



Memorandum

To: Riverside Public Utilities
From: Navigant Consulting, Inc.
Date: January 30, 2017
Re: 2016 CMUA Energy Efficiency Potential Forecasting Study

Introduction

This memo provides Riverside Public Utilities with the results of the California Municipal Utilities Association (CMUA) Energy Efficiency Potential Forecasting Study conducted in 2016 by Navigant Consulting, Inc. (Navigant). The results described here are specific to the Riverside service territory.

Summary of Potential

Navigant used their Electric Resource Assessment Model (ELRAM) to estimate achievable energy and demand savings over a 10 year forecast period. The modeling team forecasted these savings using two modeling steps:

1. **Base Case Run.** This modeling run includes no changes or adjustments to Riverside's current portfolio of energy efficiency programs.
2. **Final Run.** This modeling run uses Riverside's chosen adjustments—if any—to various features within the model to illustrate increased energy savings goals. This run may be the same as the Base Case Run if the utility chose not to make adjustments to current portfolio offerings.¹

Riverside's Final Run included the following adjustments to their Base Case Run:

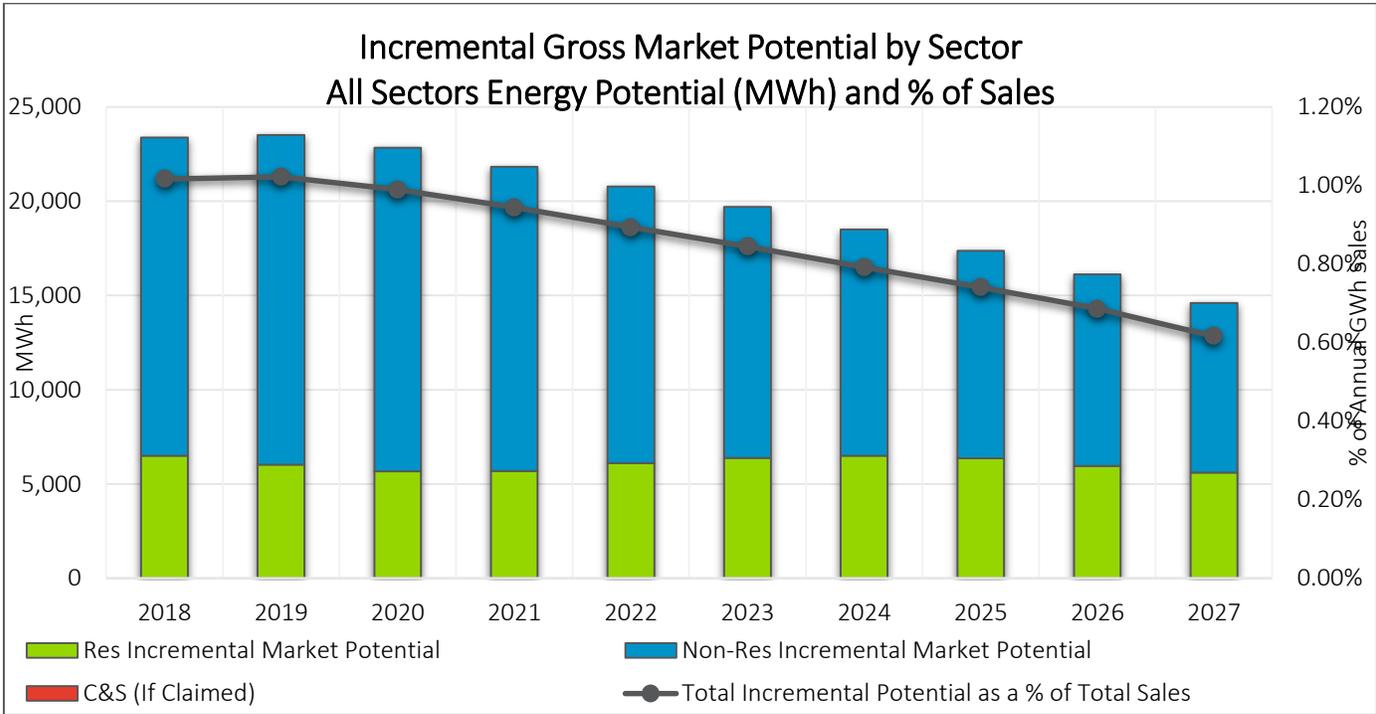
- **Expanded measure list.** Included streetlighting phase in starting in 2018.
- **Utilized a three-year average calibration target rather than 2015 alone.**

¹ Utilities are often already doing everything they can within their energy efficiency budgets and have no plans to increase current program offerings.

■ C&S (If Claimed)
 —●— Total Incremental Potential as a % of Total Sales

shows the net incremental market potential achievable for each sector across the forecast period, as well as the percent of forecasted sales for each year for the Final Run.

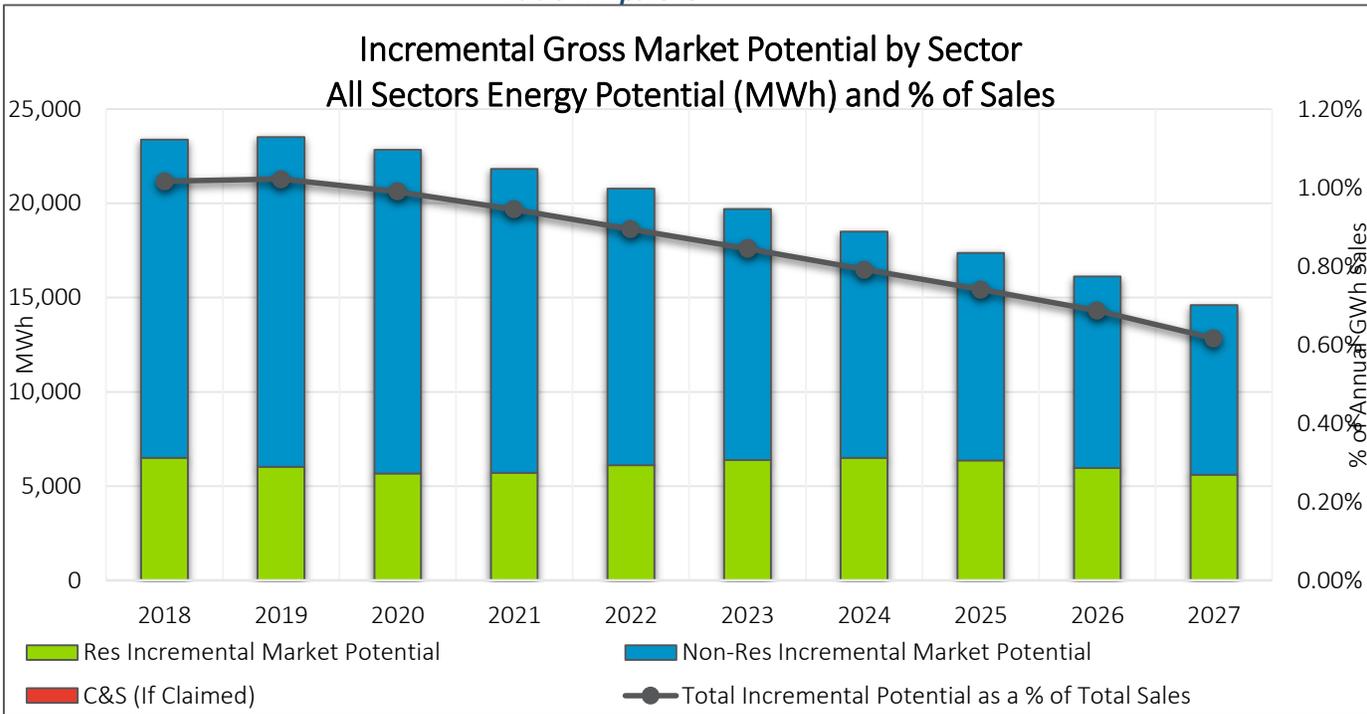
Figure 1. Gross Incremental Market Potential by Sector (MWh) and Percent of Sales – FINAL RUN



ALL Sectors (MWh)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Incremental Market Potential	23,369	23,508	22,830	21,817	20,779	19,695	18,500	17,374	16,124	14,601
Res Incremental Market Potential	6,501	6,032	5,670	5,700	6,113	6,376	6,496	6,361	5,967	5,614
Non-Res Incremental Market Potential	16,868	17,476	17,159	16,117	14,666	13,319	12,004	11,013	10,157	8,987
C&S (If Claimed)	0	0	0	0	0	0	0	0	0	0
Total Incremental Potential as a % of Total Sales	1.02%	1.02%	0.99%	0.94%	0.89%	0.84%	0.79%	0.74%	0.69%	0.62%
Res Incremental Potential as a % of Res Sales	0.86%	0.80%	0.75%	0.75%	0.80%	0.83%	0.84%	0.82%	0.77%	0.73%
Non-Res Incremental Potential as a % of Non-Res Sales	1.08%	1.12%	1.09%	1.02%	0.93%	0.84%	0.75%	0.69%	0.64%	0.56%

10 Year Demand Goals (kW)										
ALL Sectors (kW)	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Total Incremental Market Potential	8,901	8,393	8,108	8,172	8,280	8,238	8,173	7,439	6,604	5,388
Res Incremental Market Potential	5,080	4,412	4,185	4,442	4,835	5,246	5,485	4,987	4,353	3,333
Non-Res Incremental Market Potential	3,821	3,980	3,923	3,730	3,445	2,992	2,687	2,452	2,250	2,055
C&S (If Claimed)	0	0	0	0	0	0	0	0	0	0

Table 1. Inputs to



Source: Navigant 2016

At a glance, Riverside's results include:

- A 2018-2027 average annual target of 0.85% of forecasted retail sales
- Gross savings targets
- No claim of savings from codes and standards (C&S)
- The addition of streetlighting phase starting in 2018

Top Energy Saving Measures

Navigant's model displays a list of the top 50 measures generating savings for the forecast period. These measures can help inform future program design efforts as Riverside begins to allocate

program dollars in new directions. Table 2 shows the top 10 energy saving measures for the first year of the forecast period and Table 3 shows the top 10 measures for year 2030 to use as a comparison.²

Table 2. Top 10 Energy Saving Measures for 2017

Rank	Top Ten Measures – 2017	2017 - Energy Savings (MWh)	2017 - Demand Savings (KW)	Energy % of Total	Demand % of Total
1	Res-Single Family - Shade Tree	2,082	0.0	9.4%	0.0%
2	Com-Office - LED fixture: 33W, 3500 lumens	1,261	499.4	5.7%	5.9%
3	Com-Education - LED fixture: 33W, 3500 lumens	975	128.4	4.4%	1.5%
4	Com-Office - Retro-commissioning	931	0.0	4.2%	0.0%
5	Com-Retail - LED fixture: 33W, 3500 lumens	785	193.8	3.6%	2.3%
6	Com-Office - LED T8 Tube Replacement Average Fixture Wattage 59.65	649	257.0	2.9%	3.0%
7	Com-Grocery - LED downlight, screw-in lamp, 1-3W, interior Average 2 Watts	557	100.9	2.5%	1.2%
8	Com-Education - LED T8 Tube Replacement Average Fixture Wattage 59.65	502	66.1	2.3%	0.8%
9	Com-Education - Retro-commissioning	473	0.0	2.1%	0.0%
10	Com-Retail - WholeBlg - Com RET Level 2	473	144.3	2.1%	1.7%

Source: Navigant 2016

Table 3. Top 10 Energy Saving Measures for 2030

Rank	Top Ten Measures – 2030	2030 - Energy Savings (MWh)	2030 - Demand Savings (KW)	Energy % of Total	Demand % of Total
1	Res-Single Family - Refrigerator Recycling	951	191.4	8.6%	6.3%
2	Res-Single Family - Shade Tree	829	0.0	7.5%	0.0%
3	Com-Office - Retro-commissioning	823	0.0	7.4%	0.0%
4	Com-Retail - WholeBlg - Com RET Level 2	611	186.7	5.5%	6.2%
5	Com-Grocery - Retro-commissioning	439	0.0	4.0%	0.0%
6	Com-Grocery - LED downlight, screw-in lamp, 1-3W, interior Average 2 Watts	425	76.9	3.8%	2.5%
7	Res-Single Family - CEE Tier II Refrigerator	408	0.0	3.7%	0.0%
8	Com-Education - Retro-commissioning	358	0.0	3.2%	0.0%
9	Com-Retail - Electronically Commutated (EC) Motor w/Fan Cycling Controls for Cold Storage Evaporator Fans	270	30.8	2.4%	1.0%
10	Com-Grocery - Electronically Commutated (EC) Motor w/Fan Cycling Controls for Cold Storage Evaporator Fans	269	30.7	2.4%	1.0%

Source: Navigant 2016

² See the ELRAM Output Viewer workbook for the full list of top 50 measures.

Other Features

Navigant worked with Riverside to provide a number of other ELRAM modeling features described in more detail in the Output Viewer workbook. Among others these include:

- **Cumulative Savings.** Savings shown cumulating over the forecast period.
- **Electric Vehicles (EVs) and Photovoltaics (PV).** Forecast of EV and PV usage and generation over the 10 year study period. The modeling team based these projections on the EV/PV assumptions defined in the 2016 California Energy Commission (CEC) Integrated Energy Policy Report for each planning area in California. The team matched each POU to the nearest planning area and prorated the forecasts based on the POU's electric sales by sector.
- **Interactive Charts.** The tabs titled Potential by Sector, Potential by Program, and Potential by End-Use include interactive charts where users can filter the potential savings results in a number of informative ways.

Comparison to 2014-2023 10-Year EE Potential Study

The model currently used to develop the 10-year EE potential goals is similar to the one used to develop the 2014-2023 potential goals, with the following key differences:

- **Improved Calibration** – for calibration purposes, the model now spreads historical program savings across end-use categories at the program level, using actual savings per end-use category/program as identified in E3. The prior model did not calibrate to the program level.
- **Updated Measure Impact/Cost Information** – the modeling team has significantly improved the measure level inputs using the Technical Reference Manual (TRM) recently developed by the POUs, as well as the most recent CPUC database of available measures with impacts and costs at the climate zone level.
- **Measure Impacts Include C&S Effects** – the new ELRAM includes the most recent (C&S) impacts to measure savings, but does not include future or planned C&S impacts not currently adopted.
- **Increased Decision Type Flexibility and Existing Baseline Changes** – the model structure now allows for dual baseline measures (early retirement). This function uses the existing condition baseline for a specified portion of the useful life of a measure, and the code baseline for the remaining portion of the useful life.
- **Expanded Building Types** – ELRAM provides model results at the building type level for both the residential and commercial segments. The prior model only provided a rolled up commercial sector result.
- **Behavioral Programs Included** – ELRAM now includes optional Behavioral Programs for the residential, commercial, and industrial sectors. The earlier model did not.

These changes have the opportunity to either increase or decrease the utility's 10-year goal as compared to the previous study. Measure selection, program additions, and most importantly, the calibration targets determine the change.

The years 2018-2023 overlap between the two 10-year study periods. Riverside's current 10-year goals are about 106% of the goals established in the prior study. The primary reasons are:

- Using the three-year average for calibration rather than only 2015
- The addition of streetlighting