

**APPENDIX D**  
**San José Emissions Memo**

**AECOM**  
**June 2015**



June 10, 2015

Nora Monette  
Principal Project Manager  
1871 The Alameda  
Suite 200  
San José, California 95126

**Subject: San José Emissions Memo**

This memo presents the emissions reduction potential from implementation of statewide actions and the City of San José's Greenhouse Gas Reduction Strategy (GGRS). The statewide actions included within this analysis are described first followed by the GGRS measures. Emissions reduction summary tables are presented at the end to demonstrate estimated reductions to occur in 2020 and 2035 and how these reductions relate to the City's emissions reduction targets.

**STATEWIDE ACTIONS**

The state has developed various policies and programs aimed at achieving the emissions reduction goals adopted within Assembly Bill (AB) 32 (i.e., return statewide emissions levels to 1990 levels by 2020). Many of these statewide actions will result in emissions reductions at the local level, and should be considered when evaluating achievement of community-wide greenhouse gas (GHG) targets. However, the City's GGRS did not include separate quantification of reductions associated with implementation of statewide emissions reduction measures, and the City's emissions projections only considered the impact of Pavley I and the Low Carbon Fuel Standard on community-wide emissions. The following section introduces the additional statewide actions that were analyzed for the City of San José, describes how they relate to the City's emissions inventory, and presents associated reduction estimates for the 2020 and 2035 target years.

**Renewable Portfolio Standard**

*Background:* Senate Bill (SB) 1078, SB 107, Executive Order (EO)-S-14-08, and SB X1-2 have established increasingly stringent Renewable Portfolio Standard (RPS) requirements for California utilities. RPS-eligible energy sources include wind, solar, geothermal, biomass, and small-scale hydro. EO-S-14-08 increased the RPS requirements initially established by SB 1078 from 20% to 33% by 2020, which was then codified by SB X1-2. The result of implementing the RPS will be lower emissions related to electricity consumption, including electricity users within San José.

*San José Initial Inventory:* The City's initial electricity emissions were developed using a year 2008 PG&E-specific electricity emissions factor to correspond with that baseline inventory year. The PG&E-specific electricity emissions factor accounted for PG&E's electricity production portfolio (e.g., natural gas, coal, solar) in the year 2008. This 2008 emissions factor was also used to calculate the City's projected 2020 and 2035 electricity-related emissions under a business-as-usual (BAU) scenario. In the BAU scenario, the electricity emissions factor used to prepare the 2008 baseline inventory would remain constant through the 2020 and 2035 target years. Therefore, BAU electricity emissions projections demonstrate what emissions levels are likely to be under a scenario in which the RPS is not fully implemented.

*Statewide Reduction Calculation:* In order to account for the required increase in renewable energy sources used by PG&E pursuant to the RPS, AECOM obtained a projected 2020 PG&E-specific emissions factor. This projected 2020 electricity emissions factor developed by PG&E accounts for compliance with the RPS, which would reduce the City's electricity-related GHG emissions. The City's projected 2020 and 2035 electricity consumption in units of megawatt-hours (MWh) was multiplied by the 2020 PG&E electricity emissions factor to calculate GHG emissions with implementation of the RPS. The difference in GHG emissions between the BAU (i.e., 2008 PG&E emissions factor) and RPS scenarios (i.e., 2020 PG&E emissions factor) represents the reduction potential of the RPS. Although it is conceivable that after 2020 PG&E's renewable portfolio would continue to increase (i.e., exceed the RPS-mandated 33% renewable electricity), this analysis only considers the existing RPS requirements and assumes no additional increase in the RPS from 2020 to 2035. See the section titled Proposed Statewide Legislation for a brief description of current efforts to extend the state's RPS requirements beyond the 2020 implementation timeframe.

### **AB 1109**

*Background:* AB 1109 was signed into law in 2007. The California Lighting Efficiency and Toxics Reduction Act requires the California Energy Commission (CEC) to adopt energy efficiency standards for all general purpose lights, reducing lighting energy usage in indoor residences and state facilities by no less than 50% by 2018, as well as require a 25% reduction in commercial facilities by that same date. To achieve these efficiency levels, the CEC applied its existing appliance efficiency standards to include lighting products, as well as required minimum lumen/watt standards for different categories of lighting products. In addition, the bill prohibits the manufacturing for sale or the sale of certain general purpose lights that contain hazardous substances.

*San José Initial Inventory:* The City's initial energy sector did not include the emissions reductions associated with the AB 1109 Lighting Efficiency Program.

*Statewide Reduction Calculation:* Estimated residential electricity use in the 2020 horizon year was assumed to be reduced by 11.0% over baseline levels. Total residential electricity savings were then multiplied by an RPS-compliant electricity emissions factor to estimate emissions reductions resulting from this program, while avoiding double-counting with the RPS reductions described above. Commercial electricity use would also be reduced by AB 1109. However, the City's commercial and industrial electricity use is combined in the baseline inventory as a result of PG&E's 15/15 Rule, precluding electricity conservation estimates from being applied to the commercial electricity subsector alone. Therefore, this analysis conservatively omits reduction estimates from commercial electricity use to avoid over-estimating potential reductions by including industrial electricity use within the calculation.

### **Pavley I and LCFS**

*Background:* AB 1493 (also referred to as Pavley I or California Clean Car Standards) is California's mobile source GHG emissions regulations for passenger vehicles, and was signed into law in 2002. AB 1493 requires ARB to develop and adopt regulations that reduce GHG emissions from passenger vehicles, light-duty trucks, and other non-commercial vehicles for personal transportation. In 2004, ARB approved amendments to the California Code of Regulations adding GHG emissions standards to California's existing standards for motor vehicle emissions for new passenger vehicles from 2009 to 2016.

EO-S-01-07 reduces the carbon intensity of California's transportation fuels by at least 10% by 2020. The Low Carbon Fuel Standard (LCFS) is a performance standard with flexible compliance

mechanisms that incentivizes the development of a diverse set of clean, low-carbon transportation fuel options to reduce GHG emissions.

*San José Initial Inventory:* The City's initial on-road transportation sector was developed with the inclusion of Pavley I and the LCFS statewide reduction measures calculated by EMFAC2007. However, the emissions inventory did not identify a business-as-usual scenario in which Pavley I and the LCFS are *not* implemented, and therefore the specific emissions reduction potential from these two pieces of legislation was not separately identified.

*Statewide Reduction Calculation:* Since the City is using GHG efficiency targets instead of a mass emissions reduction target, there is no need to recalculate its emissions projections under a BAU scenario. The resulting community-wide emissions levels after consideration of additional statewide actions and GGRS reductions are divided by service population estimates to calculate emissions efficiency level achievement.

### **Low-Emission Vehicle III (Part of the Advanced Clean Cars Program)**

*Background:* Beginning in May of 2010, ARB began working with the Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) on the second generation passenger vehicle greenhouse gas regulations for model years 2017–2025. In January 2012, ARB approved new regulations, as part of the Low-Emission Vehicle III (LEV III) element of the Advanced Clean Cars program, which merged GHG emissions with all other tailpipe emissions into one set of requirements.

*San José Initial Inventory:* The City's initial transportation sector did not include the emission reductions associated with LEV III.

*Statewide Reduction Calculation:* The emission reduction potential of LEV III was calculated using a top-down approach. ARB has estimated the emissions reductions associated with LEV III in the 2020 target year. In addition, ARB develops statewide emissions inventories for current and future years, specifically year 2020 to demonstrate attainment of AB 32 emissions reduction targets. The percent reduction associated with LEV III on a statewide level was calculated by dividing the projected 2020 LEV III emission reductions by the statewide 2020 passenger vehicles emissions, which is the specific emissions sector that LEV III would affect. The statewide percent reduction associated with LEV III was then applied to the City's passenger vehicle emissions in 2020 to calculate the City-specific reductions from LEV III. The following equation summarizes the calculation of this statewide action:

$$\text{San José LEV III Reductions} = \text{San José 2020 passenger vehicle emissions} * (\text{Statewide 2020 LEV III reductions} \div \text{Statewide 2020 passenger vehicle emissions})$$

As stated above, implementation of LEV III would continue until 2025 and therefore it is anticipated that as the program is fully implemented, additional reductions would be achieved throughout the state and within the City. However, for the purposes of a conservative emissions reduction analysis, the same percent reduction calculated for 2020 was assumed to occur in year 2035.

### **Vehicle Efficiency Regulations (Heavy-Duty Aerodynamics)**

*Background:* This regulation requires existing trucks/trailers to be retrofitted with the best available technology and/or ARB-approved technology to increase vehicle aerodynamics and fuel efficiency that will result in GHG reductions. Technologies that reduce GHG emissions and improve the fuel efficiency of trucks may include devices that reduce aerodynamic drag and rolling resistance. These

requirements apply to both California-registered trucks and out-of-state registered trucks that travel to California. This measure was identified as a Discrete Early Action in the California Air Resources Board's (ARB) Climate Change Scoping Plan and became enforceable beginning in 2010.

*San José Initial Inventory:* The City's initial transportation sector did not include emissions reductions associated with the Heavy-Duty Aerodynamics program.

*Statewide Reduction Calculation:* Similar to the method described for LEV III, the reductions associated with the Heavy-Duty Aerodynamic program were calculated using a top-down approach. ARB also calculates the projected emissions reductions that would occur in target year 2020 as a result of the Heavy-Duty Aerodynamic program. Because this program would only affect heavy-duty vehicles, the projected statewide reductions were divided by the statewide heavy-duty vehicle emissions. The statewide percent reduction associated with the Heavy-Duty Aerodynamic program was then applied to the City's heavy-duty vehicle transportation emissions to calculate the City's share of GHG reductions.

Table 1 presents the estimated statewide reductions for 2020 and 2035.

<b>Table 1                      Statewide Reduction Estimates</b>		
<b>Reduction Measure</b>	<b>2020 Emissions Reductions (MT CO<sub>2</sub>e/yr)</b>	<b>2035 Emissions Reductions (MT CO<sub>2</sub>e/yr)</b>
Renewable Portfolio Standard	1,372,558	2,168,283
AB 1109	32,249	38,746
Low-Emission Vehicle III	87,427	111,666
Vehicle Efficiency Regulations	9,317	15,483
<b>Total</b>	<b>1,501,551</b>	<b>2,334,178</b>

Notes: MT CO<sub>2</sub>e/yr = metric tons carbon dioxide equivalent per year

## **GGRS REDUCTION MEASURES**

The City prepared its GGRS in conjunction with the *Envision San José 2040 General Plan* update to help the community achieve emissions reductions in alignment with the statewide 2020 target established in AB 32 (i.e., return to 1990 emissions levels by 2020). Attachment A within the GGRS provides emissions reduction estimates for several reduction measures with a 2035 implementation timeframe. AECOM reviewed this list of measures to identify areas of possible overlap with the statewide reductions sources presented above, as well as identify reductions that were already incorporated within the BAU emissions forecasts. Through this analysis, GGRS measures presented in Attachment A were organized into the following five categories.

### **Previously quantified reduction estimates to be revised**

Based on our review of GGRS measures, AECOM revised the reduction estimates associated with GGRS Strategies BEE-5 (Renewable Energy Systems) and RWR-1 (Reclaimed Water) to incorporate an RPS-compliant electricity emissions factors. This allowed reductions from these GGRS strategies to be combined with statewide reductions associated with implementation of the RPS, without double-counting emissions reduction potential.

AECOM used the same underlying quantification assumptions described in Attachment A of the GGRS (e.g., kWh/yr generated by new solar installations, kWh/yr saved from water conservation efforts) and replaced the electricity emissions factor with the 2020 PG&E electricity emissions factor described above in the Renewable Portfolio Standard discussion.

#### **Previously quantified reduction estimates that cannot be revised**

Insufficient methodological information was available in the GGRS to revise reductions from Strategies BEE-1 (Efficient Appliances) and BEE-6 (Public Lighting) to remove double-counting as related to the RPS calculations. Therefore, reductions associated with these strategies as provided in the GGRS were omitted to provide more conservative total emissions reduction estimates.

#### **Previously quantified reduction estimates included in the BAU emissions forecasts**

The transportation model used to prepare the 2008 baseline emissions inventory and emissions projections is based on the land use diagram and population and employment growth assumptions from the City's 2040 General Plan. It was assumed that this model would have also considered the potential reductions in vehicle miles traveled (VMT) associated with development densities and location efficiencies outlined in the General Plan's Land Use and Circulation Elements. If this assumption is true, then reductions associated with these types of land use strategies should not be quantified and included separately to avoid double counting emissions reduction potential.

The GGRS *did* include reductions associated with LUT-1 (Development Density) and LUT-2 (Location Efficiency) because City staff believed these specific reductions were not incorporated into the baseline inventory traffic model. However, verifying that staff assumption would be highly complicated at this time. Therefore, in order to provide a conservative estimate of the total emissions reduction potential from implementation of GGRS strategies, the previously estimated reductions from Strategies LUT-1 and LUT-2 were omitted from this analysis.

#### **Previously quantified reduction estimates not included in the BAU emissions forecasts**

The GGRS provided reduction estimates for two transportation- and circulation-related strategies in addition to the density and location efficiency strategies described above. The emissions-reduction nature of Strategies LUT-6 (Interconnected Bike Trails) and LUT-7 (Alternative Fuel Fleet) are not commonly captured within transportation models used to develop community-wide emissions estimates. Therefore, the calculation and inclusion of their associated reduction estimates would not overlap with the baseline inventory or emissions projections, and can be included as unique reductions sources within this emissions analysis.

Per the GGRS, the reduction estimates from these two strategies were calculated to demonstrate reductions by a 2035 target year. AECOM assumed that implementation would occur linearly. AECOM further assumed that implementation of LUT-6 would begin in 2011 (following adoption of the General Plan directing the related policy), and that implementation of LUT-7 began in 2008 (following the 2007 adoption of the City's Green Vision, which includes the Alternative Fuel Fleet as Goal 8).

Therefore, 37.5% of the estimated 2035 reductions for LUT-6 would be realized by 2020 per the following calculation:

$$\text{LUT-6 reductions in 2020} = \text{Total LUT-6 reductions from GGRS} * ((\text{Implementation years from 2011-2020}) \div (\text{implementation years from 2011-2035}))$$

And, 44.4% of the estimated 2035 reductions for LUT-7 would be realized by 2020 per the following calculation:

$$\text{LUT-7 reductions in 2020} = \text{Total LUT-7 reductions from GGRS} * ((\text{Implementation years from 2008-2020}) \div (\text{implementation years from 2008-2035}))$$

The GGRS also estimated reductions for Strategy RWR- Q (Zero-Waste). As with the calculations shown above for Strategies LUT-6 and LUT-7, reductions from Strategy RWR-Q were provided based on a 2035 implementation timeframe. This strategy is also included in the City's Green Vision plan as Goal 5, so implementation was assumed to begin in 2008 (as with Strategy LUT-7). The following equation describes how the 2020 reductions estimates for Strategy RWR-Q were calculated:

$$\text{RWR-Q reductions in 2020} = \text{Total RWR-Q reductions from GGRS} * ((\text{Implementation years from 2008-2020}) \div (\text{implementation years from 2008-2035}))$$

AECOM assumes that the original reductions calculations provided in the GGRS for Strategies LUT-6, LUT-7, and RWR-Q were prepared correctly.

#### **Previously unquantified reduction strategies**

The GGRS also included several reduction strategies that were not quantified, including:

- ▶ BEE-2 (Green Building Ordinance)
- ▶ BEE-3 (Green Building Incentives)
- ▶ BEE-4 (Community Energy Programs)
- ▶ BEE-7 (LED Traffic Lights)
- ▶ LUT-3 (Mixed-Use Developments)
- ▶ LUT-4 (Non-Residential Bike Parking)
- ▶ LUT-5 (Multi-Family Residential Bike Parking)
- ▶ OM-1 (Urban Tree Planting)
- ▶ OM-2 (Farmer's Market)
- ▶ OM-3 (Community Gardens)

Implementation of some of these strategies may provide additional emissions reductions that cannot be accurately quantified at this time, while others may support the reductions potential of other closely related strategies. Further evaluation of emissions reduction potential from these strategies was not undertaken as part of this analysis.

Table 2 on the following page presents the total statewide and GGRS measure reductions estimates for the 2020 and 2035 target years.

Table 2 Reduction Estimates Summary		
Reduction Measure	2020 Emissions Reductions (MT CO <sub>2</sub> e/yr)	2035 Emissions Reductions (MT CO <sub>2</sub> e/yr)
<b>Statewide Measures</b>		
Renewable Portfolio Standard	1,372,558	2,168,283
AB 1109	32,249	38,746
Low-Emission Vehicle III	87,427	111,666
Vehicle Efficiency Regulations	9,317	15,483
<b>Subtotal – Statewide Measures</b>	<b>1,501,551</b>	<b>2,334,178</b>
<b>GGRS Measures</b>		
BEE-5 On-site Renewable Energy Systems	10,267	18,480
LUT-6 Interconnected Bike Trails	53	140
LUT-7 Alternative Fuel Fleet	2,222	5,000
RWR-1 Reclaimed Water	1,714	4,286
RWR-Q Zero-Waste	88,889	200,000
<b>Subtotal – GGRS Measures</b>	<b>103,145</b>	<b>227,906</b>
<b>Total</b>	<b>1,604,696</b>	<b>2,562,084</b>

Notes: MT CO<sub>2</sub>e/yr = metric tons carbon dioxide equivalent per year

## TARGET ACHIEVEMENT

Table 3 on the following page demonstrates how the statewide and GGRS measure reductions described in the previous sections contribute to the achievement of the City’s near-term 2020 emissions reduction target. As shown, the City’s emissions are estimated to reach 10.3 million MT CO<sub>2</sub>e/yr by the 2020 target year. Statewide and GGRS measure reductions are estimated to reduce those emissions to approximately 8.7 million MT CO<sub>2</sub>e/yr compared to 7.6 million MT CO<sub>2</sub>e/yr in 2008. Based on the City’s estimated population and employment growth, or service population (i.e., population plus employment), the share of emissions per service population (SP) is estimated to be 5.3 MT CO<sub>2</sub>e/SP/yr in 2020. **This is below the City’s 2020 target of 6.6 MT CO<sub>2</sub>e/SP/yr, demonstrating achievement of the near-term target.**

Similarly, emissions are projected to reach 14.5 million MT CO<sub>2</sub>e/yr in 2035, with reductions totaling approximately 2,560,000 MT CO<sub>2</sub>e/yr. Based on the City’s projected service population growth through 2035, this would result in emissions of 5.5 MT CO<sub>2</sub>e/SP/yr. **This falls short of the City’s 2035 target of 3.3 MT CO<sub>2</sub>e/SP/yr.**



<b>Table 3 Target Achievement Summary</b>				
	<b>Units</b>	<b>2008</b>	<b>2020</b>	<b>2035</b>
Emissions Projections <sup>1</sup>	MT CO <sub>2</sub> e/yr	7,610,000	10,300,000	14,500,000
Reductions <sup>2</sup>	MT CO <sub>2</sub> e/yr	-	1,604,696	2,562,084
Emissions Level Achieved	MT CO <sub>2</sub> e/yr	-	8,695,304	11,937,916
Service Population <sup>3</sup>	(Population + Jobs)	1,354,757	1,650,942	2,153,261
Emissions/SP	MT CO <sub>2</sub> e/SP/yr	5.62	5.3	5.5
Emissions Target <sup>4</sup>	MT CO <sub>2</sub> e/SP/yr	-	6.6	3.3
Target Achieved	Yes/No	-	Yes	No

Notes: MT CO<sub>2</sub>e/yr = metric tons carbon dioxide equivalent per year

<sup>1</sup> Envision San José 2040 General Plan Integrated Final Program EIR, Table 3-15.2, Figure 3.15-6, Figure 3.15-7

<sup>2</sup> See Table 2

<sup>3</sup> Envision San José 2040 General Plan Integrated Final Program EIR, Table 3-15.3

<sup>4</sup> Envision San José 2040 General Plan Integrated Final Program EIR, Table 3-15.4

### **Proposed Statewide Legislation**

It should be noted that ARB has only provided quantified statewide reduction estimates through target year 2020, though it is likely that additional statewide action will be taken to further reduce emissions in order to achieve the state's 2050 reduction target (i.e., 80% below 1990 levels). While the precise impact of future statewide actions is currently unknown, new legislation has been proposed to expand the implementation of several statewide emissions reduction strategies.

Senate Bill 350, the Clean Energy and Pollution Reduction Act of 2015, is currently under review in the State Assembly. This bill recommends expanding the RPS to require that 50% of electricity provided by California's utilities come from emissions-free, RPS-compliant sources by 2030. It also recommends achieving statewide reductions in petroleum use of 50% by 2030. Lastly, it seeks to expand the state's successes in building efficiency programs to increase energy efficiency in buildings by 50% by 2030.

This proposed legislation has not yet been adopted, and therefore specific implementation pathways have not been developed. However, it demonstrates the types of actions under consideration at the state level to address California's aggressive emissions reduction strategies. As the City prepares for updates to its own emissions-reduction plans (e.g., GGRS, Green Vision), it should evaluate the status of this bill and similar legislation to determine if clearer direction is available regarding the future of state action on emissions reductions.