# APPENDICES A-J

## A. Results from the ERT: Evaluated Energy Savings at the Program-Level

The summary results provided in this appendix are the result of updating specific savings parameters for each of the records in the program tracking data based on evaluated results where available, other evaluation and DEER where applicable or the original IOU reported values where no update was available.   The ERT process, and the guidance provided to contractors to apply the updates are described in section 3.  The detailed justification for every parameter update is in Appendix C.

In these tables:

- Both reported and evaluated savings are net, reflecting the incremental impact of these programs.

- The cost effectiveness ratios are provided on the reported net basis as well as the evaluated net basis.

- The final column identifies the evaluation group that was responsible for the updates to that program, and in most cases the direct evaluation of that program.

**Pacific Gas and Electric Program Level Results**

| Program ID | Program Name | Net Reported Annual MWh | MW | Therms | Net Reported Lifecycle MWh | Therms | Net Evaluated Annual MWh | MW | Therms | Net Evaluated Lifecycle MWh | Therms | Net Reported TRC | PAC | Net Evaluated TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PGE2000 | PG&E Res Mass Market | 2,079,938 | 263 | 7,349 | 20,681,948 | 114,008 | 635,515 | 95 | -8,882 | 5,367,873 | -44,429 | 4.23 | 5.42 | 1.00 | 1.26 | Res |
| PGE2001 | Ag & Food Processing | 118,244 | 21 | 6,711 | 2,048,618 | 132,903 | 71,738 | 10 | 6,860 | 1,233,659 | 136,023 | 3.25 | 4.75 | 2.56 | 3.76 | PGE_Ag |
| PGE2002 | Schools and Colleges | 12,503 | 6 | 276 | 198,168 | 4,828 | 12,503 | 6 | 276 | 198,168 | 4,828 | 1.39 | 1.53 | 1.47 | 1.61 | ComFac |
| PGE2003 | PG&E Retail | 31,421 | 6 | -66 | 503,539 | -1,059 | 26,709 | 4 | -79 | 425,522 | -1,267 | 2.25 | 2.72 | 1.97 | 2.39 | SmallCom |
| PGE2004 | Fabrication, Process and Heavy Industrial Manufacturing | 196,871 | 25 | 23,232 | 3,403,884 | 464,654 | 70,682 | 9 | 6,232 | 1,163,725 | 124,660 | 5.10 | 8.25 | 1.58 | 2.55 | PGE_Ind |
| PGE2005 | Hi-Tech Facilities | 108,343 | 11 | 954 | 1,962,442 | 18,559 | 27,107 | 4 | 235 | 482,593 | 4,508 | 3.46 | 4.70 | 0.94 | 1.28 | ComFac |
| PGE2006 | Medical Facilities | 4,460 | 1 | 76 | 68,279 | 1,438 | 4,216 | 1 | 73 | 65,832 | 1,416 | 0.91 | 0.98 | 0.95 | 1.03 | RCx |
| PGE2007 | Office Buildings (Large Commercial) | 55,123 | 10 | 719 | 815,555 | 9,743 | 34,757 | 6 | 507 | 526,407 | 6,849 | 1.53 | 1.71 | 1.17 | 1.31 | ComFac |
| PGE2008 | Lodging Facilities | 3,165 | 0 | 188 | 51,152 | 3,767 | 3,165 | 0 | 188 | 51,152 | 3,767 | 0.88 | 0.96 | 0.92 | 1.01 | ComFac |
| PGE2009 | PGE RES NC | 2,194 | 2 | 514 | 40,604 | 9,749 | 3,165 | 3 | 202 | 58,480 | 3,506 | 0.63 | 0.78 | 0.53 | 0.67 | NRNC |
| PGE2015 | PGE ABAG | 13,867 | 2 | 398 | 146,482 | 5,070 | 12,520 | 2 | 322 | 141,024 | 4,586 | 1.33 | 1.60 | 1.23 | 1.47 | RCx |
| PGE2016 | PGE AMBAG | 28,586 | 6 | 46 | 203,507 | 838 | 11,693 | 4 | 40 | 128,175 | 771 | 1.79 | 1.88 | 1.14 | 1.19 | SmallCom |
| PGE2017 | PGE Bakersfield | 14,865 | 3 | 74 | 124,660 | 1,152 | 10,441 | 3 | 48 | 120,599 | 882 | 1.41 | 1.40 | 1.26 | 1.25 | SmallCom |
| PGE2018 | PGE CCC-IOU | 8,493 | 2 | 390 | 132,410 | 6,111 | 5,620 | 1 | 242 | 87,984 | 3,733 | 2.12 | 1.87 | 1.40 | 1.21 | LGP |
| PGE2019 | PGE CDCR | 9,909 | 1 | 41 | 154,294 | 618 | 9,909 | 1 | 41 | 154,294 | 618 | 3.42 | 2.62 | 3.42 | 2.62 | LGP |
| PGE2020 | PGE East Bay | 54,823 | 10 | 119 | 457,257 | 1,572 | 40,837 | 9 | 119 | 328,721 | 937 | 2.15 | 2.26 | 1.56 | 1.64 | ComFac |
| PGE2021 | PGE Fresno | 15,734 | 3 | 1 | 103,349 | 13 | 9,506 | 2 | -26 | 100,576 | -271 | 0.82 | 1.24 | 0.70 | 1.06 | SmallCom |
| PGE2024 | PGE Madera | 945 | 0 | 0 | 7,869 | 0 | 945 | 0 | 0 | 7,869 | 0 | 0.88 | 1.01 | 0.88 | 1.01 | LGP |
| PGE2025 | PGE Marin | 3,794 | 1 | 3 | 35,699 | 51 | 3,741 | 1 | 3 | 33,054 | 50 | 0.75 | 0.99 | 0.69 | 0.90 | RCx |
| PGE2026 | PGE Merced | 895 | 0 | 0 | 7,031 | 0 | 861 | 0 | 0 | 6,011 | 0 | 0.80 | 0.85 | 0.67 | 0.71 | ComFac |
| PGE2027 | PGE Motherlode | 12,832 | 2 | 0 | 86,013 | -2 | 12,832 | 2 | 0 | 86,013 | -2 | 1.18 | 1.26 | 1.18 | 1.26 | LGP |
| PGE2028 | PGE Redwood | 4,213 | 1 | 44 | 41,695 | 175 | 4,213 | 1 | 44 | 41,695 | 175 | 1.17 | 1.36 | 1.17 | 1.36 | LGP |
| PGE2029 | PGE San Francisco | 36,110 | 5 | 32 | 305,734 | 521 | 34,333 | 5 | 32 | 255,951 | 292 | 1.64 | 1.88 | 1.34 | 1.54 | ComFac |
| PGE2030 | PGE San Joaquin | 5,517 | 1 | 16 | 42,876 | 238 | 5,517 | 1 | 16 | 42,876 | 238 | 1.14 | 1.15 | 1.14 | 1.15 | LGP |

| Program ID | Program Name | Net Reported Annual [Therms are in thousands] | | | Net Reported Lifecycle | | Net Evaluated Annual | | | Net Evaluated Lifecycle | | Net Reported | | Net Evaluated | | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | |
| PGE2031 | PGE Santa Barbara | 1,169 | 0 | 0 | 7,225 | 0 | 1,169 | 0 | 0 | 7,225 | 0 | 1.10 | 1.10 | 1.10 | 1.10 | LGP |
| PGE2032 | PGE Sonoma | 6,300 | 1 | 48 | 70,645 | 501 | 5,952 | 1 | 33 | 67,860 | 378 | 1.16 | 1.60 | 1.13 | 1.56 | SmallCom |
| PGE2033 | PGE Stockton | 4,220 | 1 | 0 | 29,592 | -1 | 4,220 | 1 | 0 | 33,721 | -1 | 1.01 | 1.05 | 1.09 | 1.14 | ComFac |
| PGE2035 | PGE SVLG | 12,423 | 2 | 296 | 148,346 | 4,262 | 10,069 | 2 | 285 | 140,293 | 4,199 | 1.61 | 1.70 | 1.58 | 1.65 | RCx |
| PGE2036 | PGE UC-CSU | 28,089 | 4 | 2,887 | 427,914 | 45,140 | 23,491 | 4 | 1,487 | 359,151 | 25,659 | 3.03 | 2.74 | 2.10 | 1.86 | LGP |
| PGE2042 | Heavy Industry Energy Efficiency - Lockheed Martin Aspen Systems Corporation | 51,476 | 8 | 4,633 | 882,923 | 92,654 | 19,719 | 2 | 1,110 | 332,241 | 22,196 | 1.64 | 1.87 | 1.03 | 1.17 | PGE_Ind |
| PGE2045 | California Multi Measure Farm Program - EnSave | 8,285 | 2 | 0 | 101,329 | 0 | 8,285 | 2 | 0 | 101,329 | 0 | 1.68 | 3.84 | 1.67 | 3.83 | PGE_Ag |
| PGE2046 | California Wastewater Process Optimization (CALPOP) - Quantum / Quest | 11,970 | 1 | 465 | 179,549 | 6,975 | 4,871 | 0 | 312 | 73,072 | 4,678 | 1.96 | 2.48 | 1.33 | 1.69 | PGE_Ind |
| PGE2047 | PGE Laundry Coin-Op | 517 | 0 | 187 | 5,357 | 2,619 | 517 | 0 | 187 | 5,357 | 2,619 | 0.87 | 0.86 | 0.87 | 0.86 | SmallCom |
| PGE2048 | PGE Water Conserv | 677 | 0 | 116 | 677 | 116 | 677 | 0 | 116 | 677 | 116 | 0.30 | 0.30 | 0.30 | 0.30 | SmallCom |
| PGE2049 | Wine Industry Efficiency Solutions - D&R International | 3,739 | 1 | 106 | 43,981 | 2,027 | 3,739 | 1 | 106 | 44,072 | 2,027 | 1.18 | 1.31 | 1.17 | 1.31 | PGE_Ag |
| PGE2050 | Campus Housing Efficiency Solutions - D&R International | 756 | 0 | 3 | 4,642 | 42 | 756 | 0 | 3 | 4,642 | 42 | 0.24 | 0.24 | 0.23 | 0.23 | ComFac |
| PGE2051 | PGE RightLights | 52,703 | 9 | 171 | 482,881 | 172 | 52,703 | 9 | 171 | 482,881 | 172 | 1.73 | 1.99 | 1.73 | 1.99 | SmallCom |
| PGE2052 | LodgingSavers - Ecology Action | 22,290 | 5 | 398 | 177,467 | 3,294 | 20,202 | 4 | 259 | 158,748 | 2,220 | 1.61 | 1.99 | 1.42 | 1.74 | RCx |
| PGE2054 | PGE Energy Fitness | 31,973 | 6 | 0 | 236,329 | 0 | 13,444 | 4 | -81 | 172,004 | -1,070 | 1.64 | 1.91 | 0.98 | 1.15 | SmallCom |

| | | Net Reported | | | | | Net Evaluated | | | | | | Net Reported | | Net Evaluated | | |
| | [Therms are in thousands] | Annual | | | Lifecycle | | Annual | | | Lifecycle | | | | | | | |
| Program ID | Program Name | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PGE2056 | Monitoring-Based Persistence Commissioning (MBPCx) - Enovity | 3,146 | 0 | 100 | 15,411 | 394 | 1,431 | 0 | 57 | 7,007 | 225 | 1.00 | 0.90 | 0.46 | 0.42 | RCx |
| PGE2058 | Energy Efficiency Services for Oil Production - Global Energy Partners | 97,596 | 10 | 0 | 1,463,939 | 0 | 30,494 | 3 | 0 | 457,417 | 0 | 4.37 | 5.92 | 1.37 | 1.85 | PGE_Ind |
| PGE2059 | PGE HMG MF New Const | 405 | 0 | 84 | 6,802 | 1,574 | 405 | 0 | 84 | 6,802 | 1,574 | 0.69 | 0.53 | 0.69 | 0.53 | NRNC |
| PGE2060 | PGE Cool Control Plus | 25,909 | 10 | 0 | 374,850 | 0 | 25,909 | 10 | 0 | 374,850 | 0 | 2.22 | 2.22 | 2.22 | 2.22 | SmallCom |
| PGE2061 | Enhanced automation initiative - KEMA | 2,156 | 0 | 180 | 34,488 | 2,883 | 2,156 | 0 | 180 | 34,488 | 2,883 | 3.79 | 6.33 | 3.79 | 6.33 | SpecCom |
| PGE2062 | Waste Water | 1,496 | 0 | 0 | 24,645 | 0 | 843 | 0 | 0 | 13,890 | 0 | 0.53 | 1.94 | 0.30 | 1.09 | PGE_Ind |
| PGE2063 | PGE KEMA_SCCRP | 27,526 | 3 | 0 | 165,067 | 0 | 11,070 | 1 | 0 | 99,245 | 0 | 1.85 | 1.77 | 1.03 | 0.99 | ComFac |
| PGE2064 | Refinery Energy Efficiency - NEXANT | 7,350 | 1 | 0 | 118,283 | 0 | 2,895 | 0 | 0 | 47,511 | 0 | 1.30 | 2.05 | 0.54 | 0.86 | PGE_Ind |
| PGE2065 | Industrial Cold Storage / Food Processing Efficiency - Onsite Energy | 16,389 | 1 | 0 | 245,731 | 0 | 16,389 | 1 | 0 | 245,731 | 0 | 2.50 | 2.97 | 2.50 | 2.97 | PGE_Ag |
| PGE2066 | Supermarket Controls - PECI | 96,312 | 11 | 22 | 650,538 | 126 | 45,451 | 4 | 22 | 447,096 | 126 | 1.90 | 3.07 | 1.20 | 1.94 | ComFac |
| PGE2068 | PGE Air Care Plus | 20,036 | 0 | 35 | 155,623 | 221 | 13,718 | 1 | 35 | 123,289 | 221 | 1.79 | 1.88 | 1.35 | 1.41 | SpecCom |
| PGE2070 | Data Centers - Quest | 2,077 | 0 | 0 | 28,846 | 0 | 944 | 0 | 0 | 13,116 | 0 | 1.34 | 1.42 | 0.58 | 0.61 | RCx |
| PGE2071 | PTAC - Quest | 1,140 | 0 | 1 | 12,754 | 13 | 518 | 0 | 0 | 5,799 | 7 | 0.66 | 0.76 | 0.30 | 0.35 | RCx |
| PGE2072 | Hospitals Pilot - QuEST | 3,830 | 1 | 110 | 34,331 | 971 | 1,742 | 0 | 63 | 15,609 | 554 | 1.34 | 1.31 | 0.65 | 0.63 | RCx |
| PGE2074 | PGE SBEA | 18,254 | 4 | 0 | 244,866 | 0 | 18,254 | 4 | 0 | 244,866 | 0 | 2.53 | 2.56 | 2.53 | 2.56 | SmallCom |

| Program ID | Program Name | Net Reported Annual MWh | Net Reported Annual MW | Net Reported Annual Therms | Net Reported Lifecycle MWh | Net Reported Lifecycle Therms | Net Evaluated Annual MWh | Net Evaluated Annual MW | Net Evaluated Annual Therms | Net Evaluated Lifecycle MWh | Net Evaluated Lifecycle Therms | Net Reported TRC | Net Reported PAC | Net Evaluated TRC | Net Evaluated PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [Therms are in thousands] | | | | | | | | | | | | | | | |
| PGE2077 | School Energy Efficiency Program | 5,872 | 1 | 18 | 56,873 | 166 | 5,872 | 1 | 18 | 56,873 | 166 | 1.11 | 1.16 | 1.12 | 1.17 | ComFac |
| PGE2078 | PGE SYNERGY Mobile Home | 5,290 | 4 | 147 | 66,924 | 2,147 | 4,323 | 1 | 69 | 50,242 | 867 | 1.42 | 1.42 | 0.87 | 0.87 | Res |
| PGE2079 | Industrial Refrigeration Performance Plus - VaCom | 9,693 | 1 | 0 | 155,096 | 0 | 9,693 | 1 | 0 | 155,096 | 0 | 4.32 | 3.41 | 4.35 | 3.43 | PGE_Ag |
| PGE2080 | PG&E Com MM | 1,796,941 | 367 | 12,831 | 7,771,508 | 106,264 | 318,741 | 87 | 10,373 | 2,672,566 | 71,950 | 3.38 | 4.96 | 1.22 | 1.84 | SmallCom |
| PGE2081 | AIM (Assessment, Implementation and Monitoring) of compressed air systems | 10,948 | 1 | 0 | 109,475 | 0 | 4,056 | 0 | 0 | 40,557 | 0 | 1.81 | 3.19 | 0.65 | 1.15 | PGE_Ind |
| PGE2084 | Ecos Air | 11,182 | 2 | 0 | 111,819 | 0 | 5,967 | 1 | 0 | 59,669 | 0 | 1.50 | 1.48 | 0.84 | 0.83 | PGE_Ind |
| PGE2085 | Cool and Light Program | 4,537 | 1 | 0 | 50,341 | 0 | 4,537 | 1 | 0 | 50,341 | 0 | 3.75 | 3.01 | 3.75 | 3.01 | SmallCom |
| PGE2086 | HeatWise Program | 0 | 0 | 104 | 0 | 2,038 | 0 | 0 | 104 | 0 | 2,038 | 1.65 | 2.35 | 1.64 | 2.35 | ComFac |
| PGE2087 | Commercial and Industrial Boiler Efficiency Program (CIBEP) | 1,383 | 0 | 2,088 | 20,846 | 41,127 | 688 | 0 | 745 | 10,404 | 14,670 | 3.05 | 3.70 | 1.11 | 1.35 | PGE_Ind |
| PGE2088 | Energy Efficiency Partnership Program for Department of General Services State-Leased Facilities | 912 | 0 | 12 | 4,979 | 61 | 415 | 0 | 7 | 2,264 | 35 | 0.37 | 0.52 | 0.17 | 0.24 | RCx |
| PGE2089 | California Preschool Energy Efficiency Program (CPEEP) | 3,383 | 1 | 0 | 32,605 | 0 | 3,383 | 1 | 0 | 32,605 | 0 | 1.80 | 1.62 | 1.80 | 1.62 | SmallCom |

| Program ID | Program Name [Therms are in thousands] | Net Reported Annual MWh | MW | Therms | Lifecycle MWh | Therms | Net Evaluated Annual MWh | MW | Therms | Lifecycle MWh | Therms | Net Reported TRC | PAC | Net Evaluated TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PGE2090 | Airflow and Fume Hood Control Systems Re-Commissioning (Lab-RCx) | 930 | 0 | 55 | 8,363 | 495 | 423 | 0 | 31 | 3,802 | 283 | 1.04 | 1.14 | 0.52 | 0.57 | RCx |
| PGE2091 | Retrocommissioning Program | 2,380 | 0 | 15 | 15,455 | 45 | 1,090 | 0 | 9 | 7,050 | 25 | 0.21 | 0.22 | 0.10 | 0.10 | RCx |
| PGE2092 | Extended Time Delay Relay Program | 1,154 | 2 | 0 | 11,539 | 0 | 1,154 | 2 | 0 | 11,539 | 0 | 1.39 | 1.42 | 1.39 | 1.42 | Res |
| PGE2093 | Mercury Vapor Yard Light Exchange Program (LCP) | 2,264 | 0 | 0 | 36,231 | 0 | 2,264 | 0 | 0 | 36,231 | 0 | 1.43 | 1.42 | 1.43 | 1.42 | Res |
| PGE2094 | Macy"s Comprehensive Energy Management Program | 9,834 | 2 | 0 | 143,744 | 0 | 7,387 | 1 | 0 | 110,672 | 0 | 2.31 | 2.68 | 1.80 | 2.07 | RCx |
| PGE2095 | LGP SAN LUIS OBISPO Input | 1,369 | 0 | 0 | 9,304 | 0 | 1,369 | 0 | 0 | 9,304 | 0 | 0.58 | 0.58 | 0.58 | 0.58 | LGP |

Southern California Edison Program Level Results

| Program ID | Program Name | Net Reported Annual | | | Lifecycle | | Net Evaluated Annual | | | Lifecycle | | Net Reported | | Net Evaluated | | |
| | [Therms are in thousands] | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCE2500 | SCE Appliance Recycling | 214,967 | 39 | 0 | 2,149,564 | 0 | 138,906 | 24 | -2,987 | 1,388,922 | -29,866 | 4.69 | 4.05 | 2.40 | 2.08 | Res |
| SCE2501 | SCE Residential Incentive | 1,929,548 | 268 | 0 | 14,975,794 | 0 | 678,305 | 92 | -8,938 | 4,762,144 | -57,727 | 4.25 | 9.99 | 1.25 | 2.93 | Res |
| SCE2502 | SCE Multifamily | 149,041 | 15 | 0 | 2,091,001 | 0 | 98,902 | 8 | -262 | 1,237,445 | -1,719 | 1.47 | 1.69 | 0.87 | 1.00 | Res |
| SCE2503 | SCE Home Survey | 13,355 | 4 | 0 | 62,287 | 0 | 13,355 | 4 | 0 | 62,287 | 0 | 0.59 | 0.83 | 0.59 | 0.83 | Res |
| SCE2504 | Integrated School - Based Program | 5,258 | 1 | 0 | 46,306 | 0 | 2,891 | 0 | -28 | 20,670 | -183 | 0.60 | 0.60 | 0.26 | 0.26 | SpecCom |
| SCE2505 | SCE New Homes | 287 | 0 | 0 | 4,362 | 0 | 865 | 1 | 28 | 14,762 | 502 | 0.10 | 0.10 | 0.44 | 0.45 | NRNC |
| SCE2507 | SCE Comp AC | 101,104 | 83 | 0 | 727,985 | 0 | 79,826 | 64 | 0 | 534,182 | 0 | 1.05 | 1.46 | 0.78 | 1.08 | Res |
| SCE2508 | Retro-commissioning | 2,985 | 0 | 0 | 29,855 | 0 | 3,000 | 0 | 26 | 30,004 | 264 | 0.30 | 0.31 | 0.31 | 0.32 | RCx |
| SCE2509 | Integrated Industrial Process Program | 103,573 | 12 | 0 | 1,452,958 | 0 | 59,149 | 6 | 0 | 828,735 | 0 | 1.74 | 2.35 | 0.99 | 1.33 | SCE_Ag_Ind |
| SCE2510 | Agricultural Energy Efficiency Program | 73,821 | 18 | 0 | 960,913 | 0 | 53,969 | 15 | 0 | 713,210 | 0 | 1.28 | 2.72 | 0.96 | 2.04 | SCE_Ag_Ind |
| SCE2511 | SCE Nonres Direct Install | 273,333 | 49 | 0 | 2,270,471 | 0 | 108,600 | 28 | -272 | 1,478,543 | -3,655 | 2.01 | 2.01 | 1.20 | 1.21 | SmallCom |
| SCE2512 | SCE Savings By Design | 79,834 | 13 | 0 | 1,308,646 | 0 | 74,155 | 13 | 49 | 1,215,556 | 744 | 2.65 | 4.54 | 2.48 | 4.25 | NRNC |
| SCE2517 | Business Incentive Program | 767,710 | 148 | 0 | 7,784,978 | 0 | 498,350 | 99 | -772 | 6,359,021 | -9,868 | 2.31 | 4.54 | 1.80 | 3.53 | MajCom |
| SCE2519 | SCE Ventura County | 6,801 | 1 | 0 | 78,441 | 0 | 6,801 | 1 | 0 | 78,441 | 0 | 1.12 | 2.06 | 1.12 | 2.06 | LGP |
| SCE2520 | SCE South Bay | 658 | 0 | 0 | 6,186 | 0 | 658 | 0 | 0 | 6,186 | 0 | 0.28 | 0.28 | 0.28 | 0.28 | LGP |

| | | Net Reported | | | | | Net Evaluated | | | | | Net Reported | | Net Evaluated | | |
| | [Therms are in thousands] | Annual | | | Lifecycle | | Annual | | | Lifecycle | | | | | | |
| Program ID | Program Name | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCE2521 | SCE Bakersfield and Kern County | 4,721 | 1 | 0 | 38,174 | 0 | 4,721 | 1 | 0 | 38,174 | 0 | 1.70 | 1.70 | 1.70 | 1.70 | LGP |
| SCE2522 | SCE Santa Barbara | 272 | 0 | 0 | 2,827 | 0 | 272 | 0 | 0 | 2,827 | 0 | 0.35 | 0.44 | 0.35 | 0.44 | LGP |
| SCE2524 | SCE Community Energy | 7,982 | 1 | 0 | 76,619 | 0 | 7,982 | 1 | 0 | 76,619 | 0 | 1.07 | 1.07 | 1.07 | 1.07 | LGP |
| SCE2525 | SCE San Gabriel | 2,938 | 1 | 0 | 37,754 | 0 | 2,938 | 1 | 0 | 37,754 | 0 | 0.94 | 1.59 | 0.94 | 1.59 | LGP |
| SCE2526 | SCE Community Colleges | 19,642 | 7 | 0 | 252,666 | 0 | 10,537 | 2 | -32 | 145,190 | -371 | 0.61 | 2.98 | 0.31 | 1.54 | LGP |
| SCE2527 | SCE Department of Corrections | 6,729 | 1 | 0 | 73,554 | 0 | 6,729 | 1 | 0 | 73,554 | 0 | 1.69 | 2.18 | 1.69 | 2.18 | LGP |
| SCE2528 | SCE County of LA | 13,665 | 0 | 0 | 140,956 | 0 | 13,675 | 1 | 11 | 141,068 | 122 | 2.11 | 2.34 | 2.10 | 2.37 | RCx |
| SCE2529 | SCE County of Riverside | 553 | 0 | 0 | 6,928 | 0 | 553 | 0 | 0 | 6,928 | 0 | 0.63 | 0.76 | 0.63 | 0.76 | LGP |
| SCE2530 | SCE UC-CSU Partnership | 19,597 | 3 | 0 | 214,516 | 0 | 11,531 | 1 | -6 | 135,884 | -79 | 0.62 | 1.90 | 0.38 | 1.17 | LGP |
| SCE2534 | SCE DR Emerging Tech | 1 | 0 | 0 | 11 | 0 | 1 | 0 | 0 | 11 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | NRNC |
| SCE2535 | 80 Plus | 4 | 0 | 0 | 15 | 0 | 4 | 0 | 0 | 15 | 0 | 0.06 | 0.06 | 0.06 | 0.06 | SpecCom |
| SCE2536 | Energy Efficiency / Demand Response Flex Program | 5,473 | 2 | 0 | 53,462 | 0 | 5,473 | 2 | 0 | 53,462 | 0 | 1.54 | 1.71 | 1.54 | 1.71 | SpecCom |
| SCE2537 | SCE MAP | 19,386 | 5 | 0 | 227,193 | 0 | 18,213 | 5 | 0 | 221,332 | 0 | 2.36 | 3.64 | 2.27 | 3.50 | SpecCom |
| SCE2538 | Lighting Energy Efficiency with Demand Response (LEEDR) | 397 | 0 | 0 | 4,363 | 0 | 397 | 0 | 0 | 4,363 | 0 | 1.35 | 3.27 | 1.35 | 3.27 | SpecCom |
| SCE2543 | SCE Designed for Comfort | 252 | 0 | 0 | 4,205 | 0 | 252 | 0 | 0 | 4,205 | 0 | 0.60 | 0.81 | 0.60 | 0.81 | NRNC |

| Program ID | Program Name | Net Reported | | | | | Net Evaluated | | | | | Net Reported | | Net Evaluated | | Evaluation Group |
| | | Annual | | | Lifecycle | | Annual | | | Lifecycle | | | | | | |
| | [Therms are in thousands] | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCE2544 | SCE CPEEP | 6,322 | 2 | 0 | 62,605 | 0 | 6,322 | 2 | 0 | 62,605 | 0 | 1.33 | 1.35 | 1.33 | 1.35 | SmallCom |
| SCE2546 | SCE Lights for Learning | 102 | 0 | 0 | 955 | 0 | 102 | 0 | 0 | 955 | 0 | 0.33 | 0.35 | 0.33 | 0.35 | Res |
| SCE2550 | SCE Innov Pool Pump | 1,422 | 0 | 0 | 14,215 | 0 | 1,422 | 0 | 0 | 14,215 | 0 | 0.79 | 1.66 | 0.79 | 1.66 | Res |
| SCE2552 | SCE Night Breeze | 8 | 0 | 0 | 139 | 0 | 8 | 0 | 0 | 139 | 0 | 0.08 | 0.08 | 0.08 | 0.08 | Res |
| SCE2557 | Transforming the Market for New Energy Star Manufactured (Mobile) Homes 7(IDEEA / InDEE) | 131 | 0 | 0 | 2,616 | 0 | 131 | 0 | 0 | 2,616 | 0 | 0.45 | 0.57 | 0.45 | 0.57 | NRNC |
| SCE2559 | The Lighting Energy Efficiency PAR 38/30 CFL (LEEP 38/30 CFL) Program 7(IDEEA / InDEE) | 25,504 | 4 | 0 | 44,862 | 0 | 25,504 | 4 | 0 | 44,862 | 0 | 2.48 | 2.48 | 2.48 | 2.48 | SmallCom |
| SCE2560 | Hospital Facility Energy Efficiency Program 7(IDEEA / InDEE) | 5,069 | 1 | 0 | 44,119 | 0 | 5,069 | 1 | 0 | 44,119 | 0 | 0.83 | 2.09 | 0.83 | 2.09 | MajCom |

| Program ID | Program Name | Net Reported Annual | | | Net Reported Lifecycle | | Net Evaluated Annual | | | Net Evaluated Lifecycle | | Net Reported | | Net Evaluated | | Evaluation Group |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | [Therms are in thousands] | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | |
| SCE2561 | Energy Efficiency Program for Entertainment Centers 7(IDEEA / InDEE) | 881 | 0 | 0 | 6,685 | 0 | 898 | 1 | 0 | 6,858 | 0 | 3.25 | 3.25 | 3.63 | 3.63 | SpecCom |
| SCE2562 | Campus Housing Energy Efficiency Program 7(IDEEA / InDEE) | 258 | 0 | 0 | 670 | 0 | 258 | 0 | 0 | 835 | 0 | 0.06 | 0.06 | 0.07 | 0.07 | MajCom |
| SCE2563 | Plugging the Consumer Electronics Gap - A Cross-Cutting Plug Load Reduction Program 7(IDEEA / InDEE) | 163 | 0 | 0 | 653 | 0 | 163 | 0 | 0 | 653 | 0 | 0.34 | 0.31 | 0.34 | 0.31 | SmallCom |
| SCE2564 | Grocery Area Energy Network 7(IDEEA / InDEE) | 670 | 0 | 0 | 6,806 | 0 | 670 | 0 | 0 | 6,806 | 0 | 1.68 | 1.68 | 1.68 | 1.68 | SmallCom |
| SCE2565 | Escalator PowerGenius" Program 7(IDEEA / InDEE) | 179 | 0 | 0 | 2,692 | 0 | 179 | 0 | 0 | 2,692 | 0 | 1.94 | 1.78 | 1.94 | 1.78 | SpecCom |
| SCE2566 | SCE Palm Desert Partnership | 23,103 | 7 | 0 | 153,728 | 0 | 10,993 | 2 | -39 | 88,029 | -262 | 1.13 | 1.30 | 0.56 | 0.65 | LGP |

| Program ID | Program Name [Therms are in thousands] | Net Reported Annual | | | Net Reported Lifecycle | | Net Evaluated Annual | | | Net Evaluated Lifecycle | | Net Reported | | Net Evaluated | | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | |
| SCE2567 | Mammoth Lakes Partnership 2(Partnership Programs) | 18 | 0 | 0 | 173 | 0 | 18 | 0 | 0 | 173 | 0 | 0.03 | 0.03 | 0.03 | 0.03 | LGP |
| SCE2568 | Ridgecrest Partnership 2(Partnership Programs) | 27 | 0 | 0 | 236 | 0 | 27 | 0 | 0 | 236 | 0 | 0.07 | 0.07 | 0.07 | 0.07 | LGP |
| SCE2569 | Department of General Services Partnership 3(Partnership Programs) | 1,007 | 0 | 0 | 10,899 | 0 | 1,007 | 0 | 0 | 10,899 | 0 | 0.56 | 1.21 | 0.56 | 1.21 | LGP |
| SCE2570 | Federal Direct Install Initiative | 5,889 | 1 | 0 | 41,803 | 0 | 5,889 | 1 | 0 | 41,803 | 0 | 2.41 | 2.41 | 2.41 | 2.41 | LGP |
| SCE2571 | Santa Ana Partnership | 3,040 | 0 | 0 | 28,707 | 0 | 3,040 | 0 | 0 | 28,707 | 0 | 1.96 | 1.96 | 1.96 | 1.96 | LGP |
| SCE2573 | San Bernardino County Partnership | 14 | 0 | 0 | 114 | 0 | 14 | 0 | 0 | 114 | 0 | 0.08 | 0.08 | 0.08 | 0.08 | LGP |

San Diego Gas and Electric Program Level Results

| Program ID | Program Name [Therms are in thousands] | Net Reported Annual | | | Lifecycle | | Net Evaluated Annual | | | Lifecycle | | Net Reported | | Net Evaluated | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
| SDGE3001 | SDGE Community College | 3,866 | 1 | 31 | 45,086 | 622 | 1,328 | 0 | 22 | 12,900 | 212 | 0.35 | 1.57 | 0.11 | 0.49 | LGP |
| SDGE3006 | SDGE Lighting Exch | 4,313 | 0 | 0 | 40,316 | 0 | 2,259 | 0 | 0 | 18,575 | 0 | 1.60 | 1.67 | 0.78 | 0.82 | Res |
| SDGE3007 | SDGE Advanced Home | 260 | 0 | 21 | 4,185 | 344 | 260 | 0 | 21 | 4,185 | 344 | 0.18 | 0.18 | 0.14 | 0.14 | NRNC |
| SDGE3010 | Energy Savings Bids (project bids from participants) | 97,400 | 15 | 1,361 | 1,286,370 | 20,478 | 58,000 | 9 | 1,175 | 763,539 | 17,619 | 3.40 | 4.18 | 2.11 | 2.62 | MajCom |
| SDGE3012 | SDGE Express Efficiency | 84,492 | 16 | 722 | 625,765 | 4,880 | 24,910 | 6 | 149 | 273,134 | 581 | 3.19 | 4.25 | 1.20 | 1.60 | SmallCom |
| SDGE3015 | SDGE Refrig Repl | 783 | 0 | 5 | 7,884 | 48 | 256 | 0 | -6 | 2,619 | -59 | 0.63 | 0.53 | 0.16 | 0.14 | Res |
| SDGE3016 | SDGE Upstream Lighting | 308,745 | 28 | 0 | 2,900,444 | 0 | 72,493 | 10 | -788 | 527,600 | -5,088 | 5.82 | 9.92 | 1.09 | 1.86 | Res |
| SDGE3017 | SDGE MF Rebate | 10,598 | 4 | 285 | 113,487 | 2,867 | 8,013 | 1 | 170 | 93,541 | 1,953 | 1.06 | 1.19 | 0.82 | 0.93 | Res |
| SDGE3018 | SDGE Savings By Design | 14,707 | 4 | 184 | 196,088 | 2,763 | 9,450 | 2 | 183 | 141,747 | 2,741 | 2.19 | 1.88 | 1.56 | 1.45 | NRNC |
| SDGE3020 | SDGE Small Bus | 215,738 | 41 | 765 | 2,093,305 | 11,131 | 98,267 | 23 | -9 | 1,278,334 | -1,129 | 4.08 | 5.01 | 2.14 | 2.64 | SmallCom |
| SDGE3021 | SDGE Sustainable Communities | 806 | 0 | 12 | 12,096 | 181 | 806 | 0 | 12 | 12,096 | 181 | 0.88 | 0.80 | 0.88 | 0.80 | NRNC |
| SDGE3023 | SDGE SD Water Authority | 0 | 0 | 526 | 0 | 7,369 | 963 | 0 | 121 | 10,593 | 1,328 | 0.47 | 2.47 | 0.19 | 1.01 | Res |
| SDGE3024 | SDGE SF Rebate | 12,112 | 10 | 472 | 114,093 | 6,509 | 4,023 | 3 | 268 | 48,771 | 3,175 | 1.02 | 1.65 | 0.39 | 0.64 | Res |

| Program ID | [Therms are in thousands] Program Name | Net Reported Annual MWh | MW | Therms | Lifecycle MWh | Therms | Net Evaluated Annual MWh | MW | Therms | Lifecycle MWh | Therms | Net Reported TRC | PAC | Net Evaluated TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SDGE3025 | Standard Performance Program | 26,617 | 4 | 417 | 347,120 | 6,261 | 31,512 | 4 | 80 | 411,664 | 1,291 | 1.40 | 4.53 | 1.49 | 4.87 | MajCom |
| SDGE3026 | SDGE UC-CSU | 13,135 | 3 | 362 | 137,368 | 3,620 | 6,056 | 1 | 201 | 63,114 | 1,863 | 1.32 | 1.33 | 0.62 | 0.63 | LGP |
| SDGE3028 | SDGE Appliance Recycling | 24,578 | 4 | 0 | 245,783 | 0 | 19,683 | 3 | -410 | 196,752 | -4,104 | 1.85 | 2.10 | 1.13 | 1.29 | Res |
| SDGE3029 | Upstream HVAC/Motors Program (res and non-res) | 5,453 | 5 | 1 | 87,209 | 14 | 3,707 | 3 | 1 | 55,534 | 11 | 0.76 | 2.29 | 0.42 | 1.28 | SpecCom |
| SDGE3030 | SDGE CPEEP | 980 | 0 | 0 | 10,455 | 0 | 980 | 0 | 0 | 10,455 | 0 | 0.60 | 0.62 | 0.60 | 0.62 | SmallCom |
| SDGE3034 | EDC - Domestic Hot Water Control Program | 0 | 0 | 197 | 0 | 2,954 | 0 | 0 | 197 | 0 | 2,954 | 5.29 | 3.11 | 5.29 | 3.11 | SpecCom |
| SDGE3035 | SDGE Mobile Home | 5,419 | 3 | 280 | 64,664 | 4,134 | 4,039 | 1 | 129 | 45,424 | 1,822 | 1.12 | 1.32 | 0.64 | 0.75 | Res |
| SDGE3039 | SDGE MobileEnergy | 4,553 | 1 | 174 | 12,343 | 861 | 4,553 | 1 | 174 | 12,343 | 861 | 1.61 | 1.61 | 1.61 | 1.61 | SmallCom |
| SDGE3042 | SDGE Laundry Coin-OP | 278 | 0 | 154 | 1,556 | 1,826 | 278 | 0 | 154 | 1,556 | 1,826 | 0.87 | 1.40 | 0.87 | 1.40 | SmallCom |
| SDGE3043 | HVAC Training, Installation, and Maintenance, KEMA | 7,941 | 5 | 10 | 54,271 | 185 | 4,553 | 2 | 11 | 22,072 | 190 | 0.44 | 0.44 | 0.17 | 0.17 | SpecCom |
| SDGE3046 | SDGE3046_VPP_3PVariableSpeedPoolPumps | 1,866 | 2 | 0 | 18,657 | 0 | 1,866 | 2 | 0 | 18,657 | 0 | 0.98 | 1.15 | 0.98 | 1.15 | Res |
| SDGE3049 | SDGE3049_3P2_3PSmartContr | 1,376 | 0 | 677 | 13,757 | 6,773 | 1,376 | 0 | 677 | 13,757 | 6,773 | 2.64 | 3.28 | 2.64 | 3.28 | Res |

| Program ID | [Therms are in thousands] Program Name | Net Reported Annual | | | Lifecycle | | Net Evaluated Annual | | | Lifecycle | | Net Reported | | Net Evaluated | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
| | olsforPools&Spas | | | | | | | | | | | | | | | |
| SDGE3050 | SDGE3050_3P3_3PControlsforRestaurantHVAC&HotWater | 293 | 0 | 138 | 2,931 | 1,377 | 293 | 0 | 138 | 2,931 | 1,377 | 0.21 | 0.21 | 0.21 | 0.21 | SmallCom |
| SDGE3053 | SDGE3053_3P4_3PLodgingEnergyEfficiencyProgram | 2,428 | 1 | 11 | 26,108 | 229 | 2,428 | 1 | 11 | 26,108 | 229 | 1.51 | 2.07 | 1.51 | 2.07 | SmallCom |
| SDGE3054 | SDGE3054_3P5_3PHealthcareEnergyEfficiencyProgram | 1,613 | 0 | 30 | 32,221 | 302 | 1,613 | 0 | 30 | 32,221 | 302 | 2.56 | 3.11 | 2.36 | 2.87 | MajCom |

SoCal Gas Program Level Results

| | | Net Reported | | | | | Net Evaluated | | | | | Net Reported | | Net Evaluated | | |
| | [Therms are in thousands] | Annual | | | Lifecycle | | Annual | | | Lifecycle | | | | | | |
| Program ID | Program Name | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCG3502 | SCG Adv Home | 1,945 | 2 | 142 | 35,531 | 2,572 | 1,950 | 2 | 131 | 35,619 | 2,366 | 0.66 | 0.71 | 0.67 | 0.72 | NRNC |
| SCG3503 | SCG Ed & Train | 0 | 0 | 4,970 | 0 | 67,172 | 0 | 0 | 421 | 0 | 6,332 | 3.34 | 4.89 | 0.33 | 0.49 | #N/A |
| SCG3507 | SCG Express Efficiency | 0 | 0 | 35,190 | 0 | 498,210 | 111 | 0 | 16,113 | 553 | 112,265 | 9.76 | 14.49 | 2.76 | 4.11 | SmallCom |
| SCG3510 | SCG MF Rebate | 23 | 0 | 1,733 | 453 | 20,712 | 23 | 0 | 1,735 | 453 | 20,752 | 1.84 | 3.15 | 1.84 | 3.16 | Res |
| SCG3513 | Local Business Energy Efficiency Program | 0 | 0 | 11,728 | 0 | 204,559 | 0 | 0 | 5,635 | 0 | 97,940 | 3.37 | 5.83 | 1.61 | 2.77 | MajCom |
| SCG3517 | SCG SF Rebate | 3,821 | 2 | 2,278 | 76,421 | 37,988 | 1,271 | 1 | 880 | 25,416 | 13,949 | 0.61 | 1.62 | 0.21 | 0.57 | Res |
| SCG3518 | SCG Community College | 0 | 0 | 284 | 0 | 5,681 | 0 | 0 | 186 | 0 | 3,443 | 1.59 | 3.42 | 0.97 | 2.11 | LGP |
| SCG3519 | SCG Department of Corrections | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00 | 0.00 | 0.00 | 0.00 | LGP |
| SCG3520 | SCG UC-CSU | 0 | 0 | 679 | 0 | 6,786 | 0 | 0 | 466 | 0 | 5,118 | 0.09 | 2.00 | 0.07 | 1.46 | LGP |
| SCG3523 | SCG Bakersfield Kern | 0 | 0 | 23 | 0 | 223 | 0 | 0 | 23 | 0 | 223 | 0.48 | 0.56 | 0.48 | 0.56 | LGP |
| SCG3526 | SCG Water Conservation | 0 | 0 | 643 | 0 | 1,930 | 0 | 0 | 643 | 0 | 1,930 | 2.56 | 3.44 | 2.56 | 3.44 | SmallCom |
| SCG3527 | SCG LA County | 0 | 0 | 740 | 0 | 11,104 | 0 | 0 | 773 | 0 | 11,595 | 1.61 | 4.33 | 1.66 | 4.55 | RCx |
| SCG3536 | Constant Volume Retrofit Program (CVRP) | 707 | 0 | 22 | 7,074 | 222 | 707 | 0 | 22 | 7,074 | 222 | 0.15 | 0.19 | 0.15 | 0.19 | SpecCom |
| SCG3538 | SCG Gas Cooling | 0 | 0 | 17 | 0 | 259 | 0 | 0 | 17 | 0 | 259 | 0.22 | 0.22 | 0.22 | 0.22 | SmallCom |
| SCG3539 | SCG Mobile Home | 0 | 0 | 122 | 0 | 1,799 | 0 | 0 | 74 | 0 | 938 | 0.16 | 0.17 | 0.09 | 0.09 | Res |
| SCG3540 | SCG Laundry Coin-op | 0 | 0 | 134 | 0 | 1,266 | 0 | 0 | 134 | 0 | 1,266 | 0.17 | 0.18 | 0.17 | 0.18 | SmallCom |

| Program ID | Program Name | Net Reported Annual | | | Net Reported Lifecycle | | Net Evaluated Annual | | | Net Evaluated Lifecycle | | Net Reported | | Net Evaluated | | |
| | [Therms are in thousands] | MWh | MW | Therms | MWh | Therms | MWh | MW | Therms | MWh | Therms | TRC | PAC | TRC | PAC | Evaluation Group |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SCG3542 | SCG3542_NEW4_NEW4-SavingsByDesignSCGSCEProgram | 0 | 0 | 6,792 | 0 | 101,792 | 0 | 0 | 3,506 | 0 | 52,556 | 18.23 | 10.84 | 9.43 | 9.65 | NRNC |
| SCG3543 | SCG Palm Desert Partnership | 1 | 0 | 1 | 11 | 13 | 0 | 0 | 1 | 4 | 13 | 0.00 | 0.00 | 0.01 | 0.01 | LGP |
| SCG3544 | SCG3544_HWC4_3PEDCDomesticHotWaterControls | 0 | 0 | 333 | 0 | 4,999 | 0 | 0 | 333 | 0 | 4,999 | 7.13 | 3.63 | 7.13 | 3.63 | SpecCom |
| SCG3546 | SCG3546_EVC4_3PBenningfieldGroup-AdvancedWaterHeaterTechnolo | 10 | 0 | 76 | 152 | 1,140 | 10 | 0 | 76 | 152 | 1,140 | 1.11 | 1.11 | 1.12 | 1.12 | MajCom |
| SCG3547 | SCG3547_3P1_3PEnergyEfficientSmartControlsforCommPools&Sp | 0 | 0 | 379 | 0 | 3,791 | 0 | 0 | 379 | 0 | 3,791 | 1.68 | 2.26 | 1.68 | 2.26 | Res |
| SCG3550 | SCG3550_3P4_3PMultifamilyDirectThermSavings | 0 | 0 | 320 | 0 | 3,039 | 0 | 0 | 320 | 0 | 3,039 | 0.83 | 1.11 | 0.83 | 1.11 | Res |

## B. Description of HVAC Interactive Effects Factors

The interior building load reduction/increase due to a measure installation in a facility can interact with the heating, ventilating and air-conditioning (HVAC) system, resulting in changes in the consumption of electricity or gas. These HVAC interactive effects can result in positive or negative changes in consumption, and can cross fuel types and energy/demand categories.

Measures causing HVAC interactions primarily include lighting and appliances located within a conditioned space.  The impact of HVAC interactions on measure savings were presented in the first two verification reports.  Through a series of parametric runs of the VRT software, savings estimates with and without HVAC interactive effects were prepared.  This same set of parametrics was applied to the final energy savings calculations within the ERT, but was limited to applications for prescriptive measures.  Interactive effects for whole building, custom or process measures were captured in the evaluation measurement and verification work. Only two scenarios of interactive effects are presented: with interactive effects includes both positive and negative effects and without interactive effects removes the interactive effects for prescriptive measure savings.

A series of annual interactive effects multipliers were prepared for a variety of measure types, building types, climate zones and HVAC system types.  The annual interactive effects multipliers were derived from the DOE-2.2 simulations used to construct the 2008 DEER[1]. The interactive effect multipliers for the selected combination of parameters were calculated by climate zone and system type.  Multipliers were developed for electricity (kWh/kWh), demand (kW/kW) and gas (therm/kWh).

The process for obtaining the multipliers was as follows:

1. A representative measure from DEER for each of the interactive effects categories (lighting, appliances and so on) was selected.

| Measure category | DEER Measure ID | Description |
|---|---|---|
| Residential CFL | CFL-Int-7W-Rpl-Prim | 7 watt screw in CFL replacing a xx watt incandescent |
| Residential Appliance | RefgFrzrRefRefg-900kWh-500kWh | Refrigerator or freezer replacement; 900 kWh/yr baseline, 500 kWh/yr measure |
| Commercial CFL | ILtg-FixtPwr-Sec-100wIncRef100w-25wCFLRefSMg25w | 25 W CFL reflector replacing a 100 W incandescent reflector |
| Commercial Linear Fluorescent | ILtg-LFluor-Prim-RplLPD-48in39wT12SMg60w-48in3g30wT8ESPISNEl27w | 4 ft T-8 30 W energy saving lamp replacing a 4 ft T-12 standard lamp with standard magnetic ballast |

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[1] To better estimate interactive-effects, the ED DMQC Team, with assistance from the ED DEER Team, provided an interactive-effects spreadsheet for the ERT Team.  Several heating and cooling system types were added to the DEER dataset, and air-conditioning and heating saturations were applied which mitigate the negative therms impact. Additionally, a couple of errors identified in the DEER 2008 analysis software tool were corrected.

| Commercial Exit Signs | ILtg-Power-Exit-60pct | Exit sign with 60% power reduction |
|---|---|---|

2. Data were extracted from MISer for each measure, building type, HVAC type and climate zone combination.

3. The end-use and whole building savings from the MISer database extract were compiled. The relevant fields in the MISer database are shown below:

| Name | Description |
|---|---|
| ElecDem_D08 | Demand : Whole Bldg Demand 2008 peak period (kW) |
| ElecDemD08_EU | Demand : Direct End Use Demand 2008 peak period (kW) |
| Imp_AnnualkWh | Impact : Annual electricity use (kWh) |
| Imp_AnnualkWh_EU | Impact : Annual electricity use - direct end use (kWh) |
| Imp_Annualtherm | Impact : Annual gas use (therm) |

The HVAC interactive effects multipliers for kWh were calculated as follows:

$$HVAC_{kWh} = (Imp\_AnnualkWh - Imp\_AnnualkWh\_EU) / Imp\_AnnualkWh\_EU$$

The HVAC interactive effects multipliers for kW were calculated as follows:

$$HVAC_{kW} = (ElecDem\_D08 - ElecDem\_D08\_EU) / ElecDem\_D08\_EU$$

The HVAC interactive effects multipliers for therms were calculated as follows:

$$HVAC_{therm} = Imp\_Annualtherm / Imp\_AnnualkWh\_EU$$

The process for incorporating the multipliers was as follows:

1. Measures were mapped to appropriate measure type in the HVAC interactive effects tables. For residential buildings, HVAC interactive effects multipliers were developed for interior lighting and appliances, using simulations for CFLs and refrigerators/freezers. For commercial buildings, HVAC interactive effects multipliers were developed for CFLs, linear fluorescent lighting and exit signs. CFL measures used the CFL HVAC interactive effects multipliers, exit sign measures used the exit sign HVAC interactive effects multipliers, and all remaining interior lighting measures used the linear fluorescent interactive effects multipliers.

2. The climate zone where the building is located was identified in the standard program tracking database (SPTdb). This information, along with the IOU service territory was used to select the correct climate zone. If the climate zone was not known (as is the case with upstream lighting measures), the IOU average value was used. More detail about assigning climate zones for unknown cases is presented in the documentation of the SPTdb.

3. The appropriate DEER building type was identified from the DEER building type field in the SPTdb.  More detail about assigning building type for unknown cases is presented in the documentation of  the SPTdb. HVAC interactive effects multipliers were developed for each of the DEER building types  shown below:

Residential Building Types with HVAC Interactive Effects Multipliers

| Single Family Residential |
| --- |
| Multi-Family Residential |
| Double Wide Mobile Home |

Commercial Building Types with HVAC Interactive Effects Multipliers

| Assembly | Manufacturing - Bio/Tech |
| --- | --- |
| Education - Primary School | Manufacturing - Light Industrial |
| Education - Secondary  School | Office - Large |
| Education - Community College | Office - Small |
| Education - University | Restaurant - Sit Down |
| Education - Relocatable Classroom | Restaurant - Fast Food |
| Grocery | Retail - Multistory Large |
| Health/Medical - Hospital | Retail - Single-Story Large |
| Health/Medical - Nursing Home | Retail - Small |
| Lodging - Hotel | Storage - Conditioned |
| Lodging - Motel | |

The SPTdb DEER building type is not populated for all records.  In situations where the building type is unknown or set to "Average" or "Miscellaneous," a weighted average across the building types by program was used.  See the individual measure sections for specific details on how the weighting factors were developed.

4. The HVAC system type from building characteristics data collected during the site M&V activities were used to select the correct HVAC interactive effects multipliers.  HVAC interactive effects multipliers were developed for the following residential HVAC system types:

| System Name | Description |
| --- | --- |
| GasPac | Central air conditioning system with gas furnace |
| HP | Central air source heat pump |
| ElecHeat | Electric resistance space heating only (no AC) |
| GasFurn | Gas furnace only (no AC) |

HVAC interactive effects multipliers were developed for the following commercial HVAC system types:

| System Name | Description |
| --- | --- |
| GasPac | Packaged rooftop AC unit with gas heat |
| HP | Packaged rooftop air source heat pump |
| PVAV | Packaged rooftop VAV system with zone level gas reheat |

| SVAV | Built-up VAV system with zone level gas reheat |
| WLHP | Water loop heat pump |
| PSZElec | Packaged rooftop AC unit with electric heat |
| PVAVElec | Packaged rooftop VAV system with zone level electric reheat |
| SVAVElec | Built-up VAV system with zone level electric reheat |
| ElecHeat | Electric resistance space heating only (no AC) |
| GasFurn | Gas furnace only (no AC) |

If the HVAC system type was not known, a weighted average based on the saturation of HVAC system types in the participant population was used. The weights were derived from several sources: the Residential Appliance Saturation Study (RASS), the Commercial End-Use Survey (CEUS) and primary data collected during the course of the evaluation studies.

## PG&E HVAC System Weights

| Building Type | GasPac | HP | WLHP | PSZElec | ElecHeat | GasFurn | PVAV | SVAV | PVAVElec | SVAVElec | DX/Other | Unconditioned |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Assembly | 0.443 | 0.127 | - | 0.036 | 0.045 | 0.246 | - | - | - | - | - | 0.102 |
| Education - Primary School | 0.470 | 0.192 | - | 0.014 | 0.008 | 0.316 | - | - | - | - | - | - |
| Education - Secondary School | 0.435 | 0.177 | - | 0.013 | 0.007 | 0.293 | 0.066 | 0.008 | 0.001 | 0.000 | - | - |
| Education - Community College | 0.322 | 0.052 | 0.009 | 0.012 | - | 0.190 | 0.360 | 0.042 | 0.011 | 0.001 | - | - |
| Education - University | 0.330 | 0.053 | - | 0.012 | - | 0.190 | 0.360 | 0.042 | 0.011 | 0.001 | - | - |
| Education - Relocatable Classroom | 0.470 | 0.192 | - | 0.014 | 0.008 | 0.316 | - | - | - | - | - | - |
| Grocery | 0.498 | 0.137 | - | 0.027 | 0.271 | 0.047 | - | - | - | - | - | 0.021 |
| Health/Medical - Hospital | 0.351 | 0.117 | - | 0.046 | 0.000 | 0.246 | 0.197 | 0.023 | 0.018 | 0.002 | - | 0.001 |
| Health/Medical - Nursing Home | 0.351 | 0.117 | - | 0.046 | 0.000 | 0.246 | 0.197 | 0.023 | 0.018 | 0.002 | - | 0.001 |
| Lodging - Hotel | 0.213 | 0.194 | 0.038 | 0.115 | 0.082 | 0.187 | 0.121 | 0.014 | 0.031 | 0.004 | - | - |
| Lodging - Motel | 0.275 | 0.251 | - | 0.149 | 0.098 | 0.226 | - | - | - | - | - | - |
| Manufacturing - Bio/Tech | 0.441 | 0.127 | 0.004 | 0.036 | 0.045 | 0.246 | - | - | - | - | - | 0.102 |
| Manufacturing - Light Industrial | 0.443 | 0.127 | - | 0.036 | 0.045 | 0.246 | - | - | - | - | - | 0.102 |
| Office - Large | 0.201 | 0.091 | 0.059 | 0.004 | 0.019 | 0.152 | 0.420 | 0.049 | 0.004 | 0.001 | - | - |
| Office - Small | 0.312 | 0.273 | 0.017 | 0.038 | 0.077 | 0.230 | 0.045 | 0.005 | 0.003 | 0.000 | - | - |
| Restaurant - Sit Down | 0.514 | 0.083 | - | 0.013 | 0.142 | 0.151 | - | - | - | - | - | 0.097 |
| Restaurant - Fast Food | 0.514 | 0.083 | - | 0.013 | 0.142 | 0.151 | - | - | - | - | - | 0.097 |
| Retail - Multistory Large | 0.396 | 0.173 | 0.000 | 0.050 | 0.057 | 0.240 | 0.023 | 0.003 | 0.002 | 0.000 | - | 0.056 |
| Retail - Single-Story Large | 0.408 | 0.178 | - | 0.052 | 0.058 | 0.248 | - | - | - | - | - | 0.056 |
| Retail - Small | 0.408 | 0.178 | - | 0.052 | 0.058 | 0.248 | - | - | - | - | - | 0.056 |
| Storage - Conditioned | 0.365 | 0.280 | - | 0.003 | 0.136 | 0.174 | - | - | - | - | - | 0.043 |
| Single Family Residential | 0.4971 | 0.0286 | | | 0.0214 | 0.3729 | | | | | 0.046 | 0.034 |
| Multi-Family Residential | 0.3032 | 0.0436 | | | 0.0628 | 0.4365 | | | | | 0.063 | 0.091 |
| Double Wide Mobile Home | 0.5702 | 0.0815 | | | 0.0185 | 0.1298 | | | | | 0.163 | 0.037 |

**SCE HVAC System Weights**

| Building Type | GasPac | HP | WLHP | PSZElec | ElecHeat | GasFurn | PVAV | SVAV | PVAVElec | SVAVElec | DX/Other | Unconditioned |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Assembly | 0.591 | 0.170 | - | 0.048 | 0.017 | 0.091 | - | - | - | - | - | 0.084 |
| Education - Primary School | 0.614 | 0.250 | - | 0.018 | 0.003 | 0.115 | - | - | - | - | - | - |
| Education - Secondary  School | 0.548 | 0.223 | - | 0.016 | 0.003 | 0.102 | 0.031 | 0.075 | 0.001 | 0.002 | - | - |
| Education - Community College | 0.475 | 0.077 | 0.014 | 0.018 | - | 0.078 | 0.096 | 0.233 | 0.003 | 0.007 | - | - |
| Education - University | 0.487 | 0.079 | - | 0.018 | - | 0.078 | 0.096 | 0.233 | 0.003 | 0.007 | - | - |
| Education - Relocatable Classroom | 0.614 | 0.250 | - | 0.018 | 0.003 | 0.115 | - | - | - | - | - | - |
| Grocery | 0.593 | 0.163 | - | 0.032 | 0.090 | 0.016 | - | - | - | - | - | 0.106 |
| Health/Medical - Hospital | 0.439 | 0.146 | - | 0.057 | 0.000 | 0.086 | 0.072 | 0.176 | 0.007 | 0.016 | - | - |
| Health/Medical - Nursing Home | 0.439 | 0.146 | - | 0.057 | 0.000 | 0.086 | 0.072 | 0.176 | 0.007 | 0.016 | - | - |
| Lodging - Hotel | 0.285 | 0.260 | 0.051 | 0.154 | 0.030 | 0.070 | 0.035 | 0.085 | 0.009 | 0.022 | - | - |
| Lodging - Motel | 0.360 | 0.328 | - | 0.195 | 0.036 | 0.082 | - | - | - | - | - | - |
| Manufacturing - Bio/Tech | 0.588 | 0.169 | 0.005 | 0.047 | 0.017 | 0.091 | - | - | - | - | - | 0.084 |
| Manufacturing - Light Industrial | 0.591 | 0.170 | - | 0.048 | 0.017 | 0.091 | - | - | - | - | - | 0.084 |
| Office - Large | 0.265 | 0.120 | 0.078 | 0.005 | 0.007 | 0.056 | 0.135 | 0.329 | 0.001 | 0.003 | - | - |
| Office - Small | 0.407 | 0.355 | 0.022 | 0.050 | 0.028 | 0.083 | 0.015 | 0.036 | 0.001 | 0.002 | - | 0.001 |
| Restaurant - Sit Down | 0.711 | 0.114 | - | 0.018 | 0.054 | 0.058 | - | - | - | - | - | 0.045 |
| Restaurant - Fast Food | 0.711 | 0.114 | - | 0.018 | 0.054 | 0.058 | - | - | - | - | - | 0.045 |
| Retail - Multistory Large | 0.511 | 0.223 | 0.000 | 0.064 | 0.020 | 0.086 | 0.007 | 0.018 | 0.001 | 0.002 | - | 0.068 |
| Retail - Single-Story Large | 0.526 | 0.230 | - | 0.066 | 0.021 | 0.089 | - | - | - | - | - | 0.068 |
| Retail - Small | 0.526 | 0.230 | - | 0.066 | 0.021 | 0.089 | - | - | - | - | - | 0.068 |
| Storage - Conditioned | 0.491 | 0.376 | - | 0.003 | 0.051 | 0.065 | - | - | - | - | - | 0.013 |
| Storage - Unconditioned | 0.987 | - | - | - | - | - | - | - | - | - | - | 0.013 |
| Warehouse - Refrigerated | 0.888 | - | - | - | - | - | - | - | - | - | - | 0.112 |
| Single Family Residential | 0.6335 | 0.0364 | | | 0.0136 | 0.2365 | | | | | 0.058 | 0.022 |
| Multi-Family Residential | 0.4305 | 0.0619 | | | 0.0445 | 0.3092 | | | | | 0.090 | 0.064 |
| Double Wide Mobile Home | 0.5657 | 0.0808 | | | 0.0192 | 0.1343 | | | | | 0.162 | 0.038 |

## SDG&E HVAC System Weights

| Building Type | GasPac | HP | WLHP | PSZElec | ElecHeat | GasFurn | PVAV | SVAV | PVAVElec | SVAVElec | DX/Other | Unconditioned |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Assembly | 0.616 | 0.177 | - | 0.050 | 0.021 | 0.114 | - | - | - | - | - | 0.023 |
| Education - Primary School | 0.600 | 0.245 | - | 0.017 | 0.003 | 0.134 | - | - | - | - | - | - |
| Education - Secondary School | 0.561 | 0.229 | - | 0.016 | 0.003 | 0.126 | 0.009 | 0.055 | 0.000 | 0.001 | - | - |
| Education - Community College | 0.371 | 0.060 | 0.011 | 0.014 | - | 0.073 | 0.063 | 0.394 | 0.002 | 0.012 | - | - |
| Education - University | 0.380 | 0.062 | - | 0.014 | - | 0.073 | 0.063 | 0.394 | 0.002 | 0.012 | - | - |
| Education - Relocatable Classroom | 0.600 | 0.245 | - | 0.017 | 0.003 | 0.134 | - | - | - | - | - | - |
| Grocery | 0.571 | 0.157 | - | 0.031 | 0.103 | 0.018 | - | - | - | - | - | 0.121 |
| Health/Medical - Hospital | 0.427 | 0.142 | - | 0.056 | 0.000 | 0.099 | 0.035 | 0.218 | 0.003 | 0.020 | - | - |
| Health/Medical - Nursing Home | 0.427 | 0.142 | - | 0.056 | 0.000 | 0.099 | 0.035 | 0.218 | 0.003 | 0.020 | - | - |
| Lodging - Hotel | 0.276 | 0.251 | 0.049 | 0.149 | 0.035 | 0.081 | 0.018 | 0.109 | 0.005 | 0.028 | - | - |
| Lodging - Motel | 0.352 | 0.320 | - | 0.190 | 0.042 | 0.096 | - | - | - | - | - | - |
| Manufacturing - Bio/Tech | 0.612 | 0.176 | 0.005 | 0.049 | 0.021 | 0.114 | - | - | - | - | - | 0.023 |
| Manufacturing - Light Industrial | 0.616 | 0.177 | - | 0.050 | 0.021 | 0.114 | - | - | - | - | - | 0.023 |
| Office - Large | 0.340 | 0.154 | 0.100 | 0.006 | 0.011 | 0.085 | 0.042 | 0.259 | 0.000 | 0.003 | - | - |
| Office - Small | 0.421 | 0.367 | 0.023 | 0.051 | 0.035 | 0.103 | - | - | - | - | - | - |
| Restaurant - Sit Down | 0.727 | 0.117 | - | 0.018 | 0.067 | 0.071 | - | - | - | - | - | - |
| Restaurant - Fast Food | 0.727 | 0.117 | - | 0.018 | 0.067 | 0.071 | - | - | - | - | - | - |
| Retail - Multistory Large | 0.513 | 0.224 | 0.000 | 0.065 | 0.024 | 0.103 | 0.003 | 0.018 | 0.000 | 0.002 | - | 0.048 |
| Retail - Single-Story Large | 0.525 | 0.229 | - | 0.066 | 0.025 | 0.106 | - | - | - | - | - | 0.048 |
| Retail - Small | 0.525 | 0.229 | - | 0.066 | 0.025 | 0.106 | - | - | - | - | - | 0.048 |
| Storage - Conditioned | 0.483 | 0.370 | - | 0.003 | 0.060 | 0.077 | - | - | - | - | - | 0.007 |
| Storage - Unconditioned | 0.993 | - | - | - | - | - | - | - | - | - | - | 0.007 |
| Warehouse - Refrigerated | 1.000 | - | - | - | - | - | - | - | - | - | - | - |
| Single Family Residential | 0.4031 | 0.0232 | | | 0.0268 | 0.4669 | | | | | 0.037 | 0.043 |
| Multi-Family Residential | 0.3117 | 0.0448 | | | 0.0615 | 0.4280 | | | | | 0.065 | 0.089 |
| Double Wide Mobile Home | 0.3664 | 0.0523 | | | 0.0477 | 0.3336 | | | | | 0.105 | 0.095 |

**Application to ERT**

Measure savings are uploaded to the ERT parameter update tables as revised unit energy savings (UES) values.  The ERT accepts updated UES values with and without interactive effects in the fields EDUESi, and EDUES respectively from the input files.  Input file documentation also calls out the use of these interactive effects factors for any given program.  Some of the custom lighting measure savings analyses have been conducted using a building energy simulation program, where the HVAC interactive effects are automatically included in the results.  In these instances, the UES values are held constant for the interactive and non-interactive UES updates.

## C. ERT Input Summary tables by Contract Group and documentation files

Appendix C is provided as a separate document due to size constraints.

## D. Policy Direction on ED options for Extrapolating Results

Appendix A. Policy Direction on ED options for Extrapolating  Results

D-07-09-043  , Section 8.4.2, p137

Finally, establishing where performance falls along the adopted penalty/earnings curve involves estimating load impacts, load shapes and (for calculating PEB) measure and program costs for an extensive number of programs and measures.  In recognition that we may not have the resources to verify each parameter on an *ex post* basis for every program, our adopted EM&V protocols provide staff the flexibility to establish priorities for the EM&V efforts throughout the program cycle.  In performing its EM&V duties, we clarify that staff or its evaluation contractors may utilize any or all of the following approaches in order to report an estimated PEB for those programs that do not receive an impact evaluation, as staff deems appropriate:

- Extrapolate findings from comparable programs to determine net resource benefits for programs that do not receive full impact evaluation; or

- Accept reported savings values for programs that do not receive impact evaluation; or

- Extrapolate savings findings from impact evaluations for comparable programs for some net resource benefit parameters and accept reported values for others; or

- Apply a discount factor to savings or costs from programs that do not receive impact evaluation based upon historic impact evaluation results for comparable programs.

Staff should describe the method(s) it uses to estimate PEB for those programs that do not receive an impact evaluation in the Final Performance Basis Report, which will be issued to obtain stakeholder input pursuant to the Attachment 7 procedures.  In addition, Energy Division may need to prioritize resources for verifying measure installations and program costs over the program cycle, and may, as circumstances warrant, report the results of completed verification tasks in the Final Verification and Performance Basis Report.  If such circumstances arise, Energy Division should describe in each Verification Report the additional verification activities that will be performed and reported later in the program cycle.

## E. Requirement for the application of the DEER 2008 updates

D. 08-01-042 (Ordering Paragraph 3)

3. For the 2006-2008 program cycle, the following ex ante assumptions of energy savings and demand reductions ~~shall be used~~ in conjunction with verified installations and verified costs, <u>shall be used as the basis for</u> ~~to calculate~~ the 1st and 2nd Claims: [line out strike out per D.08-12-059; OP 11.]

(a) Except as otherwise provided for below, the ex ante measure savings parameters that are contained in the utilities' E3 calculators, as of the 4th quarter 2007 report for the 1st Claim and as of the 4th quarter 2008 report for the 2nd Claim.

(b) For measures contained in the Database for Energy Efficient Resources (DEER), the 2008 and 2009 DEER updates of ex ante measure savings parameters, including net-to-gross ratios and expected useful lives. The 2008 DEER update shall apply to the 1st Claim and the 2009 DEER update shall apply to the 2nd Claim.

(c) For customized measures or customized projects that represent aggregated measures in the E3 calculator, Energy Division shall identify the appropriate installed measure(s) based on its measure verification results and develop the associated ex ante load impact values. For this purpose, Energy Division may use the utilities' tracking system information, engineering work papers, DEER values and methods, or other current measurement and verification results that are available.

## F. Dual Baseline Memo

*Need for Dual Baseline Data and Modeling*

Savings that are in place at a given point in time are reflected in results from energy efficiency evaluation, measurement, and verification. However, estimating the savings that accrue from a specific technology or technologies over time are more difficult to quantify.  Such an evaluation needs to consider early replacement of the existing technology in the short term versus what that technology replaces in the long term, and the future operational characteristics of the site.  None of these factors were considered in the aggregated savings for the portfolios that are presented in this report.Tthe first year energy savings for all programs, based on the evaluated baseline, were multiplied by the effective useful life (EUL) of the replacement technology to derive the lifecycle savings.  The results presented in the final ERT input files and the E3 runs reflect a flat long-term savings scenario (first year savings * EUL).  In this appendix, Energy Division presents the challenges to developing accurate lifecycle impacts associated with this approach and an analysis in which a lifecycle realization rate was developed for several large industrial programs.

*Early Replacement*

Although some IOU programs encourage and provide incentives for technology early replacement, most programs focus on customer installation of the most efficient technology once the current equipment burns out ("replace on burnout").   Both scenarios produce variable benefits over the life of the technology as well as a different starting baseline.  This phenomenon is referred to as a "dual baseline"; Figure 1 illustrates the variable stream of savings over time for any given measure installation.  The blue line indicates an early replacement project and related savings over the first 5 years are larger than those from a replace on burnout project, because the baseline is the old existing equipment.  At year 6 the incremental savings decrease under the assumption that the old equipment has burned out, and  savings in future years are relative to existing code or current market practice baseline.   (Savings from technology replaced on burn out are always relative to the existing code or current market practice baseline. )

Figure 1. Savings over time for Early Replacement and Replace on Burn Out.
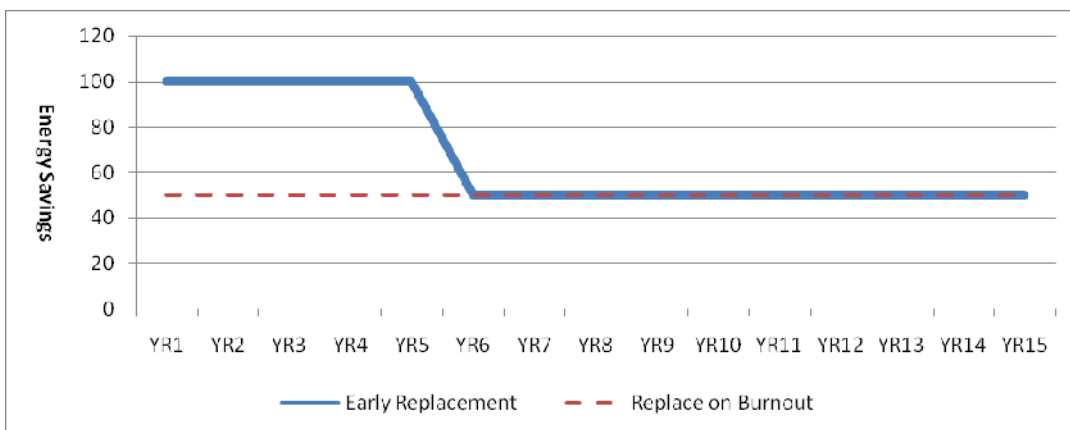
Ideally, implementers and evaluators would be able to collect information necessary to calculate and verify the variable stream of benefits in order to accurately reflect the comparative savings and benefits for early replacement situations and replace on burnout situations. However, most of the existing prescriptive measure and rebate activity in the portfolio continues to be replace on burnout, so the incremental savings (over code or standard efficiency) for the measure may be propagated over the effective useful life of that measure. This does not account for market changes overtime, or code changes that will occur at some future point in the measure life (e.g. Huffman bill and compact fluorescent bulbs. However, these factors affect the actual savings on the ground in any given time period, and are discussed below.

Evaluation contractors identified early replacement projects in the portfolios to varying degrees through participant interviews and onsite examination. As noted, early replacement means that the program encouraged a customer to change out equipment before the equipment would have expired (e.g. accelerated adoption). Early replacement cases typically realize larger savings in the early years (due to the larger marginal savings compared to the equipment that was replaced) and lower marginal savings in the period after the existing equipment would have expired (assuming more efficient products would be available in the market if replaced upon burnout.)

In the 2006-2008 cycle there were several limitations to modeling dual baselines for early replacement for both prescriptive and custom projects:

- First, tracking data did not always identify an early replacement case versus a replacement on burnout, and it was difficult to make this determination in the field after the technology had been replaced. In the future, data on the specific type and vintage of the equipment replaced, and whether it was an early replacement or replace on burnout, should be collected.

- Second, determining the remaining useful life ("RUL") of the technology presents significant challenges. The evaluations in this cycle incorporated questions to determine the remaining useful life and the net to gross algorithm considered the effect of the program on early replacement in the net savings calculation. However, an "RUL" that could confidently be applied across the sample population was not developed.

- Third, the E3 calculator used to aggregate the results did not include multiple lines of data to capture the dual streams of savings and benefits and weighted approaches would distort either the long-term savings and benefit impacts or the short term accomplishments.

Given these limitations, Energy Division that the final aggregation of results would not include dual baselines and the default assumptions would be replace on burnout (compared to the appropriate evaluation baseline) for all measures that were installed for the full effective useful life period. These are the results that are contained in the combined evaluation findings.

*Future Production*

In addition to early replacement there are other factors that lead to differences in savings over time. One aspect of particular importance in this cycle was the effect of the recession. The evaluations present a snapshot of the annual savings accomplishments and did not delve into predictions of the future economic situation. Like the early replacement dual baseline effect, the effect of future production could influence savings overtime and is illustrated in Figure 2. Note that three factors affect the lifecycle savings that will accrue for this technology: the type of installation (early or on burn out), and the effect on future production due to reduced plant activity or closure due to the recession in the second and third years. Additionally, the recession may lead to the old equipment lasting longer, which is not reflected in this hypothetical illustration and presents another source of uncertainty.

Figure 2. Potential Effect of Economic Activity on Future Energy Savings
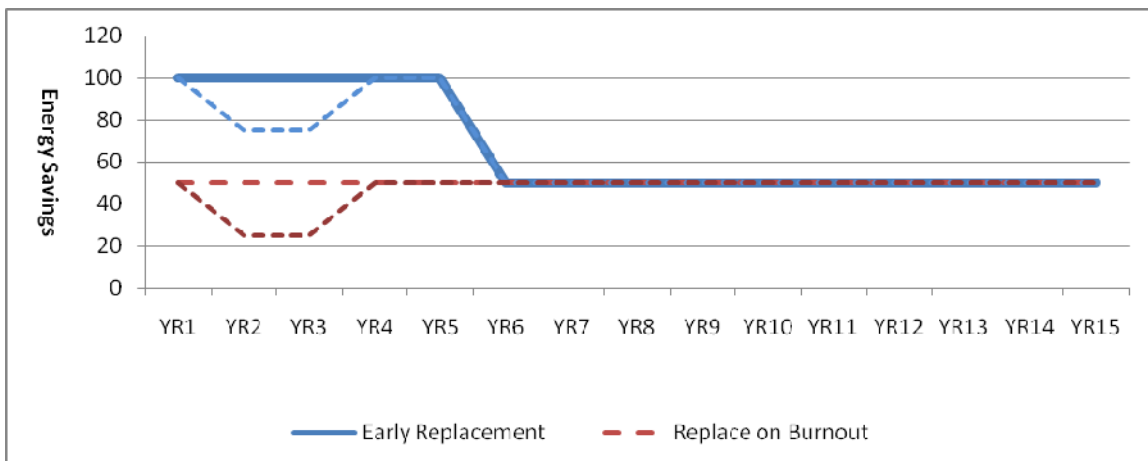


*Dual Baseline Sensitivity Analysis*

This section illustrates one method for taking the early replacement and future productivity of the sites into consideration. The results are compared to the outcomes that are modeled in the ERT (i.e. first year savings * EUL) to understand the sensitivity of taking these factors into account. Energy Division recognizes that there are several limitations to this approach. The key limitation is that it is still a single realization rate that reflects the multi-year impacts not a dual or multiple stream of savings. It also considers multiple dual baseline issues, including early replacement and economic downturn. However, this analysis is provided as a starting point for future discussion that will lead to improvements in how future savings are estimated.

The approach Itron developed is designed to quantify ex-post savings over the lifetime of the measure instead of only the first-year ex-post savings. This affects measures with dual baselines for which the annual ex-post savings over the lifetime of the measure are not equal to the first-year ex-

post savings (e.g. early retirement measures, measures that were installed and then decommissioned after a small number of years, measures switched off due to facility closure, etc.)

- The impact sample for the PG&E Fabrication contract group consisted of 134 projects. Of these, 47 projects, or 35% of the sample.

- The impact sample for program SCE2509 consisted of 31 projects. Of these, 9 projects, or 29% of the sample, had dual baseline issues as follows:

Should the bullet(s) read:

- The impact sample for the PG&E Fabrication contract group consisted of 134 projects, while the impact sample for the SCE2509 program consisted of 31 projects. Of these, 47 projects and 9 projects, respectively (35% and 29% of the samples, respectively) had dual baseline issues as follows:

The ERT Update procedure for the dual baseline scenario captures all of the dual baseline issues in a multi-year realization rate. This multi-year realization rate is substituted for the first-year realization rate as follows:

- For each site included in the impact sample, a multi-year realization rate is calculated as the sum of gross engineering ex-post savings over the lifetime of the measure divided by the sum of gross ex-ante savings from the tracking database:

  RR multiyear = S ex post savings over measure life / S tracking ex ante savings over measure life

- Multi-year realization rates for each stratum are then calculated as the weighted average of the individual multi-year realization rates in each stratum.

- The multi-year realization rates are applied by strata as multipliers to the EDFilledUES fields in the tracking database, yielding multi-year EDUES values for the dual baseline ERT scenario.

- The remaining parameters (NTG, EUL, Installation rates, update types, etc.) are applied to the tracking database using the same values and settings as for the first-year ERT scenario.

*Results for PG&E Fabrication, Process and Manufacturing*

- If multi-year realization rates are used instead of the first-year realization rates for the ERT Update:

    o   net ex-post kWh program savings decrease by 20 percent, and

    o   net ex-post kW savings decrease by 15 percent, and

    o   Therm program savings decrease by 17 percent.

- The percentage savings decrease varies by program and is influenced by the distribution of individual projects by category and strata, since the difference between multi-year realization rates and first-year realization rates varies by category – POC, non-POC and gas – and by strata.

*Results for SCE2509*

- By using multi-year realization rates instead of the first-year realization rates in the ERT calculation:

    o   net ex-post kW and kWh program savings decrease by 12 percent.

The detailed approach and examples for specific cases are provided below.

**Contract Group: PG&E Fabrication, Process and Manufacturing**

**Analyst Submitting ERT input File: Corina Jump**

**ERT Input File Name:** *ERTInput_PGEInd_Multi_02_22_10.txt*

**Programs included in ERT input File:** PGE2004, PGE2042, PGE2046, PGE2058, PGE2062, PGE2064, PGE2081, PGE2084 and PGE2087

**Procedures for ERT Update for PGE Industrial Programs, Dual Baseline Scenario**

The Dual Baseline Scenario is designed to quantify ex-post savings over the lifetime of the measure, rather than the first-year ex-post savings only. This affects measures with dual baselines, i.e. measures for which the annual ex-post savings over the lifetime of the measure are not equal to the first-year ex-post savings (e.g. early retirement measures, measures that were installed and then decommissioned after a small number of years, measures switched off due to facility closure, etc.)

**Dual Baseline Issues**

The impact sample for the PG&E Fabrication contract group consisted of 134 projects. Of these, 47 projects, or 35% of the sample, had dual baseline issues as follows:

1. Six projects (B006, B014, B033, B039, B105 and B125) installed measures in facilities that subsequently closed.

2. Three projects (B013, B042a and B095) installed measures in production lines that were subsequently shut down or underwent re-tooling for different product lines.

3. Six projects (B067, B100, B108, B112, B115 and B117) installed a number of measures as specified in the application paperwork; some of these measures had been disabled by the time the evaluation team arrived on-site.

4. One project (B080) was installed in a facility where operating hours varied over the first 3 years of the measure. This translated into ex post estimated savings that varied over the first 3 years.

5. Ten projects (B012, B015, B036a, B042, B048a, B048c, B053, B061, B077 and B101) were early retirement projects. The ex post savings used the efficiency of the measure removed as baseline for a number of years of estimated remaining life (specified by the customer in the in-depth interview.) After the years of measure remaining life, the ex post savings used an appropriate market baseline for the measure installed. The multi-year reporting table for site B012 is shown below.

**Summary Table 7: Multi-Year Reporting Table for Application B012**

| Program ID | PGE2004, Application B012 | | | |
| Program Name | PG&E Fabrication, Process and Heavy Industrial Manufacturing | | | |
| Year | Calendar Year | Ex-Ante Gross Program-Projected Annual MWh Savings[1] | Ex-Post Gross Evaluation-Confirmed Annual MWh Savings[2] | Ex-Ante Gross Program-Projected Peak MW Savings | Ex-Post Gross Evaluation-Confirmed Peak MW Savings |
|---|---|---|---|---|---|
| 1 | 2006 | 504.57 | 504.57 | 0.027 | 0.027 |
| 2 | 2007 | 504.57 | 504.57 | 0.027 | 0.027 |
| 3 | 2008 | 504.57 | 0.00 | 0.027 | 0.000 |
| 4 | 2009 | 504.57 | 0.00 | 0.027 | 0.000 |
| 5 | 2010 | 504.57 | 0.00 | 0.027 | 0.000 |
| 6 | 2011 | 504.57 | 0.00 | 0.027 | 0.000 |
| 7 | 2012 | 504.57 | 0.00 | 0.027 | 0.000 |
| 8 | 2013 | 504.57 | 0.00 | 0.027 | 0.000 |
| 9 | 2014 | 504.57 | 0.00 | 0.027 | 0.000 |
| 10 | 2015 | 504.57 | 0.00 | 0.027 | 0.000 |
| 11 | 2016 | 504.57 | 0.00 | 0.027 | 0.000 |
| 12 | 2017 | 504.57 | 0.00 | 0.027 | 0.000 |
| 13 | 2018 | 504.57 | 0.00 | 0.027 | 0.000 |
| 14 | 2019 | 504.57 | 0.00 | 0.027 | 0.000 |
| 15 | 2020 | 504.57 | 0.00 | 0.027 | 0.000 |
| 16 | 2021 | 0.00 | 0.00 | 0.000 | 0.000 |
| 17 | 2022 | 0.00 | 0.00 | 0.000 | 0.000 |
| 18 | 2023 | 0.00 | 0.00 | 0.000 | 0.000 |
| 19 | 2024 | 0.00 | 0.00 | 0.000 | 0.000 |
| 20 | 2025 | 0.00 | 0.00 | 0.000 | 0.000 |

1. Gross Program-Projected Savings are those savings projected by the program before NTG adjustments.

2. Gross Evaluation Confirmed Savings are those documented in the engineering analysis and do not include the evaluation contractor's NTG adjustments.

Note: This early retirement project involves DDC controls that accrue savings for the first two years, after which a Title 24 compliant control system is assumed that would provide systems efficacy equivalent to the operation of the new DDC controls. An effective useful life (EUL) of fifteen (15) years was input in the IOU tracking database; this is a reasonable estimate and is used in the ex-post analysis.

6. One project (B066) installed two different measures with different effective useful life according to DEER, but the tracking database specified one effective useful life for the entire project.

7. Twenty projects (B022, B048b, B064, B070a, B071, B072, B073, B075, B087, B092, B093, B106, B110, B118, B124, B130, B132, B133, B134, B135) installed measures for which the evaluation EUL was different than the EUL specified in the tracking database.

Please refer to Appendix D of the "2006-2008 Evaluation Report for the PG&E Fabrication, Process and Manufacturing Group" for more detail concerning any of these projects. A comprehensive list is provided below.

| Sample ID | Stratum | First-Year RR | | | Multi-Year RR | | | Dual Baseline Issue |
|---|---|---|---|---|---|---|---|---|
| | | kW | kWh | Therms | kW | kWh | Therms | |
| B006 | 2 | 0.77 | 0.64 | | 0.10 | 0.09 | | Facility closure in 2008 |
| B012 | 3 | 1.00 | 1.00 | | 0.13 | 0.13 | | Early retirement |
| B013 | 3 | | 1.44 | | | 0.29 | | Production line closed in 2008 |
| B014 | 3 | 0.66 | 0.79 | | 0.13 | 0.16 | | Facility closure in 2008 |
| B015 | 3 | 1.02 | 1.06 | | 0.32 | 0.32 | | Early retirement |
| B022 | 4 | 0.45 | 0.47 | | 0.34 | 0.35 | | Evaluation EUL < tracking EUL |
| B033 | 3 | | | 0.78 | | | 0.12 | Facility closure in 2008 |
| B036a | 1 | 1.01 | 0.94 | | 0.69 | 0.63 | | Early retirement |
| B039 | 5 | | | 1.04 | | | 0.16 | Facility closure in 2008 |
| B042 | 5 | | | 1.00 | | | 0.10 | Early retirement |
| B042a | 5 | | | 0.72 | | | 0.11 | Production line closed in 2008 |
| B048a | 3 | 0.93 | 0.95 | | 0.20 | 0.20 | | Early retirement |
| B048b | 5 | | 1.19 | | | 0.59 | | Evaluation EUL < tracking EUL |
| B048c | 1 | 0.98 | 0.96 | | 0.18 | 0.18 | | Early retirement |
| B053 | 3 | 1.10 | 0.84 | | 0.59 | 0.45 | | Early retirement |
| B061 | 5 | | | 1.11 | | | 0.37 | Early retirement |
| B064 | 1 | 1.00 | 1.00 | | 0.75 | 0.75 | | Evaluation EUL < tracking EUL |
| B066 | 2 | 0.66 | 0.58 | | 0.40 | 0.34 | | Two installed measures with different EULs |
| B067 | 2 | 0.81 | 0.78 | | 0.29 | 0.31 | | Partial measure removal after 2009 |
| B070a | 3 | 0.97 | 0.96 | | 0.55 | 0.54 | | Evaluation EUL < tracking EUL |
| B071 | 3 | 0.88 | 0.88 | | 0.66 | 0.66 | | Evaluation EUL < tracking EUL |
| B072 | 3 | 0.02 | 0.04 | | 0.02 | 0.04 | | Evaluation EUL < tracking EUL |
| B073 | 3 | 0.09 | 0.09 | | 0.06 | 0.07 | | Evaluation EUL < tracking EUL |
| B075 | 3 | 0.76 | 0.76 | | 0.57 | 0.57 | | Evaluation EUL < tracking EUL |
| B077 | 4 | 0.05 | 0.04 | | 0.05 | 0.03 | | Early retirement |
| B080 | 4 | -0.04 | -0.02 | | -0.16 | -0.01 | | Varying operating schedules in the first 3 years |
| B087 | 5 | 0.00 | 0.17 | | 0.00 | 0.13 | | Evaluation EUL < tracking EUL |
| B092 | 3 | 0.33 | 0.21 | | 0.25 | 0.15 | | Evaluation EUL < tracking EUL |
| B093 | 1 | | | 0.41 | | | 0.31 | Evaluation EUL < tracking EUL |
| B095 | 1 | 0.00 | -0.002 | | 0.00 | -0.0001 | | Production line re-tooled in 2008 |
| B100 | 1 | 0.33 | 0.27 | | 0.30 | 0.25 | | Partial measure removal after 2006 |
| B101 | 1 | | 0.032 | | | 0.026 | | Early retirement |
| B105 | 1 | 0.00 | 1.00 | | 0.00 | 0.10 | | Facility closure in 2009 |
| B106 | 1 | 1.03 | 0.30 | | 0.21 | 0.06 | | Evaluation EUL < tracking EUL |
| B108 | 3 | 0.33 | 0.27 | | 0.30 | 0.25 | | Partial measure removal after 2008 |
| B110 | 3 | 1.24 | 1.53 | | 0.78 | 0.93 | | Evaluation EUL < tracking EUL |
| B112 | 3 | 0.33 | 0.27 | | 0.29 | 0.25 | | Partial measure removal after 2008 |
| B115 | 3 | 0.32 | 0.27 | | 0.29 | 0.25 | | Partial measure removal after 2008 |
| B117 | 3 | 0.32 | 0.27 | | 0.30 | 0.25 | | Partial measure removal after 2008 |
| B118 | 3 | 0.64 | 0.38 | | 0.95 | 0.57 | | Evaluation EUL > tracking EUL |
| B124 | 1 | | | 0.84 | | | 0.63 | Evaluation EUL < tracking EUL |
| B125 | 3 | | | 1.00 | | | 0.10 | Facility closure in 2009 |
| B130 | 3 | | | 0.34 | | | 0.17 | Evaluation EUL < tracking EUL |
| B132 | 5 | | | 1.44 | | | 1.08 | Evaluation EUL < tracking EUL |
| B133 | 5 | | | 1.18 | | | 0.88 | Evaluation EUL < tracking EUL |
| B134 | 5 | | | 1.16 | | | 0.87 | Evaluation EUL < tracking EUL |
| B135 | 5 | | | 1.13 | | | 0.85 | Evaluation EUL < tracking EUL |

**ERT Update**

All of the dual baseline issues found in the impact sample, including EUL corrections, are captured in a multi-year realization rate as specified below. EUL corrections would ideally be incorporated into EUL corrections at the population level. However, evaluation EULs could be specified only for the impact sample, and only after the application paperwork was reviewed and the nature of each installed measure was ascertained. A similar effort cannot be implemented at the population level, because the PG&E tracking database contains measure descriptions that are very generic ("Process Other", "Process – Custom", "Lighting - Other", "Non-Process Boiler – Other" etc.)

The ERT Update procedure for the dual baseline scenario substitutes a multi-year realization rate for the first-year realization rate as follows:

- For each site included in the impact sample, a multi-year realization rate is calculated as the sum of gross engineering ex-post savings over the lifetime of the measure divided by the sum of gross ex-ante savings from the tracking database:

  RR multiyear = S ex post savings over measure life / S tracking ex ante savings over measure life

- Multi-year realization rates are then calculated for each stratum as the weighted average of the individual multi-year realization rates in each stratum.

- The multi-year realization rates are applied by strata as multipliers to the EDFilledUES fields in the tracking database, yielding multi-year EDUES values for the dual baseline ERT scenario.

- The remaining parameters (NTG, EUL, Installation rates, update types, etc.) are applied to the tracking database using the same values and settings as for the first-year ERT scenario.

- Note that multi-year realization rates were derived by category (POC, electric non-POC and gas) and are only applied to the records included in the PGE Industrial evaluation. The 58 new construction records analyzed as part of the New Construction and Codes and Standards evaluation are not affected.

**Multi-year Realization Rates vs. First-year Realization Rates**

The first-year realization rates from the evaluation were reported in the final "2006-2008 Evaluation Report for the PG&E Industrial Contract Group" in Tables 4-7 through 4-9. For comparison, the multi-year realization rates are shown side-by-side in the following tables.

**PY2006-2008 First-Year and Multi-Year Gross Impact Realization Rates for Pump-Off Controller Projects**

| Sampling Strata | First-Year RR | | Multi-Year RR | |
|---|---|---|---|---|
| | kWh | kW | kWh | kW |
| 1 | 0.50 | 0.50 | 0.50 | 0.49 |
| 2 | 0.53 | 0.53 | 0.53 | 0.53 |
| 3 | 0.39 | 0.41 | 0.38 | 0.40 |
| 4 | 0.48 | 0.49 | 0.48 | 0.49 |
| 5 | | | | |
| | | | | |
| **Weighted RR** | 0.46 | 0.47 | 0.46 | 0.47 |
| 90 Percent CI | 0.418 to 0.502 | 0.428 to 0.514 | 0.415 to 0.5 | 0.423 to 0.51 |
| Relative Precision | 0.091 | 0.092 | 0.093 | 0.094 |
| N measures in sample | 41 | 41 | 41 | 41 |
| N measures in population | 656 | 655 | 656 | 655 |
| ER | 0.37 | 0.37 | 0.37 | 0.38 |

**PY2006-2008 First-Year and Multi-Year Gross Impact Realization Rates for Electric Non-POC Projects**

| Sampling Strata | First-Year RR | | Multi-Year RR | |
|---|---|---|---|---|
| | kWh | kW | kWh | kW |
| 1 | 0.33 | 0.25 | 0.22 | 0.15 |
| 2 | 0.66 | 0.71 | 0.39 | 0.42 |
| 3 | 0.66 | 0.60 | 0.47 | 0.45 |
| 4 | 0.33 | 0.29 | 0.32 | 0.28 |
| 5 | 1.08 | 1.26 | 0.88 | 1.26 |
| | | | | |
| **Weighted RR** | 0.53 | 0.51 | 0.38 | 0.40 |
| 90 Percent CI | 0.437 to 0.615 | 0.375 to 0.637 | 0.298 to 0.47 | 0.281 to 0.528 |
| Relative Precision | 0.170 | 0.258 | 0.223 | 0.306 |
| N measures in sample | 63 | 58 | 63 | 58 |
| N measures in population | 756 | 670 | 756 | 670 |
| ER | 0.85 | 1.25 | 1.13 | 1.48 |

**PY2006-2008 First-Year and Multi-Year Gross Impact Realization Rates for Gas Projects**

| Sampling Strata | First-Year RR | Multi-Year RR |
|---|---|---|
| | Therms | Therms |
| 1 | 0.41 | 0.39 |
| 2 | 0.92 | 0.62 |
| 3 | | |
| 4 | 1.76 | 1.76 |
| 5 | 0.93 | 0.62 |
| | | |
| **Weighted RR** | 0.68 | 0.56 |
| 90 Percent CI | 0.621 to 0.733 | 0.51 to 0.611 |
| Relative Precision | 0.083 | 0.090 |
| N measures in sample | 29 | 29 |
| N measures in population | 152 | 152 |
| ER | 0.30 | 0.33 |

As these tables show, in the 2006-2008 program cycle, dual baseline issues affected electric non-POC measures the most.

**Results**

ERT runs conducted for the "All" Scenario produced the following results:

| Program ID | "All" Scenario, Multi-Year RRs | | | "All" Scenario, First Year RRs | | | Percent Difference | | |
|---|---|---|---|---|---|---|---|---|---|
| | Net Ex-post kW | Net Ex-post kWh | Net Ex-post Thm | Net Ex-post kW | Net Ex-post kWh | Net Ex-post Thm | Net Ex-post kW | Net Ex-post kWh | Net Ex-post Thm |
| PGE2004 in PGE Ind | 7,115 | 52,410,892 | 5,062,909 | 8,286 | 64,689,936 | 6,135,894 | -14 | -19 | -17 |
| PGE2004 in NCCS | 688 | 5,991,658 | 95,652 | 688 | 5,991,658 | 95,652 | 0 | 0 | 0 |
| PGE2042 | 1,893 | 14,378,271 | 1,006,215 | 2,462 | 19,718,894 | 1,109,791 | -23 | -27 | -9 |
| PGE2046 | 277 | 3,298,132 | 311,868 | 394 | 4,871,471 | 311,868 | -30 | -32 | 0 |
| PGE2058 | 2,781 | 26,352,203 | 0 | 3,111 | 30,494,472 | 0 | -11 | -14 | - |
| PGE2062 | 67 | 599,915 | 0 | 88 | 843,036 | 0 | -24 | -29 | - |
| PGE2064 | 188 | 1,974,017 | 0 | 269 | 2,894,778 | 0 | -30 | -32 | - |
| PGE2081 | 323 | 2,824,855 | 0 | 443 | 4,055,688 | 0 | -27 | -30 | - |
| PGE2084 | 787 | 4,426,497 | 0 | 932 | 5,966,890 | 0 | -15 | -26 | - |
| PGE2087 | 157 | 559,570 | 498,227 | 177 | 688,247 | 744,929 | -11 | -19 | -33 |
| All PGE Industrial | 14,276 | 112,816,011 | 6,974,872 | 16,849 | 140,215,070 | 8,398,135 | -15 | -20 | -17 |

If multi-year realization rates are used instead of the first-year realization rates for the ERT Update, overall net ex-post kWh program savings decrease by 20 percent, and net ex-post kW savings decrease by 15 percent, and Therm program savings decrease by 17 percent. The percentage savings decrease varies by program and is influenced by the distribution of individual projects by category and strata, since the difference between multi-year realization rates and first-year realization rates varies by category – POC, non-POC and gas – and by strata.

Note that the 58 PGE2004 records that were included in the New Construction and Codes and Standards evaluation are not affected by the dual baseline issue.

**Contract Group: Southern California Industrial and Agricultural**

**Analyst Submitting ERT Input File: Corina Jump**

**ERT Input File Name: ERTInput_SCEIndAg_SCE2509_02_23_10_dualbase.txt**

**Program Included in Input File: SCE2509**

**Procedures for ERT Update for the SCE Industrial Energy Efficiency (SCE2509) Program, Dual Baseline Scenario**

The Dual Baseline Scenario is designed to quantify ex-post savings over the lifetime of the measure, rather than first-year ex-post savings only. This approach affects measures with dual baselines, i.e. measures for which the annual ex-post savings over the lifetime of the measure are not equal to the first-year ex-post savings (for example: early retirement measures, measures that were installed and then decommissioned after a small number of years, measures switched off due to facility closure, measures for which the measure life was under- or over-estimated, etc.)

**Dual Baseline Issues**

The impact sample for program SCE2509 consisted of 31 projects. Of these, 9 projects, or 29% of the sample, had dual baseline issues as follows:

| Sample ID | Stratum | First-Year RR | | Multi-Year RR | | Dual Baseline Issue |
|-----------|---------|------|------|------|------|---------------------|
| | | kW | kWh | kW | kWh | |
| C007 | 2 | 1.08 | 1.08 | 1.08 | 1.06 | Scheduled maintenance |
| C010 | 3 | 0.89 | 0.89 | 1.15 | 1.22 | Evaluation EUL > tracking EUL |
| C015 | 3 | 0.61 | 0.87 | 0.23 | 0.34 | Early Retirement |
| C019 | 4 | 0.88 | 0.89 | 0.88 | 0.87 | Scheduled maintenance |
| C020 | 4 | 3.33 | 3.37 | 3.33 | 3.32 | Scheduled maintenance |
| C024 | 4 | 0.34 | 0.74 | 0.33 | 0.45 | Early Retirement |
| C026 | 5 | 1.12 | 1.16 | 0.30 | 0.31 | Early Retirement |
| C028 | 5 | 1.00 | 1.00 | 0.07 | 0.07 | Measure removed after 1 year |
| C030 | 5 | 1.53 | 1.48 | 2.30 | 2.23 | Evaluation EUL > tracking EUL |

8. Three projects (C007, C019 and C020) had scheduled maintenance every 4 years, resulting in a one-month closure every 4th year. The evaluated ex post kWh savings in the maintenance year were lower by 1/12 as compared to the evaluated ex post values in the years with no maintenance. The multi-year reporting table for site C007 is shown below for illustration.

9. Two projects (C010 and C030) installed measures for which the evaluation EUL is estimated to be 15 years, but the tracking system specifies 10 years. This causes the multi-year ex post savings to be higher than the multi-year tracking ex ante savings.

10. Three projects (C015, C024, and C026) were early retirement projects. The ex post savings used the efficiency of the measure removed as baseline for a number of years of estimated remaining life (specified by the customer in the in-depth

interview.) After the years of measure remaining life, the ex post savings used an appropriate market baseline for the measure installed.

11. One project (C028) installed a measure that was removed after one year of operation. The ex post savings are non-zero for the first year, then zero for the remaining life of the measure.

Please refer to Appendix D-5 of the "2006-2008 Evaluation Report for the Southern California Industrial and Agricultural Group" for more detail concerning any of these projects.

**Summary Table 7: Multi-Year Reporting Table for Application C007**

| Program ID | SCE2509, Application C007 | | | |
|---|---|---|---|---|
| Program Name | Integrated Industrial Process Program | | | |
| Year | Calendar Year | Ex-Ante Gross Program-Projected Annual MWh Savings[1] | Ex-Post Gross Evaluation-Confirmed Annual MWh Savings[2] | Ex-Ante Gross Program-Projected Peak MW Savings | Ex-Post Gross Evaluation-Confirmed Peak MW Savings |
| 1 | 2006 | 0.00 | 0.00 | 0.000 | 0.000 |
| 2 | 2007 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 3 | 2008 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 4 | 2009 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 5 | 2010 | 2,066.08 | 2,043.00 | 0.239 | 0.258 |
| 6 | 2011 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 7 | 2012 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 8 | 2013 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 9 | 2014 | 2,066.08 | 2,043.00 | 0.239 | 0.258 |
| 10 | 2015 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 11 | 2016 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 12 | 2017 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 13 | 2018 | 2,066.08 | 2,043.00 | 0.239 | 0.258 |
| 14 | 2019 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 15 | 2020 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 16 | 2021 | 2,066.08 | 2,229.51 | 0.239 | 0.258 |
| 17 | 2022 | 0.00 | 0.00 | 0.000 | 0.000 |
| 18 | 2023 | 0.00 | 0.00 | 0.000 | 0.000 |
| 19 | 2024 | 0.00 | 0.00 | 0.000 | 0.000 |
| 20 | 2025 | 0.00 | 0.00 | 0.000 | 0.000 |

1. Gross Program-Projected Savings are those savings projected by the program before NTG adjustments.

2. Gross Evaluation Confirmed Savings are those documented in the engineering analysis and do not include the evaluation contractor's NTG adjustments.

3. Per field operator, the well will be taken out of service for maintenance one month every four years. Thus in those years an estimated decrease in savings is projected.

**Summary Table 7: Multi-Year Reporting Table for Application C024**

| Program ID | SCE2509, Application C024 | | | |
|---|---|---|---|---|
| Program Name | Integrated Industrial Process Program | | | |
| Year | Calendar Year | Ex-Ante Gross Program-Projected Annual MWh Savings[1] | Ex-Post Gross Evaluation-Confirmed Annual MWh Savings[2] | Ex-Ante Gross Program-Projected Peak MW Savings | Ex-Post Gross Evaluation-Confirmed Peak MW Savings |
| 1 | 2006 | 0.00 | 0.00 | 0.000 | 0.000 |
| 2 | 2007 | 548.40 | 406.84 | 0.068 | 0.023 |
| 3 | 2008 | 548.40 | 406.84 | 0.068 | 0.023 |
| 4 | 2009 | 548.40 | 406.84 | 0.068 | 0.023 |
| 5 | 2010 | 548.40 | 406.84 | 0.068 | 0.023 |
| 6 | 2011 | 548.40 | 406.84 | 0.068 | 0.023 |
| 7 | 2012 | 548.40 | 169.00 | 0.068 | 0.023 |
| 8 | 2013 | 548.40 | 169.00 | 0.068 | 0.023 |
| 9 | 2014 | 548.40 | 169.00 | 0.068 | 0.023 |
| 10 | 2015 | 548.40 | 169.00 | 0.068 | 0.023 |
| 11 | 2016 | 548.40 | 169.00 | 0.068 | 0.023 |
| 12 | 2017 | 548.40 | 169.00 | 0.068 | 0.023 |
| 13 | 2018 | 548.40 | 169.00 | 0.068 | 0.023 |
| 14 | 2019 | 548.40 | 169.00 | 0.068 | 0.023 |
| 15 | 2020 | 548.40 | 169.00 | 0.068 | 0.023 |
| 16 | 2021 | 548.40 | 169.00 | 0.068 | 0.023 |
| 17 | 2022 | 0.00 | 0.00 | 0.000 | 0.000 |
| 18 | 2023 | 0.00 | 0.00 | 0.000 | 0.000 |
| 19 | 2024 | 0.00 | 0.00 | 0.000 | 0.000 |
| 20 | 2025 | 0.00 | 0.00 | 0.000 | 0.000 |

1. Gross Program-Projected Savings are those savings projected by the program before NTG adjustments.

2. Gross Evaluation Confirmed Savings are those documented in the engineering analysis and do not include the evaluation contractor's NTG adjustments.

The Remaining Useful Life (RUL) of the replaced compressors was estimated to be 5 years. After the first 5 years of service, the measure baseline for the balance of the EUL for the new compressors will be equivalent to a new installation. For this project, the new baseline is air compressors with similar capacity with inlet modulation.

**ERT Update**

All of the dual baseline issues found in the impact sample, including EUL corrections, are captured in a multi-year realization rate as specified below. EUL corrections would ideally be incorporated into EUL corrections at the population level. However, evaluation EULs could be specified only for the impact sample, and only after the application paperwork was reviewed and the nature of each measure installed was ascertained. A similar effort cannot be implemented at the population level, because the SCE tracking database contains very generic custom measure descriptions (e.g. "Ind Customized Process", "Ind. Refrigeration" etc.)

The ERT Update procedure for the dual baseline scenario captures all of the dual baseline issues in a multi-year realization rate. This multi-year realization rate is substituted for the first-year realization rate as follows:

- For each site included in the impact sample, a multi-year realization rate is calculated as the sum of gross engineering ex-post savings over the lifetime of the measure divided by the sum of gross ex-ante savings from the tracking database:

    RR multiyear = S ex post savings over measure life / S tracking ex ante savings over measure life

- Multi-year realization rates for each stratum are then calculated as the weighted average of the individual multi-year realization rates in each stratum.

- The multi-year realization rates are applied by strata as multipliers to the EDFilledUES fields in the tracking database, yielding multi-year EDUES values for the dual baseline ERT scenario.

- The remaining parameters (NTG, EUL, Installation rates, update types, etc.) are applied to the tracking database using the same values and settings as for the first-year ERT scenario.

**Multi-year Realization Rates vs. First-year Realization Rates**

The first-year realization rates from the evaluation were reported in the final "2006-2008 Evaluation Report for the Southern California Industrial and Agricultural Contract Group" in Table 6-12. For comparison purposes, the multi-year realization rates for program SCE2509 are shown side by side in the table below:

**PY2006-2008 First-Year and Multi-Year Gross Impact Realization Rates for SCE2509 Industrial Sample**

|  | First-Year RR | | Multi-Year RR | |
| --- | --- | --- | --- | --- |
| **Sampling Strata** | kWh | kW | kWh | kW |
| 1 | 0.70 | 0.58 | 0.70 | 0.58 |
| 2 | 0.68 | 0.72 | 0.67 | 0.72 |
| 3 | 0.64 | 0.54 | 0.60 | 0.50 |
| 4 | 0.81 | 0.73 | 0.73 | 0.69 |
| 5 | 0.73 | 0.66 | 0.46 | 0.43 |
|  |  |  |  |  |
| **Weighted RR** | 0.72 | 0.65 | 0.63 | 0.57 |
| 90 Percent CI | 0.49 to 0.953 | 0.463 to 0.838 | 0.411 to 0.855 | 0.398 to 0.742 |
| Relative precision | 0.321 | 0.288 | 0.35 | 0.30 |
| N measures in sample | 31 | 29 | 31 | 29 |
| N measures in population | 264 | 259 | 264 | 259 |
| ER | 1.16 | 1.00 | 1.26 | 1.05 |

As these tables show, the 9 projects affected by dual baseline issues were classified as strata 2, 3, 4 and 5 projects.

**Results**

ERT runs conducted for the "All" Scenario produced the following results:

| Program ID | "All" Scenario | | |
| --- | --- | --- | --- |
| | Net Ex-post kW | Net Ex-post kWh | Net Ex-post Therms |
| SCE2509 - Multi-Year RRs | 5,522 | 51,880,179 | 0 |
| SCE2509 - First Year RRs | 6,299 | 59,149,486 | 0 |
| Percent Difference | -12 | -12 | - |

By using multi-year realization rates instead of the first-year realization rates in the ERT calculation, the net ex-post kW and kWh program savings decrease by 12 percent.

## G. ERT Quality Control Activities

Several quality control (QC) checks were run and are documented as part of that effort.  The QC team, consisting of Energy Division and a sub-group of its consultants, used the full table of ERT Input sheets to perform additional QC checks at multiple levels.  The QC team's goal was a 100% match between the final evaluation reports and the numbers used in the ERT, the correct application of DEER EUL values, and the proper application of evaluation results to the UES and net to gross ratios used in the ERT.  A description of the specific QC activities undertaken are discussed in this Appendix.

The QC team segregated its tasks into several distinct activities.  :

- *Identifying Gross Errors in ERT Input sheets-* Energy Division required contractors to perform three distinct iterations of ERT application runs. In the first iteration, the QC team identified multiple errors that resulted from mistakes in the input files. These gross errors were fixed by iteration 2.

- *Comparing quantities reported in Final Evaluation Reports to ERT data-* A primary goal of the ERT process was to assure that the data in the ERT agreed with the results as documented in the Final Evaluation Reports.  The QC team created a table of reported results from the Final Evaluations and then ran queries on the entire portfolio, rolled up by program and measure group. These queries comprise the core set of QC activities.  The comparison focused primarily on gross realization rates and net to gross ratios for kW, kWh, and therms.  These metrics were extracted from the contractor reports and compiled into a table.  The results of the queries were used to compute the apparent gross realization rates and net to  gross ratios for all records identified as updated through the evaluation studies.  Due to differences in measure naming and target populations, these numbers seldom matched exactly.  The magnitude of the discrepancy in the realization rates and net to gross ratios was multiplied by the ex-ante claim amount to estimate the potential swing in the reported savings. The QC team addressed all the deviations that represented a potential swing in any of the energy savings metrics of greater than 1% at the IOU level.  As time ran out, the team stopped when the largest variation was ~.5%.  A list of known deviations are in a spreadsheet filed with Appendix G.

- *Application of HVAC Interactive Effects-* The query results were used to identify which records had HVAC interactive effects multipliers applied, and the magnitude of the adjustments.  Contractors were instructed to apply HVAC interactive effects multipliers to all interior lighting and appliance measures not subject to "whole building" analysis[2].   Although HVAC interactive effects were not applied to all interior lighting and appliance measures, the majority of the applicable measures were addressed.   The savings reported with and without interactive effects were compared to estimate the apparent magnitude of the adjustments. The magnitude of the adjustments was compared to the HVAC interactive effects multipliers supplied to the contractors to identify potential misapplication of the HVAC

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[2] Some lighting and/or appliance measures were analyzed with building energy simulation models, where the HVAC interactive effects are included in the analysis.

interactive effects multipliers.   A list of the HVAC interactive effects adjustments is shown in Appendix B.

- *Comparing Record counts* - ED required evaluation contractors to declare each record on which they performed any evaluation activity.  The QC team ran queries on the ERT Input sheets to test the condition where any UES or NTG "TYPE" was marked "EMV", against the table of declared records.

- *Assuring that Update TYPES agreed with parameter data* - The QC team ran queries that tested the case where the parameter was marked "PassThru" by comparing the EDFilled value to the ED"update" value. Any discrepancies were corrected.

- *Comparing ERTInput EUL data to DEER EUL data* - Having completed the primary QC tests to assure adequate quality on parameter data relevant to the MPS parameters the QC team moved on to QC tests on the EUL parameters.  The QC team loaded a table of DEER EUL quantities, as mapped to 2006-2008 ED Measure Group categories, onto the ERT database. The team then ran a comparison of all ERT EUL values against the appropriate DEER value for that measure group.   The team identified several discrepancies but did not have sufficient time to reconcile them all. A list of know discrepancies is filed with Appendix G.

The QC team's goal was a 100% match between the final evaluation reports and the numbers used in the ERT, the correct application of DEER EUL values, and the proper application of evaluation results to the UES and net to gross ratios used in the ERT. Invariably, some discrepancies were identified were irreparable. In all cases these did not exceed 1% and there was no observed directional bias, i.e., discrepancies were both high and low.

**H.** Evaluation Reporting Tools (ERT)

<div align="center">**Documentation V.03**</div>

The ERT stands for "Evaluation Reporting Tools" and generally refers to the suite of tools and processes that work in concert to produce the final evaluated results for the 2006-2008 Energy Efficiency portfolio.

However, within that suite of tools is an MS Access database that is also referred to as the ERT or ERT Application. This document specifically describes the forms, tables, and queries found in ERT application.

I. Forms

There is only one form in the ERT application, but there are 8 tabs within this form.

a. Main
   i. Link Data File tab
      1. Function – This tab is mainly used by the contract groups who have created 'ERT Input Sheet' .txt files. This tab allows the ERT application to find the appropriate .txt files and also performs an initial quality control check on the data in the .txt files.
      2. "Link Data Text File" - This link will open up a window so the user can select a folder that stores all the 'ERT Input Sheet' .txt files. Once the user clicks "OK", all the fields in this tab are automatically populated and the 16 QC tests are automatically run.
      3. "QC Data File" - This link will perform a quality control check on the input file.
      4. "View Data File" - This will open up the "Evaluation" query
   ii. Run E3 Calculator tab
      1. Function – This tab is mainly used by the contract groups to process the data in the 'ERT Input Sheet' .txt files through the appropriate E3 engine.
      2. Select Option
         a. Option 1: E3 Claim Lines – Selecting this option processes the line items from the utility E3 records through the appropriate E3 engine. This option has no "Select Scenario" options. The input data for Option 1 comes from the IOU_E3_Claim_Q42008 table.
         b. Option 3: Program Tracking Modified Parameters – Selecting this option processes the line items at the tracking database level. This is how a user would process all the updated data from an 'ERT Input Sheet' .txt file through an E3 engine.
      3. Select Scenario
         a. User can select scenarios to run for Primary output (savings from the Export tab) and secondary output (Emissions,

Annual Reductions, and Net Impacts by Sector, End Use, and Climate Zone).

b. The scenarios are defined as follows:
   i. All Scenarios – The user typically would select this option so that the E3 data are processed to pick up results for each of the 11 scenarios listed below.
   ii. No Update – None of the evaluated results are processed through the E3 engine. This is basically similar to an Option 1 run.
   iii. EDFilledPaidDate – Only the EDFilledPaidDate is applied to each record. All other parameters are passed through. The EDFilledPaidDate determines which quarter (or year for SCE) the quantity is applied.
   iv. Irate – Only the installation rates are applied to each record and processed through the E3 engine, all other parameters are passed through.
   v. UES – Only the ex-post UES values are applied to each record and then each record is processed through the E3 engine, all other parameters are passed through
   vi. UES_I – Only the ex-post UES values with the Interactive Effect factor applied will be processed through the E3 engine, all other parameters are passed through.
   vii. NTGR – Only the ex-post NTGRs are applied and processed through the E3 engine, all other parameters are passed through.
   viii. EUL - Only the updated EULs are applied and processed through the E3 engine, all other parameters are passed through.
   ix. EDFilled – This scenario uses parameters from the SPT database instead of the EDClaim table.
   x. IRateUESEUL – This scenario produces gross energy savings results by applying the installation rate, ex-post UES, and updated EUL values, and processes the records through the E3 engine. The NTGR is not applied at all in this scenario.
   xi. IRateUESEUL_I -This scenario produces gross energy savings results (with interactive effects) by applying the installation rate, ex-post UES (with interactive effect factors applied), and updated EUL values, and processes the records through the E3 engine. The NTGR is not applied at all in this scenario.
   xii. Gross – This scenario produces gross energy savings results by applying the installation rate, ex-post UES, and updated EUL values, and processes the

records through the E3 engine. It does not apply net-to-gross.

      xiii.  Gross_I – This scenario produces gross energy savings results (with interactive effects) by applying the installation rate, ex-post UES, and updated EUL values, and processes the records through the E3 engine. It does not apply net-to-gross.

      xiv.  All – This scenario produces net energy savings results by applying the installation rate, ex-post UES, ex-post NTGR, and updated EUL values, and processes the records through the E3 engine.

      xv.  All_I - This scenario produces net energy savings results (with interactive effects) by applying the installation rate, ex-post UES, ex-post NTGR, and updated EUL values, and processes the records through the E3 engine.

  c.  Select Programs – The user can process the records for a select group of programs only, or all programs at once. Selecting "All Program" will only process all programs that have been linked through the 'ERT Input Sheet' .txt file from the Link Data File tab.

iii.  Analysis tab

1. Function – This tab allows the user to compare one set of data to another set and see the percentage change and also view run results for savings and secondary output. The "Select Option" and "Select Scenario" are the same as in the Run E3 Calculator tab, except there is one more option

2. Select Option – In addition to Option 1 and Option 3, the user can compare to Option 0. This option does not re-run the E3 line items through the E3 engine. Instead, Option 0 takes the results from the utility run E3 files as was submitted.

3. Run Comparison Query – This button will open the "Compare Results Set" query. It will compare Result Set 1 with Result Set 2.

4. Show All Rolled-up Results by IOU - This link will run the "q_Results_Rollup_IOU_Option" query.

5. Show All Rolled-up by Program – This link will run the "q_Results_Rollup_Program" query.

6. Show All Run Results – This link will run the "q_All_Results" query.

7. Combined Options 1 & 3 checkbox: if this is checked then the results will be the same as for the RRIM Calculations. All Option 3 programs will be displayed and all Option 1 programs if there is no Option 3 runs (passthru).

iv.  View Runs tab

1. Function – This tab allows the user to see which Program/Scenario combinations have been run. There is the ability to filter the program runs by IOU or contract group; and view all programs, missing programs (according to the Study Group list), or only

programs with runs. The runs can be viewed for net savings as well as secondary output options.

    v.  Server QC tab
1. Note – This tab is viewable by checking the box "View RRIM Calculations" box in the Setting tab
2. Function – This tab allows the user to perform four additional quality control checks on the input files. It is called Server QC because the QC checks are queries against the SPT table in the SQL Server database which resides on the ED Central Server.
3. QC all ERTInput Files in Folder – This will run the QC checks on all ERTInput files in a folder.
4. QC Single ERTInput File – This will run QC checks on a single ERTInput file.
5. QC Missing Study Group Programs – This runs the QCS_5_1_MissingStudyGroupPrograms query.
6. Checked = Values must be exact –
7. QC Tests
    a. Missing Records – program tracking records in the SPT table but missing from the ERTInput file
    b. Extra Records – records in the ERTInput file that do not exist in the SPT table.
    c. Duplicates – checks for duplicate records.
    d. Values Match – this query compares SPT fields that exist in the ERTInput files and compares against the SPT table in the SQL Server.

    vi.  RRIM Calculations
1. Function – This tab is primarily used by Energy Division to merge all the submitted ERTs and to populate the RRM spreadsheet.
2. Merge
    a. Import Results from All ERTs in Folder – This button opens a window that allows the user to select the folder that stores the ERT .mdb applications to merge
    b. Import Results from Individual ERT file -  This button opens a window that allows the user to select a single ERT .mdb file to import
    c. Merge programs into existing results set – The existing results are kept and merge with any new results
    d. Clear existing results before importing – All Option 3 results in the result tables are cleared before any new results are merged
    e. Merge Programs into Existing Results set (existing programs will be over-written). This is selected as a default.  This will remove all Option 3 data for a program before merging data from ERTs into the results tables.
    f. Merge Scenarios into Existing Results set (existing scenarios will be over-written) - This will  remove Option 3 data for a scenario before merging data from ERTs into the results tables if a scenario is present in the source ERT.

g.
3. RRM Calculations
   a. Options and Scenarios are the same as described in the Run E3 Calculator tab in section 1(a)(ii).
   b. Show RRIM Calcs Results by IOU – This button runs the "q_RRIM_Results_Rollup_IOU" query.
   c. Export to RRM Calcs Spreadsheet – This button will populate the latest version of the RRM spreadsheet with the appropriate energy savings and net benefits results from the merged ERT datasets. The RRM spreadsheet has to be in the same folder as the ERT application (.mdb file). The name of the spreadsheet must not be altered: RRMCalculator_Template_v6.xls

vii. Settings tab
   1. Function – This tab is mainly for Energy Division use to make functions available to the user
   2. Fill E3 with Program Costs from IOU_E3_Cost_Q4208 table
   3. Run Excel in visible mode
   4. View E3 calculator version
   5. View RRIM calculations tab – The default is unchecked. By checking this box, the QC server and RRM Calculations tab are visible to the user
   6. Debug features – this will stamp the EDPrgTrkClaimID on each E3 line to make it easier to track the source of individual E3 lies. It will also check input data for hidden characters including line feeds.

viii. Utilities tab
   1. Function – This tab includes miscellaneous functions.
   2. Import IOU Claim Tables – This will import the IOU_E3_Claim, Cost, and Output tables from another mdb file.
   3. Force-close Excel Instances - Occasionally hidden instances of Excel remain in memory after the runs are complete. Press this button and it will force-close all Excel instances, including hidden instances.
   4. Remove run labels – This will remove any labeled runs from the results tables.
   5. Remove option 3 run results – This is a way to remove results at a program level.
   6. Import ERT Input files in folder – This button will import all ERT input text files in the folder and subfolders into the ERTInput table in the ERT SQL Server database which resides on the ED Central Server.

II. Tables
   a. CG_Program_Assignments:  Lists all the program IDs that contribute savings in 2006-2008, and the corresponding contract group, and CPUC/MECT/Evaluator point person.  Used for identifying which programs are "touched" by an evaluation study design
   b. ContractGroups: Lists the contract groups and assigns code numbers to each.

c. E3Calculators:  List the available E3 version numbers and E3 files names specific to each utility.  Also lists the current RRM Spreadsheet name.  These names are used by the application to identify the appropriate E3 file and RRM spreadsheet to use.

d. IOU_E3_Claim_Q42008:  This table contains the records from the utility Q42008 E3 spreadsheet "Input" tab that report savings.

e. IOU_E3_Cost_Q42008:  This table contains the cost data from the utility Q42008 E3 spreadsheet "Input" tab.

f. IOU_E3_Output_Q42008:  This table contains the results data from the utility Q42008 E3 spreadsheet "Export" tab.

g. LinkedFileInfo: Saves information of the currently linked file.

h. lkupOptions:  List the three different options which the ERT application can produce

i. lkupProgramIDs: List of Program options to run (i.e., All Programs, PGE Programs, SCE Programs, SCG Programs, SDGE Programs).

j. lnkSPT:  Table linked to the SQL Server . Used on the ED Central Server to QC the ERTInput files. Mapping_Input_Measures:  Provides mapping information for the measure-level input. This and the Mapping_Scenarios_Option3 table are used by the q_Mapping_Scenarios_Option3 query to provide a mapping between the input data (the Evaluation query) and the E3 calculator for all the scenarios and versions of the E3.

k. Mapping_Input_Program:  Provides mapping information for the program-level input for the E3 calculator. The program-level input comes from the IOU_E3_Cost_Q42008 table.

l. Mapping_Input_Ranges: The ERT outputs data into the E3 calculator by 'pasting' from memory consequetive blocks, or ranges, of data that has been placed into memory. The Mapping_Input_Ranges table contains the information on the ranges used by the ERT to know where to paste the ranges of data.

m. Mapping_Input_Ranges_SCE. Same as above but for SCE. The difference is that the SCE E3 versions import quantities into the year columns instead of the quarter columns.

n. Mapping_Results:  This table maps the fields from the E3 calculator to the result table. It maps at the Excel cell level. The primary mapping is from the 'Export' sheet to the Results_Savings_Claim table.

o. Mapping_Results_Tables. This table maps the fields from the E3 calculator to results tables for row-level data. It is used mainly to map the secondary output data on the 'Output' tab. The output includes Annual and Lifecycle Emission reductions Net and Gross, Annual Net Reductions, Net Impacts by Sector, Net Impacts by End Use, and Net Impacts by Climate Zone. The corresponding results tables are: Results_Emissions, Results_EmissionsLifecycle, Results_AnnualReductions, Results_NetImpactsSector, Results_NetImpactsEndUse, Results_NetImpactsClimateZone.

p. Mapping_RRMCalcs:  This table describes which cells in the RRM spreadsheet, "ERT Summary" tab should be populated with which  source field.

q. Mapping_Scenarios_Option1: This table defines which fields are used to run Option 1. The only scenario allowed for Option 1 is NoUpdate.

r. Mapping_Scenarios_Option3: This table defines which fields are used for the various scenarios. Depending on scenario, different input fields may be used to populate the E3 calculator.  This table and the Mapping_Input_Measures table are used by the q_Mapping_Scenarios_Option3 query to provide a mapping between the input data

(the Evaluation query) and the E3 calculator for all the scenarios and versions of the E3

s. ProgramGroups: Lists the program groupings by contact groups.
t. QC_Queries: List of QC queries that are run when a file is first linked.
u. QCS_Queries - List of Server-side QC queries.
v. Results_Savings_Claim: This is where the savings results are stored in the ERT application.
w. Results_Server_QC: This table shows the program level results of the "Server QC" tests.
x. ResultSet1: Internal table used in the Analysis compare query. Resultset1.
y. ResultSet2: Internal table used in the Analysis compare query. Resultset2.
z. RunStatus: This table contains the program scenarios which have been run. This is the underlying table for the query that populates the "View Runs" tab of the ERT application.
aa. Scenarios: Lists the 14 different scenarios available through the ERT application. This is used to populate the drop down box.
bb. Scenarios_ToRun: This is used to populate the list of scenarios to run on the 'Run E3 Calculator' tab.
cc. SQLServerSettings: This table contains the settings for SQL Server needed to run the server-side QC queries.
dd. tmp_ID: This is a temporary table to store lists of IDs during queries.
ee. tmpValueMatch: This is a temporary table used during the QC queries.
ff. txtERTInput: This is a linked table to the "ERT Input Sheet" .txt file during the server-side QC process of the ERT Input Sheets.
gg. txtEvaluation: This is the linked table to the "ERT Input Sheet" .txt file.
hh. Version: Lists the latest changes to the latest version of the ERT application

III. Queries
a. Compare_Result_Sets: This query is populated based on the options selected for the "Run Comparison Query" in the "Analysis" tab. The query compares the numbers for two sets of results and shows the percent difference, by program, for 17 parameters (for example kW, kWh, therms, TRC cost, PAC cost..)
b. Compare_Result_Sets_All: Same as above but will show all results even if there are no differences.
c. Evaluation: This query an older version of the main query that displays the complete data set on input data. The query joins two tables: 1) the IOU_E3_Claim_Q82008 tables and 2) the txtEvaluation table, which is a linked table to the ERTInput text file. The Evaluation query is in a format that is not compatible with the Upstream revision.
d. EvaluationUp: This query is the main query that displays the complete data set of the input data. The query joins two tables: 1) the IOU_E3_Claim_Q82008 tables and 2) the txtEvaluation table, which is a linked table to the ERTInput text file. The Evaluation query is in a format that is compatible with the Upstream revision, so it is an older version.
e. Find duplicates for Results_Savings_Claim: this is a query that will identify if any duplicate records exist in the Results_Savings_Claim table.

f. Find duplicates for txtERTInput: this is a query that will identify if any duplicate records exist for the txtERTInput table. This is used during the server-side QC.

g. q_All_Results: This query is accessed by clicking the "Show All Run Results" in the Analysis tab. This query shows a subset of the fields stored in the "Results_Savings_Claim" table including the energy savings and net benefits results for each program, for each scenario, and for each run of the E3. So for one program/scenario combination there could be multiple "runs".

h. q_OptionList: This is a query on the lkupOptions table. This is used to populate the drop down box in the Run E3 Calculator tab.

i. q_OptionList0: This is a query on the lkupOptions table. This is used to populate the drop down box in the Analysis tab. It includes Option 0.

j. q_ProgramIDs: This query returns the unique list of ProgramIDs from the E3_Cost_Q42008 table.

k. q_ProgramList: This query is a union of the lkupProgramIDs table and the q_ProgramList query. It is a list of options to run programs, including All Programs, IOU programs, and individual programs. It is used to populate the drop down box on the Run E3 Calculator tab.

l. q_RequiredDataTextFields: This is a query on the Mapping_Scenarios_Option3 table and returns the values where the Source field equals SPT or EDUpdate. It is used to validate the ERTInput text file to make sure that the required fields are present in the file.

m. q_Results_Rollup_IOU: This is a query on the Results_Savings_Claim table that sums the energy and net benefits metrics and groups the results by IOU and Option (either Option 1 or 3).

n. q_Results_Rollup_IOU_Option: This query is used in the Analysis tab to show results by IOU. The query is dynamically generated in-code. Each time the user selects to show results the query will be generated based on the filters that the user selected. The underlying table is the Results_Savings_Claim table.

o. q_Results_Rollup_Program: This query is used in the Analysis tab to show results by program. The query is dynamically generated in-code. Each time the user selects to show results the query will be generated based on the filters that the user selected. The underlying table is the Results_Savings_Claim table.

p. q_RRIM_Results_Rollup_IOU: This query is used on the RRIM Calculations tab to view to RRM calculation parameters. The underlying table is the ResultsSet1 table, which is a temporary table that is populated based on the filter that the user selects

q. QC_1_1_ClimateZone: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Climate Zone.

r. QC_1_2_ClimateZone: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Climate Zone.

s. QC_2_1_EULRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid EUL range.

t. QC_2_2_EULRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid EUL range.

u. QC_3_1_NTGRRange: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid NTGR range.

v. QC_4_1_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.

w. QC_4_2_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.

x. QC_4_3_kWh_TargetSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Target Sector.

y. QC_5_1_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.

z. QC_5_2_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.

aa. QC_5_3_Therms_GasSector: This query is one of the QC queries when an ERTInput text file is first linked. It checks for valid Gas Sector.

bb. QC_7_1_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.

cc. QC_7_2_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.

dd. QC_7_3_kWh_Qty: This query is one of the QC queries when an ERTInput text file is first linked. It checks quantity if there is a value for savings.

ee. QC_8_1_Mismatched_ProgramIDs: This query is one of the QC queries when an ERTInput text file is first linked. It checks the foreign keys for the EDIOUClaimID between the ERTInput txt file and the IOU_E3_Claim_Q42008 table to make sure the program matches.

ff. QCS queries: These are a series of queries (prefixed with 'QCS') that are used by the server-side QC process. They primarily check the ERTInput text file against the SPT table in the SQL Server database on the ED Central Server.

gg. qEmissions: This query is used to join the Results_Emissions and Results_EmissionsLifecycle tables to create one virtual view of the emissions results.

hh. qMapping_Scenarios_Option1: This query joins the Mapping_Scenarios_Option1 and the Mapping_Input_Measures tables and is used to provide a mapping between the input data (EvaluationUp query) and the E3 calculator for all versions of E3 calculators.

ii. qMapping_Scenariors_Option3: This query joins the Mapping_Scenarios_Option3 and the Mapping_Input_Measures tables and is used to provide a mapping between the input data (EvaluationUp query) and the E3 calculator for all of the scenarios and versions of E3 calculators.

jj. qRunStatus: This query is used by the View Runs tab to view the status of runs.

kk. Results_Savings_Claim_Option0: This query is used to provide input for Option 0. The underlying table is the IOU_E3_Output_Q42008 table.

**I.** Standard Program Tracking Database March 2010v.8

The documentation for the Standard Program Tracking Database is provided in an external appendix.  It includes an executable file with the database:  SPTdb2006 2008 17Marc2010v8.exe

## J. ERT Input Sheet Documentation

**INPUT TEXT FILE**

**Documentation V.01**

This is documentation for the file, "ERTE3Input 20100115.xls," also known as the ERT Input Sheet Design Specification, hereafter referred to as "ERT Specification."  The ERT Specification is an Excel spreadsheet which lists all the necessary columns for the ERT application to run properly.  It also indicates where the data should come from and which data are needed for the various scenarios the ERT application is able to produce.

Each evaluation team used the ERT specification to create the ERT Input Sheet, which is the main source of data for the ERT application.  The ERT specification lists a total of 75 fields in Column A, but not all of them are required to be submitted in the ERT Input Sheet, as described below.

**Fields in ERT Specification**

| Column | Name | Description |
|---|---|---|
| A | Field Name | Lists the 75 fields needed to run the ERT |
| B | E3ColumnName | Maps the corresponding E3 spreadsheet field names |
| C | InTextFile | This is important because it tells the evaluation contractor which 35 fields need to be populated when they create their ERT Input Sheets. |
| D | Source | Tells you where the data come from. <ul><li>SPT means the data come from the Standardized Program Tracking database.  All evaluation contractors used the same SPT db. 19 fields come from the SPT.</li><li>E3Claim means the data come from the table of Standardized E3 table.  There is one table in the ERT application that combines all the E3 spreadsheets into one table.  If the source says "E3Claim" then the value comes from this table in the ERT application.  10 fields come from E3Claim.</li><li>EDUpdate means the data come from the evaluation contractors.  The numbers either come directly from their own study (cell value in ERT Input Sheet = "EMV") or from another evaluation study (cell value in ERT Input Sheet = "OthEMV") or DEER (cell value in ERT Input Sheet = "DEER") or are pass-thru, meaning no update is made (cell value in ERT Input Sheet = "Pass Thru").  16 fields come from EDUpdate.</li><li>Computed means the ERT application is programmed is compute these fields based on</li></ul> |

| | | |
|---|---|---|
| | | other submitted data fields.  30 fields are computed. |
| E | Equation/Derivation/Value List | Includes the formulas used to calculate "Computed" fields.  Also lists the restrictions of some of the fields. |
| F | No Update | Indicates which fields are needed to produce numbers in the ERT application where no utility numbers are updated. |
| G to L* | [various] | Indicates which fields are needed to produce numbers in the ERT application under one of the individual update scenarios.<br>• Irate = only the installation rate is adjusted<br>• UES = only the unit energy savings values are adjusted<br>• UES_I = only the unit energy savings values with interactive effects factors applied are adjusted<br>• NTGR = only the net-to-gross ratios are adjusted<br>• EUL = only the effective useful life values are adjusted<br>• EDFilled = only the fields beginning with EDFilled_ are adjusted |
| M to P* | [various] | Indicates which fields are needed to produce numbers in the ERT application under one of the combined update scenarios.<br>• Gross = The installation rates, UES, and EUL values are adjusted.  The NTGR is not applied.  This produces gross evaluated savings.<br>• All = The installation rates, UES, NTGR and EUL values are adjusted.   This produces net evaluated savings.<br>• Gross_I = The installation rates, UES with interactive effects factors applied, and EUL values are adjusted.  The NTGR is not applied.  This produces gross evaluated savings with interactive effects applied.<br>• All_I = The installation rates, UES with interactive effects factors applied, NTGR and EUL values are adjusted.   This produces net evaluated savings with interactive effects applied. |

**\*** If the cell in any of these columns has a value of '99', it means that the field is needed to calculate another field, but it is not a direct input to the E3 calculator.  A '4' just means that value has to be entered four times.