

| GHG Measure Reduction Summary                                                                                                             |                                             |                  |                  |                  |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|------------------|------------------|------------------|
| GHG Emission Reductions by Category                                                                                                       |                                             |                  |                  |                  |
| Category                                                                                                                                  | Annual GHG Reduction (MT CO <sub>2</sub> e) |                  |                  |                  |
|                                                                                                                                           | 2020                                        | 2030             | 2050             |                  |
| Built Environment and Transportation                                                                                                      | 6,020                                       | 229,260          | 64,459           |                  |
| Energy                                                                                                                                    | 125,140                                     | 557,948          | 684,022          |                  |
| Solid Waste                                                                                                                               | 0                                           | 79,052           | 86,052           |                  |
| Water and Wastewater                                                                                                                      | 254                                         | 17,920           | 19,738           |                  |
| Agriculture and Conservation                                                                                                              | 791                                         | 12,965           | 16,384           |                  |
| <b>TOTAL Reductions from Proposed Measures</b>                                                                                            | <b>132,205</b>                              | <b>897,145</b>   | <b>870,655</b>   |                  |
| <b>Emissions Gap: Needed reductions to meet CAP Targets after GHG Reduction Measures have been applied (MT CO<sub>2</sub>e) (Surplus)</b> | <b>-260,810</b>                             | <b>0</b>         | <b>1,382,207</b> |                  |
| Projections with Legislative Reductions                                                                                                   |                                             |                  |                  |                  |
| Category                                                                                                                                  | Annual GHG Emissions (MT CO <sub>2</sub> e) |                  |                  |                  |
|                                                                                                                                           | 2014                                        | 2020             | 2030             | 2050             |
| Built Environment and Transportation                                                                                                      | 1,492,987                                   | 1,347,494        | 1,125,161        | 1,165,847        |
| Energy                                                                                                                                    | 1,061,264                                   | 1,002,533        | 995,329          | 1,088,173        |
| Solid Waste                                                                                                                               | 338,107                                     | 358,651          | 389,610          | 411,298          |
| Water and Wastewater                                                                                                                      | 155,452                                     | 148,617          | 153,813          | 167,430          |
| Agriculture and Conservation                                                                                                              | 163,696                                     | 161,376          | 160,136          | 158,760          |
| <b>TOTAL Emissions with Legislative Reductions</b>                                                                                        | <b>3,211,505</b>                            | <b>3,018,671</b> | <b>2,824,049</b> | <b>2,991,507</b> |
| Projected Percent Reduction from 2014                                                                                                     |                                             | -6%              | -12%             | -7%              |
| CAP Targets (adjusted for percent reduction from 2014)                                                                                    |                                             | -2%              | -40%             | -77%             |
| CAP Targets (MT CO <sub>2</sub> e)                                                                                                        |                                             | 3,147,275        | 1,926,903        | 738,646          |
| Needed reductions to meet CAP Targets from 2014 levels (MT CO <sub>2</sub> e)                                                             |                                             | 64,230           | 1,284,602        | 2,472,859        |
| Needed reductions to meet CAP Targets from Legislative reductions (MT CO <sub>2</sub> e) (Surplus)                                        |                                             | -128,605         | 897,145          | 2,252,861        |
| <b>TOTAL BAU Emissions</b>                                                                                                                | <b>3,211,505</b>                            | <b>3,407,168</b> | <b>3,723,596</b> | <b>4,220,560</b> |
| Projections with Legislative Reductions and County CAP Measures                                                                           |                                             |                  |                  |                  |
| Category                                                                                                                                  | Annual GHG Emissions (MT CO <sub>2</sub> e) |                  |                  |                  |
|                                                                                                                                           | 2014                                        | 2020             | 2030             | 2050             |
| Built Environment and Transportation                                                                                                      | 1,492,987                                   | 1,341,474        | 895,901          | 1,101,388        |
| Energy                                                                                                                                    | 1,061,264                                   | 877,393          | 437,381          | 404,151          |
| Solid Waste                                                                                                                               | 338,107                                     | 358,651          | 310,558          | 325,246          |
| Water and Wastewater                                                                                                                      | 155,452                                     | 148,363          | 135,892          | 147,692          |
| Agriculture and Conservation                                                                                                              | 163,696                                     | 160,585          | 147,171          | 142,376          |
| <b>TOTAL</b>                                                                                                                              | <b>3,211,505</b>                            | <b>2,886,465</b> | <b>1,926,903</b> | <b>2,120,853</b> |
| Percent below 2014                                                                                                                        |                                             | -10%             | -40%             | -34%             |
| Additional Reductions Needed to meet CAP Targets (MT CO <sub>2</sub> e) (Surplus)                                                         |                                             | -260,810         | 0                | 1,382,207        |

| GHG Measure Reduction Summary (continued)                                                      |      |      |      |
|------------------------------------------------------------------------------------------------|------|------|------|
| Percent below 2014 by Category. Legislative reductions only                                    |      |      |      |
| Category                                                                                       | 2020 | 2030 | 2050 |
| Built Environment and Transportation                                                           | -10% | -25% | -22% |
| Energy                                                                                         | -6%  | -6%  | 3%   |
| Solid Waste                                                                                    | 6%   | 15%  | 22%  |
| Water and Wastewater                                                                           | -4%  | -1%  | 8%   |
| Agriculture and Conservation                                                                   | -1%  | -2%  | -3%  |
| Percent below 2014 by Category. Combined effect of legislative reductions and proposed actions |      |      |      |
| Category                                                                                       | 2020 | 2030 | 2050 |
| Built Environment and Transportation                                                           | -10% | -40% | -26% |
| Energy                                                                                         | -17% | -59% | -62% |
| Solid Waste                                                                                    | 6%   | -8%  | -4%  |
| Water and Wastewater                                                                           | -5%  | -13% | -5%  |
| Agriculture and Conservation                                                                   | -2%  | -10% | -13% |
| Percent below BAU by Category. Effect of proposed actions                                      |      |      |      |
| Category                                                                                       | 2020 | 2030 | 2050 |
| Built Environment and Transportation                                                           | 0%   | -20% | -6%  |
| Energy                                                                                         | -12% | -56% | -63% |
| Solid Waste                                                                                    | 0%   | -20% | -21% |
| Water and Wastewater                                                                           | 0%   | -12% | -12% |
| Agriculture and Conservation                                                                   | 0%   | -8%  | -10% |

**Built Environment and Transportation Reduction Measure Quantification**

| Assumptions                                                        |       |         |       |
|--------------------------------------------------------------------|-------|---------|-------|
|                                                                    | 2020  | 2030    | 2050  |
| San Diego County Average Electricity Emissions Factor (MTCO2e/MWh) | 0.260 | 0.237   | 0.237 |
| Natural Gas Emissions Factor (MTCO2e/therm)                        |       | 0.00685 |       |

| T-1.1                                                                            |        |           |           |           |
|----------------------------------------------------------------------------------|--------|-----------|-----------|-----------|
| Acquire Open Space Conservation Land                                             | 2014   | 2020      | 2030      | 2050      |
| Current MSCP program (2011-2016)                                                 |        |           |           |           |
| Average Annual Acres purchased                                                   | 436.93 |           |           |           |
| Dwelling Units Offset                                                            | 31     |           |           |           |
| Total Dwelling Units Offset between 2015 and 2020                                | 184    |           |           |           |
| Total Dwelling Units Offset between 2021 and 2030                                | 307    |           |           |           |
|                                                                                  |        | 2020      | 2030      | 2050      |
| Annual Dwelling Units offset due to acquisition of open space conservation lands |        | 184       | 491       | 491       |
| Building Electricity Avoided (kWh)                                               |        | 1,723,535 | 4,594,533 | 4,594,533 |
| Building Natural Gas Avoided (therms)                                            |        | 68,329    | 182,148   | 182,148   |
| Transportation Emissions Avoided (MTCO2e)                                        |        | 2,189     | 4,154     | 3,674     |
| Building Energy Emissions Avoided (MTCO2e)                                       |        | 916       | 1,090     | 1,090     |
| Waste Emissions Avoided (MTCO2e)                                                 |        | 109       | 291       | 291       |
| Water Emissions Avoided (MTCO2e)                                                 |        | 89        | 237       | 237       |

Source: Scaled from modeling results from CalEEMod 2016 for 25 single family homes in 2030.

|                                                                                                           |        |           |            |            |
|-----------------------------------------------------------------------------------------------------------|--------|-----------|------------|------------|
| Emissions per mile for Passenger and LDT1 vehicles (MTCO2e/mi) (used to scale emissions from 2030 values) |        | 2.90E-04  | 2.07E-04   | 1.83E-04   |
| Back-calculated annual VMT from transportation emissions                                                  |        | 7,536,082 | 20,089,393 | 20,089,393 |
| Building Energy Reductions                                                                                | MTCO2e | 916       | 1,090      | 1,090      |
| Transportation Emissions Reductions                                                                       | MTCO2e | 2,189     | 4,154      | 3,674      |
| Waste Emissions Reductions                                                                                | MTCO2e | 109       | 291        | 291        |
| Water Emissions Reductions                                                                                | MTCO2e | 89        | 237        | 237        |
| GHG Reductions from T-1.1 (MTCO2e)                                                                        |        | 3,303     | 5,771      | 5,291      |

| T-1.2                                                                                       |       |         |           |           |
|---------------------------------------------------------------------------------------------|-------|---------|-----------|-----------|
| Acquire Agricultural Easements                                                              | 2014  | 2020    | 2030      | 2050      |
| Annual Activity based on County estimates of \$1,500,000 in annual funding starting in 2020 |       |         |           |           |
| Total Acres Purchased by 2020                                                               | 443   |         |           |           |
| Acres per unit                                                                              | 24.60 |         |           |           |
| Dwelling Units Offset Annually                                                              | 18    |         |           |           |
| Total Dwelling Units Offset in 2020                                                         | 18    |         |           |           |
| Total Dwelling Units Offset between 2021 and 2030                                           | 180   |         |           |           |
|                                                                                             |       | 2020    | 2030      | 2050      |
| Annual Dwelling Units offset due to expanded PACE program                                   |       | 18      | 198       | 198       |
| Building Electricity Avoided (kWh)                                                          |       | 168,607 | 1,854,674 | 1,854,674 |
| Building Natural Gas Avoided (therms)                                                       |       | 6,684   | 73,528    | 73,528    |
| Transportation Emissions Avoided (MTCO2e)                                                   |       | 214     | 1,677     | 1,483     |
| Building Energy Emissions Avoided (MTCO2e)                                                  |       | 90      | 440       | 440       |
| Waste Emissions Avoided (MTCO2e)                                                            |       | 11      | 118       | 118       |
| Water Emissions Avoided (MTCO2e)                                                            |       | 9       | 95        | 95        |

Source: Scaled from modeling results from CalEEMod 2016 for 25 single family homes in 2030.

|                                                                                                           |          |          |           |           |
|-----------------------------------------------------------------------------------------------------------|----------|----------|-----------|-----------|
| Emissions per mile for Passenger and LDT1 vehicles (MTCO2e/mi) (used to scale emissions from 2030 values) | 0.00E+00 | 2.90E-04 | 2.07E-04  | 1.83E-04  |
| Back-calculated annual VMT from transportation emissions                                                  |          | 737,225  | 8,109,480 | 8,109,480 |
| Building Energy Reductions                                                                                | MTCO2e   | 90       | 440       | 440       |
| Transportation Emissions Reductions                                                                       | MTCO2e   | 214      | 1,677     | 1,483     |
| Waste Emissions Reductions                                                                                | MTCO2e   | 11       | 118       | 118       |
| Water Emissions Reductions                                                                                | MTCO2e   | 9        | 95        | 95        |
| GHG Reductions from T-1.2 (MTCO2e)                                                                        |          | 323      | 2,330     | 2,136     |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| T-1.3                  |      |      |      |      |
|------------------------|------|------|------|------|
| Update Community Plans | 2014 | 2020 | 2030 | 2050 |

Measure assumes that reductions from other street-transforming measures affect areas outside of these 19 Community Plans.

**Background Calculations**

| Number                                                                                                  | Community Plan Area Name | 2016 Population Estimate |
|---------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|
| 1                                                                                                       | Alpine                   | 5,701                    |
| 2                                                                                                       | Bonsall                  | 1,451                    |
| 3                                                                                                       | Central Mountain         | 1,854                    |
| 4                                                                                                       | County Islands           | 2,427                    |
| 5                                                                                                       | Desert                   | 711                      |
| 6                                                                                                       | Fallbrook                | 27,508                   |
| 7                                                                                                       | Julian                   | 55                       |
| 8                                                                                                       | Lakeside                 | 55,251                   |
| 9                                                                                                       | Mountain Empire          | 1,025                    |
| 10                                                                                                      | North County Metro       | 28,033                   |
| 11                                                                                                      | North Mountain           | 123                      |
| 12                                                                                                      | Pala-Pauma               | 803                      |
| 13                                                                                                      | Rainbow                  | -                        |
| 14                                                                                                      | Ramona                   | 9,550                    |
| 15                                                                                                      | San Dieguito             | 16,889                   |
| 16                                                                                                      | Spring Valley            | 61,401                   |
| 17                                                                                                      | Sweetwater               | 10,083                   |
| 18                                                                                                      | Valle De Oro             | 21,292                   |
| 19                                                                                                      | Valley Center            | 216                      |
| Population Affected by the 19 Community Plans (excluding Specific Plan Areas, Otay, and Camp Pendleton) |                          | 244,372                  |

Source: County of San Diego 2017

|                                                                                         | 2014          | 2020          | 2030          | 2050          |
|-----------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
| Modified Unincorporated County Population                                               | 454,599       | 493,604       | 551,712       | 600,560       |
| Population affected by Community Plan updates (assumes 2016 population remains in 2020) |               | 244,372       | 280,210       | 310,953       |
| Percent of Population/VMT affected                                                      |               | 50%           | 51%           | 52%           |
| Passenger and LDT1 VMT (excluding non-unincorporated County employee commute)           | 1,654,960,756 | 1,906,820,493 | 2,186,461,667 | 2,426,351,442 |
| VMT affected by Community Plan updates                                                  |               | 944,022,641   | 1,110,485,989 | 1,256,297,888 |
| Percent of Plans Implemented                                                            |               | 0%            | 50%           | 100%          |

**CAPCOA LUT-9: Improve Design of Development (note that CAPCOA mislabels LUT-9 as LUT-8)**

|                        |       |
|------------------------|-------|
| % VMT Reduction (Low)  | 3%    |
| % VMT Reduction (High) | 21%   |
| Median Percentage      | 12.2% |
| % VMT reduction        | 12.2% |

**Emissions Reductions**

|                                                                             |           |            |             |
|-----------------------------------------------------------------------------|-----------|------------|-------------|
| Annual VMT Reduced                                                          | -         | 67,462,024 | 152,640,193 |
| Emissions per mile for Passenger and LDT1 vehicles (MTCO <sub>2e</sub> /mi) | 0.0002905 | 0.0002068  | 0.0001829   |
| Emissions Reductions (MTCO <sub>2e</sub> )                                  | -         | 13,949     | 27,913      |
| GHG Reductions from T-1.3 (MTCO <sub>2e</sub> )                             | -         | 13,949     | 27,913      |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| <b>T-2.1</b>                                                                  |               |               |               |               |
|-------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
| <b>Improve Roadway Segments as Multi-Modal</b>                                |               |               |               |               |
|                                                                               | <b>2014</b>   | <b>2020</b>   | <b>2030</b>   | <b>2050</b>   |
| Passenger and LDT1 VMT (excluding non-unincorporated County employee commute) | 1,654,960,756 | 1,906,820,493 | 2,186,461,667 | 2,426,351,442 |
| New Passenger and LDT1 VMT since 2020 (for calculation of T-2.2)              |               | 0             | 279,641,173   | 519,530,949   |

**CAPCOA SDT-2 ( Percent reduction in VMT for rural contexts)**

| % of streets with improvements       |                 |            |       |            |       |            |       |
|--------------------------------------|-----------------|------------|-------|------------|-------|------------|-------|
|                                      | <b>5%</b>       | <b>10%</b> | 25%   | <b>36%</b> | 50%   | <b>61%</b> | 100%  |
| % of intersections with improvements | % VMT Reduction |            |       |            |       |            |       |
| <b>5%</b>                            | 0.02%           | 0.04%      | 0.12% | 0.13%      | 0.17% | 0.27%      | 0.42% |
| <b>10%</b>                           | 0.04%           | 0.06%      | 0.15% | 0.16%      | 0.20% | 0.29%      | 0.45% |
| 25%                                  | 0.12%           | 0.16%      | 0.25% | 0.23%      | 0.25% | 0.36%      | 0.50% |
| <b>36%</b>                           | 0.15%           | 0.17%      | 0.23% | 0.30%      | 0.38% | 0.42%      | 0.63% |
| 50%                                  | 0.17%           | 0.19%      | 0.25% | 0.38%      | 0.50% | 0.50%      | 0.75% |
| <b>61%</b>                           | 0.27%           | 0.29%      | 0.36% | 0.42%      | 0.50% | 0.55%      | 0.75% |
| 75%                                  | 0.37%           | 0.41%      | 0.50% | 0.48%      | 0.50% | 0.61%      | 0.75% |
| 100%                                 | 0.42%           | 0.44%      | 0.50% | 0.63%      | 0.75% | 0.75%      | 1%    |

Note: Bolded percentage values were interpolated based on CAPCOA estimates for 25%, 50%, 75%, and 100%.

|                                                           | 2020 | 2030 | 2050 |
|-----------------------------------------------------------|------|------|------|
| Number of Intersections Improved by X year                | 0    | 250  | 500  |
| Streets Improved by X year (measured in centerline miles) | 0    | 700  | 1200 |
| Total Number of Intersections                             | 5054 | 5054 | 5054 |
| Total Streets (measured in centerline miles)              | 1954 | 1954 | 1954 |

Source: County GIS Data dated June 16, 2016

|                                                                         | 2020 | 2030 | 2050 |
|-------------------------------------------------------------------------|------|------|------|
| Percent of intersections in the Unincorporated County with improvements | 0%   | 5%   | 10%  |
| Percent of streets in the Unincorporated County with improvements       | 0%   | 36%  | 61%  |

|                                                                             |          |            |              |
|-----------------------------------------------------------------------------|----------|------------|--------------|
| Percent Reduction in VMT under T-2.1                                        | 0.00%    | 0.13%      | 0.29%        |
| Annual VMT Reduced under T-2.1                                              | -        | 2,919,809  | 7,062,562    |
| Annual VMT Reduced under T-2.1 (from new VMT as of 2020 only)               | -        | 373,434    | 1,512,237    |
| Emissions per mile for Passenger and LDT1 vehicles (MTCO <sub>2</sub> e/mi) | 2.90E-04 | 2.07E-04   | 1.83E-04     |
| <b>GHG Reductions from T-2.1 (MTCO<sub>2</sub>e)</b>                        | <b>-</b> | <b>604</b> | <b>1,292</b> |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| <b>T-2.2</b>                                                                                                                                                     |               |               |               |               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
| <b>Reduce New Residential and Non-Residential Development Vehicle Miles Traveled</b>                                                                             |               | <b>2020</b>   | <b>2030</b>   | <b>2050</b>   |
| Passenger and LDT1 VMT (excluding non-unincorporated County employee commute)                                                                                    | 1,654,960,756 | 1,906,820,493 | 2,186,461,667 | 2,426,351,442 |
| New Passenger and LDT1 VMT since 2020                                                                                                                            |               | 0             | 279,641,173   | 519,530,949   |
| New Passenger VMT (since 2020) reduced from other measures                                                                                                       |               |               |               |               |
|                                                                                                                                                                  | <i>T-1.1</i>  | 0             | 20,089,393    | 20,089,393    |
|                                                                                                                                                                  | <i>T-1.2</i>  | 0             | 8,109,480     | 8,109,480     |
|                                                                                                                                                                  | <i>T-2.1</i>  | 0             | 373,434       | 1,512,237     |
| Adjusted New Passenger and LDT1 VMT (assumed to represent all new household VMT)                                                                                 |               | 0             | 251,068,866   | 489,819,838   |
| Percent of Household VMT for commuting (AASHTO 2013)                                                                                                             | 28%           |               |               |               |
| New County Commute VMT from Adjusted Passenger and LDT1 VMT since 2020                                                                                           |               | -             | 70,299,283    | 137,149,555   |
| New Jobs in Unincorporated County since 2020                                                                                                                     |               |               | 8,487         | 34,117        |
| Annual VMT per employee                                                                                                                                          |               |               | 8,283         | 4,020         |
| <b>Target</b>                                                                                                                                                    |               |               |               |               |
| Target Percent Reduction in New Commute VMT starting in 2020                                                                                                     |               | 0%            | 15.0%         | 15%           |
| Annual VMT reduced under T-2.2                                                                                                                                   |               | -             | 10,544,892    | 20,572,433    |
| Target Average Annual VMT per employee                                                                                                                           |               |               | 7,041         | 3,417         |
| <b>CAPCOA Percent Commute VMT reduction from TRT-1, TRT-2, and TRT-3</b>                                                                                         |               |               |               |               |
| CAPCOA TRT-1 Percent Shift in Vehicle Mode Share of Commute Trips for Participating Employees (Commute Trip Reduction Programs - Voluntary) - Low Density Suburb | 5.2%          |               |               |               |
| CAPCOA TRT-2 Percent Shift in Vehicle Mode Share of Commute Trips for Participating Employees (Commute Trip Reduction Programs with Monitoring)                  | 21.0%         |               |               |               |
| CAPCOA TRT-3 Percent Shift in Vehicle Mode Share of Commute Trips with a Ride Sharing Program - Low Density Suburb                                               | 5%            |               |               |               |
|                                                                                                                                                                  |               | 2020          | 2030          | 2050          |
| <b>Percent of New Employees eligible/participating in TDM programs (Required to meet the Target Percent Reduction in Commute VMT)</b>                            |               |               |               |               |
| Commute Trip Reduction Programs - Voluntary (TRT-1)                                                                                                              |               | 0%            | 100%          | 100%          |
| Commute Trip Reduction Programs - Monitored (TRT-2)                                                                                                              |               | 0%            | 33%           | 33%           |
| Commute Trip Reduction Programs - Ride Sharing (TRT-3)                                                                                                           |               | 0%            | 62%           | 62%           |
| Total Participation Rate                                                                                                                                         |               | 0%            | 5%            | 5%            |
|                                                                                                                                                                  |               | 0%            | 100%          | 100%          |
| Emissions per mile for Passenger and LDT1 vehicles (MTCO <sub>2</sub> e/mi)                                                                                      | 0.00E+00      | 2.90E-04      | 2.07E-04      | 1.83E-04      |
| GHG Reductions from T-2.2 (MTCO <sub>2</sub> e)                                                                                                                  |               | -             | 2,180         | 3,762         |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| <b>T-2.3</b>                                                                |             |             |             |             |
|-----------------------------------------------------------------------------|-------------|-------------|-------------|-------------|
| <b>Reduce County Employee Vehicle Miles Traveled</b>                        | <b>2014</b> | <b>2020</b> | <b>2030</b> | <b>2050</b> |
| County employee commute miles (scaled by change in employee forecast) (VMT) | 155,043,720 | 156,969,260 | 160,178,494 | 166,596,960 |
| County Employee Count Forecast                                              | 19,205      | 19,444      | 19,841      | 20,636      |
| Emissions per mile for Passenger and LDT1 vehicles (MTCO2e/mi)              | 0.00E+00    | 2.90E-04    | 2.07E-04    | 1.83E-04    |
| Forecasted emissions from County Employee Commuting (MTCO2e)                | -           | 45,595      | 33,119      | 30,465      |
| Percent reduction in employee commute miles <b>below 2014 levels</b>        |             | 0%          | 20%         | 20%         |
| Annual employee commute miles after reduction (VMT)                         |             | 156,969,260 | 124,034,976 | 124,034,976 |
| Annual reduction in employee commute miles from forecasts (VMT)             |             | -           | 36,143,517  | 42,561,984  |
| Forecasted commute emissions after reduction (MTCO2e)                       |             | 45,595      | 25,646      | 22,682      |
| Forecasted commute emissions after reduction (MTCO2e)                       |             | 45,595      | 22,440      | 19,847      |
| GHG Reductions from T-2.3 (MTCO2e)                                          |             | -           | 7,473       | 7,783       |

  

| <b>T-2.4</b>                                                                                                                           |               |               |               |               |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|
| <b>Shared and Reduced Parking in New Non-Residential Development</b>                                                                   | <b>2014</b>   | <b>2020</b>   | <b>2030</b>   | <b>2050</b>   |
| Passenger and LDT1 VMT (excluding non-unincorporated County employee commute)                                                          | 1,654,960,756 | 1,906,820,493 | 2,186,461,667 | 2,426,351,442 |
| New Passenger VMT (since 2020)                                                                                                         |               | 0             | 279,641,173   | 519,530,949   |
| New Passenger VMT (since 2020) reduced from other measures                                                                             |               |               |               |               |
| <i>T-1.1</i>                                                                                                                           |               | 0             | 20,089,393    | 20,089,393    |
| <i>T-1.2</i>                                                                                                                           |               | 0             | 8,109,480     | 8,109,480     |
| <i>T-2.1</i>                                                                                                                           |               | 0             | 373,434       | 1,512,237     |
| <i>T-2.2</i>                                                                                                                           |               | 0             | 10,544,892    | 20,572,433    |
| Adjusted New VMT                                                                                                                       |               | 0             | 240,523,974   | 469,247,405   |
| Percent of Household VMT for commuting (AASHTO 2013)                                                                                   | 28%           |               |               |               |
| New Commute VMT                                                                                                                        |               | -             | 67,346,713    | 131,389,273   |
| <i>Reductions in Commute VMT from other measures not included as the percent reduction is from the forecasted commute VMT</i>          |               |               |               |               |
| Target Percent VMT reduction from New Commute VMT                                                                                      |               | 0%            | 10%           | 10%           |
| Calculated Percent Reduction in Parking Spaces at new Non-residential land uses to achieve the target percent reduction (CAPCOA PDT-1) |               | 0%            | 20%           | 20%           |
| VMT reduction under this measure                                                                                                       |               | -             | 6,734,671     | 13,138,927    |
| Emissions per mile for Passenger and LDT1 vehicles (MTCO2e/mi)                                                                         |               | 0.00029047    | 0.000206765   | 0.000182867   |
| GHG Reductions from T-2.4 (MTCO2e)                                                                                                     |               | -             | 1,392         | 2,403         |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| T-3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |      |        |        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------|--------|--------|
| MEASURE REMOVED                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |      |        |        |
| T-3.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |      |        |        |
| Use Alternative Fuels in County Projects                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2014  | 2020 | 2030   | 2050   |
| <i>Measure assumes the level of conversion from diesel to alternative fuels is proportional to level of emissions reductions from such actions. Measure also assumes that any emissions related to additional electricity use from converted equipment are negligible. Emissions from electricity use would decrease in future years due to the increasing renewable energy mix in the electricity generation. This measure only applies to construction equipment in the County fleet.</i> |       |      |        |        |
| County-Only (Municipal) Construction Equipment Emissions (MTCO <sub>2</sub> e) from CRIS database and Municipal Forecast                                                                                                                                                                                                                                                                                                                                                                    | 431   | 381  | 364    | 369    |
| Percent County construction fuel offset due to conversion of equipment to renewable diesel or electric fuel sources                                                                                                                                                                                                                                                                                                                                                                         |       | 0%   | 100%   | 100%   |
| Construction Equipment Emission offset by renewable and electric conversions (MTCO <sub>2</sub> e)                                                                                                                                                                                                                                                                                                                                                                                          |       | -    | 364    | 369    |
| Diesel fuel emission factors (kg CO <sub>2</sub> /gal) (The Climate Registry 2016)                                                                                                                                                                                                                                                                                                                                                                                                          | 10.21 |      |        |        |
| Approximate diesel fuel use offset by electric conversions (gal)                                                                                                                                                                                                                                                                                                                                                                                                                            |       | -    | 35,653 | 36,143 |
| GHG Reductions from T-3.2 (MTCO <sub>2</sub> e)                                                                                                                                                                                                                                                                                                                                                                                                                                             |       | -    | 364    | 369    |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| T-3.3                                                                                                                                                                                                                                    |      |      |                |      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|----------------|------|
| Develop a Local Vehicle Retirement Program                                                                                                                                                                                               | 2014 | 2020 | 2030           | 2050 |
| <i>Measure assumes any replaced vehicles are replaced with the average light-duty vehicle in the same year, as a conservative approach. Newer vehicles would have even lower emission factors.</i>                                       |      |      |                |      |
|                                                                                                                                                                                                                                          |      |      | 0.38           |      |
|                                                                                                                                                                                                                                          |      |      | 4,248.01       |      |
| <b>Light Duty Vehicles MY1996 or older County-wide (LDA, LDT1, LDT2, and MDV)</b>                                                                                                                                                        |      |      |                |      |
| Vehicle Population (EMFAC2014 forecasts)                                                                                                                                                                                                 |      |      | 28,600         |      |
| Annual VMT                                                                                                                                                                                                                               |      |      | 97,786,270     |      |
| Annual VMT per vehicle                                                                                                                                                                                                                   |      |      | 3,419          |      |
| <b>Light Duty Vehicles MY1997 or newer County-wide (LDA, LDT1, LDT2, and MDV)</b>                                                                                                                                                        |      |      |                |      |
| Vehicle Population (EMFAC2014 forecasts)                                                                                                                                                                                                 |      |      | 2,581,230      |      |
| Annual VMT                                                                                                                                                                                                                               |      |      | 27,086,935,423 |      |
| Annual VMT per vehicle                                                                                                                                                                                                                   |      |      | 10,494         |      |
| <b>Average Emission Factor for Light Duty Vehicles MY1996 or older in San Diego County (g CO<sub>2</sub>/mi)</b>                                                                                                                         |      |      | 396            |      |
| <b>Average Emission Factor for Light Duty Vehicles MY1997 or older in San Diego County (g CO<sub>2</sub>/mi)</b>                                                                                                                         |      |      | 214            |      |
| CO <sub>2</sub> to CO <sub>2</sub> e Conversion factor used in inventory for transportation emissions                                                                                                                                    |      |      | 1.01           |      |
| <b>Average Emission Factor for Light Duty Vehicles MY1996 or older in San Diego County (g CO<sub>2</sub>e/mi)</b>                                                                                                                        |      |      | 400            |      |
| <b>Average Emission Factor for Light Duty Vehicles MY1997 or older in San Diego County (g CO<sub>2</sub>e/mi)</b>                                                                                                                        |      |      | 216            |      |
| Total Number of MY1996 vehicles removed                                                                                                                                                                                                  |      |      | 1,600          |      |
| Replacement Rate (based on 2013 ARB Survey Report) ( <a href="https://www.arb.ca.gov/msprog/aqip/EFMP_Update_Staff_Report_November_2013.pdf">https://www.arb.ca.gov/msprog/aqip/EFMP_Update_Staff_Report_November_2013.pdf</a> ) page 34 |      |      | 48%            |      |
| Annual VMT from retired vehicles                                                                                                                                                                                                         |      |      | 5,470,653      |      |
| Annual VMT from replacement vehicles                                                                                                                                                                                                     |      |      | 16,790,094     |      |
| Emissions from old vehicles (MTCO <sub>2</sub> e)                                                                                                                                                                                        |      |      | 2,187          |      |
| Emissions from replaced vehicles (MTCO <sub>2</sub> e)                                                                                                                                                                                   |      |      | 1,742          |      |
| Emissions Reductions (MTCO <sub>2</sub> e)                                                                                                                                                                                               |      |      | 446            |      |
| GHG Reductions from T-3.3 (MTCO <sub>2</sub> e)                                                                                                                                                                                          |      |      | 446            |      |

**Built Environment and Transportation Reduction Measure Quantification (Continued)**

| T-3.4                                                                                                                                                                                                      |                                                                                                                                   |                |                |                |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|--------|
| Reduce the County's Fleet Emissions                                                                                                                                                                        |                                                                                                                                   | 2014           | 2020           | 2030           | 2050   |
| Forecasted BAU Emissions by Fuel from County Fleet Operations (MTCO2e)                                                                                                                                     |                                                                                                                                   | 2014           | 2020           | 2030           | 2050   |
| CNG                                                                                                                                                                                                        |                                                                                                                                   | 40             | 41             | 42             | 43     |
| Diesel                                                                                                                                                                                                     |                                                                                                                                   | 4,061          | 3,916          | 3,779          | 3,860  |
| Gasoline                                                                                                                                                                                                   |                                                                                                                                   | 22,063         | 19,985         | 14,544         | 13,152 |
| Total                                                                                                                                                                                                      |                                                                                                                                   | 26,164         | 23,942         | 18,365         | 17,055 |
| Fuel Type                                                                                                                                                                                                  | Scaling Factors for business-as-usual forecasted emissions                                                                        |                |                |                |        |
| CNG                                                                                                                                                                                                        | No change                                                                                                                         |                |                |                |        |
| Diesel                                                                                                                                                                                                     | Includes additional construction emissions from capitol projects anticipated through 2020. Assumes emissions constant after 2020. |                |                |                |        |
| Gasoline                                                                                                                                                                                                   | No change                                                                                                                         |                |                |                |        |
|                                                                                                                                                                                                            |                                                                                                                                   | 2020           | 2030           | 2050           |        |
| Percent reduction in vehicle fleet emissions below future forecasts years                                                                                                                                  |                                                                                                                                   | 10%            | 20%            | 20%            |        |
| Target fleet emissions after reduction (MTCO2e)                                                                                                                                                            |                                                                                                                                   | 21,548         | 14,692         | 13,644         |        |
| Annual reduction in fleet emissions from forecast (MTCO2e)                                                                                                                                                 |                                                                                                                                   | 2,394          | 3,673          | 3,411          |        |
| GHG Reductions from T-3.4 (MTCO2e)                                                                                                                                                                         |                                                                                                                                   | 2,394          | 3,673          | 3,411          |        |
| T-3.5                                                                                                                                                                                                      |                                                                                                                                   |                |                |                |        |
| Install Electric Vehicle Charging Stations                                                                                                                                                                 |                                                                                                                                   | 2020           | 2030           | 2050           |        |
| The reductions calculated for this measure are assumed to achieve reductions above and beyond those forecasted by the State.                                                                               |                                                                                                                                   |                |                |                |        |
| EMFAC2014 Outputs for San Diego County                                                                                                                                                                     |                                                                                                                                   |                |                |                |        |
| Total Vehicle Miles per day (All vehicle types)                                                                                                                                                            |                                                                                                                                   | 82,315,741     | 89,623,697     | 100,696,455    |        |
| VMT/year                                                                                                                                                                                                   |                                                                                                                                   | 30,045,245,368 | 32,712,649,577 | 36,754,206,224 |        |
| Number of EVs                                                                                                                                                                                              |                                                                                                                                   | 28,999         | 188,321        | 330,314        |        |
| Unincorporated San Diego County Adjustments                                                                                                                                                                |                                                                                                                                   |                |                |                |        |
| SANDAG unincorporated VMT/year                                                                                                                                                                             |                                                                                                                                   | 3,240,906,504  | 3,546,863,373  | 3,945,087,154  |        |
| Unincorporated percentage of regional VMT                                                                                                                                                                  |                                                                                                                                   | 11%            | 11%            | 11%            |        |
| Number of EVs in Unincorporated County                                                                                                                                                                     |                                                                                                                                   | 3,128          | 20,419         | 35,455         |        |
| 10% of EVs                                                                                                                                                                                                 |                                                                                                                                   | 313            | 2,042          | 3,545          |        |
| 10% of EVs (rounded)                                                                                                                                                                                       |                                                                                                                                   | 310            | 2,040          | 3,550          |        |
| Emissions from EV Charger Usage                                                                                                                                                                            |                                                                                                                                   |                |                |                |        |
| Number of Chargers installed by 2030 (no additional targets set for 2050)                                                                                                                                  |                                                                                                                                   | -              | 2,040          | 2,040          |        |
| Number of Connections per Charge                                                                                                                                                                           |                                                                                                                                   | 0              | 2              | 2              |        |
| Average Charging hours per Connection per day                                                                                                                                                              |                                                                                                                                   | 0              | 3              | 3              |        |
| Number of hours of charge per year for all chargers (h/year)                                                                                                                                               |                                                                                                                                   | -              | 4,169,760      | 4,169,760      |        |
| Average Efficiency of EV LDV (kWh/100-mi) (1)                                                                                                                                                              |                                                                                                                                   | 34             | 34             | 34             |        |
| GHG Emissions per MWh in San Diego (MTCO2e/MWh)                                                                                                                                                            |                                                                                                                                   | 0.260          | 0.237          | 0.237          |        |
| Charger Power (kW) (Level 2 - High) (2)                                                                                                                                                                    |                                                                                                                                   | 6.6            | 6.6            | 6.6            |        |
| Charged amount (kWh)                                                                                                                                                                                       |                                                                                                                                   | -              | 27,520,416     | 27,520,416     |        |
| EV emissions (MT CO2e)                                                                                                                                                                                     |                                                                                                                                   | -              | 6,526          | 6,526          |        |
| Source:                                                                                                                                                                                                    |                                                                                                                                   |                |                |                |        |
| (1) <a href="http://www.fueleconomy.gov/feg/download.shtml">http://www.fueleconomy.gov/feg/download.shtml</a> (Without EV efficiency forecasts, EV efficiency assumed to be the same for all future years) |                                                                                                                                   |                |                |                |        |
| (2) <a href="https://www.driveclean.ca.gov/pev/Charging.php">https://www.driveclean.ca.gov/pev/Charging.php</a>                                                                                            |                                                                                                                                   |                |                |                |        |
| Emissions from Equivalent Gasoline/Diesel Vehicles                                                                                                                                                         |                                                                                                                                   |                |                |                |        |
| Equivalent Annual VMT (mi)                                                                                                                                                                                 |                                                                                                                                   | -              | 81,837,791     | 81,837,791     |        |
| Avg GHG Emissions per mi for Gasoline/Diesel Passenger and LDT1 vehicles (gCO2/mi) (EMFAC2014)                                                                                                             |                                                                                                                                   | 296            | 224            | 201            |        |
| CO2 to CO2e Conversion factor used in inventory for transportation emissions                                                                                                                               |                                                                                                                                   | 1.01           | 1.01           | 1.01           |        |
| GHG Emissions per mi for average gasoline LDV (gCO2e/mi)                                                                                                                                                   |                                                                                                                                   | 299            | 226            | 203            |        |
| Equivalent Gasoline emissions (MT CO2e)                                                                                                                                                                    |                                                                                                                                   | -              | 18,514         | 16,626         |        |
| Emissions Reductions                                                                                                                                                                                       |                                                                                                                                   |                |                |                |        |
| Emissions reductions (MT CO2e)                                                                                                                                                                             |                                                                                                                                   | -              | 11,987         | 10,100         |        |
| Emissions reductions per hour of charge (kg CO2e/h)                                                                                                                                                        |                                                                                                                                   |                | 2.9            | 2.4            |        |
| GHG Reductions from T-3.5 (MTCO2e)                                                                                                                                                                         |                                                                                                                                   | -              | 11,987         | 10,100         |        |

## Energy Reduction Measure Quantification

| Assumptions                                                         |       |         |       |
|---------------------------------------------------------------------|-------|---------|-------|
|                                                                     | 2020  | 2030    | 2050  |
| San Diego County Average Electricity Emissions Factor (MTCO2e/MWh)  | 0.260 | 0.237   | 0.237 |
| SD County Average Electricity EF with E-2.1                         | 0.000 | 0.045   | 0.040 |
| SD County Local Government Electricity Emission Factor (MTCO2e/MWh) | 0.317 | 0.237   | 0.237 |
| Natural Gas Emissions Factor (MTCO2e/therm)                         |       | 0.00685 |       |
| Propane Emissions Factor (MTCO2e/therm)                             |       | 0.00627 |       |

| E-1.1                                                 |      |      |      |
|-------------------------------------------------------|------|------|------|
| Improve Building Energy Efficiency in New Development | 2014 | 2020 | 2030 |
|                                                       | 2050 |      |      |

This calculates the reductions in energy usage solely due to the measure's energy efficiency targets and eventual zero net energy standard in 2020 for residential and 2030 for Non-residential. This calculation assumes energy efficiency gains under this measure only apply to commercial/industrial uses. This measure does not apply to agricultural energy uses.

If the State Energy Efficiency Code is amended to require building energy efficiency exceed 10% above the 2016 code, then the revised State requirement would supercede this measure.

|                                                                 |         |         |         |         |
|-----------------------------------------------------------------|---------|---------|---------|---------|
| Modified Unincorporated County Population                       | 454,599 | 493,604 | 551,712 | 600,560 |
| Modified Unincorporated County Jobs - Commercial and Industrial | 85,742  | 95,671  | 104,157 | 129,788 |

### Residential

|                                                             |            |            |            |            |
|-------------------------------------------------------------|------------|------------|------------|------------|
| Forecast energy usage (w/o 2016 code, scaled by population) |            |            |            |            |
| Electricity (MWh)                                           | 1,377,278  | 1,495,449  | 1,671,495  | 1,819,488  |
| Natural Gas (therms)                                        | 28,860,437 | 31,336,685 | 35,025,673 | 38,126,823 |

|                                                                             |  |           |           |           |
|-----------------------------------------------------------------------------|--|-----------|-----------|-----------|
| New Energy Use Only (w/o 2016 code, difference between future and existing) |  |           |           |           |
| Electricity (MWh)                                                           |  | 118,172   | 294,217   | 442,210   |
| Natural Gas (therms)                                                        |  | 2,476,248 | 6,165,237 | 9,266,387 |

|                                    |  |           |           |           |
|------------------------------------|--|-----------|-----------|-----------|
| New Energy Use Only (w/ 2016 code) |  |           |           |           |
| Electricity (MWh)                  |  | 63,813    | 158,877   | 238,794   |
| Natural Gas (therms)               |  | 1,337,174 | 3,329,228 | 5,003,849 |

|                                                                          |  |               |     |     |
|--------------------------------------------------------------------------|--|---------------|-----|-----|
| Percent better than 2016 Title 24 Standards for Residential Construction |  |               |     |     |
| Applicable standard for new construction                                 |  | 0%            | 0%  | 0%  |
|                                                                          |  | Measure E-1.1 | ZNE | ZNE |

|                                                         |           |           |           |           |
|---------------------------------------------------------|-----------|-----------|-----------|-----------|
| Adjusted Energy Use from buildings built through years: | 2014-2017 | 2018-2019 | 2020-2029 | 2040-2050 |
| Electricity (MWh)                                       | 42,542    | 21,271    | 95,065    | 34,599    |
| Natural Gas (therms)                                    | 891,449   | 445,725   | 1,992,054 | 725,019   |

|                                          |  |           |           |           |
|------------------------------------------|--|-----------|-----------|-----------|
| Cumulative Energy use from New Buildings |  |           |           |           |
| Electricity (MWh)                        |  | 63,813    | 158,877   | 238,794   |
| Natural Gas (therms)                     |  | 1,337,174 | 3,329,228 | 5,003,849 |

|                                 |  |   |   |   |
|---------------------------------|--|---|---|---|
| Energy Reductions from Baseline |  |   |   |   |
| Electricity (MWh)               |  | - | - | - |
| Natural Gas (therms)            |  | - | - | - |

|                               |  |   |   |   |
|-------------------------------|--|---|---|---|
| Emissions Reductions (MTCO2e) |  |   |   |   |
| Electricity                   |  | - | - | - |
| Natural Gas                   |  | - | - | - |

## Energy Reduction Measure Quantification (Continued)

| E-1.1 (Continued)                                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                             |                             |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------|-----------------------------|------------|
| Improve Building Energy Efficiency in New Development                                                                                                                                                                                                                                                                                                                                                                                                    | 2014       | 2020                        | 2030                        | 2050       |
| <b>Commercial/Industrial</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |            |                             |                             |            |
| Forecast energy usage (w/o 2016 code, scaled by jobs)                                                                                                                                                                                                                                                                                                                                                                                                    |            |                             |                             |            |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 | 957,016    | 1,067,836                   | 1,162,562                   | 1,448,639  |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              | 22,744,894 | 25,378,685                  | 27,629,983                  | 34,429,035 |
| New Energy Use Only (w/o 2016 code, difference between future and existing)                                                                                                                                                                                                                                                                                                                                                                              |            |                             |                             |            |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | 110,820                     | 205,545                     | 491,623    |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              |            | 2,633,791                   | 4,885,089                   | 11,684,141 |
| New Energy Use Only (w/ 2016 code)                                                                                                                                                                                                                                                                                                                                                                                                                       |            |                             |                             |            |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | 73,695                      | 136,688                     | 326,929    |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              |            | 1,751,471                   | 3,248,584                   | 7,769,954  |
| Percent better than 2016 Title 24 Standards for Non-residential Construction                                                                                                                                                                                                                                                                                                                                                                             |            | 0%                          | 10%                         | 100%       |
| <i>Applicable standard for new construction</i>                                                                                                                                                                                                                                                                                                                                                                                                          |            | <i>Standard under E-1.1</i> | <i>Standard under E-1.1</i> | <i>ZNE</i> |
| Adjusted Energy Use from buildings built through years:                                                                                                                                                                                                                                                                                                                                                                                                  | 2014-2017  | 2018-2019                   | 2020-2029                   | 2040-2050  |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 | 49,130     | 24,565                      | 56,693                      | -          |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              | 1,167,647  | 583,824                     | 1,347,402                   | -          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            | 2020                        | 2030                        | 2050       |
| Cumulative Energy use from New Buildings                                                                                                                                                                                                                                                                                                                                                                                                                 |            |                             |                             |            |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | 73,695                      | 130,388                     | 130,388    |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              |            | 1,751,471                   | 3,098,873                   | 3,098,873  |
| Energy Reductions from Baseline                                                                                                                                                                                                                                                                                                                                                                                                                          |            |                             |                             |            |
| <i>Electricity (MWh)</i>                                                                                                                                                                                                                                                                                                                                                                                                                                 |            | -                           | 6,299                       | 196,541    |
| <i>Natural Gas (therms)</i>                                                                                                                                                                                                                                                                                                                                                                                                                              |            | -                           | 149,711                     | 4,671,081  |
| Emissions Reductions (MTCO2e)                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                             |                             |            |
| <i>Electricity</i>                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | -                           | 1,494                       | 46,607     |
| <i>Natural Gas</i>                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | -                           | 1,026                       | 31,997     |
| <b>Commercial and Residential</b>                                                                                                                                                                                                                                                                                                                                                                                                                        |            |                             |                             |            |
| Emissions Reductions (MTCO2e)                                                                                                                                                                                                                                                                                                                                                                                                                            |            |                             |                             |            |
| <i>Electricity</i>                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | -                           | 1,494                       | 46,607     |
| <i>Natural Gas</i>                                                                                                                                                                                                                                                                                                                                                                                                                                       |            | -                           | 1,026                       | 31,997     |
| <p><i>Note: ZNE aims for a net zero usage in energy, which does not necessarily translate to net zero emissions because natural gas and electricity have different emission factors. If roof-top solar is being used to offset overall energy usage, the reductions in emissions would be greater because there are more emissions reductions per unit of energy for electricity than for natural gas, based on estimated SDGE emission factors.</i></p> |            |                             |                             |            |
| GHG Reductions from E-1.1 (MTCO2e)                                                                                                                                                                                                                                                                                                                                                                                                                       |            | -                           | 2,519                       | 78,604     |

## Energy Reduction Measure Quantification (Continued)

| E-1.2                                                            |  |      |      |
|------------------------------------------------------------------|--|------|------|
| Use Alternately-powered Water Heaters in Residential Development |  | 2020 | 2030 |
|                                                                  |  |      | 2050 |

Note: Only homes not connected to natural gas utilities are allowed to install electric water heaters (See 2016 California Energy Code, Title 24 Part 6). Measure is conservative in that it assumes no water heaters are converted to solar, which would result in more GHG reductions.

|                                                                                                             |  |             |
|-------------------------------------------------------------------------------------------------------------|--|-------------|
| Percent of natural gas use in homes by end use in California (assumed to apply to propane -only homes also) |  | <b>2009</b> |
| Space Heating                                                                                               |  | 25%         |
| Water Heating                                                                                               |  | 34%         |
| Cooking                                                                                                     |  | 25%         |
| Other                                                                                                       |  | 16%         |
| Water heating usage by fuel type                                                                            |  | <b>2009</b> |
| Natural Gas                                                                                                 |  | 85%         |
| Electric                                                                                                    |  | 11%         |
| Propane                                                                                                     |  | 4%          |

Source: EIA 2009. <http://www.eia.gov/consumption/residential/data/2009/>

Note: This is based on most recent data from the US. Energy Information Administration as of May 2017. There was a survey done in 2015, but the breakdown of fuel use by end use will not be available until 2018.

<https://www.eia.gov/consumption/residential/data/2015/index.php?view=consumption>

|                                                                |    |
|----------------------------------------------------------------|----|
| Average age of natural gas water heater at replacement (years) | 13 |
|----------------------------------------------------------------|----|

|                                                                                      | Percent of existing NG/Propane water heaters by age (EIA 2009) | Assumed percent of existing NG/Propane water heaters replaced by this year by age |             |             |
|--------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------|-------------|
|                                                                                      | 2009                                                           | 2020                                                                              | 2030        | 2050        |
| Less Than 2 Years                                                                    | 16%                                                            | 0                                                                                 | 100%        | 100%        |
| 2 to 4 Years                                                                         | 16%                                                            | 0                                                                                 | 100%        | 100%        |
| 5 to 9 Years                                                                         | 30%                                                            | 50%                                                                               | 100%        | 100%        |
| 10 to 14 Years                                                                       | 18%                                                            | 100%                                                                              | 100%        | 100%        |
| 15 to 19 Years                                                                       | 7%                                                             | 100%                                                                              | 100%        | 100%        |
| 20 Years or More                                                                     | 14%                                                            | 100%                                                                              | 100%        | 100%        |
|                                                                                      | <b>2014</b>                                                    | <b>2020</b>                                                                       | <b>2030</b> | <b>2050</b> |
| Annual Residential Natural Gas Use in San Diego with Legislative Reductions (therms) | 28,860,437                                                     | 30,197,611                                                                        | 32,189,665  | 33,864,286  |
| Annual Residential Propane Gas Use in San Diego with Legislative Reductions (therms) | 1,577,792                                                      | 1,650,894                                                                         | 1,759,799   | 1,851,350   |
| Total Therms                                                                         | 30,438,228                                                     | 31,848,505                                                                        | 33,949,464  | 35,715,636  |

## Energy Reduction Measure Quantification (Continued)

## E-1.2 (Continued)

|                                                                                                                                                                                                           |            | 2020                                                                                                                                                            | 2030      | 2050      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| <b>Percent of replacement water heaters that are electric (only applicable to households that do not have natural gas connections per 2016 Energy Code)</b>                                               |            |                                                                                                                                                                 |           |           |
|                                                                                                                                                                                                           |            | 0%                                                                                                                                                              | 5%        | 5%        |
| <b>Percent of replacement water heaters that are natural gas tankless</b>                                                                                                                                 |            |                                                                                                                                                                 |           |           |
|                                                                                                                                                                                                           |            | 0%                                                                                                                                                              | 95%       | 95%       |
| <b>Natural Gas Savings from replacement of Existing Water Heaters</b>                                                                                                                                     |            |                                                                                                                                                                 |           |           |
| Natural gas usage in existing water heaters (No Action) (therms)                                                                                                                                          |            |                                                                                                                                                                 | 9,714,461 | 9,714,461 |
| Average annual natural gas usage per water heater (therms/heater) (assuming 64 gal/year and a 0.61 energy factor)                                                                                         |            |                                                                                                                                                                 |           |           |
| ( <a href="https://energy.gov/eere/femp/energy-cost-calculator-electric-and-gas-water-heaters-0#output">https://energy.gov/eere/femp/energy-cost-calculator-electric-and-gas-water-heaters-0#output</a> ) |            |                                                                                                                                                                 |           |           |
| Estimated equivalent number of water heaters replaced                                                                                                                                                     | 244        |                                                                                                                                                                 | 39,813    | 39,813    |
| Natural gas usage in <b>existing</b> water heaters after replacement (therms)                                                                                                                             |            |                                                                                                                                                                 | -         | -         |
| Natural Gas Savings from replacement of Existing Water Heaters (therms)                                                                                                                                   |            |                                                                                                                                                                 | 9,714,461 | 9,714,461 |
| Total reduction in Natural Gas Use due to Measure (therms)                                                                                                                                                |            |                                                                                                                                                                 | 9,714,461 | 9,714,461 |
| GHG Reductions from Natural Gas Savings (MTCO2e)                                                                                                                                                          |            |                                                                                                                                                                 | 66,544    | 66,544    |
| <b>Propane Savings from replacement of Existing Water Heaters</b>                                                                                                                                         |            |                                                                                                                                                                 |           |           |
| Propane usage in existing water heaters (No Action) (therms)                                                                                                                                              |            |                                                                                                                                                                 | 531,087   | 531,087   |
| Propane usage in <b>existing</b> water heaters after replacement (therms)                                                                                                                                 |            |                                                                                                                                                                 | -         | -         |
| Propane Savings from replacement of Existing Water Heaters (therms)                                                                                                                                       |            |                                                                                                                                                                 | 531,087   | 531,087   |
| Total reduction in Propane Use due to Measure (therms)                                                                                                                                                    |            |                                                                                                                                                                 | 531,087   | 531,087   |
| GHG Reductions from Propane Savings (MTCO2e)                                                                                                                                                              |            |                                                                                                                                                                 | 3,330     | 3,330     |
| <b>Additional emissions from electricity use in new water heaters in Existing Propane-only homes</b>                                                                                                      |            |                                                                                                                                                                 |           |           |
| Therms needed to heat 45 gallons of hot water (61% efficiency)                                                                                                                                            | 0.333333   |                                                                                                                                                                 |           |           |
| kWh needed to heat 45 gallons of hot water (99% efficiency)                                                                                                                                               | 6.6        |                                                                                                                                                                 |           |           |
| kwh per therm conversion for water heating                                                                                                                                                                | 19.8000198 |                                                                                                                                                                 |           |           |
| Total electricity use needed to offset propane water heating (kWh)                                                                                                                                        |            |                                                                                                                                                                 | 525,776   | 525,776   |
| Additional GHG emissions from Electricity Use (MTCO2e)                                                                                                                                                    |            |                                                                                                                                                                 | 125       | 125       |
| <b>Additional emissions from natural gas use in new NG tankless water heaters in Existing NG Homes</b>                                                                                                    |            |                                                                                                                                                                 |           |           |
| Percent savings relative to storage tank natural gas water heaters (Average)                                                                                                                              | 20%        | Source: <a href="https://energy.gov/energysaver/tankless-or-demand-type-water-heaters">https://energy.gov/energysaver/tankless-or-demand-type-water-heaters</a> |           |           |
| Total natural gas use needed for new NG tankless water heaters (therms)                                                                                                                                   |            |                                                                                                                                                                 | 7,382,990 | 7,382,990 |
| Additional GHG emissions from new NG Use (MTCO2e)                                                                                                                                                         |            |                                                                                                                                                                 | 50,573    | 50,573    |
| GHG Reductions from E-1.2 (MTCO2e)                                                                                                                                                                        |            |                                                                                                                                                                 | 19,176    | 19,176    |

## Energy Reduction Measure Quantification (Continued)

## E-1.3

## MEASURE REMOVED

| E-1.4                                            |      |      |      |      |
|--------------------------------------------------|------|------|------|------|
| Reduce Energy Use Intensity at County Facilities | 2014 | 2020 | 2030 | 2050 |

Propane and diesel use is not included in these calculations because the County primarily uses these fuels for facilities in emergency generators.

#### Electricity Use at County Facilities County-wide (MWh)

| Facility Type                                                   |         |         |         |         |
|-----------------------------------------------------------------|---------|---------|---------|---------|
| Airports                                                        | 755     | 771     | 797     | 849     |
| Buildings & Other Facilities                                    | 133,837 | 134,387 | 135,305 | 137,139 |
| Public Lighting                                                 | 7,594   | 7,879   | 8,354   | 9,305   |
| Wastewater/Water Facilities                                     | 739     | 802     | 897     | 977     |
| Total Electricity                                               | 142,925 | 143,840 | 145,353 | 148,270 |
| Total Electricity in the unincorporated County (from CRIS data) | 44,051  | 44,559  | 45,394  | 46,956  |
| Percent of Electricity use in the unincorporated County         | 31%     | 31%     | 31%     | 32%     |

#### Natural Gas Use at County Facilities (therms)

|                              |           |           |           |           |
|------------------------------|-----------|-----------|-----------|-----------|
| Airports                     | 6,730     | 6,954     | 7,329     | 8,077     |
| Buildings & Other Facilities | 2,334,004 | 2,341,919 | 2,355,110 | 2,381,492 |
| Total Natural Gas            | 2,340,734 | 2,348,873 | 2,362,438 | 2,389,568 |

| Facility Type               | Forecasting Methodology                                                                                                                                                                   |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Airport                     | County plans to construct accessory facilities at the Palomar Airport, however this project has not yet been funded through 2020. Assume no change in airport operations in future years. |
| Building & Other Facilities | County's 5-year plan through 2020. Assumed growth rate continues through 2050.                                                                                                            |
| Lighting                    | County's 5-year plan through 2020. Assumed growth rate continues through 2050.                                                                                                            |
| Wastewater/Water Facilities | County Population                                                                                                                                                                         |

| Percent reduction in energy use below 2014 levels                | 10%       | 20%       | 20%       |
|------------------------------------------------------------------|-----------|-----------|-----------|
| Target Annual Electricity Use (MWh)                              | 128,633   | 114,340   | 114,340   |
| Target Annual Natural Gas Use (Therms)                           | 2,106,661 | 1,872,587 | 1,872,587 |
| Annual Electricity Reductions (MWh)                              | 15,207    | 31,013    | 33,930    |
| Annual Electricity Reductions in the unincorporated County (MWh) | 4,711     | 9,685     | 10,745    |
| Annual Natural Gas Reductions (therms)                           | 242,212   | 489,851   | 516,981   |
| Emissions savings from reduced electricity (MTCO <sub>2</sub> e) | 4,827     | 7,346     | 8,037     |
| Emissions savings from reduced natural gas (MTCO <sub>2</sub> e) | 1,659     | 3,355     | 3,541     |
| GHG Reductions from E-1.4 (MTCO <sub>2</sub> e)                  | 6,486     | 10,702    | 11,578    |

## Energy Reduction Measure Quantification (Continued)

| E-2.1                                                                                                                                                                                                                                                                                    |                                                   |                                |           |           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------|-----------|-----------|
| Increase Renewable Electricity                                                                                                                                                                                                                                                           |                                                   | 2020                           | 2030      | 2050      |
| Background Calculations                                                                                                                                                                                                                                                                  |                                                   |                                |           |           |
| Forecasted County electricity from existing and new development (MWh)                                                                                                                                                                                                                    |                                                   | 2,633,427                      | 2,788,644 | 3,051,096 |
| Reductions from other measures (MWh)                                                                                                                                                                                                                                                     |                                                   |                                |           |           |
|                                                                                                                                                                                                                                                                                          | Existing or New                                   | Residential or Non-residential |           |           |
|                                                                                                                                                                                                                                                                                          | E-1.1 New only                                    |                                | 6,299     | 196,541   |
|                                                                                                                                                                                                                                                                                          | E-1.2 New and Existing                            |                                | -526      | -526      |
|                                                                                                                                                                                                                                                                                          | E-1.3 Existing Only                               | MEASURE REMOVED                | 0         | 0         |
|                                                                                                                                                                                                                                                                                          | New and Existing (County only) Excludes municipal |                                |           |           |
|                                                                                                                                                                                                                                                                                          | E-1.4 electricity use outside the County          |                                | 9,685     | 10,745    |
|                                                                                                                                                                                                                                                                                          | E-2.2 New only                                    |                                | 56,693    | 56,693    |
|                                                                                                                                                                                                                                                                                          | E-2.3 Existing Only                               |                                | 1,097,768 | 1,097,768 |
|                                                                                                                                                                                                                                                                                          | New and Existing (County only) Excludes municipal |                                |           |           |
|                                                                                                                                                                                                                                                                                          | E-2.4 electricity use outside the County          |                                | 7,142     | 7,242     |
|                                                                                                                                                                                                                                                                                          | T-1.1 New only                                    |                                | 4,595     | 4,595     |
|                                                                                                                                                                                                                                                                                          | T-1.2 New only                                    |                                | 169       | 1,855     |
|                                                                                                                                                                                                                                                                                          | W-1.2 Excludes electricity use outside the County |                                | 7,406     | 8,062     |
|                                                                                                                                                                                                                                                                                          | W-1.3 Excludes electricity use outside the County |                                | 73        | 73        |
|                                                                                                                                                                                                                                                                                          | W-2.1 New and Existing                            |                                | 10        | 10        |
|                                                                                                                                                                                                                                                                                          | A-1.2 New and Existing                            |                                | -1        | -6        |
|                                                                                                                                                                                                                                                                                          | Total Reductions from Other Measures              |                                | 1,189,313 | 1,383,052 |
| Note: W-1.1, A-1.1, and T-3.3 were not included. W-1.1 savings are already included in E-1.1. A-1.1 and T-3.3 are not clear as to what part of the reductions are coming from electricity vs. other fuels, so it is more conservative to assume no electric replacements are being made. |                                                   |                                |           |           |
| Non-Renewable Emissions from Local Utility (MTCO2e/MWh)                                                                                                                                                                                                                                  |                                                   |                                | 0.474     | 0.474     |
| Estimated Renewable Energy Program (REP) Emission Factor (MTCO2e/MWh)                                                                                                                                                                                                                    |                                                   |                                | 0.045     | 0.040     |
| Average SDGE Emission Factor (MTCO2e/MWh)                                                                                                                                                                                                                                                |                                                   |                                | 0.237     | 0.237     |
| REP Participation Rate                                                                                                                                                                                                                                                                   |                                                   |                                | 80%       | 90%       |
| REP Renewable Mix                                                                                                                                                                                                                                                                        |                                                   |                                | 90%       | 90%       |
| REP Member Participation Rate in 100% renewable option                                                                                                                                                                                                                                   |                                                   |                                | 6%        | 15%       |
| City of Fairfax's current participation rate with similar subsidy program for Deep Green which is limited to 100 households                                                                                                                                                              |                                                   |                                | 6%        |           |
| Overall Renewable Mix from REP (includes those choosing the 100% renewable option)                                                                                                                                                                                                       |                                                   |                                | 91%       | 92%       |
| Adjusted County Electricity Use (MWh)                                                                                                                                                                                                                                                    |                                                   |                                | 1,599,330 | 1,668,044 |
| Electricity Use of Participating Customers (MWh)                                                                                                                                                                                                                                         |                                                   |                                | 1,279,464 | 1,501,240 |
| Emissions related to Electricity Use from participating customers without REP program (MTCO2e)                                                                                                                                                                                           |                                                   |                                | 303,409   | 356,000   |
| Emissions related to Electricity Use from participating customers with REP program (MTCO2e)                                                                                                                                                                                              |                                                   |                                | 57,041    | 60,520    |
| Emissions Reductions (MTCO2e)                                                                                                                                                                                                                                                            |                                                   |                                | 246,368   | 295,480   |
| GHG Reductions from E-2.1 (MTCO2e)                                                                                                                                                                                                                                                       |                                                   |                                | 246,368   | 295,480   |

## Energy Reduction Measure Quantification (Continued)

| E-2.2                                                                                                                                                                                                                                                  |           |           |               |               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|---------------|---------------|
| Increase Renewable Energy in Non-Residential Development                                                                                                                                                                                               |           | 2020      | 2030          | 2050          |
| <i>Measure only applies to new buildings built before ZNE standards are required.</i>                                                                                                                                                                  |           |           |               |               |
| <b>Non-residential</b>                                                                                                                                                                                                                                 |           |           |               |               |
| New Non-residential grid-based Electricity Use (w/ 2016 code) (MWh)                                                                                                                                                                                    |           | 73,695    | 136,688       | 326,929       |
| Reductions from other measures that affect new Non-residential buildings (MWh)                                                                                                                                                                         | E-1.1     | -         | 6,299         | 196,541       |
| Adjusted New Non-residential grid-based Electricity Use (MWh) (Reflects new buildings built through 2029. ZNE standards applied to new buildings after 2030.)                                                                                          |           | 73,695    | 130,388       | 130,388       |
|                                                                                                                                                                                                                                                        | 2014-2017 | 2018-2019 | 2020-2029     | 2040-2050     |
| New Non-residential Electricity Use for buildings built through these years (MWh)                                                                                                                                                                      | 49,130    | 24,565    | 56,693        | -             |
| Percent of electricity from Non-residential buildings built through these years that install solar under this measure (Note that ZNE standards will begin requiring solar in 2030 for Non-residential developments. This is already captured in E 1.1) | 0%        | 0%        | 100%          | 0%            |
| Electricity offset by this measure in new Non-residential buildings built through these years (MWh)                                                                                                                                                    | 0         | 0         | 56,693        | 0             |
| New Non-residential grid-based Electricity Use for buildings built through these years AFTER SOLAR installation (MWh)                                                                                                                                  | 49,130    | 24,565    | -             | -             |
|                                                                                                                                                                                                                                                        |           | 2020      | 2030          | 2050          |
| Cumulative Adjusted New Non-residential grid-based Electricity Use for all buildings built since 2018 under this measure (MWh)                                                                                                                         |           | 73,695    | 73,695        | 73,695        |
| <b>Non-residential Electricity Reduction from solar systems under this measure (MWh)</b>                                                                                                                                                               |           | -         | <b>56,693</b> | <b>56,693</b> |
| <i>("Adjusted New Non-residential grid-based Electricity Use" minus "Cumulative Adjusted New Non-residential grid-based Electricity Use for all buildings built since 2018")</i>                                                                       |           |           |               |               |
| Total Electricity Reduction (MWh)                                                                                                                                                                                                                      |           | -         | 56,693        | 56,693        |
| GHG Reductions from E-2.2 (MTCO2e)                                                                                                                                                                                                                     |           | -         | 13,444        | 13,444        |

## Energy Reduction Measure Quantification (Continued)

| E-2.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |              |                          |                            |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|--------------|--------------------------|----------------------------|-------------------------------|
| Install Solar Photovoltaic in Existing Homes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                 |              |                          |                            |                               |
| <p><i>This assumes that buildings with solar would opt out of the Renewable Energy Program (REP). (See measure discounts in E-2.1). Also assumes that permitted solar panels are constructed six months after permits are approved. An assumption of 5.06 kW per home allows the calculated electricity generated by solar per existing home to match the average energy use per existing home in 2020. With additional improvements in energy efficiency from other measures, some homes may still see lower energy use compared to solar electricity generation post-2020.</i></p> |                                                 |              |                          |                            |                               |
| Solar permits approved from July 2013 through January 2017 for                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                 |              |                          |                            |                               |
| <b>existing and new construction</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                 | Total kW     | Total Non-residential kW | Total Residential kW       | Number of Residential Permits |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 13/14</i>                        | 32,680       | 0                        | 32,680                     | 4,583                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 14/15</i>                        | 57,359       | 8,854                    | 48,505                     | 6,165                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 15/16</i>                        | 70,617       | 7,149                    | 63,468                     | 8,674                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 16/17 (through January 2017)</i> | 27,474       | 2,374                    | 25,100                     | 3,394                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Total</i>                                    | 188,130      | 18,377                   | 169,753                    | 22,816                        |
| Annual kWh per kW in San Diego County                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |              |                          |                            |                               |
| Average solar size per residence based on average electricity demand per existing household as of 2014 (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 | 1,665        |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 | 5.06         |                          |                            |                               |
| Calculating Residential solar permits for <b>new construction only</b> with only information on number of new building permits.                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                 |              |                          |                            |                               |
| <i>Assume all new homes construct minimum solar requirement as a conservative approach.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                 |              |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Number of New Home Building Permits             | Custom Homes | Tract Homes              | Mobile Homes (Private Lot) |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 13/14</i>                        | 298          | 218                      | 39                         |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 14/15</i>                        | 351          | 292                      | 29                         |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 15/16</i>                        | 380          | 256                      | 45                         |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 16/17 (through January 2017)</i> | 206          | 53                       | 29                         |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Total</i>                                    | 1,235        | 819                      | 142                        |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Size per system (kW)                            | 5.06         | 5.06                     | 5.06                       |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Annual electricity generated per system (kWh)   | 8,433        | 8,433                    | 8,433                      |                               |
| Assumed Solar Panel Size if all New Construction installed Solar (kW)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                 |              |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Total</i>                                    | 2,810        |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 13/14</i>                        | 3,403        |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 14/15</i>                        | 3,448        |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 15/16</i>                        | 1,458        |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Fiscal Year 16/17 (through January 2017)</i> | 11,120       |                          |                            |                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <i>Total</i>                                    |              |                          |                            |                               |
| Source: County of San Diego 2017. NREL PV Watts Calculator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                 |              |                          |                            |                               |

**Energy Reduction Measure Quantification (Continued)****E-2.3 (Continued)**

| Calculated Size of <b>residential</b> solar permits approved from July 2013 through January 2017 for <b>existing buildings only</b> |         | Number of Existing<br>Months Residential Permits |        |
|-------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------------------------------------|--------|
|                                                                                                                                     | kW      |                                                  |        |
| <i>Fiscal Year 13/14</i>                                                                                                            | 29,870  | 12                                               | 4,028  |
| <i>Fiscal Year 14/15</i>                                                                                                            | 45,102  | 12                                               | 5,493  |
| <i>Fiscal Year 15/16</i>                                                                                                            | 60,020  | 12                                               | 7,993  |
| <i>Fiscal Year 16/17 (through January 2017)</i>                                                                                     | 23,642  | 7                                                | 3,106  |
| Total                                                                                                                               | 158,633 | 43                                               | 20,620 |
| Average annual size                                                                                                                 | 44,270  | N/A                                              | N/A    |

|                                                                                                                | 2014-2017 | 2018-2019 | 2020-2029 | 2040-2050 |
|----------------------------------------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|
| Target annual number of homes (residential permits approved) within these years                                | 5,754     | 10,027    | 8,200     | -         |
| Target annual size of solar permits for <b>existing residential</b> buildings approved within these years (kW) | 44,270    | 50,773    | 41,523    | -         |
| Size of solar permits approved within these years (kW)                                                         | 177,079   | 101,547   | 415,229   |           |
| Installation rate: Percent of permitted solar panel actually constructed                                       | 95%       |           |           |           |
|                                                                                                                |           | 2020      | 2030      | 2050      |
| Cumulative size of all rooftop solar systems in operation from 2014 (kW)                                       |           | 264,695   | 659,162   | 659,162   |
| Average solar size per residence (kW/unit)                                                                     |           | 5.06      | 5.06      | 5.06      |
| Target cumulative number of existing residential units with solar since 2014                                   |           | 52,273    | 130,175   | 130,175   |

|                                                                                                                                                                                                                                                      | 2020       | 2030       | 2050       |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|------------|------------|
| Annual kWh generated per kW of solar PV in San Diego County                                                                                                                                                                                          | 1,665      |            |            |
| Annual Electricity Generated by new Solar PVs from new permits in existing residences (MWh)                                                                                                                                                          | 440,822    | 1,097,768  | 1,097,768  |
| <b>Feasibility Assessment</b>                                                                                                                                                                                                                        |            |            |            |
| Existing Electricity Usage in Residential land uses (MWh)                                                                                                                                                                                            | 1,377,278  | 1,377,278  | 1,377,278  |
| Electricity Reductions from Existing Residential land uses from other Measures (MWh) (excludes measures that only affect Non-residential, new construction, or any energy use not used on existing residential land uses, such as water consumption) |            |            |            |
| <i>E-1.2</i>                                                                                                                                                                                                                                         | 0          | -526       | -526       |
| Adjusted Electricity Usage from Existing Residential land uses (MWh)                                                                                                                                                                                 | 1,377,278  | 1,377,803  | 1,377,803  |
| Number of Existing Residential units                                                                                                                                                                                                                 | 163,354    | 163,354    | 163,354    |
| Electricity Usage per Existing Residence (MWh/residence)                                                                                                                                                                                             | 8.43       | 8.43       | 8.43       |
| Number of Existing Residences with Solar under this measure                                                                                                                                                                                          | 52,273     | 130,175    | 130,175    |
| Electricity use in participating residences (MWh)                                                                                                                                                                                                    | 440,729    | 1,097,954  | 1,097,954  |
| Annual Electricity Generated by new Solar PVs from new permits (MWh)                                                                                                                                                                                 | 440,822    | 1,097,768  | 1,097,768  |
| Unused electricity generated (MWh)                                                                                                                                                                                                                   | 94         | (186)      | (186)      |
| Percent of electricity sent back into grid                                                                                                                                                                                                           | 0%         | 0%         | 0%         |
| <b>Percent of Electricity use in Existing Homes offset by solar (Feasibility Check)</b>                                                                                                                                                              | <b>32%</b> | <b>80%</b> | <b>80%</b> |

|                                    |         |         |         |
|------------------------------------|---------|---------|---------|
| GHG Reductions from E-2.3 (MTCO2e) | 114,571 | 260,322 | 260,322 |
|------------------------------------|---------|---------|---------|

**E-2.4**

| Increase Use of On-Site Renewable Electricity Generation for County Operations | 2020    | 2030    | 2050    |
|--------------------------------------------------------------------------------|---------|---------|---------|
| County electricity use after the implementation of E-1.4 (MWh)                 | 128,633 | 114,340 | 114,340 |
| Percent of renewable electricity generated on-site                             | 10%     | 20%     | 20%     |
| Electricity offset (MWh)                                                       | 12,863  | 22,868  | 22,868  |
| GHG Reductions from E-2.4 (MTCO2e)                                             | 4,083   | 5,417   | 5,417   |

## Solid Waste Reduction Measure Quantification

### SW-1.1

#### Increase Solid Waste Diversion

See additional quantification on separate sheets.

#### From implementation of Zero Waste diversion program (80% diversion)

|                                                                                                  |           | Source                                                                                     |
|--------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------------|
| <b>Baseline</b>                                                                                  |           |                                                                                            |
| Total Unincorporated Waste Accepted by Landfills in 2014 (wet short tons)                        | 449,323   | Unincorporated County of San Diego 2014 Greenhouse Gas Emissions Inventory and Projections |
| Total Unincorporated Waste Accepted by Landfills in 2030 (Post-diversion) (tons)                 | 545,308   | Scaled with population                                                                     |
| Organics Content in Unincorporated SD County                                                     | 66%       | Calculated from CalRecycle Data. Date unreported.                                          |
| Total Unincorporated Waste Accepted by Landfills in 2030 (Post-diversion) - organics only (tons) | 362,486   |                                                                                            |
| Current Diversion Rate                                                                           | 62%       | CalRecycle                                                                                 |
| Total Unincorporated Generated Waste (tons)                                                      | 1,435,022 | Calculated                                                                                 |
| <b>Target</b>                                                                                    |           |                                                                                            |
| Target Diversion Rate                                                                            | 80%       | Assumed                                                                                    |
| Target Disposal Tonnage under 80% diversion rate                                                 | 287,004   | Calculated                                                                                 |
| Target Diverted Tonnage under 80% diversion rate                                                 | 1,148,018 | Calculated                                                                                 |
| Waste disposal reduction under 80% diversion rate compared to baseline (ton)                     | 258,304   | Calculated                                                                                 |
| Organics content in reduced waste                                                                | 60%       | Estimated from HF&H Calculations                                                           |
| Additional Diverted waste generation under 80% diversion rate - organics only (ton)              | 154,483   | Calculated                                                                                 |
| <b>Reduction in Organics</b>                                                                     |           |                                                                                            |
| Percent reduction in organics compared to baseline                                               | 43%       | Calculated. Assume that emissions are proportional to organics content in waste            |

#### Forecasted Emissions Reductions

|                                            |  | 2030    | 2050    |
|--------------------------------------------|--|---------|---------|
| GHG Emissions from Waste Disposal (MTCO2e) |  | 185,492 | 201,915 |
| Emissions reductions from SWP (MTCO2e)     |  | 79,052  | 86,052  |

  

|                                     | 2020 | 2030   | 2050   |
|-------------------------------------|------|--------|--------|
| GHG Reductions from SW-1.1 (MTCO2e) | -    | 79,052 | 86,052 |

**Water and Wastewater Reduction Measure Quantification**

| Assumptions                                                                     |       |         |       |
|---------------------------------------------------------------------------------|-------|---------|-------|
|                                                                                 | 2020  | 2030    | 2050  |
| San Diego County Average Electricity Emissions Factor (MTCO <sub>2</sub> e/MWh) | 0.302 | 0.237   | 0.237 |
| Natural Gas Emissions Factor (MTCO <sub>2</sub> e/therm)                        |       | 0.00685 |       |

**W-1.1****Increase Water Efficiency in New Residential Development**

Note that this measure will not be in effect until after 2020.

|                                                                                                                                                                                                                                                                                | Mandatory Reqmt/<br>Standard Equivalent | Measure Reqmt/Energy Star<br>Rating                                                                                                                                           | Requirement Metric                                   |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|---------|
| Kitchen Faucet Flow Rate (gal per minute)                                                                                                                                                                                                                                      | 1.8                                     |                                                                                                                                                                               | 1.5 Flow Rate                                        |         |
| Dishwasher water use (gal/cycle)                                                                                                                                                                                                                                               | 5                                       |                                                                                                                                                                               | 3.5 Energy Star Appliance - standard size            |         |
| Dishwasher energy use (kWh/year)                                                                                                                                                                                                                                               | 307                                     |                                                                                                                                                                               | 270 Energy Star Appliance - standard size            |         |
| Clotheswasher water use (gal/cycle)                                                                                                                                                                                                                                            | 16.82                                   |                                                                                                                                                                               | 9.25 Energy Star Appliance - 2.5 cu-ft front loading |         |
| Clotheswasher energy use (kWh/cycle)                                                                                                                                                                                                                                           | 7.93                                    |                                                                                                                                                                               | 5.95 Energy Star Appliance                           |         |
| Assumption based on water usage used for dishwashing and standard flowrate:<br><a href="https://water.usgs.gov/edu/qa-home-percapita.html">https://water.usgs.gov/edu/qa-home-percapita.html</a> . Assumes water is also used for washing produce,<br>5 cooking, and drinking. |                                         |                                                                                                                                                                               |                                                      |         |
| Kitchen faucet water use per day per household with dishwasher (HH)<br>(minutes)                                                                                                                                                                                               |                                         |                                                                                                                                                                               |                                                      |         |
| Average dishwasher cycles per unit per year                                                                                                                                                                                                                                    | 215                                     | <a href="https://www.energystar.gov/products/appliances/dishwashers/key_product_criteria">https://www.energystar.gov/products/appliances/dishwashers/key_product_criteria</a> |                                                      |         |
| Average dishwasher cycles per year per HH                                                                                                                                                                                                                                      | 215                                     |                                                                                                                                                                               |                                                      |         |
| Average American family wash loads per year                                                                                                                                                                                                                                    | 300                                     | <a href="https://www.energystar.gov/products/appliances/clothes_washers">https://www.energystar.gov/products/appliances/clothes_washers</a>                                   |                                                      |         |
| Average clotheswasher cycles per year per HH                                                                                                                                                                                                                                   | 300                                     |                                                                                                                                                                               |                                                      |         |
|                                                                                                                                                                                                                                                                                | 2014                                    | 2020                                                                                                                                                                          | 2030                                                 | 2050    |
| Households in Unincorporated San Diego County                                                                                                                                                                                                                                  | 162,805                                 | 163,354                                                                                                                                                                       | 174,741                                              | 204,604 |
| Number of new households since 2014                                                                                                                                                                                                                                            |                                         | 549                                                                                                                                                                           | 11,936                                               | 41,799  |

**Activity in New Households Only**

|                                                                                           |  |      |      |
|-------------------------------------------------------------------------------------------|--|------|------|
| Water use with standard equipment (MG/year)                                               |  |      |      |
| Kitchen Faucets                                                                           |  | 39   | 137  |
| Dishwashers                                                                               |  | 13   | 45   |
| Clotheswashers                                                                            |  | 60   | 211  |
| Total                                                                                     |  | 112  | 393  |
| Water use with Tier 1 equipment (MG/year)                                                 |  |      |      |
| Kitchen Faucets                                                                           |  | 33   | 114  |
| Dishwashers                                                                               |  | 9    | 31   |
| Clotheswashers                                                                            |  | 33   | 116  |
| Total                                                                                     |  | 75   | 262  |
| Water Savings (MG/year)                                                                   |  |      |      |
| Kitchen Faucets                                                                           |  | 7    | 23   |
| Dishwashers                                                                               |  | 4    | 13   |
| Clotheswashers                                                                            |  | 27   | 95   |
| Total                                                                                     |  | 37   | 131  |
| Emissions per gallon of water (MTCO <sub>2</sub> e/MG) (see calculation in measure W-2.1) |  | 2.31 | 2.31 |

|                                                 | For water<br>reductions only |    |     |
|-------------------------------------------------|------------------------------|----|-----|
| GHG Reductions from W-1.1 (MTCO <sub>2</sub> e) | -                            | 87 | 303 |

Note that this measure will not be in effect until after 2020.

|                                                    |  |            |             |
|----------------------------------------------------|--|------------|-------------|
| Electricity use with standard equipment (kWh/year) |  |            |             |
| Dishwashers                                        |  | 3,662,284  | 12,824,625  |
| Clotheswashers                                     |  | 28,408,473 | 99,481,091  |
| Total                                              |  | 32,070,757 | 112,305,716 |
| Electricity use with Tier 1 equipment (kWh/year)   |  |            |             |
| Dishwashers                                        |  | 3,222,810  | 11,285,670  |
| Clotheswashers                                     |  | 21,306,355 | 74,610,818  |
| Total                                              |  | 24,529,165 | 85,896,488  |
| Electricity Savings (kWh/year)                     |  |            |             |
| Dishwashers                                        |  | 439,474    | 1,538,955   |
| Clotheswashers                                     |  | 7,102,118  | 24,870,273  |
| Total                                              |  | 7,541,592  | 26,409,228  |

|                                                 | Assumed to be<br>included in E-1.1 |       |       |
|-------------------------------------------------|------------------------------------|-------|-------|
| GHG Reductions from W-1.1 (MTCO <sub>2</sub> e) | -                                  | 1,788 | 6,263 |

**Water and Wastewater Reduction Measure Quantification (Continued)**

| <b>W-1.2</b>                                                                                                                                    |             |             |             |             |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------|-------------|-------------|
| <b>Reduce Outdoor Water Use</b>                                                                                                                 | <b>2014</b> | <b>2020</b> | <b>2030</b> | <b>2050</b> |
| <i>This measure only applies to potable water use in outdoor landscaping, and not all outdoor applications.</i>                                 |             |             |             |             |
| Residential and Non-residential Landscape irrigation water use per capita per day (gallons) (Assumed for 2014)                                  |             |             |             |             |
| 94 Source: California Water Plan Update 2013 Vol. 3. Table 3-2. Based on 2009 gallons and population.                                           |             |             |             |             |
| Modified Unincorporated County Population                                                                                                       | 454,599     | 493,604     | 551,712     | 600,560     |
| Estimated annual water demand for landscaping based on 2014 rates (MG)                                                                          | 15,631      | 16,972      | 18,970      | 20,649      |
| In existing development                                                                                                                         |             | 15,631      | 15,631      | 15,631      |
| In new development                                                                                                                              |             | 1,341       | 3,339       | 5,019       |
| Percent reduction in outdoor landscaping water use rates from 2014 rates                                                                        |             |             |             |             |
| In existing development                                                                                                                         |             | 0%          | 40%         | 40%         |
| In new development                                                                                                                              |             | 0%          | 40%         | 40%         |
| Annual Water Reduction (MG)                                                                                                                     |             |             |             |             |
| In existing development                                                                                                                         |             | -           | 6,252       | 6,252       |
| In new development                                                                                                                              |             | -           | 1,336       | 2,007       |
| TOTAL                                                                                                                                           |             | -           | 7,588       | 8,260       |
| Emissions per gallon of water (MTCO <sub>2</sub> e/MG) (see calculation in measure W-2.1)                                                       |             | 2.53        | 2.31        | 2.31        |
| Remaining water use for landscape irrigation (MG)                                                                                               |             |             |             |             |
| In existing development                                                                                                                         |             | 15,631      | 9,378       | 9,378       |
| In new development                                                                                                                              |             | 1,341       | 2,003       | 3,011       |
| GHG Reductions from W-1.2 (MTCO <sub>2</sub> e)                                                                                                 |             | -           | 17,535      | 19,087      |
| Electricity savings from local water distribution and treatment (MWh) to calculate E-2.1                                                        |             | -           | 7,406       | 8,062       |
| <b>W-1.3</b>                                                                                                                                    |             |             |             |             |
| <b>Reduce Potable Water Consumption at County Facilities</b>                                                                                    | <b>2014</b> | <b>2020</b> | <b>2030</b> | <b>2050</b> |
| Imported Potable water consumption at all County facilities (HCF)                                                                               | 622,568     |             |             |             |
| Imported Potable water consumption at all County facilities (Million gallons)                                                                   | 466         | 472         | 481         | 501         |
| Forecasting method: Employee growth                                                                                                             |             |             |             |             |
| County Employee Count Forecast                                                                                                                  | 19205       | 19,444      | 19,841      | 20,636      |
| Electricity Use from Potable Water Consumption (MWh)                                                                                            | 4,988       | 5,049       | 5,153       | 5,359       |
| Electricity intensity per million gallons of imported potable water (includes conveyance, treatment, and distribution) (Average for the County) |             |             |             |             |
| Water Activity                                                                                                                                  | kWh/MG      |             |             |             |
| Upstream Supply and Conveyance                                                                                                                  | 9,727       |             |             |             |
| Local water distribution                                                                                                                        | 292         |             |             |             |
| Conventional water treatment                                                                                                                    | 684         |             |             |             |
| Total (kWh/MG)                                                                                                                                  | 10,703      |             |             |             |
| Total (MWh/MG)                                                                                                                                  | 10.70       |             |             |             |
| Percent reduction in potable water consumption at County facilities below 2014 levels                                                           |             | 15%         | 20%         | 20%         |
| Water use forecast with water reduction (MG)                                                                                                    |             | 396         | 373         | 373         |
| Electricity Use with water reduction (MWh)                                                                                                      |             | 4,239       | 3,990       | 3,990       |
| Difference in electricity use (MWh)                                                                                                             |             | 810         | 1,163       | 1,369       |
| GHG Reductions from W-1.3 (MTCO <sub>2</sub> e)                                                                                                 |             | 244         | 276         | 325         |
| Electricity savings from local water distribution and treatment (MWh) to calculate E-2.1                                                        |             | 58          | 73          | 73          |

## Water and Wastewater Reduction Measure Quantification (Continued)

### W-2.1

#### Increase Rain Barrel Installations

Note: Rainwater catchment would only be used for landscaping uses.

| Background and Assumptions                                                                                                                 | 2014    | 2020                                         | 2030        | 2050        |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------|-------------|-------------|
| Modified Unincorporated County Population                                                                                                  | 454,599 | 493,604                                      | 551,712     | 600,560     |
| Water Use (million gallons)                                                                                                                | 45,678  | 49,597                                       | 55,436      | 60,344      |
| Emissions from water use (MTCO <sub>2</sub> e)                                                                                             | 134,269 | 125,616                                      | 128,104     | 139,446     |
| Emissions per gallon (MTCO <sub>2</sub> e/MG)                                                                                              |         | 2.53                                         | 2.31        | 2.31        |
| <b>Water Demand</b>                                                                                                                        |         | 2020                                         | 2030        | 2050        |
| Landscaping water demand after W-1.2 (MG)                                                                                                  |         | 16,972                                       | 11,382      | 12,390      |
| Total roof sqft in County (see below)                                                                                                      |         | 116,938,533                                  | 130,255,005 | 144,445,872 |
| Annual landscaping water demand per roof sqft (gal/sqft)                                                                                   |         | 145                                          | 87          | 86          |
| Annual landscaping water demand per barrel (see below) (gal/sqft)                                                                          |         | 72,568                                       | 43,691      | 42,887      |
| <b>Rain Barrel Savings</b>                                                                                                                 |         |                                              |             |             |
| Annual Rainfall in San Diego, CA (inches) (height per any unit area)                                                                       | 10.13   | Source: Western Regional Climate Center 2016 |             |             |
| Number of rain barrels installed starting in 2020                                                                                          |         | 1,200                                        | 3,200       | 3,200       |
| Rain barrel size (gal)                                                                                                                     | 50      |                                              |             |             |
| Average roof collection area per barrel (e.g., half of a low-rise house roof slanted in a single direction) (sqft)                         | 500     |                                              |             |             |
| Maximum annual rain collected per average roof per barrel (gal/barrel)                                                                     | 3,157   |                                              |             |             |
| Annual rain collected per roof sqft (gal/sqft)                                                                                             | 6.31    |                                              |             |             |
| Annual rain collected under this measure (assuming average roof area per barrel) (gal)                                                     |         | 3,788,883                                    | 10,103,688  | 10,103,688  |
| Maximum annual barrel fillings per year (feasibility check)                                                                                |         | 3,157                                        | 3,157       | 3,157       |
| Utilization/Emptying rate (Rate at which barrels are emptied everytime it is full so there is no wasted water to overflow)                 |         | 100%                                         | 100%        | 100%        |
| Annual water savings per year under this measure (gal)                                                                                     |         | 3,788,883                                    | 10,103,688  | 10,103,688  |
| Percent of landscaping demand of participating buildings                                                                                   |         | 4.4%                                         | 7.2%        | 7.4%        |
| Percent of landscaping demand offset by this measure                                                                                       |         | 0.022%                                       | 0.089%      | 0.082%      |
| <b>Emissions reductions from water savings (MTCO<sub>2</sub>e) (million gallons X MTCO<sub>2</sub>e/MG) (see beginning of calculation)</b> |         | 10                                           | 23          | 23          |

#### Existing Countywide Rooftop Area

|                                                                                                                                                                                                                                            |             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Area of commercial/industrial roofspace in 2005 (sqft) (Anders and Bailek 2009)                                                                                                                                                            | 235,047,321 |
| Area of residential roofspace in 2010 (sqft) (calculated below)                                                                                                                                                                            | 646,002,117 |
| Sum of roofspace (sqft)                                                                                                                                                                                                                    | 881,049,438 |
| Source: Anders and Bailek 2009 ( <a href="https://www.sandiego.edu/law/documents/centers/epic/060309_ASESPVPotentialPaperFINAL_000.pdf">https://www.sandiego.edu/law/documents/centers/epic/060309_ASESPVPotentialPaperFINAL_000.pdf</a> ) |             |

#### Calculating Residential Rooftop Space in San Diego County

|                                                                                                                                                           |                |                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------------------------|
| Matching PV rating (kW) from NREL PV Calculator                                                                                                           | 2,772,000      | Source: Anders and Bailek 2009 |
| sq meter per kW                                                                                                                                           | 1              | PV Watts Calculator Default    |
| sqft per sq meter                                                                                                                                         | 10.76391042    | PV Watts Calculator Default    |
| Module efficiency                                                                                                                                         | 0.16           | PV Watts Calculator Default    |
| Size of PV area needed (sf)                                                                                                                               | 186,484,748    | Calculated                     |
| Tilt Degree                                                                                                                                               | 30             | Source: Anders and Bailek 2009 |
| Footprint of PV area needed (sqft)                                                                                                                        | 161,500,529    | Calculated                     |
| % sqft roof                                                                                                                                               | 50%            | Source: Anders and Bailek 2009 |
| % homes suitable                                                                                                                                          | 50%            | Source: Anders and Bailek 2009 |
| Footprint of Available Rooftop (sqft)                                                                                                                     | 646,002,116.66 | Calculated                     |
| Calculations based on methods used in NREL's PV Watts Calculator<br><a href="http://pvwatts.nrel.gov/pvwatts.php">http://pvwatts.nrel.gov/pvwatts.php</a> |                |                                |

#### Estimated Unincorporated San Diego County Roofspace (Scaled from entire county) (sqft)

|                                     | 2014        | 2020        | 2030        | 2050        |
|-------------------------------------|-------------|-------------|-------------|-------------|
| Commercial/Industrial               | 13,890,169  | 15,498,609  | 16,873,464  | 21,025,604  |
| Residential                         | 93,424,065  | 101,439,924 | 113,381,541 | 123,420,268 |
| Total                               | 107,314,235 | 116,938,533 | 130,255,005 | 144,445,872 |
| All Existing Roofspace (as of 2014) | 107,314,235 | 107,314,235 | 107,314,235 | 107,314,235 |
| All New Roofspace (since 2014)      | -           | 9,624,299   | 22,940,770  | 37,131,637  |

|                                                                                          |      |      |      |
|------------------------------------------------------------------------------------------|------|------|------|
| GHG Reductions from W-2.1 (MTCO <sub>2</sub> e)                                          | 10   | 23   | 23   |
| Electricity savings from local water distribution and treatment (MWh) to calculate E-2.1 | 3.70 | 9.86 | 9.86 |

## Agriculture Reduction Measure Quantification

### Assumptions

|                                                                                 |        | 2020   | 2030   | 2050   |
|---------------------------------------------------------------------------------|--------|--------|--------|--------|
| San Diego County Average Electricity Emissions Factor (MTCO <sub>2</sub> e/MWh) |        | 0.260  | 0.237  | 0.237  |
| Cropland in SD County (acres)                                                   | 97,432 | 96,051 | 95,313 | 94,494 |

### A-1.1

| Convert Farm Equipment to Electric |  | 2020 | 2030 | 2050 |
|------------------------------------|--|------|------|------|
|------------------------------------|--|------|------|------|

#### Background Information

|                                                                                                                        |        | 2020   | 2030   | 2050   |
|------------------------------------------------------------------------------------------------------------------------|--------|--------|--------|--------|
| Emissions from Agricultural Equipment Except for Irrigation Pumps. Scaled by change in cropland. (MTCO <sub>2</sub> e) | 86,087 | 84,867 | 84,215 | 83,491 |

|                                                                |  | 2020 | 2030 | 2050 |
|----------------------------------------------------------------|--|------|------|------|
| Percent of Equipment Converted to Electric or Alternative Fuel |  | 0%   | 8%   | 8%   |

|                                                 |  |   |       |       |
|-------------------------------------------------|--|---|-------|-------|
| GHG Reductions from A-1.1 (MTCO <sub>2</sub> e) |  | - | 6,737 | 6,679 |
|-------------------------------------------------|--|---|-------|-------|

### A-1.2

| Convert Stationary Irrigation Pumps to Electric | 2014 | 2020 | 2030 | 2050 |
|-------------------------------------------------|------|------|------|------|
|-------------------------------------------------|------|------|------|------|

|                                                                           |        |     |       |       |
|---------------------------------------------------------------------------|--------|-----|-------|-------|
| Number of Diesel Pumps in San Diego County. Scaled by change in cropland. | 159    | 157 | 156   | 154   |
| Total Number of Pumps Converted                                           |        | 4   | 44    | 44    |
| Percent of Pump Energy Converted                                          |        | 3%  | 28%   | 28%   |
| Emissions from Diesel Pumps to be Converted (MTCO <sub>2</sub> )          | 11,768 | 296 | 3,251 | 3,251 |

|                                                                           |           |        |         |         |
|---------------------------------------------------------------------------|-----------|--------|---------|---------|
| Diesel Emission Factor (kg CO <sub>2</sub> /gal)                          | 10.21     |        |         |         |
| Calculated fuel use of converted pumps (gal)                              | 1,152,982 | 28,954 | 318,491 | 318,491 |
| <a href="#">Energy content of diesel (kBTU/gal) - lower heating value</a> | 128       | 128    | 128     | 128     |
| Efficiency of diesel pump (%)                                             | 35%       | 35%    | 35%     | 35%     |
| Energy required by pumps (kBTU)                                           | 51,851    | 1,302  | 14,323  | 14,323  |

|                                                      |        |       |        |        |
|------------------------------------------------------|--------|-------|--------|--------|
| Efficiency of electric pump (%)                      | 75%    | 75%   | 75%    | 75%    |
| Calculated electricity use in electric pumps (kBTU)  | 69,134 | 1,736 | 19,097 | 19,097 |
| Calculated electricity use in electric pumps (kWh)   | 20,261 | 509   | 5,597  | 5,597  |
| Emissions from electricity use (MTCO <sub>2</sub> e) |        | 0.13  | 1.33   | 1.33   |

|                                                 |  |     |       |       |
|-------------------------------------------------|--|-----|-------|-------|
| GHG Reductions from A-1.2 (MTCO <sub>2</sub> e) |  | 295 | 3,249 | 3,249 |
|-------------------------------------------------|--|-----|-------|-------|

|                                                                        |  |     |       |       |
|------------------------------------------------------------------------|--|-----|-------|-------|
| Calculated electricity use in electric pumps for selected option (kWh) |  | 509 | 5,597 | 5,597 |
|------------------------------------------------------------------------|--|-----|-------|-------|

**Agriculture Reduction Measure Quantification (Continued)**

| <b>A-2.1</b>                                                                                                                 |                       |               |               |               |
|------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|---------------|---------------|
| <b>Increase Residential Tree Planting</b>                                                                                    | <b>2014</b>           | <b>2020</b>   | <b>2030</b>   | <b>2050</b>   |
| Modified Number of Single Family Residences in Unincorporated County (detached units) (Excluding Camp Pendleton units)       | 134,815               | 146,436       | 164,009       | 178,110       |
| Number of New SFRs starting in 2020                                                                                          |                       | -             | 17,573        | 31,674        |
| Trees planted per home                                                                                                       |                       | 2             | 2             | 2             |
| Total trees planted since 2020                                                                                               |                       | 0             | 35,146        | 63,348        |
| Default Annual CO2 accumulation per tree for Miscellaneous Trees (MT CO2e/tree/year) (From Appendix A of CalEEMod v2016.3.1) | 0.0354                |               |               |               |
| Annual Sequestration from Planted Trees (MTCO2e/year)                                                                        |                       | -             | 1,244         | 2,243         |
| <b>GHG Reductions from A-2.1 (MTCO2e)</b>                                                                                    |                       | -             | 1,244         | 2,243         |
| <b>A-2.2</b>                                                                                                                 |                       |               |               |               |
| <b>Increase County Tree Planting</b>                                                                                         |                       | <b>2020</b>   | <b>2030</b>   | <b>2050</b>   |
| Annual Tree Planting Targets starting in 2017                                                                                | 3500                  |               |               |               |
| Annual Tree Planting Targets starting in 2020                                                                                | 3500                  |               |               |               |
| Total number of Trees Planted since 2017                                                                                     |                       | 14,000        | 49,000        | 119,000       |
| Feasibility Test                                                                                                             |                       |               |               |               |
| Average Tree Canopy Area of mature tree (sqft)                                                                               | 50                    |               |               |               |
| Total Acres of Planted Tree Canopy (Acres)                                                                                   |                       | 4.0           | 56.24         | 136.59        |
| Total undeveloped acres in the County (Acres) (SANDAG)                                                                       |                       | 346,055       | 306,876       | 219,557       |
| <b>Percent Coverage by new trees</b>                                                                                         | <b>Very Low--&gt;</b> | <b>0.001%</b> | <b>0.018%</b> | <b>0.062%</b> |
| Default Annual CO2 accumulation per tree for Miscellaneous Trees (MT CO2e/tree/year) (From Appendix A of CalEEMod v2016.3.1) | 0.0354                |               |               |               |
| Annual Sequestration from Planted Trees (MTCO2e/year)                                                                        |                       | 496           | 1,735         | 4,213         |
| <b>GHG Reductions from A-2.2 (MTCO2e)</b>                                                                                    |                       | 496           | 1,735         | 4,213         |

| <b>Assumptions</b>             |                               |
|--------------------------------|-------------------------------|
| <b>Category</b>                | <b>Value</b>                  |
| <b>Conversions</b>             |                               |
| sqin/sqft                      | 144                           |
| cubic in/gallons               | 231                           |
| sqft/acre                      | 43560                         |
| acre/hectare                   | 2.47105                       |
| g/MT                           | 1000000                       |
| lb/MT                          | 2204.622622                   |
| g/lb                           | 453.592                       |
| kg/MT                          | 1000                          |
| lb/kg                          | 2.20462                       |
| tons/MT                        | 1.10231                       |
| kWh/MWh                        | 1000                          |
| MWh/GWh                        | 1000                          |
| btu/kWh                        | 3412.14                       |
| Btu/therm                      | 100000                        |
| MMBtu/therm                    | 0.1                           |
| MMBtu/MWh                      | 3.41214148                    |
| LPG Gallons/GGE                | 1.344086022                   |
| LNG Gallons/GGE                | 1.572327044                   |
| gal/cubic foot                 | 7.480519481                   |
| gal/Liter                      | 3.785411784                   |
| gallon/acrefoot                | 325851.429                    |
| million gal/hundred cubic feet | 0.000748503                   |
| million gal/acre-feet          | 0.325851429                   |
| <b>GWP</b>                     |                               |
| CO2                            | 1                             |
| CH4                            | 25                            |
| N2O                            | 298                           |
| Source                         | IPCC Fourth Assessment Report |