita) × (Number of vehicles traded-in).

#### **Variables:**

MT CO<sub>2</sub>e reduced/capita = Calculated using an assumption for the VMT per capita per year in 2020, fuel efficiency, and emission factor. The VMT is estimated using assumptions for commute distances and frequency.

#### **Measure CT 1.1a: High occupancy vehicles.**

**Description:** The total emission reductions are calculated assuming 1,000 employees per year from 2010 to 2020 would carpool for all of their annual commute trips. AECOM feels like this is an ambitious assumption that 1,000 employees per year would carpool and continue to carpool for all work trips. However, AECOM feels that the use of the commute VMT for quantification of this measure is more appropriate than that for Measure 1.1.

#### **Reduction Calculations:**

(MT CO<sub>2</sub>e reduced/capita) × (Number of employees carpooling).

**Variables:**

MT CO<sub>2</sub>e reduced/capita = Calculated using an assumption for the VMT per capita per year in 2020, fuel efficiency, and emission factor. The VMT is estimated using assumptions for commute distances and frequency.

**Measure CT 1.2: Low-emission vehicle recharge stations.**

**Description:** This measure assumes that 50 recharge stations per year from 2012 to 2020 would be made available throughout San Diego County. The reduction calculations, variables, and assumptions to calculate the anticipated reductions were not available in the appendix. AECOM suggests that the background information be provided similar to that for Measure 1.1.

**Reduction Calculations:**

Not available.

**Variables:**

Not available.

**Measure CT 2.2: Demand management.**

**Description:** AECOM suggests that the percentages be defined. Same comments as those for Measure 2.1.

**Reduction Calculations:**

(Total transportation emissions) × (2%) × (On-road percent).

**Variables:**

2% = Not available.

On-road percent = Percent of total transportation emissions associated with on-road vehicles.

**Measure CT 2.3: Biking**

**Description:** This calculation uses bike commuter estimates from the San Diego Regional Bike Plan. AECOM recommends that the assumptions behind the calculation be defined within the appendices.

**Reduction Calculations:**

12,229 MT CO<sub>2</sub>e – 6,370 MT CO<sub>2</sub>e

**Variables:**

12,229 = the amount of emissions reductions generated from implementation of the Bike Plan  
6,370 = the amount of emission reductions from normal increase in bike use with no additional facilities

## Measure CT 3.1: Smart growth

**Description:** AECOM suggests that the percentages be defined. Same comments as those for Measure 2.1.

### Reduction Calculations:

$(\text{Total transportation emissions}) \times (0.5\%) \times (\text{On-road percent})$ .

### Variables:

0.5% = Not available.

On-road percent = Percent of total transportation emissions associated with on-road vehicles.

## Measure CT 3.2: Anti-idling

**Description:** AECOM suggests providing literature source to support 3% assumption.

### Reduction Calculations:

$(\text{Total transportation emissions}) \times (3\%) \times (\text{On-road percent})$ .

### Variables:

3% = reduction in on-road emissions from traffic light synchronization.

On-road percent = Percent of total transportation emissions associated with on-road vehicles.

## Measure CT 3.3: Traffic calming

**Description:** AECOM suggests recommends use of additional literature to determine potential impact of traffic calming on vehicle emissions in San Diego County.

### Reduction Calculations:

$(\text{Total transportation emissions}) \times (31\%) \times (15\%) \times (\text{On-road percent})$

### Variables:

31% = percentage of travel on local roads.

15% = VMT reduction from roundabouts.

On-road percent = Percent of total transportation emissions associated with on-road vehicles.

## Measure CT 4.1: Off-road anti-idling

**Description:** This measure assumes that all idling for off-road vehicles would be eliminated by 2020. AECOM feels that this assumption could overestimate the reduction potential of Measure 4.1. In addition, AECOM recommends that the technical support for idling emissions being 3% of total off-road emissions be provided.

### Reduction Calculations:

$(\text{Total transportation emissions}) \times (\text{Off-road percent}) \times (3\%)$ .

### Variables:

5% = Percent of off-road emissions from total transportation emissions.



3% = Percent of idling emissions of total off-road VMT.

**Measure CT 5.1: Public Education**

**Description:** This measure assumes that educational transportation-related programs would reduce total transportation emissions by 0.1% in 2020. The equation should be changed to use the following formula:  $= (0.1\% * 2010 \text{ Transportation Emissions}) * (1 + 0.1\%)^{10}$ .

**Reduction Calculations:**

$(2020 \text{ Total transportation emissions}) \times (0.1\%)$ .

**Variables:**

0.1% = Percent reduction from total transportation emissions associated with education programs.