

PREPARED BY GDS ASSOCIATES, INC.

# CMUA

California Municipal Utilities  
Association

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## *2020 Energy Efficiency Potential Forecast*

FINAL REPORT

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ENGINEERS & CONSULTANTS

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# 1 Introduction

GDS Associates and Brightline Group (the GDS Team) developed this study on behalf of the California Municipal Utilities Association (CMUA) to provide 10-year Demand Side Management (DSM) Potential target goals for 38 publicly owned utilities (POUs). These utilities include:

- Alameda Municipal Power
- Anaheim, City of
- Azusa, City of
- Banning, City of
- Biggs, City of
- Burbank Water and Power
- Colton Public Utilities, City of
- Corona, City of
- Glendale Water and Power
- Gridley Electric Utility
- Healdsburg, City of
- Imperial Irrigation District
- Lassen Municipal Utility District
- Lodi Electric Utility
- Lompoc, City of
- Los Angeles Department of Water & Power
- Merced Irrigation District
- Modesto Irrigation District
- Moreno Valley Electric Utility
- Needles, City of
- Palo Alto, City of
- Pasadena Water and Power
- Pittsburg, City of
- Plumas-Sierra Rural Electric Cooperative
- Port of Oakland
- Rancho Cucamonga Municipal Utility
- Redding Electric Utility
- Riverside, City of
- Roseville, City of
- Sacramento Municipal Utility District
- San Francisco Public Utilities Commission
- Shasta Lake, City of
- Silicon Valley Power (Santa Clara, City of)
- Trinity Public Utilities District
- Truckee Donner Public Utilities District
- Turlock Irrigation District
- Ukiah, City of
- Vernon, City of

Target goals were developed for the years 2022-2031. The models used to develop these goals is an Excel-based open-source tool developed by the GDS Team. The models leverage utility-specific inputs and provide consistent calculation methodologies for each utility’s energy efficiency (EE) forecast. The GDS Team coordinated with each participating utility throughout the project to customize and tailor the inputs to be as relevant and appropriate as possible for their service territory, customer base, and portfolio of EE programs.

The EE forecasting study is performed to address a compliance requirement for the state of California POU. Senate Bill 1037 (Kehoe, 2005) requires each POU to report annually to its customers and the California Energy Commission (Energy Commission) on its EE and demand reduction programs. In accordance with the direction of Assembly Bill (AB) 2021 (Levine, 2006) and AB 2227 (Bradford, 2012), and to facilitate the development and implementation of these programs, the POU conduct these forecasts once every four years to help identify future potential savings opportunities. The results of this study establish, for each of the participating utilities, their subsequent 10-year program targets.

## 2 Key Issues Relevant to the 2020 Study

This section describes how the GDS Team addressed key issues related to the 2020 study. The study made some adjustments to the sector-level utility sales forecasts to account for the impacts of the COVID-19 pandemic. These impacts generally only affected the early years of the study, but it was determined that the observed impacts of the pandemic during 2020 were sufficient to be accounted for with adjustments on a utility-specific basis. The GDS Team coordinated these adjustments with CMUA, Northern California Power Agency (NCPA), Southern California Public Power Authority (SCPPA), and the utilities in establishing the parameters of these adjustments. The study also included updates to the avoided costs for each POU and the calculation of claimed savings from codes and standards (C&S) updates. The approach and outcome of these adjustments are described in more detail below.

### 2.1 TREATMENT OF COVID-19 IMPACTS

In developing baseline load forecasts, the GDS Team used recent load forecast as provided by each CMUA participating utility and performed an analysis to adjust those load forecasts to reflect impacts on residential, commercial, and industrial energy sales related to the COVID pandemic. We provided each utility with an overview of our recommended approach, which was to project the recovery of energy sales because of the pandemic by 2023 through a gradual recovery over the three-year frame of 2021-2023. Each utility was able to provide feedback on the appropriateness of this approach specific to their service territory and the GDS Team applied slower recovery options when recommended by the utility. Furthermore, if the utility had already included COVID impacts and assumed recovery effects into their forecast as provided to our team, we gave the utility the opportunity to note such so that we would not make additional adjustments to that specific forecast.

To determine base year COVID impacts for adjusting 2020 energy sales, we asked for a minimum of thirteen months of historical sales by class. Nine utilities provided sufficient historical data that could be used to estimate COVID impacts. For those specific utilities, the data was used to adjust their load forecasts directly. For those utilities for which data was not provided, we used average impacts computed from the available data. The average residential impact for 2020 was an increase of 2.9%. The average impact for commercial was a decline of 2.8% and the average for industrial was 4.4%. With 2020 adjustments thus computed, we assume linear recovery of the COVID impacts through 2023.

The GDS Team had initially considered making a complementary adjustment to the initial year EE forecast calibration target. However, based on the relatively minor impact to the sales forecast, particularly at the EE Forecast analysis starting year of 2022 and beyond, the GDS Team did not make any further adjustments beyond the sales forecast adjustment noted above as a direct consequence of the COVID-19 pandemic.

### 2.2 AVOIDED COST DEVELOPMENT

In the assessment of economic and achievable potential using the total resource cost test (TRC), the GDS Team acquired contemporary avoided electricity costs for the cost-effectiveness screen. The avoided electricity costs are based on the California Public Utilities Commission (CPUC) sponsored 2020 version of the avoided cost calculator.<sup>1</sup> The avoided cost calculator provides 8760 hourly electricity costs, measured

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<sup>1</sup> <https://www.cpuc.ca.gov/General.aspx?id=5267>. Consistent with prior analyses and internal planning, select participating utilities have internally developed their own forecasts of avoided costs for use in calculating the future benefits of EE savings.

in dollars per megawatt hour (\$/MWh), through 2050 to calculate the benefits of demand-side resources and includes the following components at an hourly level:

- Generation energy costs,
- Generation capacity costs,
- Ancillary Services,
- Transmission of Distribution Capacity, and
- Environmental Benefits including greenhouse gasses (GHG) and methane leakage.

The 2020 update of the avoided cost calculator, developed by E3, is closely aligned with the grid planning efforts of the California state-wide Integrated Resource Plan (IRP) (R. 16-02-007) and Distributed Resource Plan (DRP) (R. 14-08-013) proceedings.<sup>2</sup> This update represents a major change in the CPUC's approach to developing avoided costs, including the following the new facets:

- Generation Capacity benefits are based on battery storage costs of new entry (CONE).
- Generation Capacity hourly periods have been shifted to align with prior year California Independent System Operator market data, shifting the peak hours later in the evening and into September and October.
- Energy prices are based on RESOLVE AND SERVM modeling and are no longer based on market energy futures and gas turbine modeling.
- GHG benefits increase over the 30-year forecast.

Avoided transmission and distribution (T&D) costs are uniquely estimated for each of California's three largest investor-owned utilities (IOUs), PG&E, SCE, and SDG&E and regional zone for each IOU. While differences in these T&D costs are not significant, they do represent unique regional avoided cost estimates. Unique avoided costs are assigned for each POU in this study to the nearest California IOU zone. These assignments remain largely unchanged from assignments in avoided cost regions from prior years cost-effectiveness reporting.

### 2.3 CLAIMED SAVINGS FROM CODES AND STANDARDS

In prior analysis, select participating utilities included estimates of energy savings potential of C&S advocacy programs. The prior method involved taking the C&S claims by from the closest IOU and pro-rating those savings based on the utility energy sales.<sup>3</sup> The future year projections of IOU claimed savings used the prior CMUA analysis only extended through 2023.

To update the prior analysis' methodology for the 2024-2043 current study timeframe, the GDS Team used the latest projections of Incremental Net Attributable C&S Savings from the 2019 Potential and Goals (PG) Study. The 2019 PG Study supporting data workbooks provide measure-level C&S savings by IOU, and the GDS Team summarized these savings by IOU, sector, and major end-use.

Like prior CMUA analyses, the GDS Team then applied a pro-rated share to each participating POU, at the sector level. This share was based on:

- 1) the nearest IOU sector-level Net Attributable C&S Savings (the comparison IOU)

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<sup>2</sup> See [https://www.ethree.com/public\\_proceedings/energy-efficiency-calculator/](https://www.ethree.com/public_proceedings/energy-efficiency-calculator/)

<sup>3</sup> IOU C&S energy savings were defined in the CPUC 2006-2008 C&S program evaluation report.

- 2) the ratio of the participating utility's 2018 sector-level sales to the comparison IOU (as reported by the Energy Commission's Energy Consumption Database).

As lighting measures modeled in the market potential study had the potential to require code-compliant upgrades, there is a potential that C&S savings could double count a portion of the market potential savings. To reduce the likelihood of double counting claimed C&S the GDS Team eliminated the impact of 2019 Title-24 commercial lighting impacts for interior and exterior lighting from nonresidential new construction and discounted nonresidential alteration code savings by 50 percent. The discounting of nonresidential alteration C&S savings addresses the potential that some program projects may require code-compliance – an issue that cannot be directly addressed in the market potential study or accounted for in program designs that do not explicitly address nonresidential alterations. Pre-2019 Title-24 code impacts were assumed to already be reflected in the measure baseline assumed in the market potential study.

Claimable savings from C&S was included in the analysis for select participating utilities; the estimates for these savings are not included in the EE Forecast Savings data presented to the Energy Commission for review and adoption.

## 3 Analysis Approach

This section describes the overall methodology proposed to assess the electric EE forecast for residential and non-residential customers in the 38 participating utility service areas included in the study.

The main objectives of this EE potential forecast study were to estimate the technical, economic, and market EE potential in these utility territories; and to quantify these estimates of potential in terms of MWh and megawatt savings on an incremental annual and cumulative annual basis, across the 10 year study timeframe. An overview of these study results is found in Chapter 4 of this report. Detailed results for each participating utility in the study can be found in Appendix A.

### 3.1 EE FORECAST MODELING

An initial overview of the methodological approaches employed in the development of the EE potential forecasts as well as a high-level description of the GDS modeling structure developed for CMUA is provided below.

#### 3.1.1 Overview of Approach

For the residential sector, the GDS Team utilized a bottom-up approach to the modeling of EE potential, whereby measure-level estimates of costs, savings, and useful lives were used as the bases for developing the technical, economic, and achievable potential estimates. The measure data was used to build up the technical potential, by applying the data to each relevant market segment. The measure data allowed for benefit-cost screening to assess economic potential, which was in turn used as the basis for achievable potential, taking into consideration incentives and estimates of annual adoption rates.

For the nonresidential sectors, the GDS Team employed a hybrid approach that includes bottom-up modeling to first estimate measure-level savings, costs, and cost-effectiveness, and then applied a top-down measure savings factor to all applicable disaggregated shares of energy load by building type. This approach was used for commercial and industrial (C&I) sectors, as well as the agricultural sector.

Due to the difference in sector-level approaches, the GDS Team used sector-specific models to develop the EE forecasts for each participating utility. The sector models, described in additional detail below, follow a similar structure but employ slightly different modeling logic that aligns with the bottom-up versus top-down methodology.

#### 3.1.2 Model Structure and Flow

As noted above, the GDS Team used sector-specific models to develop the EE Forecasts for each participating utility to reflect differences in overall approach (bottom-up versus top-down estimates of future potential). However, both models were developed so that they maintain a similar structure and flow in the overall analysis. In addition, both the residential model and nonresidential models are Microsoft Excel-based models that are completely open and transparent to the end-user.

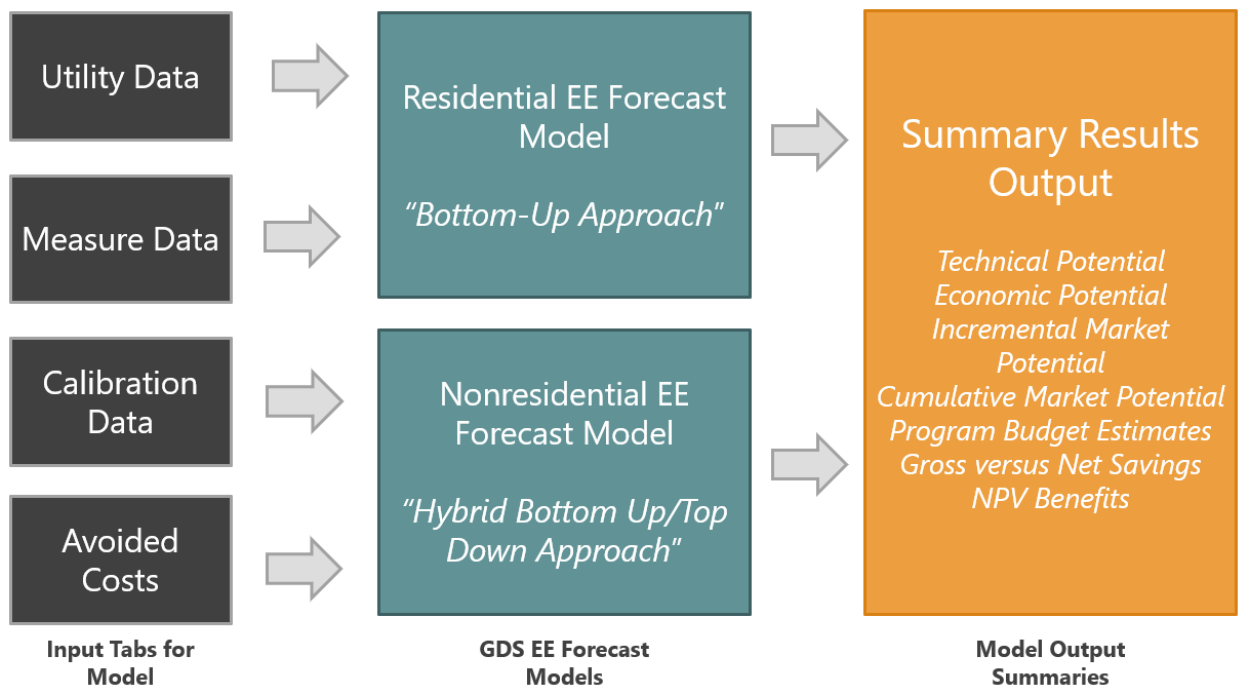
The GDS models include four input worksheets that contain utility-specific information. The four input worksheets include:

**Utility Data.** The GDS Team worked with the CMUA utilities to gather utility-specific data such as energy and demand forecasts, discount rates, line losses, and customer count data. The GDS Team also coordinated with utilities to receive C&I sales information by North American Industry Classification (NAICS).

**Measure Data.** The GDS Team created a dataset of EE measures based on prior CMUA analyses, the POU Technical Reference Manual, and the California eTRM. The GDS Team developed measure characteristics including costs, energy and demand use impacts, and measure life for both baseline and energy efficient technologies. Measure assumptions varied by segment and by climate zone.

**Avoided Costs.** The model utilized POU-specific avoided costs (discussed in Section 2.2). For purposes of the EE Forecast models, 8760 annual avoided costs were mapped to existing load shapes contained within ESPLabs ESPPortfolios (ESP) Platform tool, to create a weighted-average annual value for each end-use load shape. These annual avoided cost by end-use load shape were then multiplied by the measure per-unit savings to estimate the annual benefits of EE savings.

**Calibration Data.** The calibration inputs tab houses utility-specific data associated with existing program savings as well as average historical incentive levels (either on a cost per first-year savings basis or percentage of measure cost) as well as recent observed utility non-incentive costs. Historical utility incentive and non-incentive costs were developed and input at both the program and/or end-use level. The calibration inputs tab also includes assumptions about long-term adoption rates based on different incentive levels.



**FIGURE 3-1: GDS EE FORECAST MODEL FLOW OVERVIEW**

The outputs from the sector models accomplish the following objectives:

- Determining the incremental annual and cumulative annual technical, economic, and market potential of energy savings over 10-year and 20-year periods.
- Market potential estimates are calculated for each program in a utility’s portfolio; end-use level estimates are calculated as well.
- Estimates of program-level budgets are calculated, including estimates of incentives and non-incentive costs.
- Market potential estimates are provided in terms of both gross and net savings.

Outputs are summarized within each sector model. The GDS Team also created an output results file to view combined results from both sectors in a summary format consistent with prior EE Forecast analyses.

### 3.2 MARKET CHARACTERIZATION

The initial step in the analysis was to gather a clear understanding of the current market segments in each CMUA participating utility service area. The GDS Team coordinated with the CMUA utilities to gather utility sales and customer data to define appropriate market sectors and market segments.

#### 3.2.1 Forecast Segmentation

The GDS Team requested a forecast of utility sales, absent future DSM impacts, from each of the CMUA Participating Members. In the nonresidential sector, a key next step for input into the potential modeling analysis is to segment the sales forecast by building type and end-use. To segment by building type, the GDS Team also requested a current breakdown of nonresidential sales by NAICS/Standard Industry Classification (SIC) code.<sup>4</sup> The GDS Team then mapped these industry codes to building type using the cross-reference tables found in Appendix J of the California End-Use Study.<sup>5</sup> In addition to providing point-estimates for the segmentation of sales by building type, the GDS Team also used the sales by NAICS code data to compare the breakdown of commercial versus industrial sales indicated in the long-term sales forecast. Often, the sales by sector reflected in a utility’s long-term sales forecast may with sales by rate class (i.e., small versus large C&I), whereas the sales by NAICS code give a better indication of the typical use of the facility (i.e., is the facility used for manufacturing or commercial business applications).

Sales by building/industry type were then further disaggregated to the end-use level using representative data from the 2006 California Commercial End-Use Survey (CEUS)<sup>6</sup> and the 2014 California Commercial Saturation Survey (CSS).<sup>7</sup> The 2006 CEUS provided the initial breakdown of end-use sales by building type. However, the impact of C&S specifically to lighting has had a dramatic impact on the relative contribution of lighting to total C&I sales. The 2014 California CSS has a more recent analysis of the lighting end-use’s contribution to total building consumption. The GDS Team used this data to update the 2006 CEUS analysis.

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<sup>4</sup> The GDS Team received sales by NAICS code for 25 of the Participating Members. For utilities that were unable to provide sales by NAICS code, the GDS Team used an average of similar neighboring participating utilities as a general proxy.

<sup>5</sup> California Commercial End-Use Survey, Appendices A-J. Prepared for California Energy Commission. Prepared by Itron, Inc. March 2006.

<sup>6</sup> California Commercial End-Use Survey. Prepared for California Energy Commission. Prepared by Itron, Inc. March 2006.

<sup>7</sup> California Commercial Saturation Survey. Prepared for California Public Utilities Commission. Prepared by Itron, Inc. August 2014.

Table 3-1 provides a breakdown of the various commercial building/industry types, as well as the end-uses considered in the GDS Team analysis.

**TABLE 3-1. NONRESIDENTIAL SEGMENTATION**

Commercial		Industrial/Agriculture	
Building Types	End-Uses	Industry Types	End-Uses
College	Whole Building	Chemicals	HVAC (Ind)
Food/Liquor	Heat	Electronics	Lighting (Ind)
Health Care	Cool	Fabricated Metals	Machine Drive (Ind)
Hotel	Vent.	Food	Process Heat (Ind)
Miscellaneous	Refrigeration	Lumber & Furniture	Process Refrigeration (Ind)
Office	WH	Average	Other Process (Ind)
Refrigerated Warehouse	Cook	Nonmetallic Mineral	Other Facility (Ind)
Restaurant	Interior Lighting	Paper	Motors and Pumps (Ag)
Retail Store	Exterior Lighting	Chemicals	Refrigeration (Ag)
School	Office Equip.	Plastics	Lighting (Ag)
Warehouse	Misc.	Primary Metals	Ventilation (Ag)
Data Center	Air Comp.	Transportation	HVAC (Ag)
	Motors	Agriculture	Water Heating (Ag)
	Proc.		

In the residential sector, the measures were segmented to include impacts for single family versus multifamily impacts as well as income qualified versus market rate offerings. A detailed breakdown of energy use by end-use and building type is less critical due to the bottom-up nature of the analysis of measure-level market potential. The GDS Team did make assumptions about the end-use level consumption for each of the residential customer bases, but this was only to inform the interactive effects adjustments (see Section 3.5.1)

### 3.2.2 Building Stock/Equipment Saturation

To assess the potential electric EE savings available, estimates of the current saturation of baseline equipment and EE measures are necessary.

#### 3.2.2.1 Residential Sector

For the residential sector, the GDS Team relied primarily on the California 2019 Residential Appliance Saturation Study (RASS). The project managers of this study with the Energy Commission shared the raw data from the 2019 RASS with the GDS team, and we were able to calculate baseline saturations for each of the investor-owned utilities in the state. The GDS Team then mapped the IOUs to each of the participating utilities in the study according to geographic region and climate similarities.

Other data sources included ENERGY STAR® unit shipment data, the 2019 PG Study, and Energy Information Administration Residential Energy Consumption Survey (RECS) data. The ENERGY STAR® unit shipment data filled data gaps related to the increased saturation of energy efficient equipment across the U.S. in the last decade.

#### 3.2.2.2 Nonresidential Sector

In the nonresidential sector, base equipment saturation data was developed primarily from the PG measure data and the CSS Study. For base densities sourced from the CSS Study, the GDS Team reviewed saturation data from other regions with more current information to determine if the data from the CSS Study was still relevant given the age of the study. While non-lighting measure base densities were found to be appropriate, the GDS Team judged specific lighting technologies, e.g., the saturation of LED lighting, in the CSS Study to be outdated. As a result, lighting base densities were adjusted based on data from the 2019 Commercial Building Stock Assessment conducted in the Pacific Northwest.<sup>8</sup>

The EE saturations were sourced from the prior Electric Resource Assessment Models (ELRAM) and PG database as well as the CSS Study. The saturation values for non-lighting measures were cited directly from these resources. Lighting measure efficiency saturations, however, underwent an additional adjustment. Due to the rapid market transformation toward LED technologies, the GDS Team adjusted the initial saturations to better reflect anticipated saturations in 2022. The adjustments to efficient lighting saturations were based on a Massachusetts lighting market study.<sup>9</sup>

### 3.2.3 Remaining Factor & Measure Re-Engagement

The remaining factor is the proportion of a given market segment that is not yet efficient and can still be converted to an efficient alternative. It is, by definition, the inverse of the saturation of an energy efficient measure. This study makes several assumptions regarding the future potential of equipment that is already efficient, or will become efficient, over the analysis timeframe.

This analysis considered the impact of measure re-engagement in a manner consistent with prior CMUA EE Potential forecasting analyses. Measure re-engagement is the share of measure installations that continue to provide efficiency benefits at least equal to the initial DSM measure installed after reaching the end of their effective useful life. For example, an assumed 85% re-engagement rate assumes that 85% of the measures installed would continue to yield savings after reaching the end of their initial effective useful life, but there are no new incremental savings accruing from the re-engagement population.

To address the future potential savings associated with measures that are already efficient at the beginning of the analysis (the current saturation of energy efficient equipment), the GDS Team developed our models to allow a portion (15%, or the complimentary share of installations not part of re-engagement) of these existing measures to be refilled, during their natural replacement cycle, by assuming that consumers will either backslide back to baseline technologies or that advances in the efficiency of equipment will enable new technologies, tiers, or improved standards to replace the current measure and allow for continued savings opportunities. There were, of course, exceptions to this logic. Select measures were considered one-time efficiency opportunities and were not eligible to be replaced/refilled in the analysis. Examples of these measures include variable frequency drives, motor controls, comprehensive residential retrofits, and most shell measures (insulation, air sealing, door improvements). Other exceptions include measures that are known to be impacted by codes or standards or are considered to have reached the limit of technological advancements in efficiency (ex. LED Lighting, where future efficiency improvements are expected to be minimal compared to historic baselines) and miscellaneous residential electronics with high market penetration.

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<sup>8</sup> Commercial Building Stock Assessment 4 (2019). Northwest Energy Efficiency Alliance, May 2020.

<sup>9</sup> MA19C14-E-LGHTMKT- 2019 C&I Lighting Inventory and Market Model Updates. DNV GL, April 2020.

## 3.3 MEASURE CHARACTERIZATION

### 3.3.1 Measure Lists

The study's sector-level EE measure lists were informed by a range of sources. The primary resources for developing the measure lists included the CMUA Technical Reference Manual (TRM) <sup>10</sup>, the California Electronic Technical Reference Manual (eTRM) <sup>11</sup>, and measures included in the 2016 CMUA market potential study. In addition to this resource, additional measures were considered for inclusion by referencing current CMUA utility program offerings, and other publicly available technical reference manuals, and commercially viable emerging technologies. Measure list development was a collaborative effort in which the GDS Team developed a draft measure lists that was shared with CMUA participating utilities for qualitative review. The final measure lists ultimately included in the study reflects the informed comments and considerations from the parties that participated in the measure list review process.

In total, the GDS Team analyzed 116 residential and 147 non-residential measure types. To help inform future program planning and to align with existing offerings, many measures were included in the study as multiple permutations to account for different specific market segments, such as different building types, efficiency levels, and replacement/delivery options.

#### 3.3.1.1 Assumptions & Sources

After identifying the measure list, the GDS Team next performed measure research. Using multiple data sources, the GDS Team defined measure parameters for energy and demand savings, measure life values, costs, base densities, and market saturation of energy efficient technologies. The GDS Team strived to rely primarily on California-based resources to ensure parameters were representative of each municipality's territory. In some cases, however, the GDS Team did use non-California studies and reports to support components of the measure analysis as is discussed below.

**Measure Savings:** For each measure, estimates of energy and demand reductions are characterized to provide seasonal peak impacts. The GDS Team relied primarily on the CMUA 2017 TRM and the eTRM to inform calculations supporting estimates of annual measure demand and energy reduction impacts as a percentage of base equipment usage. In many cases, the GDS Team was able to identify energy and demand savings values for measures directly without any need for adjustments. However, in cases where the CMUA 2017 TRM did not support specific measures on the study's measure list, the GDS Team needed to consult additional resources to define savings. In these cases, the GDS Team leveraged the CMUA 2017 TRM to its fullest extent before relying on additional sources. For example, the GDS Team defined specific lighting measure savings impacts by leveraging the CMUA 2017 TRM's assumptions for hours of use, interactive factors, and coincident demand factors in conjunction with the eTRM's baseline wattage assumptions. Additionally, as the CMUA 2017 TRM provided only savings values, the GDS Team used various algorithm sources including the eTRM and Illinois TRM v8.0 to calculate baseline and efficient case consumptions, as these metrics were required for the potential modeling. This approach allowed the GDS Team to define distinct savings values for different measure vintages based on market and code baselines.

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<sup>10</sup> [www.cmua.org/energy-efficiency-technical-reference-manual](http://www.cmua.org/energy-efficiency-technical-reference-manual)

<sup>11</sup> [www.caetrm.com](http://www.caetrm.com)

For measures not included in the CMUA TRM or California eTRM, the GDS Team estimated savings from a variety of sources, including:

- Illinois TRM
- Other TRMs
- Engineering analyses
- Past CMUA potential studies
- Secondary sources such as the American Council for an Energy-Efficient Economy (ACEEE), Department of Energy (DOE), EIA, ENERGY STAR<sup>®</sup>, and other technical potential studies

**Measure Costs:** Measure costs represent either incremental or full costs. These costs typically include the incremental cost of measure installation, when appropriate based on the measure definition. For purposes of this study, nominal measure costs held constant over time.

The GDS Team obtained measure cost estimates primarily from the CMUA TRM and the eTRM, and ELRAM models from the previous study. The GDS Team also used use the following data sources to supplement measure cost data:

- Illinois TRM
- Secondary sources such as the ACEEE, ENERGY STAR<sup>®</sup>, and National Renewable Energy Lab (NREL) EE measures database
- Program evaluation and market assessment reports completed for utilities in the Pacific Northwest (Bonneville Power Administration) and California

Costs and savings for new construction and replace on burnout measures were calculated as the incremental difference between the code minimum equipment and the EE measure. This approach was utilized because the consumer must select an efficiency level that is at least the code minimum equipment when purchasing new equipment. The incremental cost is calculated as the difference between the cost of high efficiency and standard efficiency (code compliant) equipment. However, for retrofit or direct install measures, the measure cost was the “full” cost of the measure, as the baseline scenario assumes the consumer would not make EE improvements in the absence of a program. In general, the savings for retrofit measures are calculated as the difference between the energy use of the removed equipment and the energy use of the new high efficiency equipment (until the removed equipment would have reached the end of its useful life).

**Measure Life:** Measure life represents the number of years that energy using equipment is expected to operate. The GDS Team obtained measure life estimates from the CMUA TRM. and used the following data sources for any additional measures:

- eTRM
- Illinois TRM
- Other TRMs

All measure savings, costs, and useful life assumptions are inputs into the market potential models which were provided to the utilities participating in the study.

### 3.3.2 Dual Baseline Measures

Measures that may typically be offered with a replace-on-burnout delivery strategy may be candidates for early replacement program offerings if found to be cost-effective. Candidates for an early replacement delivery strategy were examined using a dual baseline calculation for savings and costs.

Under the dual baseline approach, savings for early replacement measures are broken up into two time periods: (1) the remaining useful life (RUL) of the replaced equipment and (2) the adjusted effective useful life (EUL) of the new equipment (i.e., the original EUL – RUL). In the example of an air conditioning system, the difference in energy use between the replaced and new system is claimed as savings for the RUL of the system being replaced. After the RUL (ex. 10 years) of the replaced equipment and until the end of the EUL of the new equipment (15 years, if the new system is assumed to have an EUL of 25 years), the difference in energy use between the new system and a system that meets minimal federal efficiency standards is claimed as the energy savings.

In addition to the EUL and savings adjustments required to analyze dual baseline/early replacement measures, the cost must also receive an adjustment. The initial cost in an early replacement scenario is the full install cost of the efficient technology (because the existing equipment is still operation, and the purchaser would not otherwise be in the market for new equipment). However, the dual baseline approach acknowledges the deferred cost of the need to replace the equipment in the future. The early replacement cost is estimated as the present value of the efficient device (including installation) minus the present value of the standard device (including installation).

**TABLE 3-2: DEFINING COSTS AND IMPACTS FOR DUAL BASELINE MEASURES**

Decision Type	Measure Cost (\$/Unit)	Impact Measurement (kWh/Unit)
Replace-on-Burnout / New Construction	Cost of efficient device minus cost of standard device	Consumption of device that meets minimum code/standards minus consumption of efficient device
Dual Baseline / Early Replacement	Present value of efficient device minus present value of standard device	<i>During remaining expected life of existing equipment:</i> Consumption of existing device minus consumption of efficient device  <i>After normal replacement time for old device:</i> Consumption of standard device minus consumption of efficient device

Dual baseline measures typically have higher initial savings, but at an increased initial cost (even after accounting for the deferred future cost of replacing the equipment). The GDS models analyzed the measure-level cost-effectiveness of candidate replace-on-burnout measures for an

early replacement offering and included the early replacement option in cases where the option was deemed cost-effective. Table 3-2 summarizes the contrasting methods for quantifying the impacts and incremental costs of efficiency measures between replace-on-burnout and early replacement strategies.

### 3.3.3 Behavior Based Energy Savings Potential

Savings potential from behavior-based initiatives are modeled by program or measure type as well as by sector. In the residential sector, the GDS Team assessed the future savings potential opportunities associated with home energy report measures. Nonresidential behavior-based initiatives were analyzed based on a variety of strategies including competitions, training, and feedback. Consistent with prior CMUA analyses, behavior-based savings reflect estimates of usage-based behavior. Savings from any behavior program-driver equipment upgrades are assumed to be addressed by the utility’s other incentive-based programs.

**Residential Sector:** The behavior-based energy savings potential in the residential sector was restricted to usage-based behavior opportunities in the form of home energy reports (or home electricity reports). These measures have an

assumed measure life of one-year. Measure costs for these programs were assumed to be only related to non-incentives – therefore all home energy reports passed the TRC test screening at the measure-level. Non-incentive cost assumptions are based on historical program costs for participating utilities which have historically offered these programs. Savings potential estimates are based on recent impact evaluation reports for home energy report measures as well as recent portfolio reported results within the ESP Platform Tool.

**Nonresidential Sector:** Nonresidential behavior-based initiatives included competitions, business energy reports, building benchmarking, strategic energy management, building integrated energy management systems, and building operator certification. Measure assumptions related to savings, costs, effective useful lives, and market applicability levels were informed by the 2019 PG Study. Savings ranged from 0.3% to 3.6% of a building’s typical annual consumption.

In both sectors, the impacts of behavior-based savings, if included in a utility’s market potential offering, were considered after accounting for the interactive impacts of incentive equipment-based savings.

### 3.3.4 Data Center Potential Savings

The GDS Team developed its estimate of stand-alone data center market potential by relying on several key sources of data:

- Industry literature detailing Power Usage Effectiveness (PUE) for three sizes of data center.
- Utilizing the PUE and industry literature to disaggregate data center end-use loads and tiers of efficiency for IT loads and infrastructure loads.
- Developing a per sq ft EUI under four conditions to develop efficiency gains under two scenarios, at a per kWh level.
- Applying general cost improvements on a per kWh level using industrial heating, ventilation, and air conditioning (HVAC), and operations and maintenance (O&M) cost factors to reflect the energy demands of data centers.

The approach leverages overall industry trends in efficiency improvements and best practices based on the share of electricity used by information technology (IT) equipment – the core purpose of a data center – and the electricity loads associated with infrastructure to support that IT equipment. The PUE reflects the relative share of overall electricity loads relative to the IT loads.

#### EQUATION 3-1 POWER USAGE EFFECTIVENESS METRIC FOR DATA CENTERS

$$PUE = \frac{\text{Total Facility Energy}}{\text{IT Energy}}$$

Infrastructure improvements were modeled as equipment upgrades that improve the PUE with long measure lives (15 years). In contrast, opportunities for IT improvements were modeled as O&M improvements with three-year measure lives, reflecting the pace of change of core IT equipment.

The opportunity for energy savings varies by the scale of data centers. Separated into three bins – mid-tier, high-end, and hyperscale, the PUE of each decrease based on available technology and the scale of operations, with larger data centers demonstrating lower PUEs and few opportunities for incremental percentage improvements in EE. While hyperscale data centers are prodigious users of electricity, the relative share of electricity is weighted more toward IT demands than smaller data centers.

The outcome of the analysis presented savings opportunities for each of the sizes of data centers (mid-tier, high end, and hyperscale across:

- IT and infrastructure improvements
- Savings in moving from baseline to improved practices or best practices.

Table 3-3 summarizes the overall savings estimates for each tier of datacenters.

**TABLE 3-3. SCENARIO SAVINGS AND SATURATION ESTIMATES FOR DATA CENTERS**

Type	Improved Practice	Best Practices		Load Share	% of Load Already Efficient
Mid-Tier	13%	40%		21.1%	22%
High-End	13%	38%		38.4%	25%
Hyperscale	8%	26%		40.5%	70%

### 3.3.5 Treatment of Codes and Standards and Modified Baselines

C&S increase the baseline efficiency of utility program measures. During the measure assumption development process, the GDS Team reviewed the assumptions included in the CMUA TRM, California eTRM, and supporting resources to align the assumed baseline to mirror current (or known) future C&S. By mapping measure baseline consumption estimates current C&S, we reduce the likelihood of quantifying potential derived from C&S advocacy programs (see Section 2.3).

In addition to accounting for improved code baselines noted above, an additional primary adjustment in this analysis impacts residential screw-based lighting. The DOE issued a final rule stating the Energy Independence and Security Act (EISA) backstop has not been triggered and adopted a narrow definition of general service lighting.<sup>12</sup> However, based on discussion with CMUA utilities and a prevailing viewpoint that residential lighting opportunities have been exhausted through program intervention and market transformation, the latter of which resulted from previously anticipated EISA backstop trigger, the GDS Team limited residential lighting opportunities to minor direct install opportunities through programs providing that type of channel. There are therefore only a limited number of direct-install screw-based lighting opportunities for standard, specialty, and reflector bulbs over the analysis period.

## 3.4 TYPES OF POTENTIAL

Potential studies often distinguish between several types of EE potential: technical, economic, achievable, and market or program potential. However, because there are often important definitional issues between studies, it is important to understand the definition and scope of each potential estimate as it applies to this analysis.

The first two types of potential, technical and economic, provide a theoretical upper bound for energy savings from EE measures. Still, even the best-designed portfolio of programs is unlikely to capture 100% of the technical or economic potential. Therefore, market potential attempts to estimate what savings may realistically be achieved through market interventions associated with a utility’s EE portfolio. These projections estimate the magnitude and timing of savings opportunities as well as the level of utility spending that would be required to realize these savings. In this analysis, market potential is closely calibrated to historical incentive levels and current program savings achievements, with

<sup>12</sup> 42 United States Code [Chapter 152](#) § 17001 et seq.

future market potential informed by the level of opportunity remaining. Figure 3-2 illustrates the types of EE potential considered in this analysis.

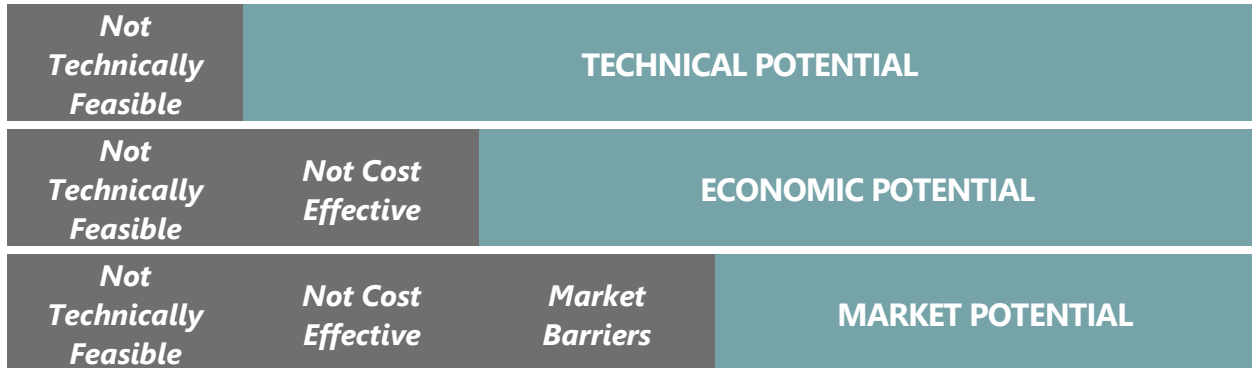


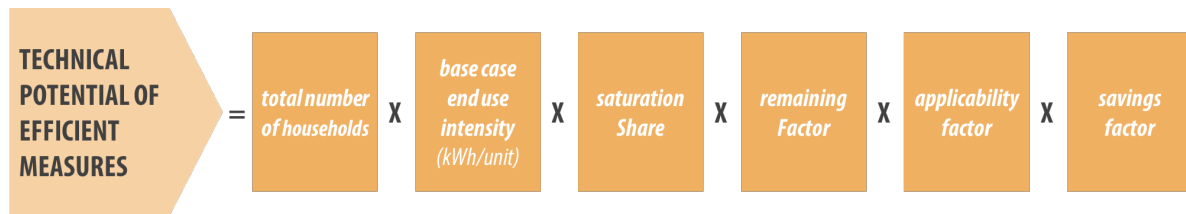
FIGURE 3-2 TYPE OF EE POTENTIAL<sup>13</sup>

### 3.5 TECHNICAL POTENTIAL

Technical potential is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end users to adopt the efficiency measures. Technical potential only constrained by factors such as technical feasibility of measures. Under technical potential, the GDS Team assumed that 100% of new construction and market opportunity measures are adopted as those opportunities become available (e.g., as new buildings are constructed, they immediately adopt efficiency measures, or as existing measures reach the end of their useful life). For retrofit measures, implementation is assumed to be resource constrained and that it is not possible to install all retrofit measures all at once. Rather, retrofit opportunities are assumed to be replaced incrementally until 100% of stock will be converted to the efficient measure over a period of no more than 20 years.

The core equation used in the residential sector EE technical potential analysis for each individual efficiency measure is shown in Equation 3-2 below. The C&I business sector employs a similar analytical approach.

EQUATION 3-2 CORE EQUATION FOR RESIDENTIAL SECTOR TECHNICAL POTENTIAL



Where...

**Base Case Equipment End-Use Intensity** = the electricity used per customer per year by each base-case technology in each market segment. In other words, the base case equipment end-use intensity is the consumption of the electrical energy using equipment that the efficient technology replaces or affects.

<sup>13</sup> Reproduced from “Guide to Resource Planning with Energy Efficiency.” November 2007. US Environmental Protection Agency (EPA). Figure 2-1. Modified to depict the additional levels of achievable and program potential included in this study.

**Saturation Share** = the fraction of the end-use electrical energy that is applicable for the efficient technology in a market segment. For example, for residential water heating, the saturation share would be the fraction of all residential electric customers that have electric water heating in their household.

**Remaining Factor** = the fraction of equipment that is not considered to already be energy efficient. To extend the example above, the fraction of electric water heaters that is not already energy efficient.

**Applicability Factor** = the fraction of the units that can derive savings. The applicability may be limited either based on the proportion of the population that is technically feasible for conversion to the most efficient available technology from an engineering perspective (e.g., it may not be possible to install heat pump water heaters in all homes because of space limitations) or based on competition with other technologies.

**Savings Factor** = the percentage reduction in electricity consumption resulting from the application of the efficient technology.

### 3.5.1 Competing Measures & Interactive Effects Adjustments

GDS prevents double-counting of savings, and accounts for competing measures and interactive savings effects, through three primary adjustment factors:

**Baseline Saturation Adjustment.** Competing measure shares may be factored into the baseline saturation estimates. For example, nearly all homes can receive insulation, but the analysis will create multiple measure permutations to account for varying impacts of different heating/cooling combinations and will apply baseline saturations to reflect proportions of households with each heating/cooling combination.

**Applicability Factor Adjustment.** The GDS Team may combine measures into measure groups, where total applicability factor across measures is set to 100%. For example, homes cannot receive a programmable thermostat, connected thermostat, and smart thermostat. The measure applicability factor is calculated based on the pro-rated share of the individual measure benefit-cost ratio to the group total. For example, if an interactive measure group included two measures, one with a benefit-cost ratio that was 2.0 and the other with a benefit-cost ratio of 1.0, the measures with the higher benefit-cost ratio would receive a 66.6% applicability factor while the other measure would be assigned an applicability factor of 33.3%. In technical potential, even measures with a benefit-cost ratio below 1.0 are included in the applicability factor calculation. The applicability factors for economic and market potential are recalculated to exclude measures that do not pass economic screening.

**Interactive Savings Adjustment.** As savings are introduced from select measures, the per-unit savings from other measures need to be adjusted (downward) to avoid over-counting. The analysis typically prioritizes market opportunity equipment measures (versus retrofit measures that can be installed at any time). For example, the savings from a smart thermostat are adjusted down to reflect the efficiency gains of installing an efficient air source heat pump. The analysis also prioritizes efficiency measures relative to conservation (behavioral) measures. These impacts are accounted for in all phases of estimated potential savings.

## 3.6 ECONOMIC POTENTIAL

Economic potential refers to the subset of the technical potential that is economically cost-effective. Both technical and economic potential ignore market barriers to ensuring actual implementation of EE. Technical and economic potential only consider the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration, program evaluation, etc.) that would be necessary to capture them. The GDS Team models calculate several financial tests for evaluating measure cost-effectiveness. These tests are briefly described below.

**Total Resource Cost Test.** The TRC test calculations in this study follow the prescribed methodology detailed in the latest version of the California Standard Practice Manual. The California Standard Practice Manual establishes standard procedures for cost-effectiveness evaluations for utility-sponsored or public benefits programs.

The TRC test measures benefits and costs from the perspective of the utility and society. The benefits include the net present value of the energy and capacity saved by the measures but exclude any natural gas or other fossil fuel benefits. The costs are the net present value of all costs to implement those measures. These costs include full incremental costs (both utility and participant contributions), but no incentive payments that offset incremental costs to customers and no lost revenues. The full incremental costs include single upfront costs and O&M costs where applicable. While non-incentive costs were not included in the measure-level screening of electric EE potential, they were included in further assessments of market potential level.

**Program Administrator Cost Test.** The Program Administrator Cost Test (PACT), also known as the Utility Cost Test is also calculated by the GDS models. This test measures the costs and benefits from the perspective of the utility administering the program. As such, this test is characterized as the revenue requirement test. Benefits are the net present value of the avoided energy and capacity costs resulting from the implementation of the measures. Costs are the administrative, marketing and evaluation costs resulting from program implementation along with the costs of incentives but do not include lost revenues. Programs passing the PACT result in overall net benefits to the utility, thus making the program worthwhile from a utility cost accounting perspective.

**Participant Cost Test.** The Participant Cost Test (PCT) measures the benefits and costs from the perspective of program participants, or customers. Benefits are the net present value savings that participating customers receive on their electric bills as a result of the implementation of the EE and demand response measures plus incentives received by the customer. Costs are the customer's up-front net capital costs to install the measures. If the customer receives some form of a rebate incentive, then those costs are considered as a credit to the customer and are added to the customer's total benefits.

**Rate Impact Measure Test.** The Rate Impact Measure (RIM) Test measures the impact on a customer's bill as a result in changes to utility revenue and operating costs resulting from the portfolio of EE and DSM programs.

All measures that are not found to be cost-effective based on the results of the measure-level cost effectiveness screening were excluded from the economic and market potential.<sup>14</sup>

### 3.7 MARKET POTENTIAL

Market potential is the amount of energy that can realistically be saved given likely future program offerings and various market barriers. Market potential considers real-world barriers to encouraging end users to adopt efficiency measures; the non-measure costs of delivering programs (for administration, marketing, analysis, and EM&V); and the capability of programs and administrators to boost program activity over time. Barriers include financial, customer awareness and willingness to participate in programs, technical constraints, and other barriers the "program intervention" is modeled to overcome.

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<sup>14</sup> There are a few exceptions to this cost-effectiveness requirement. Low-income measures did not have to pass the TRC Test to remain in the market potential; the City of Redding retained the TRC Test cost-effectiveness requirement for low-income measures; market potential did not include a cost-effectiveness threshold for LADWP.

The potential study evaluated two market potential scenarios:

- **Market Potential** is estimated based on a relationship between incentive levels (as a percent of incremental measure costs) and expected market adoption rates. In the base market potential scenario, assumed measure incentive levels are closely calibrated to historical levels.
- **Maximum Market Potential** estimates achievable potential from aggressive adoption rates based on paying incentives equal to 100% of measure incremental costs and increased program awareness.

Market potential also includes an estimate of non-incentive program costs to fully capture the overall expected utility costs relative to the lifetime benefits of EE improvements.

### 3.7.1 Market Adoption Rates

The assumed level of customer participation for each EE measure is a key driver of market potential estimates. To inform estimates of future market adoption, the GDS Team relied on both the historical achievements in each participating utility in prior years, as well as end-use long-term adoption rate estimates.<sup>15</sup> The historical benchmarking provides a point-estimate to serve as an initial “ground floor” market adoption rate while the final adoption rates reflect the presence of possible market barriers and associated difficulties in achieving the 100% market adoption assumed in the technical and economic scenarios.

**Initial Year Measure Adoption.** First year adoption levels were informed either by recent historical<sup>16</sup> or planned performance (where possible). The GDS Team reviewed the claimed savings by program for each CMUA utility to ensure that initial year savings aligned with prior year achievements. The combined initial year savings from the market potential measures that were mapped to the utility’s existing program offerings were then calculated (as a percent of total annual eligibility) to be roughly equivalent to those historical savings levels. This step ensures that the forecasted market potential savings in the initial year are realistic and attainable by accounting for prior year activity and initial market acceptance.

**Long-Term Market Adoption Rates.** Long-term market adoption rate estimates were derived from existing secondary willingness-to-participate (WTP) market research conducted in various jurisdictions across the United States.<sup>17</sup> The WTP survey research estimates customer willingness to purchase and install EE technologies at various incentive levels for several technologies and/or end-uses in both sectors. These WTP survey results serve as the initial point-estimate for the long-term market adoption potential for the market potential scenario. Table 3-4 provides a summary of the long-term adoption rates that were used in this analysis rate by sector and end-use.

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<sup>15</sup> Long-term adoption rate estimates were informed by publicly available secondary research on consumer willingness-to-participate research (discussed in further detail below). This data was derived from similar surveys performed in other jurisdictions by the GDS Team as well as other industry experts to help inform adoption rate assumptions related to energy efficiency program intervention.

<sup>16</sup> The GDS Team performed a historical benchmarking analysis based on 2017-2019 reported program savings by participating utility in their ESP Platform Tool. This analysis considered reviewed observed trends from the prior three years to estimate an initial year calibration target for the EE Forecast market potential.

<sup>17</sup> The 2021 PG study has included market research that is also intended to investigate California-specific customer adoption rates. Based on our understanding of this research, the GDS Team believes the existing WTP data used in this analysis can be updated to reflect the California-specific data that will be produced in the 2021 PG study currently underway.

**TABLE 3-4. ASSUMED LONG-TERM ADOPTION RATES BY SECTOR AND END-USE**

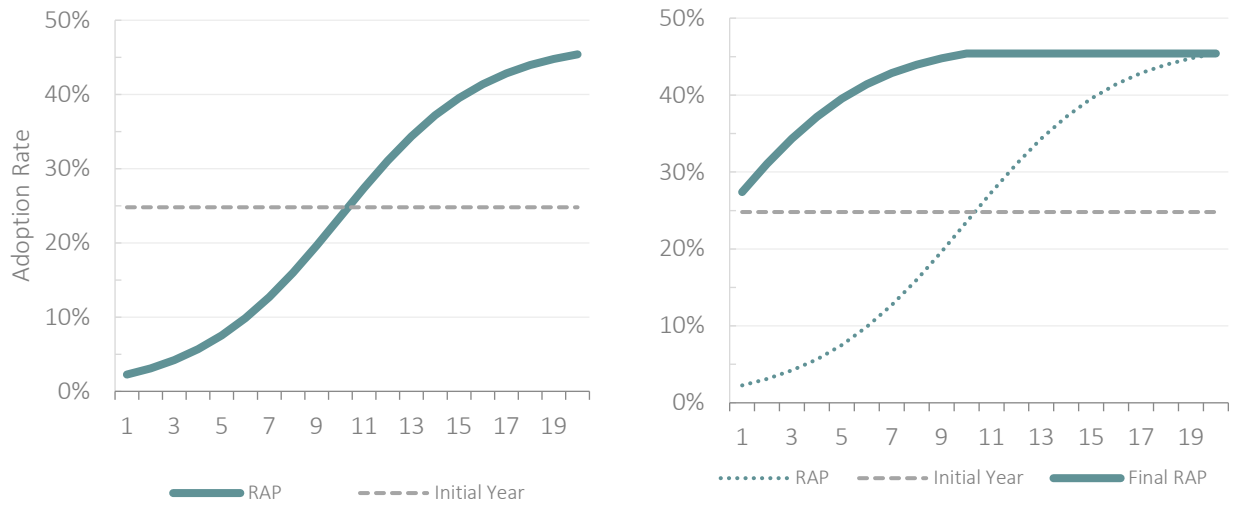
Sector	End-Use	Incentive Level (as a % of Measure Cost)				
		0%	25%	50%	75%	100%
Residential	Appliances	44%	53%	65%	73%	87%
Residential	Building Shell	29%	35%	52%	62%	79%
Residential	Cooling	28%	52%	52%	65%	81%
Residential	Electronics	38%	46%	55%	64%	80%
Residential	HVAC Equip,	28%	35%	51%	62%	79%
Residential	Lighting	49%	62%	69%	79%	88%
Residential	Pools	9%	19%	28%	34%	41%
Residential	Water Heating	34%	44%	59%	68%	79%
Residential	New Const	29%	35%	52%	62%	79%
C&I	Whole Building	28%	39%	50%	65%	80%
C&I	Heating	29%	44%	59%	68%	83%
C&I	Cooling	34%	46%	58%	69%	80%
C&I	Ventilation	33%	48%	62%	71%	90%
C&I	Refrigeration	49%	66%	82%	89%	90%
C&I	Hot Water	35%	61%	61%	70%	81%
C&I	Cooking	34%	42%	50%	57%	81%
C&I	Interior Lighting	44%	65%	67%	77%	90%

An additional adjustment is made to account for expected long-term measure/program awareness, and that not all consumers are aware of various efficient technologies or utility program activities to promote EE. This adjustment factor was set at 85%. In the model, the impact of this awareness factor adjustment reduces the point-estimate of long-term adoption identified by the WTP market research.

Measure specific final adoption scores in the base market potential scenario were based on the assumed current incentive level (see Section 3.7.2). For the maximum market potential scenario, the final adoption score was adjusted upward, assuming incentives equal to (but not exceeding) 100% incentives.

**Adoption Curve.** Once the initial year adoption rate (Point A) and long-term adoption rates (Point B) are determined, the remaining step was to determine the rate and duration to get from Point A to Point B. The GDS EE Forecast models employed a standard s-curve that was set to a period of 20 years with the market potential end-point estimate based on the WTP data. The first year point estimate (based on the historical calibration targets) was then used to establish the number of years remaining to reach the long-term adoption rate and the slope of adoption.

In the illustrative figure below (Figure 3-3), the initial s-shaped curve (left chart) reaches a long-term adoption rate of 45% of the annual eligible market over a period of 20 years. However, the initial year calibration indicates that the program has historically reached 25% of the annual eligible market. The curve (right chart) is reset so that the initial year adoption aligns with recent historical levels and the 45% long-term adoption rate target is reached in a shortened period of nine years.



**FIGURE 3-3: EXAMPLE INITIAL ADOPTION CURVE (LEFT) AND FINAL ADJUSTED ADOPTION CURVE (RIGHT) FOR ESTIMATING MARKET POTENTIAL**

The above example represents measures that are assumed to be replaced-on-burnout and are dependent on an annual turnover rate. Retrofit measures (and early replacement/dual baseline measures) were modeled using a bell-shaped adoption curve. The initial year adoption rate, then, informed whether program opportunities were either increasing over time, or already on the downswing.

### 3.7.2 Historical Program Metrics

The Team reviewed cost data associated with the utilities’ most recently reported program offerings to develop cost-related model inputs. The GDS Team collected various data points including direct and indirect expenditures to establish benchmarking data on each CMUA participating utility’s performance of their DSM programs. The purpose of this step was to understand historical program delivery performance, and to help inform estimates of market potential. Metrics tracked included:

- Gross and Net Energy Savings
- Incentive expenditures as a percentage of incremental measure costs
- Administrative cost (\$ per 1st-year kWh saved)

**Incentives.** Incentive metrics were calculated by program for each CMUA participating based on both (1) an incentive cost per first-year kWh saved as well as (2) the incentive cost as a percent of the measure cost.<sup>18</sup> This allowed the models the flexibility to analyze the market potential using both metrics. For measures that did not map directly to a utility’s existing program offerings, the average incentive by sector and/or end-use was applied to these measures.<sup>19</sup>

The highest observed reported incentive costs per kWh of gross annual savings (i.e., >\$1.00/kWh) were typically found for: miscellaneous residential measures, residential service and domestic hot water measures, residential heat pump measures, residential appliance and plug load measures, residential HVAC cooling measures, other miscellaneous measures.

<sup>18</sup> Dependent on reported data quality.

<sup>19</sup> For utilities with limited program offerings, the GDS Team relied on the average incentives levels by sector and end-use of several neighboring utilities within the SCPPA and NCPA territories.

The lowest incentive costs per kWh of gross annual savings (i.e., <\$0.05/kWh) are for: whole building residential measures, residential outdoor lighting measures, commercial HVAC heat pump measures, industrial HVAC cooling measures, and residential HVAC heating measures.

**Non-Incentive Costs.** Consistent with National Action Plan for Energy Efficiency (NAPEE) guidelines<sup>20</sup>, utility non-incentive costs were also included in the overall assessment of cost-effectiveness in the market potential scenarios. Consistent with the incentive cost benchmarking, non-incentive costs were also developed based on the latest three-year data from found in the participating utilities ESP Platform Tool. Non-incentive costs were calculated for each program by sector on a gross dollars per first-year kWh saved. Where a three year trend was present, GDS applied the latest year \$/kWh to forecasted potential incremental annual savings to develop an estimate of future year non-incentive budgets. If a consistent trend was not present, the average \$/kWh over the last three program years was used.

In general, the highest overhead costs as a function of gross kWh annual savings (i.e., >\$0.50/kWh) are for: residential lighting (outdoor and indoor), indoor industrial lighting, outdoor commercial lighting, residential water pumping and irrigation, and residential appliance and plug load measures.

The lowest overhead costs as a function of gross kWh annual savings (i.e., <\$0.05/kWh) are water pumping and irrigation measures (non-sector-specific), C&S programs (non-sector-specific), commercial appliance and plug load measures, outdoor industrial lighting measures, process industrial measures, commercial heat pump measures, agricultural process measures, and commercial and residential C&S programs.

**Net to Gross (NTG).** All estimates of technical and economic potential, as well as measure level cost-effectiveness screening are conducted in terms of gross savings to reflect the absence of program design considerations in these phases of the analysis. Estimates of market potential were provided at both gross and net levels to the CMUA utilities.

Net energy savings consider free-riders (participants who would have installed the high efficiency option in the absence of the program) and spillover customers (participants who install efficiency measures due to program activities, but never receive a program incentive). Measure net-to-gross ratios were based on the most recent program year data (or prior year data if the program did not exist in the most recent ESP Platform Tool reporting year).

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<sup>20</sup> National Action Plan for Energy Efficiency (2007). Guide for Conducting Energy Efficiency Potential Studies. Prepared by Optimal Energy. This study notes that economic potential only considers the cost of efficiency measures themselves, ignoring programmatic costs. Conversely, achievable (market) potential should consider the non-measures costs of delivering programs. Pg. 2-4.

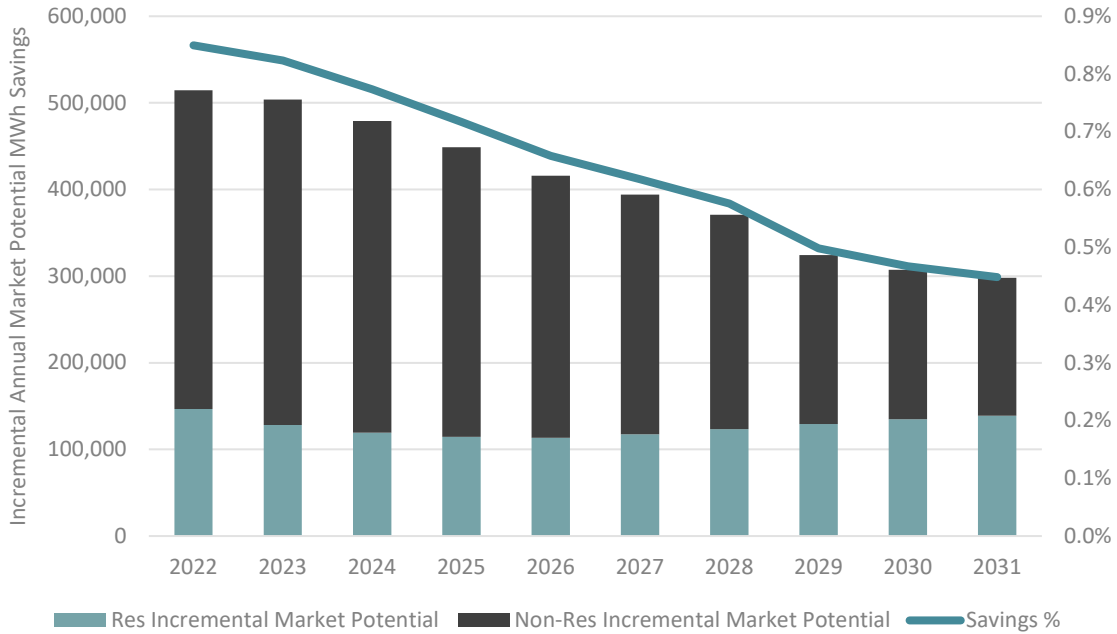
### 3.8 PARTICIPATING UTILITY CUSTOMIZATION

The final step in developing the GDS EE Forecast models for each of the 38 participating utilities were to build customization options into the core models. Based on discussions with the CMUA, the GDS Team included several customization options to refine participating utility EE Forecast estimates based on key decision points indicated by individual utilities. These customization options included:

- The ability to economically screen measures using a benefit-cost ratio above or below the typical threshold of 1.0.
- The ability to perform the economic measure screen using net (in place of gross) impacts and include non-incentive program costs.
- The ability to increase or decrease current historical incentive levels (to impact long-term adoption rate estimates).
- The ability to include/exclude dual baseline/early replacement measure offerings in the model.
- The ability to include/exclude behavior-based savings in the model.
- The ability to change the measure re-engagement assumption.
- The ability to toggle on/off the assumed impacts of COVID-19 on the existing utility sales forecast.
- The ability to increase/decrease the initial year calibration target to reflect potential impacts of COVID-19 forecast.
- The ability to increase/decrease initial assumptions about the saturation of energy efficient equipment (by end-use) based on feedback from individual utilities about their service area.
- The ability to cap excessive year over year growth (or increase the rate of savings decline) in market potential savings and extend the assumed adoption rate curve/eliminate drastic program savings decline.
- Select CMUA participating utilities requested to include the impacts of conservation voltage reduction (CVR) opportunities. For these utilities, GDS added an additional worksheet to include an estimate of future CVR savings based on utility-provided data surrounding estimated impacts and additional system opportunities.
- Claimable savings from C&S was included in the analysis for select participating utilities; the estimates for these savings are not included in the EE Forecast Savings data presented to the Energy Commission for review and adoption.

## 4 Summary of Results

This section of the memo provides an overview of the annual EE targets for all public power utilities included in the study. Figure 4-1 shows the annual market potential in MWh as well as a percentage of forecasted energy sales. The annual savings percentage starts out at 0.85% in 2022 and decreases steadily to 0.45% by 2031. This decrease is largely reflected by the decrease in non-residential sector savings as the opportunities for lighting savings continue to wane.



**FIGURE 4-1. 2022-2031 EE TARGETS FOR ALL CMUA PARTICIPATING UTILITIES (MWH AND % OF FORECASTED SALES)**

Table 4-1 below provides the underlying data in Figure 4-1, as well as 10-yr totals. The total incremental annual market potential is more than 4.1 million MWh. The 10-yr total incremental annual savings as a percentage of sales is 0.64%, with approximately 70% of the savings from the non-residential sector and the remaining 30% from the residential sector.

**TABLE 4-1: 10-YR ANNUAL AND SECTOR-LEVEL AND TOTAL MARKET POTENTIAL**

All Sectors (MWh)	Total Incremental Market Potential	Res Incremental Market Potential	Non-Res Incremental Market Potential	Total Utility Sales (MWh)	Savings %
<b>2022</b>	519,216	146,721	367,990	61,109,304	0.85%
<b>2023</b>	508,470	128,075	375,899	61,749,184	0.82%
<b>2024</b>	483,619	119,258	359,882	62,520,727	0.77%
<b>2025</b>	453,091	114,630	334,011	63,173,208	0.72%
<b>2026</b>	420,210	113,286	302,520	63,814,111	0.66%
<b>2027</b>	398,390	117,412	276,625	64,507,506	0.62%
<b>2028</b>	375,311	123,365	247,645	65,212,875	0.58%
<b>2029</b>	328,701	129,303	195,153	65,950,155	0.50%
<b>2030</b>	311,499	134,717	172,598	66,667,164	0.47%
<b>2031</b>	302,098	138,937	159,033	67,382,982	0.45%
<b>10-yr Target</b>	4,100,606	1,265,703	2,791,357	642,087,217	0.64%

Table 4-2 below provides the incremental annual market potential and 10-yr target for each POU in the study.

**TABLE 4-2: 10-YR ANNUAL AND TOTAL MARKET POTENTIAL FOR EACH POU**

Total Incremental Market Potential (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-yr target
<b>Alameda</b>	1,251	1,243	1,166	1,101	1,024	905	837	695	660	700	9,582
<b>Anaheim</b>	17,825	17,277	15,621	11,732	7,636	7,346	7,363	7,435	7,222	7,264	106,721
<b>Azusa</b>	2,078	1,866	1,688	1,547	1,281	1,033	627	624	657	680	12,080
<b>Banning</b>	202	205	209	215	227	238	247	257	263	267	2,329
<b>Biggs</b>	5	6	7	7	9	10	10	9	9	8	80
<b>Burbank</b>	8,837	9,388	8,868	7,832	7,518	7,188	6,666	6,172	4,447	3,052	69,968
<b>Colton</b>	2,022	1,755	1,827	1,839	1,847	1,858	1,915	1,948	1,986	2,051	19,050
<b>Corona</b>	23	23	23	24	25	27	29	31	32	33	269
<b>Glendale</b>	16,957	17,504	17,686	18,263	18,592	18,648	18,548	18,332	17,866	17,385	179,779
<b>Gridley</b>	90	92	92	92	94	96	96	96	96	95	939
<b>Healdsburg</b>	355	353	327	295	262	195	141	126	109	124	2,288
<b>Imperial</b>	12,450	12,643	12,941	13,156	13,172	13,256	13,098	13,163	13,167	13,468	130,514
<b>LADWP</b>	270,407	261,085	247,448	232,005	212,984	199,959	188,069	154,090	144,404	142,811	2,053,262
<b>Lassen</b>	182	189	201	208	222	240	264	279	291	296	2,373
<b>Lodi</b>	860	909	973	1,055	1,134	1,143	1,298	1,340	1,369	1,379	11,461
<b>Lompoc</b>	217	239	245	252	261	284	286	284	278	270	2,615
<b>Merced</b>	1,433	1,557	1,548	1,525	1,460	1,422	1,041	1,081	1,132	1,174	13,375
<b>Modesto</b>	6,113	6,356	6,370	6,379	6,409	6,351	6,202	6,123	5,686	5,346	61,335
<b>Moreno Valley</b>	791	517	316	321	330	356	378	395	410	415	4,230
<b>Needles</b>	5	6	7	8	9	10	11	11	12	12	90
<b>Palo Alto</b>	4,357	4,501	4,840	5,197	4,037	4,047	4,032	4,419	4,447	4,426	44,302
<b>Pasadena</b>	12,741	12,995	12,686	12,390	11,974	11,566	11,115	10,792	10,573	10,368	117,200
<b>Pittsburg Power</b>	90	84	77	71	65	59	53	48	43	38	627

**CALIFORNIA MUNICIPAL UTILITIES ASSOCIATION** *2020 Energy Efficiency Forecast* April 2021

Total Incremental Market Potential (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-yr target
<b>Plumas-Sierra</b>	59	66	94	123	149	171	188	201	207	212	1,471
<b>Port of Oakland</b>	53	51	49	46	45	43	41	39	37	35	439
<b>Rancho Cucamonga</b>	510	512	484	449	409	370	335	304	258	212	3,843
<b>Redding</b>	1,358	1,305	1,233	1,115	992	755	581	525	439	388	8,690
<b>Riverside</b>	21,383	18,523	16,569	15,551	14,120	13,117	11,694	9,340	8,584	8,394	137,276
<b>Roseville</b>	11,070	11,024	10,240	9,632	9,786	9,881	9,591	9,366	9,172	9,028	98,791
<b>SF PUC</b>	2,875	2,801	2,698	2,616	2,546	2,633	2,479	2,424	2,303	2,064	25,440
<b>Shasta Lake</b>	518	536	518	488	454	421	387	353	320	293	4,288
<b>Silicon Valley</b>	11,584	11,536	11,013	10,604	8,913	7,305	6,651	5,808	5,817	5,372	84,602
<b>SMUD</b>	92,984	93,679	88,453	81,184	78,738	76,056	70,024	61,661	58,390	53,871	755,039
<b>Trinity</b>	1	1	1	1	1	2	2	2	2	2	15
<b>Truckee Donner</b>	606	595	553	514	444	373	327	281	256	247	3,894
<b>Turlock</b>	11,274	11,138	11,078	10,358	10,054	9,728	9,697	9,777	9,688	9,445	102,236
<b>Ukiah</b>	403	404	403	405	413	424	424	425	424	422	4,147
<b>Vernon</b>	5,247	5,504	5,069	4,489	2,575	876	564	446	445	449	25,665
<b>Total</b>	<b>519,216</b>	<b>508,470</b>	<b>483,619</b>	<b>453,091</b>	<b>420,210</b>	<b>398,390</b>	<b>375,311</b>	<b>328,701</b>	<b>311,499</b>	<b>302,098</b>	<b>4,100,303</b>

## APPENDIX - Utility Summary Memorandums

This Appendix contains the summary results of the EE Potential Forecasting Study for each participating POU. The results reported in these Summary Memorandums were calculated pursuant to the methods described above in collaboration with each individual participating POU.



# MEMORANDUM

**TO** Alameda Municipal Power  
**FROM** GDS Associates, Inc.  
**DATE** March 11, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Alameda Municipal Power with the results of the California Municipal Utilities Association (CMUA) Energy Efficiency (EE) Potential Forecasting Study conducted in 2020 by GDS Associates, Inc. (GDS). The results described here are specific to the Alameda service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Alameda as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Alameda energy efficiency program target for the next 10 years (2022 to 2031) is set at 9,582 MWh. This results in an average annual target of 0.26 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

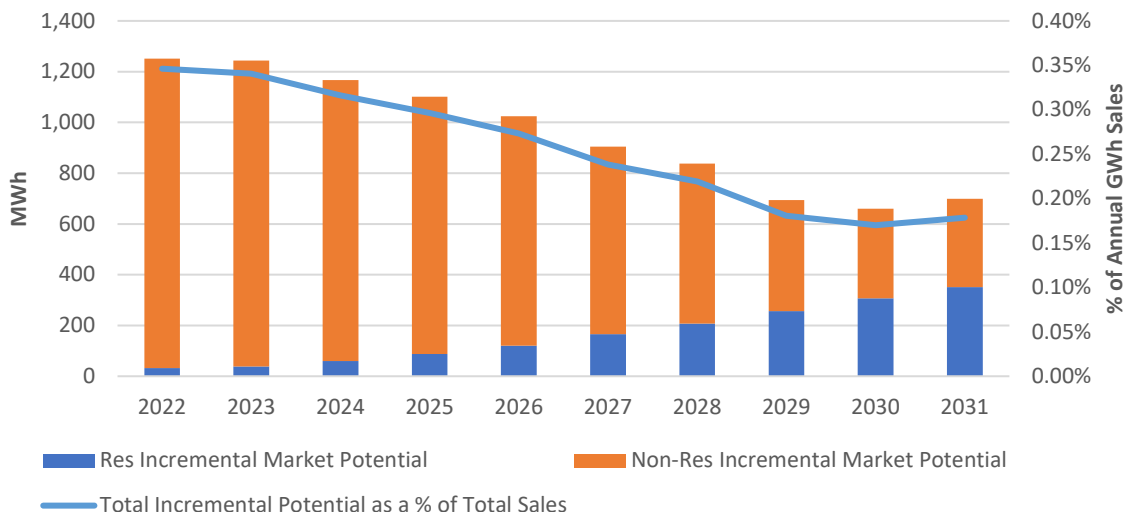


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 660 MWh to 1,251 MWh, which corresponds to 0.17% to 0.35% of forecasting sales.

**TABLE 3 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,251	1,243	1,166	1,101	1,024	905	837	695	660	700
Res Market Potential	32	38	60	87	121	166	208	257	307	351
Non-Res Market Potential	1,219	1,205	1,106	1,014	904	739	630	438	352	348
Total Potential as a % of Total Sales	0.35%	0.34%	0.32%	0.30%	0.27%	0.24%	0.22%	0.18%	0.17%	0.18%
Res Potential as a % of Res Sales	0.02%	0.03%	0.04%	0.06%	0.09%	0.12%	0.14%	0.17%	0.20%	0.23%
Non-Res Potential as a % of Non-Res Sales	0.54%	0.52%	0.47%	0.43%	0.39%	0.31%	0.27%	0.19%	0.15%	0.15%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	290	282	247	215	182	137	103	56	44	49
Res Market Potential	1	2	3	4	6	9	12	17	21	25
Non-Res Market Potential	288	280	244	210	176	128	91	39	23	24

At a glance, Alameda’s results include:

- A 2022-2031 average annual gross savings target of 0.30% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.26% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Alameda with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Anaheim  
**FROM** GDS Associates, Inc.  
**DATE** March 8, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Anaheim with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Anaheim service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the Anaheim as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Anaheim energy efficiency program target for the next 10 years (2022 to 2031) is set at 106,721 MWh. This results in an average annual target of 0.49 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWh) AND PERCENT OF SALES**

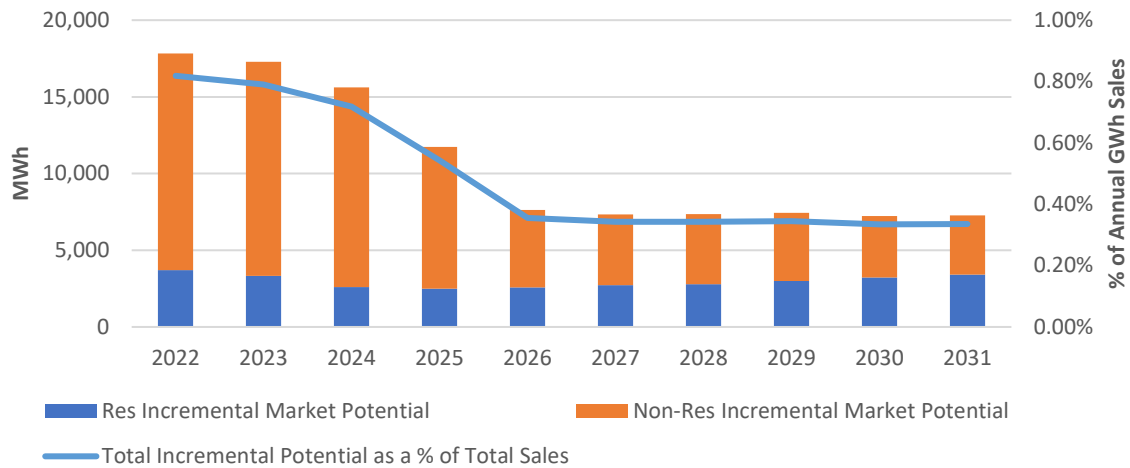


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 7,222 MWh to 17,825 MWh, which corresponds to 0.33% to 0.82% of forecasting sales.

**TABLE 4 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	17,825	17,277	15,621	11,732	7,636	7,346	7,363	7,435	7,222	7,264
Res Market Potential	3,710	3,340	2,603	2,506	2,582	2,721	2,792	2,991	3,226	3,411
Non-Res Market Potential	14,115	13,936	13,018	9,226	5,054	4,624	4,571	4,445	3,996	3,853
Total Potential as a % of Total Sales	0.82%	0.79%	0.72%	0.54%	0.36%	0.34%	0.34%	0.35%	0.33%	0.34%
Res Potential as a % of Res Sales	0.62%	0.56%	0.44%	0.43%	0.44%	0.47%	0.48%	0.51%	0.55%	0.58%
Non-Res Potential as a % of Non-Res Sales	0.90%	0.87%	0.82%	0.59%	0.32%	0.30%	0.29%	0.28%	0.25%	0.24%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	3,467	3,236	2,828	2,265	1,668	1,604	1,384	1,212	1,185	1,197
Res Market Potential	1,478	1,287	1,016	958	932	947	736	580	623	660
Non-Res Market Potential	1,989	1,949	1,812	1,306	736	656	647	631	561	538

At a glance, Anaheim’s results include:

- A 2022-2031 average annual gross savings target of 0.49% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.49% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Anaheim with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program

- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 5 GROSS INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	17,825	17,277	15,621	11,732	7,636	7,346	7,363	7,435	7,222	7,264
Codes & Standards Advocacy	18,026	18,589	17,879	17,374	16,350	15,347	13,929	12,092	10,349	8,901

# MEMORANDUM

**TO** City of Azusa  
**FROM** GDS Associates, Inc.  
**DATE** March 9, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Azusa with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Azusa service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Azusa as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Azusa's energy efficiency program target for the next 10 years (2022 to 2031) is set at 12,080 MWh. This results in an average annual target of 0.47 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

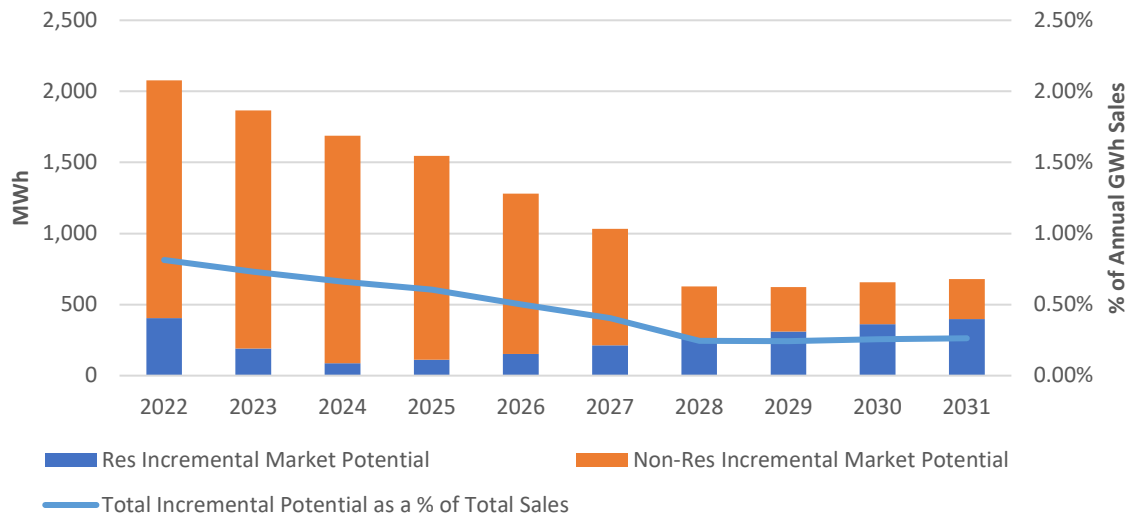


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 624 MWh to 2,078 MWh, which corresponds to 0.24% to 0.81% of forecasting sales.

**TABLE 6 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2,078	1,866	1,688	1,547	1,281	1,033	627	624	657	680
Res Market Potential	404	192	87	113	152	213	258	310	362	398
Non-Res Market Potential	1,674	1,674	1,601	1,435	1,129	819	368	314	295	282
Total Potential as a % of Total Sales	0.81%	0.73%	0.66%	0.60%	0.50%	0.40%	0.24%	0.24%	0.26%	0.26%
Res Potential as a % of Res Sales	0.46%	0.22%	0.10%	0.13%	0.18%	0.25%	0.30%	0.36%	0.42%	0.46%
Non-Res Potential as a % of Non-Res Sales	1.00%	0.99%	0.95%	0.84%	0.66%	0.48%	0.22%	0.18%	0.17%	0.16%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	393	346	317	289	229	174	107	107	111	114
Res Market Potential	71	27	14	17	22	29	38	47	55	63
Non-Res Market Potential	322	319	303	272	207	145	69	60	55	51

At a glance, the City of Azusa’s results include:

- A 2022-2031 average annual gross savings target of 0.52% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.47% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Azusa with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand

- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 7 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	2,078	1,866	1,688	1,547	1,281	1,033	627	624	657	680
Codes & Standards Advocacy	1,819	1,836	1,754	1,704	1,593	1,487	1,337	1,168	995	862

# MEMORANDUM

**TO** City of Banning  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Banning with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Banning service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the City of Banning as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Banning's energy efficiency program target for the next 10 years (2022 to 2031) is set at 2,329 MWh. This results in an average annual target of 0.14 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

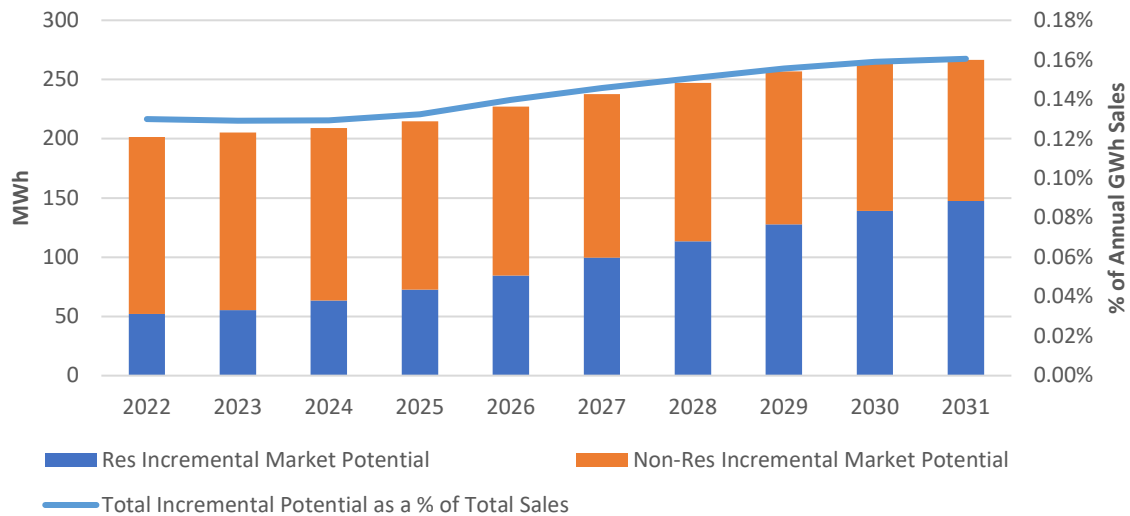


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 202 MWh to 267 MWh, which corresponds to 0.13% to 0.16% of forecasting sales.

**TABLE 8 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	202	205	209	215	227	238	247	257	263	267
Res Market Potential	52	55	63	73	84	100	113	128	139	148
Non-Res Market Potential	149	150	146	142	143	138	134	129	124	119
Total Potential as a % of Total Sales	0.13%	0.13%	0.13%	0.13%	0.14%	0.15%	0.15%	0.16%	0.16%	0.16%
Res Potential as a % of Res Sales	0.06%	0.06%	0.07%	0.08%	0.09%	0.10%	0.12%	0.13%	0.14%	0.15%
Non-Res Potential as a % of Non-Res Sales	0.23%	0.23%	0.22%	0.21%	0.21%	0.21%	0.20%	0.19%	0.18%	0.17%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	44	44	45	46	47	50	53	56	58	60
Res Market Potential	18	19	20	22	24	27	31	35	38	41
Non-Res Market Potential	26	25	24	24	23	23	22	21	20	19

At a glance, Banning’s results include:

- A 2022-2031 average annual gross savings target of 0.19% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.14% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Banning with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Biggs  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Biggs with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Biggs service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the City of Biggs as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Biggs energy efficiency program target for the next 10 years (2022 to 2031) is set at 80 MWh. This results in an average annual target of 0.05 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

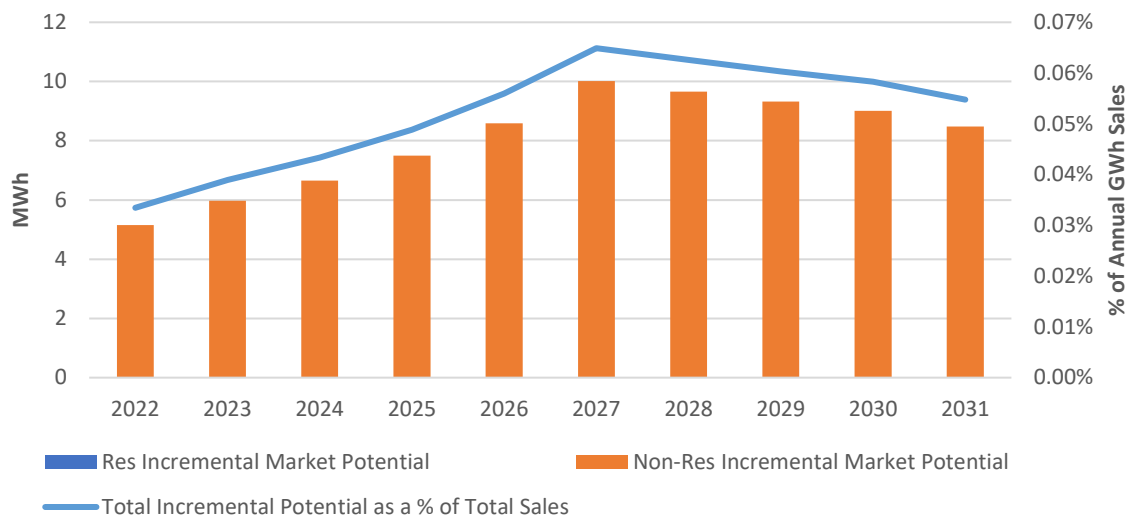


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 5 MWh to 10 MWh, which corresponds to 0.03% to 0.06% of forecasting sales.

**TABLE 9 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	5.2	6.0	6.7	7.5	8.6	10.0	9.7	9.3	9.0	8.5
Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Res Market Potential	5.2	6.0	6.7	7.5	8.6	10.0	9.7	9.3	9.0	8.5
Total Potential as a % of Total Sales	0.03%	0.04%	0.04%	0.05%	0.06%	0.06%	0.06%	0.06%	0.06%	0.05%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.05%	0.06%	0.06%	0.07%	0.08%	0.09%	0.09%	0.09%	0.08%	0.08%
10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	0.92	1.03	1.10	1.19	1.31	1.47	1.42	1.38	1.33	1.22
Res Market Potential	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Res Market Potential	0.92	1.03	1.10	1.19	1.31	1.47	1.42	1.38	1.33	1.22

At a glance, the City of Biggs results include:

- A 2022-2031 average annual gross savings target of 0.05% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.05% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Biggs with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Burbank  
**FROM** GDS Associates, Inc.  
**DATE** February 26, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Burbank with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Burbank service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## BACKGROUND

The energy efficiency forecasting study is performed to address a compliance requirement for the state of California publicly owned utilities. Senate Bill 1037 requires each POU to report annually to its customers and the California Energy Commission on its energy efficiency and demand reduction programs. In accordance with the direction of Assembly Bills 2021 and 2227, and to facilitate the development and implementation of these programs, the POU's conduct these forecasts once every four years to help identify future potential savings opportunities. The results of this study establish for each of the CMUA members their subsequent 10 program targets.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Burbank as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Burbank's energy efficiency program target for the next 10 years (2022 to 2031) is set at 69,968 MWh. This results in an average annual target of 0.61 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

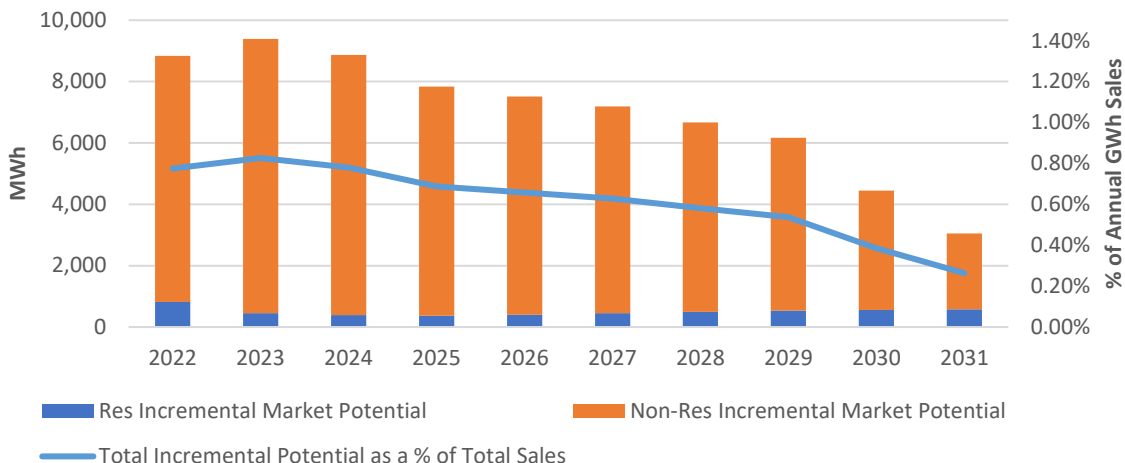


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 3,052 MWh to 9,388 MWh, which corresponds to 0.26% to 0.83% of forecasting sales.

**TABLE 10 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	8,837	9,388	8,868	7,832	7,518	7,188	6,666	6,172	4,447	3,052
Res Market Potential	816	447	393	371	404	450	496	534	561	579
Non-Res Market Potential	8,020	8,940	8,475	7,462	7,114	6,738	6,170	5,639	3,885	2,472
Total Potential as a % of Total Sales	0.78%	0.83%	0.78%	0.69%	0.66%	0.63%	0.58%	0.54%	0.39%	0.26%
Res Potential as a % of Res Sales	0.27%	0.15%	0.13%	0.13%	0.14%	0.15%	0.17%	0.18%	0.19%	0.19%
Non-Res Potential as a % of Non-Res Sales	0.95%	1.06%	1.00%	0.88%	0.84%	0.79%	0.72%	0.66%	0.46%	0.29%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,508	1,604	1,505	1,362	1,299	1,227	1,157	1,091	755	477
Res Market Potential	196	159	133	119	138	158	180	199	217	229
Non-Res Market Potential	1,311	1,444	1,372	1,243	1,161	1,069	978	891	538	248

At a glance, the City of Burbank’s results include:

- A 2022-2031 average annual gross savings target of 0.61% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.61% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided the City of Burbank with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Colton  
**FROM** GDS Associates, Inc.  
**DATE** February 19, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Colton with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Colton service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Colton as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Colton's energy efficiency program target for the next 10 years (2022 to 2031) is set at 19,050 MWh. This results in an average annual target of 0.48 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

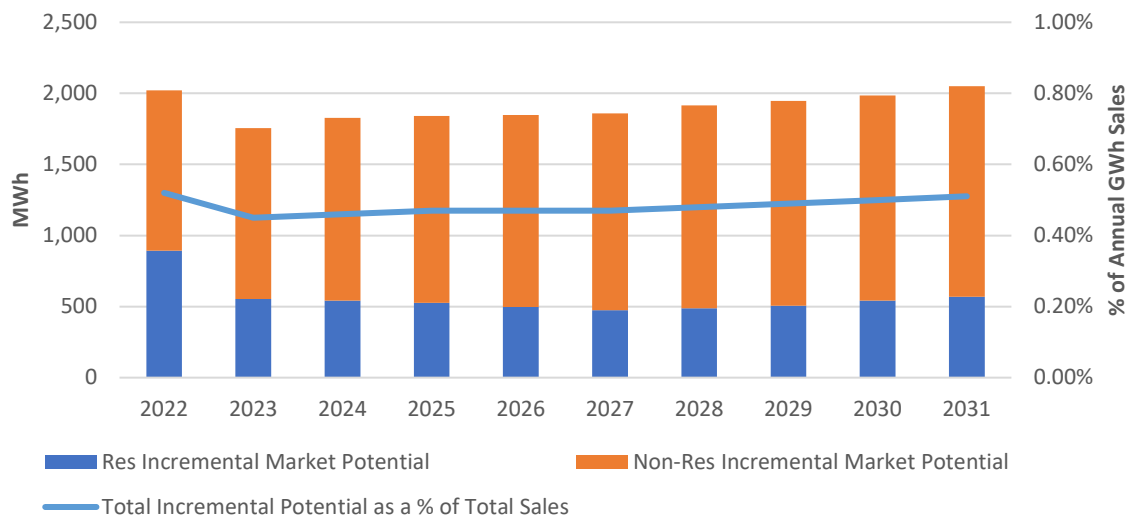


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 1,755 MWh to 2,051 MWh, which corresponds to 0.45% to 0.52% of forecasting sales.

**TABLE 11 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2,022	1,755	1,827	1,839	1,847	1,858	1,915	1,948	1,986	2,051
Res Market Potential	894	553	543	526	497	474	489	506	542	568
Non-Res Market Potential	1,128	1,202	1,285	1,314	1,350	1,384	1,426	1,442	1,444	1,483
Total Potential as a % of Total Sales	0.52%	0.45%	0.46%	0.47%	0.47%	0.47%	0.48%	0.49%	0.50%	0.51%
Res Potential as a % of Res Sales	0.81%	0.50%	0.49%	0.47%	0.45%	0.43%	0.44%	0.45%	0.48%	0.51%
Non-Res Potential as a % of Non-Res Sales	0.40%	0.43%	0.45%	0.46%	0.48%	0.49%	0.50%	0.51%	0.50%	0.52%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	301	281	292	291	293	297	304	309	315	328
Res Market Potential	117	88	90	87	87	90	96	101	108	116
Non-Res Market Potential	184	193	202	203	205	207	208	208	207	212

At a glance, the City of Colton’s results include:

- A 2022-2031 average annual gross savings target of 0.51% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.48% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Colton with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program

- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 12 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	2,022	1,755	1,827	1,839	1,847	1,858	1,915	1,948	1,986	2,051
Codes & Standards Advocacy	2,704	2,770	2,659	2,584	2,426	2,273	2,057	1,789	1,528	1,317

# MEMORANDUM

**TO** City of Corona  
**FROM** GDS Associates, Inc.  
**DATE** March 15, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Corona with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Corona service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the City of Corona as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Corona's energy efficiency program target for the next 10 years (2022 to 2031) is set at 269 MWh. This results in an average annual target of 0.02 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**



Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 23 MWh to 33 MWh, which corresponds to 0.01% to 0.02% of forecasting sales.

**TABLE 13 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	23	23	23	24	25	27	29	31	32	33
Res Market Potential	23	23	23	24	25	27	29	31	32	33
Non-Res Market Potential	0	0	0	0	0	0	0	0	0	0
Total Potential as a % of Total Sales	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%
Res Potential as a % of Res Sales	0.33%	0.34%	0.35%	0.35%	0.37%	0.40%	0.43%	0.45%	0.47%	0.49%
Non-Res Potential as a % of Non-Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	4.0	4.1	4.3	4.5	5.0	5.6	6.4	7.2	8.0	8.6
Res Market Potential	4.0	4.1	4.3	4.5	5.0	5.6	6.4	7.2	8.0	8.6
Non-Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

At a glance, Corona’s results include:

- A 2022-2031 average annual gross savings target of 0.02% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.02% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Corona with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Glendale  
**FROM** GDS Associates, Inc.  
**DATE** February 26, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Glendale with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Glendale service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Glendale as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Glendale's energy efficiency program target for the next 10 years (2022 to 2031) is set at 179,779 MWh. This results in an average annual target of 1.86 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors and conservation voltage reduction (CVR), as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

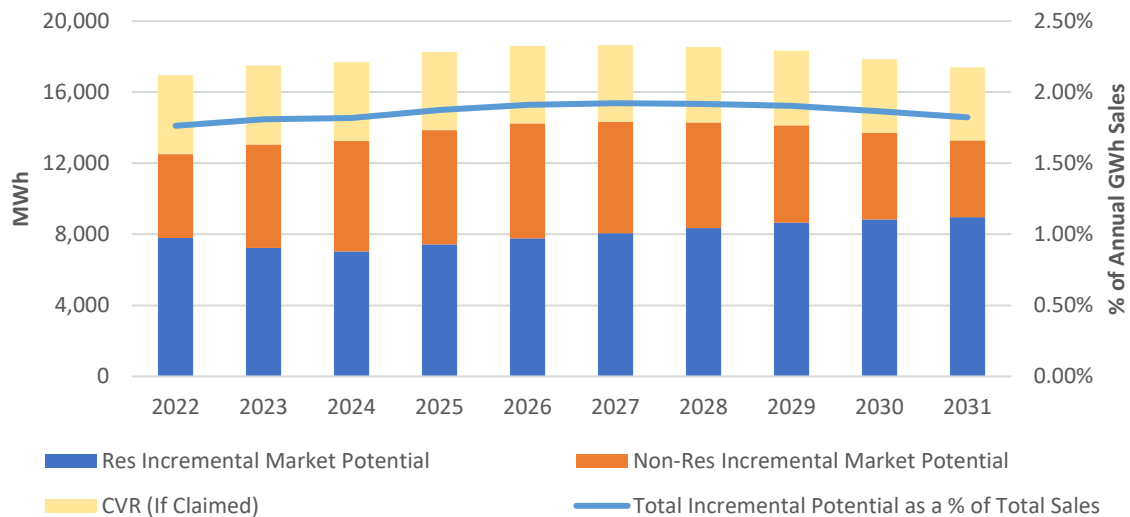


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 16,957 MWh to 18,648 MWh, which corresponds to 1.76% to 1.92% of forecasting sales.

**TABLE 14 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	16,957	17,504	17,686	18,263	18,592	18,648	18,548	18,332	17,866	17,385
Res Market Potential	7,801	7,238	7,034	7,428	7,775	8,055	8,349	8,662	8,830	8,972
Non-Res Market Potential	4,704	5,819	6,220	6,432	6,457	6,282	5,939	5,464	4,888	4,321
CVR Potential	4,453	4,446	4,431	4,403	4,359	4,310	4,260	4,206	4,148	4,092
Total Potential as a % of Total Sales	1.76%	1.81%	1.82%	1.88%	1.91%	1.92%	1.92%	1.90%	1.86%	1.82%
Res Potential as a % of Res Sales	2.05%	1.89%	1.81%	1.89%	1.96%	2.02%	2.08%	2.15%	2.19%	2.23%
Non-Res Potential as a % of Non-Res Sales	0.81%	1.00%	1.07%	1.11%	1.12%	1.10%	1.05%	0.97%	0.88%	0.78%
CVR Potential as a % of Total Sales	0.46%	0.46%	0.46%	0.45%	0.45%	0.44%	0.44%	0.44%	0.43%	0.43%
10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2,847	2,887	2,866	2,919	2,935	2,915	2,881	2,840	2,777	2,736
Res Market Potential	1,243	1,097	1,043	1,104	1,158	1,206	1,255	1,304	1,336	1,372
Non-Res Market Potential	763	908	936	933	907	859	798	727	650	586
CVR Potential	841	882	888	882	870	850	828	809	792	779

At a glance, the City of Glendale’s results include:

- A 2022-2031 average annual gross savings target of 1.89% of forecasted retail sales
- A 2022-2031 average annual net savings target of 1.86% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

## Detailed Results

GDS has provided Glendale with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Gridley  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Gridley with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Gridley service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the City of Gridley as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Gridley's energy efficiency program target for the next 10 years (2022 to 2031) is set at 939 MWh. This results in an average annual target of 0.29 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

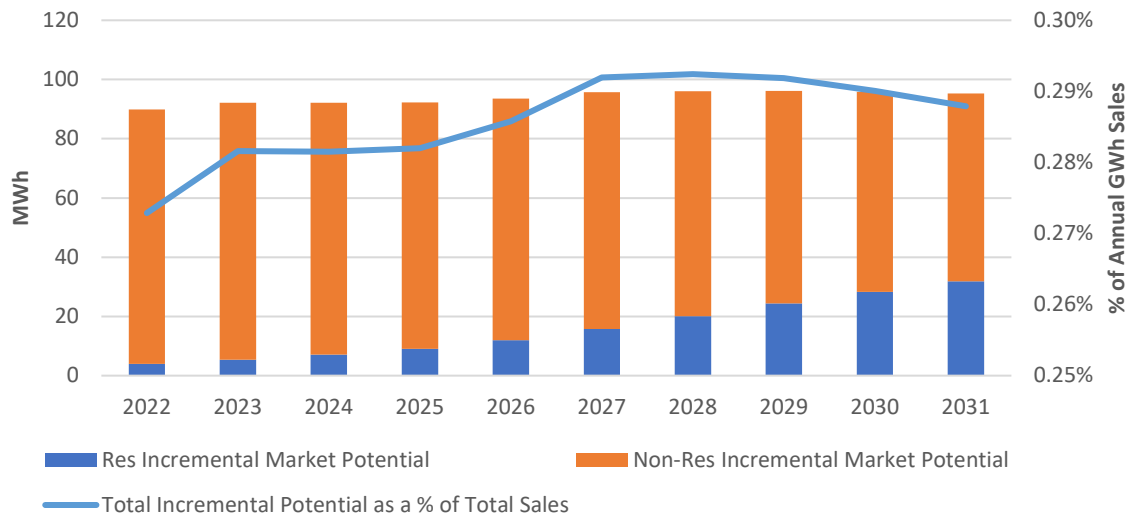


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 90 MWh to 96 MWh, which corresponds to 0.27% to 0.29% of forecasting sales.

**TABLE 15 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	90	92	92	92	94	96	96	96	96	95
Res Market Potential	4	5	7	9	12	16	20	24	28	32
Non-Res Market Potential	86	87	85	83	82	80	76	72	67	63
Total Potential as a % of Total Sales	0.27%	0.28%	0.28%	0.28%	0.29%	0.29%	0.29%	0.29%	0.29%	0.29%
Res Potential as a % of Res Sales	0.03%	0.04%	0.05%	0.06%	0.08%	0.10%	0.13%	0.16%	0.19%	0.21%
Non-Res Potential as a % of Non-Res Sales	0.49%	0.49%	0.48%	0.47%	0.46%	0.45%	0.43%	0.40%	0.38%	0.36%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	19	19	18	18	18	18	18	18	18	19
Res Market Potential	2	2	2	2	3	3	4	5	6	7
Non-Res Market Potential	17	17	16	16	15	15	14	13	12	12

At a glance, Gridley’s results include:

- A 2022-2031 average annual gross savings target of 0.37% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.29% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Gridley with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Healdsburg  
**FROM** GDS Associates, Inc.  
**DATE** March 8, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Healdsburg with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Healdsburg service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the Healdsburg as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Healdsburg's energy efficiency program target for the next 10 years (2022 to 2031) is set at 2,288 MWh. This results in an average annual target of 0.29 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

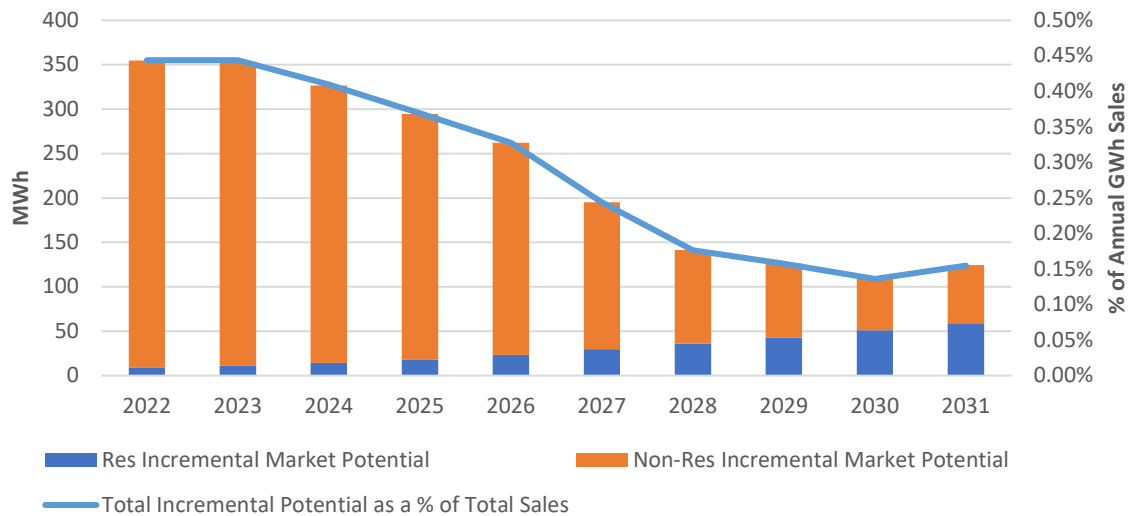


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 109 MWh to 355 MWh, which corresponds to 0.14% to 0.44% of forecasting sales.

**TABLE 16 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	355	353	327	295	262	195	141	126	109	124
Res Market Potential	9	11	14	18	23	30	36	43	51	59
Non-Res Market Potential	345	342	312	276	239	166	105	84	58	65
Total Potential as a % of Total Sales	0.44%	0.44%	0.41%	0.37%	0.33%	0.24%	0.18%	0.16%	0.14%	0.15%
Res Potential as a % of Res Sales	0.03%	0.04%	0.05%	0.06%	0.08%	0.10%	0.12%	0.15%	0.18%	0.20%
Non-Res Potential as a % of Non-Res Sales	0.68%	0.67%	0.61%	0.54%	0.47%	0.32%	0.21%	0.16%	0.11%	0.13%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	68	66	60	53	45	34	24	19	13	16
Res Market Potential	2	2	2	3	3	4	5	5	6	7
Non-Res Market Potential	66	64	57	50	42	30	19	14	7	8

At a glance, Healdsburg’s results include:

- A 2022-2031 average annual gross savings target of 0.32% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.29% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Healdsburg with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Imperial Irrigation District  
**FROM** GDS Associates, Inc.  
**DATE** February 17, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the Imperial Irrigation District with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the IID service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for IID as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Imperial Irrigation District energy efficiency program target for the next 10 years (2022 to 2031) is set at 130,514 MWh. This results in an average annual target of 0.34 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

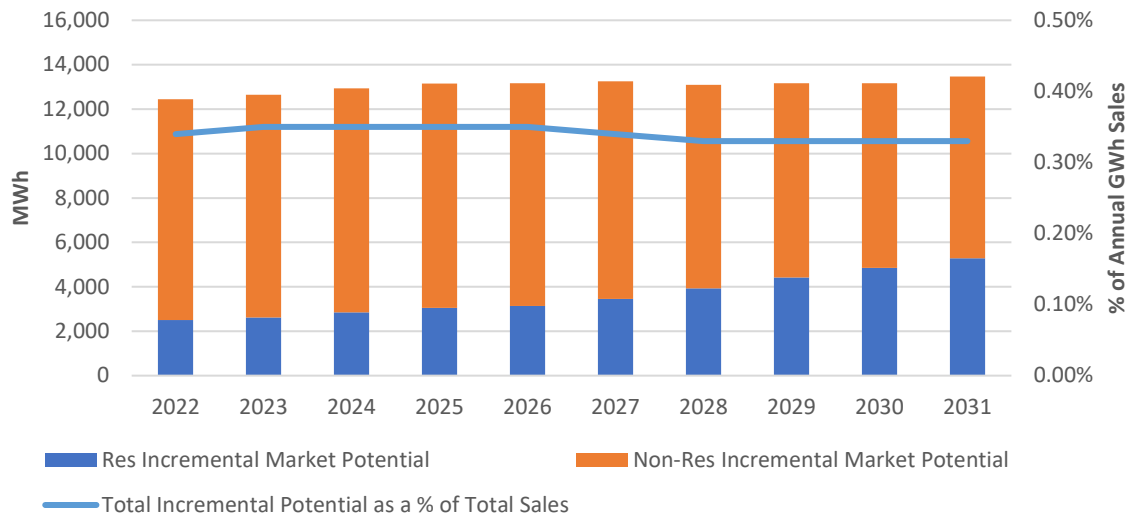


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 12,450 MWh to 13,468 MWh, which corresponds to 0.33% to 0.35% of forecasting sales.

**TABLE 17 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	12,450	12,643	12,941	13,156	13,172	13,256	13,098	13,163	13,167	13,468
Res Market Potential	2,507	2,625	2,852	3,057	3,142	3,453	3,934	4,413	4,858	5,290
Non-Res Market Potential	9,943	10,018	10,089	10,099	10,031	9,803	9,165	8,749	8,309	8,178
Total Potential as a % of Total Sales	0.34%	0.35%	0.35%	0.35%	0.35%	0.34%	0.33%	0.33%	0.33%	0.33%
Res Potential as a % of Res Sales	0.14%	0.14%	0.15%	0.16%	0.16%	0.18%	0.20%	0.22%	0.24%	0.26%
Non-Res Potential as a % of Non-Res Sales	0.55%	0.55%	0.55%	0.54%	0.53%	0.51%	0.47%	0.44%	0.41%	0.40%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,932	1,977	2,049	2,124	2,167	2,240	2,354	2,455	2,543	2,685
Res Market Potential	841	867	910	958	977	1,044	1,157	1,279	1,400	1,533
Non-Res Market Potential	1,091	1,109	1,138	1,167	1,190	1,196	1,197	1,175	1,143	1,152

At a glance, the IID's results include:

- A 2022-2031 average annual gross savings target of 0.39% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.34% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided IID with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings

- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 18 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	12,450	12,643	12,941	13,156	13,172	13,256	13,098	13,163	13,167	13,468
Codes & Standards Advocacy	25,948	25,927	24,777	24,050	22,301	20,651	18,346	16,090	13,553	11,792



Industry Public Utilities  
2020 Energy Efficiency Potential Forecasting Study

## INTRODUCTION

Industry Public Utilities (IPU) was established on February 22, 2001, to serve electric customers that built new facilities located in the designated service territory. In fiscal year 2020 IPU sold 37,800 mega-watt hours (MWh) to 109 customers. The peak demand was 8.4 MW. Industrial and commercial customers consumed 99.6 percent of energy sales. All customers' facilities are in climate zone 9 and meet the 2005, 2008, 2013, 2016 or 2019 California Building Standard Code Title 24 requirements. The recent age of these facilities provides less energy efficiency upgrade opportunities. IPU funds various voluntary customer EE programs (EE Programs), demand side management programs, and research, development and demonstration projects. These programs help customers reduce their electricity use and the utility to achieve its energy efficiency targets and related regulatory requirements.

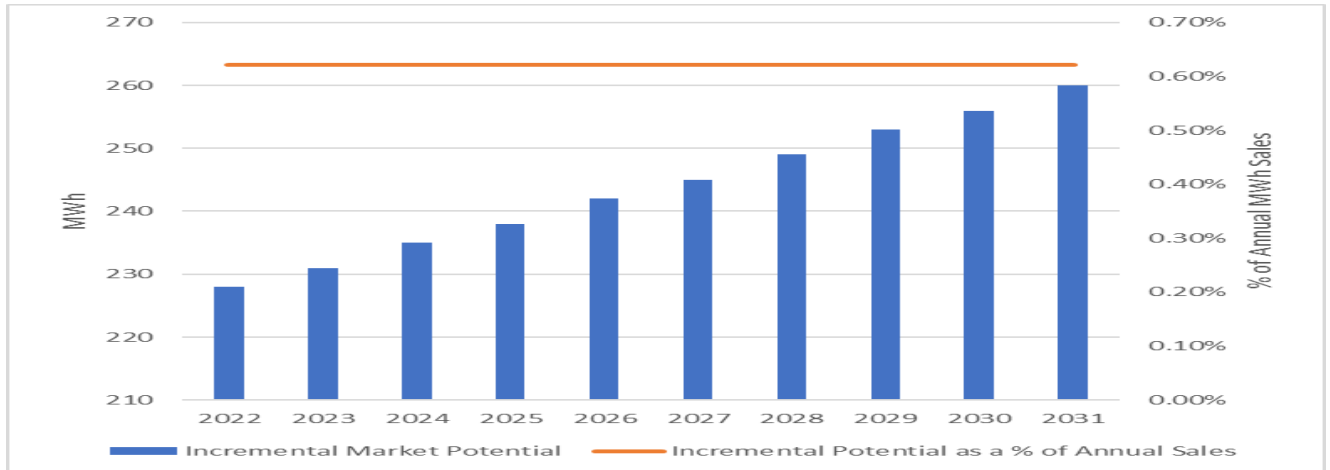
## SUMMARY OF POTENTIAL

In 2019, a customer installed energy efficient LED lighting that reduced their consumption and peak demand by 367 MWh per year (0.97% of IPU's recorded sales) and 64 kW (0.76% of IPU's recorded peak demand) respectfully. The customer received \$25,000.00 in incentive payments from IPU's Energy Efficiency Program, and the net-present value of the customer's investment was \$146,400.

Forecasted potential annual energy savings are based upon current customer inquiries and engineering analysis programs. As mentioned before, EE Programs have been in effect for two years and average annual energy consumption reduction is 0.485% and peak demand reduction is 0.38%. Based on the recent customers inquiries, it is anticipated that the average annual energy consumption reduction will be 25 percent more than that and 0.62% for the next ten years. The same is true for the peak demand reduction and it is estimated that the peak demand reduction will be almost double and 0.76%. It is a forecast based on the limited data. These annual energy efficiency and demand reduction goals provide a roadmap for IPU to develop strategies and programs for planning and modification purposes.

IPU's energy efficiency program target for the next 10 years (2022 to 2031) is 2,437 MWh. The average annual energy efficiency target is 0.62% of the cumulative forecasted energy sales. Figure 1 provides the forecasted annual net incremental energy efficiency market potential and the percentage of that total to annual sales for the 10-year period of 2022 to 2031.

FIGURE 1. FORECASTED NET INCREMENTAL MARKET POTENTIAL (MWh) AND PERCENT OF ANNUAL SALES



Forecasted potential annual demand reduction is based upon current customer inquiries and engineering analysis programs. IPU's demand reduction program target for the next 10 years (2022 to 2031) is 665 kW. The average annual demand reduction is 0.76% of the cumulative forecasted peak demand. Figure 2 provides the forecasted annual net incremental demand reduction market potential and the percentage of that total to the annual peak demand for the 10-year period of 2022 to 2031.

FIGURE 2. FORECASTED NET INCREMENTAL MARKET POTENTIAL (kW) AND PERCENT OF PEAK DEMAND



Table 1 includes the specific inputs used to create Figure 1. The annual energy impact is provided. The energy impacts are shown as a percentage of forecasted annual sales. Incremental annual savings range from 228 MWh to 260 MWh, which corresponds to 0.62% of forecasted annual sales. The cumulative net incremental annual energy savings is 2,437 MWh for the 10-year period of 2022 to 2031.

**TABLE 19 FORECASTED NET INCREMENTAL MARKET POTENTIAL – ENERGY**

	10 Year Energy Goals (incremental New MWh)									
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Potential (MWh)	228	231	235	238	242	245	249	253	256	260
Potential as a % of Total Sales	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%	0.62%

Table 2 includes the specific inputs used to create Figure 2. The annual demand impact is provided. The demand impacts are shown as a percentage of forecasted annual peak demand. Incremental annual savings range from 62 kW to 71 kW, which corresponds to 0.76% of the forecasted annual peak demand. The cumulative net incremental annual demand savings is 665 kW for the 10 year period of 2022 to 2031.

**TABLE 2 FORECASTED NET INCREMENTAL MARKET POTENTIAL – DEMAND**

	10 Year Demand Goals (Incremental kW)									
	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Potential (kW)	62	63	64	65	66	67	68	69	70	71
Potential as a % of Peak Demand	0.76%	0.76%	0.76%	0.76%	0.76%	0.76%	0.76%	0.76%	0.76%	0.76%

# MEMORANDUM

**TO** City of Lassen  
**FROM** GDS Associates, Inc.  
**DATE** March 15, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Lassen with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Lassen service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Lassen as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Lassen's energy efficiency program target for the next 10 years (2022 to 2031) is set at 2,373 MWh. This results in an average annual target of 0.19 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

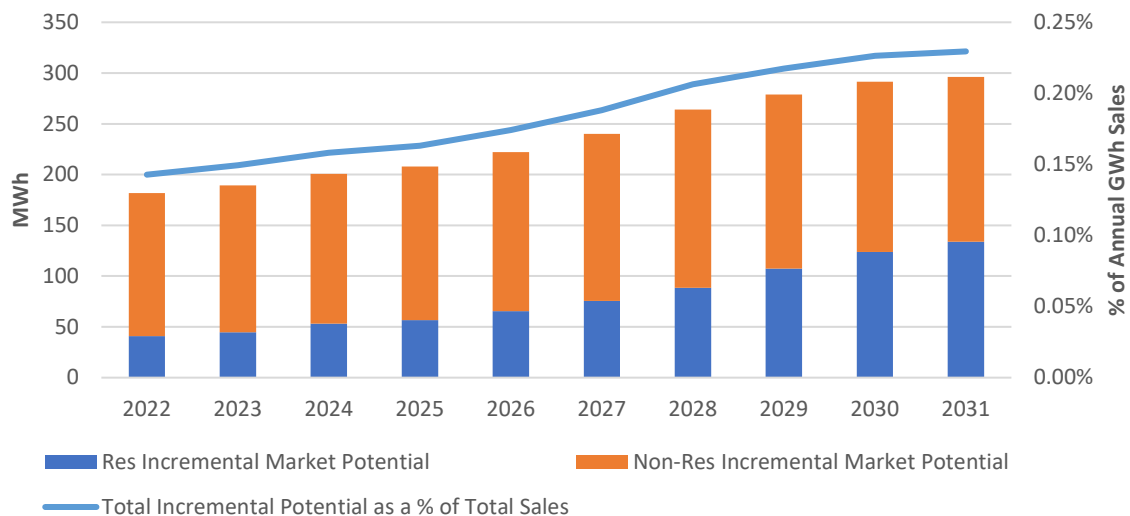


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 182 MWh to 296 MWh, which corresponds to 0.14% to 0.23% of forecasting sales.

**TABLE 20 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	182	189	201	208	222	240	264	279	291	296
Res Market Potential	41	45	53	57	65	76	88	107	124	134
Non-Res Market Potential	141	145	148	151	157	165	176	172	168	162
Total Potential as a % of Total Sales	0.14%	0.15%	0.16%	0.16%	0.17%	0.19%	0.21%	0.22%	0.23%	0.23%
Res Potential as a % of Res Sales	0.06%	0.06%	0.07%	0.08%	0.09%	0.10%	0.12%	0.15%	0.17%	0.18%
Non-Res Potential as a % of Non-Res Sales	0.26%	0.26%	0.27%	0.28%	0.29%	0.30%	0.32%	0.31%	0.30%	0.29%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	29	30	30	31	33	35	37	37	38	38
Res Market Potential	2	3	3	4	5	7	8	9	11	12
Non-Res Market Potential	27	27	27	27	27	28	29	28	27	26

At a glance, Lassen’s results include:

- A 2022-2031 average annual gross savings target of 0.23% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.19% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Lassen with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Lodi Electric Utility  
**FROM** GDS Associates, Inc.  
**DATE** March 5, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Lodi Electric Utility with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Lodi service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Lodi Electric Utility as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Lodi's energy efficiency program target for the next 10 years (2022 to 2031) is set at 11,461 MWh. This results in an average annual target of 0.27 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

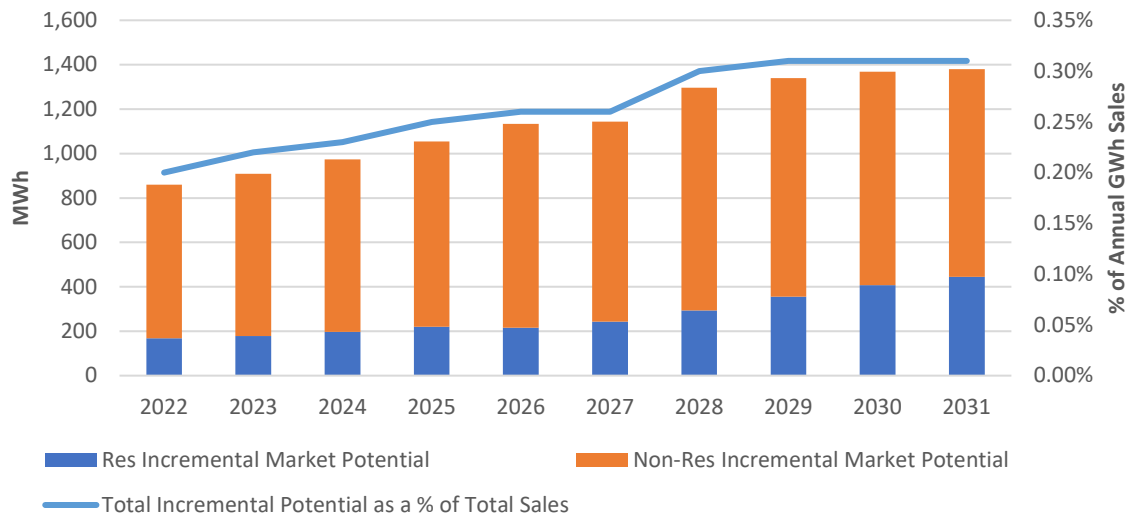


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 860 MWh to 1,379 MWh, which corresponds to 0.20% to 0.31% of forecasting sales.

**TABLE 21 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	860	909	973	1,055	1,134	1,143	1,298	1,340	1,369	1,379
Res Market Potential	168	178	197	220	216	243	293	355	407	445
Non-Res Market Potential	692	731	777	835	918	901	1,004	985	962	935
Total Potential as a % of Total Sales	0.20%	0.22%	0.23%	0.25%	0.26%	0.26%	0.30%	0.31%	0.31%	0.31%
Res Potential as a % of Res Sales	0.11%	0.12%	0.13%	0.14%	0.14%	0.15%	0.19%	0.22%	0.26%	0.28%
Non-Res Potential as a % of Non-Res Sales	0.26%	0.27%	0.29%	0.31%	0.34%	0.33%	0.36%	0.36%	0.34%	0.33%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	153	159	164	172	182	183	201	206	209	210
Res Market Potential	31	32	31	34	33	37	44	52	59	65
Non-Res Market Potential	122	127	133	139	148	146	157	154	150	145

At a glance, Lodi Electric Utility’s results include:

- A 2022-2031 average annual gross savings target of 0.34% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.27% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Lodi with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Lompoc  
**FROM** GDS Associates, Inc.  
**DATE** March 5, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Lompoc with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Lompoc service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the Lompoc as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Lompoc’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 2,615 MWh. This results in an average annual target of 0.20 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

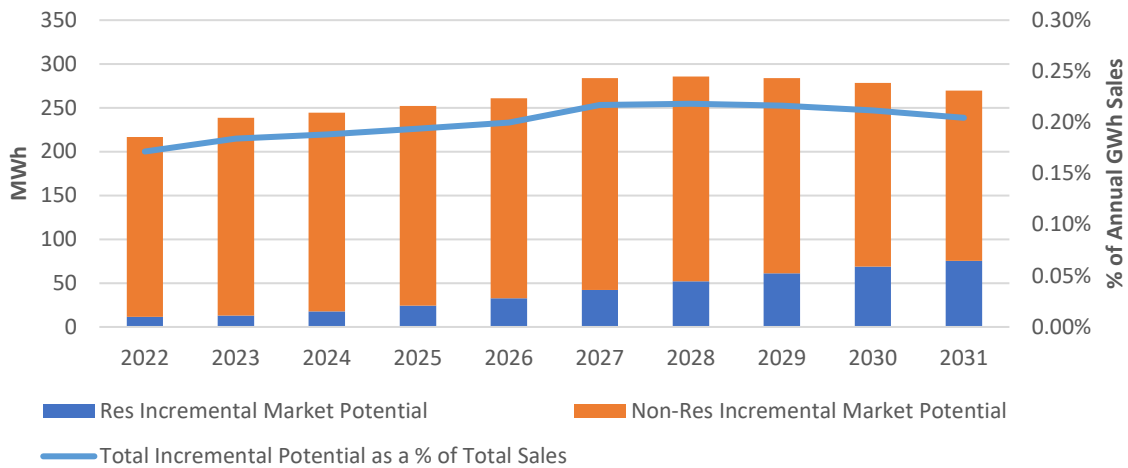


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 217 MWh to 286 MWh, which corresponds to 0.17% to 0.22% of forecasting sales.

**TABLE 22 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	217	239	245	252	261	284	286	284	278	270
Res Market Potential	12	13	18	24	33	42	52	61	69	75
Non-Res Market Potential	205	226	227	228	228	241	234	223	209	194
Total Potential as a % of Total Sales	0.17%	0.18%	0.19%	0.19%	0.20%	0.22%	0.22%	0.22%	0.21%	0.20%
Res Potential as a % of Res Sales	0.02%	0.02%	0.03%	0.04%	0.05%	0.07%	0.09%	0.10%	0.11%	0.12%
Non-Res Potential as a % of Non-Res Sales	0.30%	0.32%	0.33%	0.33%	0.33%	0.35%	0.33%	0.32%	0.30%	0.28%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	32	34	34	34	35	37	36	36	35	34
Res Market Potential	1	1	2	2	3	3	4	5	6	7
Non-Res Market Potential	31	33	32	32	32	33	32	31	29	27

At a glance, the City of Lompoc’s results include:

- A 2022-2031 average annual gross savings target of 0.20% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.16% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided the City of Lompoc with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# Los Angeles Department of Water and Power

## INTRODUCTION

This summary report provides the Los Angeles Department of Water and Power (LADWP) with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the LADWP service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This report provides a summary of potential and a description of the data provided in a detailed results spreadsheet file. As with all projections, forecasting 10 years ahead in a highly variable area like Energy Efficiency requires acknowledging the inability to do so accurately for a variety of reasons. The following projections are presented as the best snapshot of information currently available. More information will become clearer as time progresses, and LADWP intends to make continuous course-corrections and adjustments to its targets as newly informed. As such, all projections in this report as of the time of submission have not been approved by LADWP’s Board of Commissioners and may be subject to change.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the LADWP as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The LADWP energy efficiency portfolio cumulative projection for the next 10 years (2022 to 2031) is tentatively set at 3,811,786 MWh (inclusive of C&S). This results in an average annual potential of 1.69 percent (with C&S) and 1.03% (without C&S) of total projected energy sales. Figure 1 provides the market potential for the residential, non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

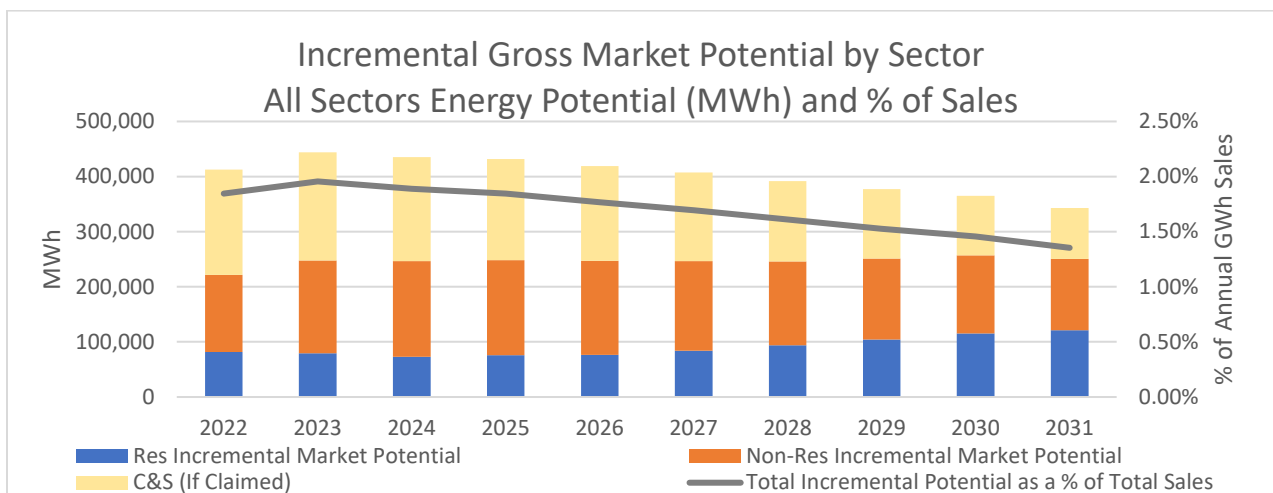


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The summary of potential described above represents the program results. GDS also produced estimates of savings projections for C&S. Table 1 below also provides the estimate of C&S savings.

**TABLE 23 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Projections (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	412,528	443,806	435,314	431,811	418,841	407,303	391,486	377,236	364,769	343,023
Res Market Potential	81,524	79,542	72,966	75,587	76,566	83,819	93,675	104,458	115,589	120,955
Non-Res Market Potential	140,312	168,308	173,757	173,029	170,466	162,715	152,599	146,551	141,612	129,424
Codes & Standards	190,691	195,957	188,591	183,195	171,809	160,770	145,212	126,227	107,568	92,644
Total Potential as a % of Total Sales	1.85%	1.96%	1.89%	1.85%	1.77%	1.69%	1.61%	1.53%	1.46%	1.35%
Res Potential as a % of Res Sales	0.98%	0.96%	0.87%	0.89%	0.89%	0.97%	1.07%	1.18%	1.29%	1.34%
Non-Res Potential as a % of Non-Res Sales	1.00%	1.17%	1.19%	1.16%	1.13%	1.06%	0.98%	0.92%	0.88%	0.79%
Codes & Standards as a % of Total Sales	0.85%	0.86%	0.82%	0.78%	0.72%	0.67%	0.60%	0.51%	0.43%	0.37%

10 Year Demand Projections (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	140,350	147,032	144,676	139,910	133,886	145,110	137,777	131,531	124,061	116,983
Res Market Potential	74,917	74,927	73,919	71,584	69,368	84,793	82,745	80,180	77,052	73,896
Non-Res Market Potential	25,949	30,568	30,505	29,268	27,717	25,648	23,549	22,683	21,177	19,665
Codes & Standards	39,485	41,536	40,253	39,058	36,802	34,669	31,483	28,668	25,832	23,423

At a glance, LADWP's results include:

- A 2022-2031 average annual gross savings potential of 1.69% (with C&S) of forecasted retail sales
- A 2022-2031 cumulative gross savings projections of 15% (with C&S) of forecasted retail sales.
- Increase of existing incentives and cost caps for program consideration
- 25% downward adjustment of program ramp up due to Covid 19 impact considerations

### Detailed Results

GDS has provided LADWP with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list
- Setting of incentive rates and cost caps
- Estimated budgets for expenditures to achieve projected potentials.

# MEMORANDUM

**TO** Merced Irrigation District  
**FROM** GDS Associates, Inc.  
**DATE** March 15, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Merced Irrigation District with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Merced service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Merced Irrigation District as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Merced energy efficiency program target for the next 10 years (2022 to 2031) is set at 13,375 MWh. This results in an average annual target of 0.25 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

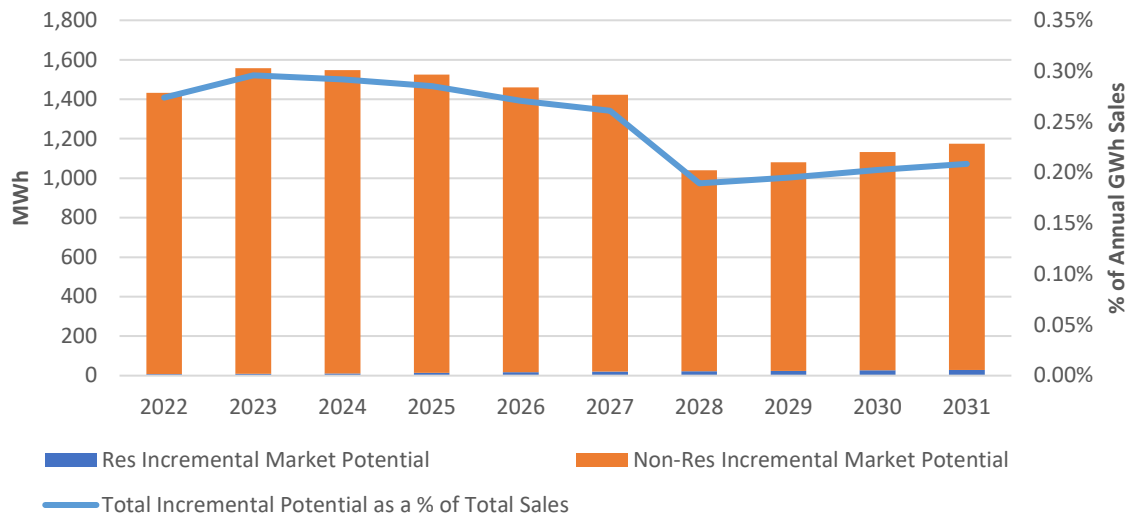


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 1,041 MWh to 1,557 MWh, which corresponds to 0.19% to 0.30% of forecasting sales.

**TABLE 24 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,433	1,557	1,548	1,525	1,460	1,422	1,041	1,081	1,132	1,174
Res Market Potential	7	9	11	14	18	21	23	24	27	29
Non-Res Market Potential	1,426	1,549	1,537	1,511	1,442	1,401	1,018	1,056	1,105	1,146
Total Potential as a % of Total Sales	0.27%	0.30%	0.29%	0.29%	0.27%	0.26%	0.19%	0.20%	0.20%	0.21%
Res Potential as a % of Res Sales	0.01%	0.01%	0.02%	0.02%	0.03%	0.03%	0.04%	0.04%	0.04%	0.05%
Non-Res Potential as a % of Non-Res Sales	0.31%	0.33%	0.33%	0.32%	0.30%	0.29%	0.21%	0.21%	0.22%	0.23%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	198	219	209	198	184	172	122	118	117	120
Res Market Potential	0	0	0	0	1	1	2	2	2	2
Non-Res Market Potential	198	218	208	198	184	171	121	116	115	118

At a glance, Merced’s results include:

- A 2022-2031 average annual gross savings target of 0.28% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.25% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Merced with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Modesto Irrigation District  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Modesto Irrigation District with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Modesto service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Modesto Irrigation District as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Modesto energy efficiency program target for the next 10 years (2022 to 2031) is set at 61,335 MWh. This results in an average annual target of 0.23 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

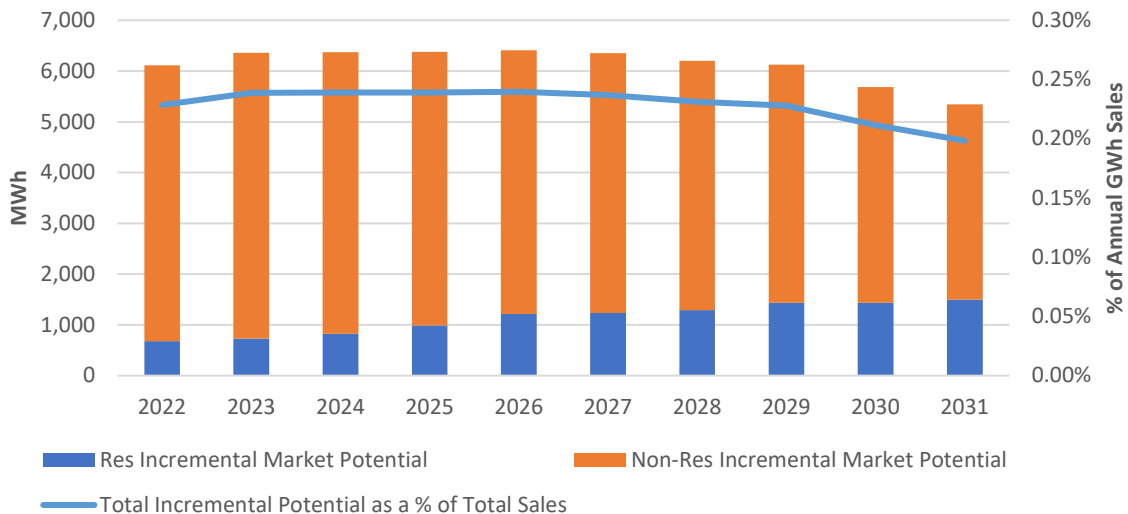


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 5,346 MWh to 6,409 MWh, which corresponds to 0.20% to 0.24% of forecasting sales.

**TABLE 25 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	6,113	6,356	6,370	6,379	6,409	6,351	6,202	6,123	5,686	5,346
Res Market Potential	680	730	822	990	1,215	1,235	1,290	1,436	1,436	1,502
Non-Res Market Potential	5,433	5,626	5,547	5,389	5,193	5,116	4,912	4,687	4,250	3,845
Total Potential as a % of Total Sales	0.23%	0.24%	0.24%	0.24%	0.24%	0.24%	0.23%	0.23%	0.21%	0.20%
Res Potential as a % of Res Sales	0.08%	0.08%	0.09%	0.11%	0.14%	0.14%	0.15%	0.16%	0.16%	0.17%
Non-Res Potential as a % of Non-Res Sales	0.30%	0.31%	0.31%	0.30%	0.29%	0.28%	0.27%	0.26%	0.23%	0.21%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	937	955	939	924	916	914	918	901	867	842
Res Market Potential	182	191	192	205	229	258	291	325	348	370
Non-Res Market Potential	755	764	746	718	687	656	627	576	519	472

At a glance, Modesto’s results include:

- A 2022-2031 average annual gross savings target of 0.27% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.23% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Modesto with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Moreno Valley  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Moreno Valley with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Moreno Valley service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Moreno Valley as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Moreno Valley's energy efficiency program target for the next 10 years (2022 to 2031) is set at 4,230 MWh. This results in an average annual target of 0.18 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

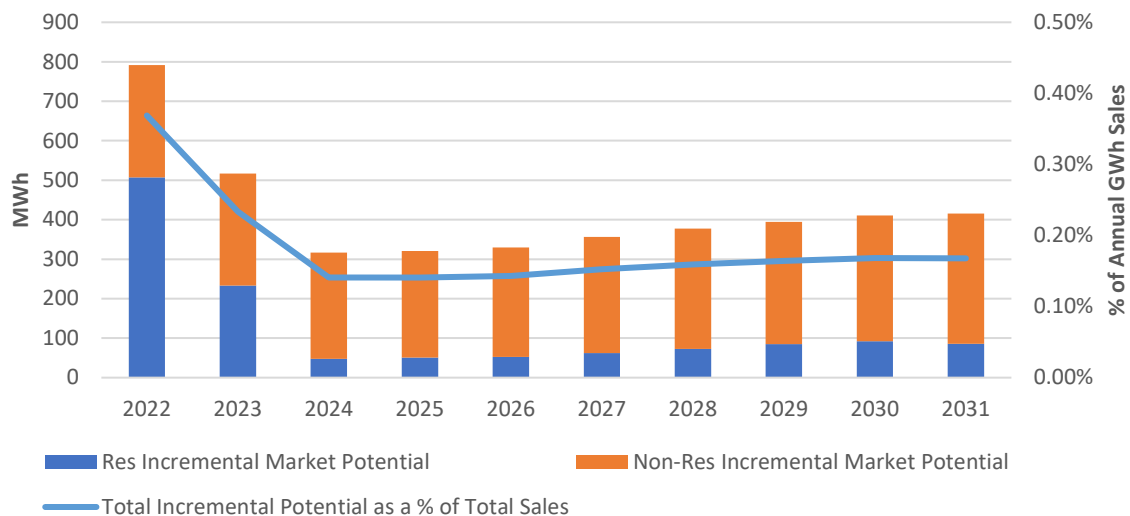


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 316 MWh to 791 MWh, which corresponds to 0.14% to 0.37% of forecasting sales.

**TABLE 26 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	791	517	316	321	330	356	378	395	410	415
Res Market Potential	507	233	47	51	52	62	73	85	92	86
Non-Res Market Potential	284	284	269	270	277	294	305	310	319	330
Total Potential as a % of Total Sales	0.37%	0.23%	0.14%	0.14%	0.14%	0.15%	0.16%	0.16%	0.17%	0.17%
Res Potential as a % of Res Sales	1.12%	0.51%	0.10%	0.11%	0.11%	0.13%	0.15%	0.17%	0.18%	0.17%
Non-Res Potential as a % of Non-Res Sales	0.17%	0.16%	0.15%	0.15%	0.15%	0.16%	0.16%	0.16%	0.16%	0.17%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	595	397	69	68	61	64	65	65	65	63
Res Market Potential	536	338	14	14	7	8	9	10	11	10
Non-Res Market Potential	60	59	55	54	54	56	56	55	54	53

At a glance, the City of Moreno Valley’s results include:

- A 2022-2031 average annual gross savings target of 0.21% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.18% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Moreno Valley with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program

- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 27 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	791	517	316	321	330	356	378	395	410	415
Codes & Standards Advocacy	1,784	1,868	1,807	1,756	1,658	1,562	1,424	1,231	1,056	904

# MEMORANDUM

**TO** City of Needles  
**FROM** GDS Associates, Inc.  
**DATE** February 16, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Needles with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Needles service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Needles as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Needles energy efficiency program target for the next 10 years (2022 to 2031) is set at 90 MWh. This results in an average annual target of 0.02 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

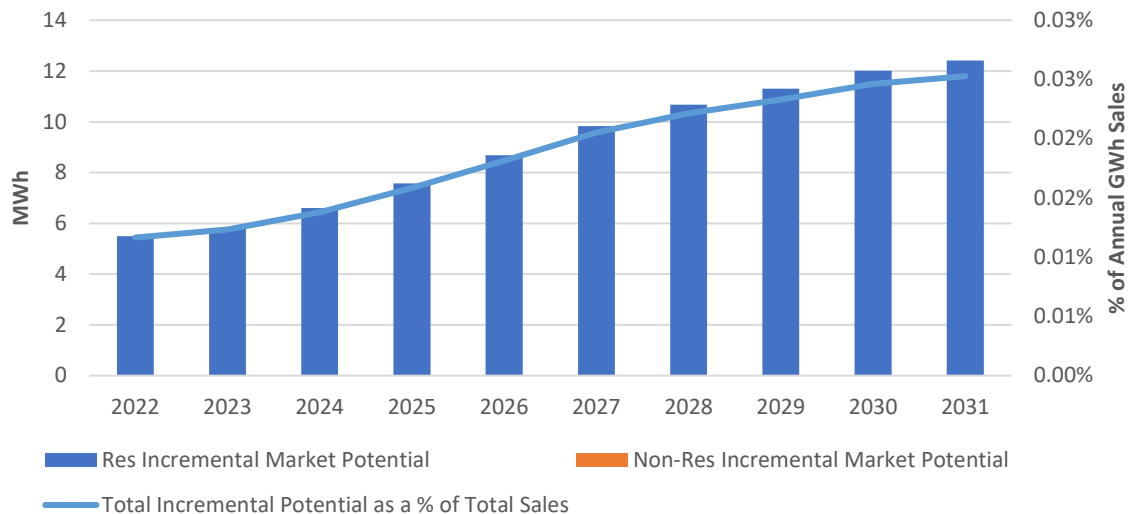


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 5 MWh to 12 MWh, which corresponds to 0.01% to 0.03% of forecasting sales.

**TABLE 28 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	5.5	5.8	6.6	7.6	8.7	9.8	10.7	11.3	12.0	12.4
Res Market Potential	5.5	5.8	6.6	7.6	8.7	9.8	10.7	11.3	12.0	12.4
Non-Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Potential as a % of Total Sales	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.03%
Res Potential as a % of Res Sales	0.09%	0.10%	0.11%	0.13%	0.15%	0.17%	0.18%	0.19%	0.20%	0.21%
Non-Res Potential as a % of Non-Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2.6	2.7	2.8	2.9	3.1	3.5	3.9	4.3	4.7	4.9
Res Market Potential	2.6	2.7	2.8	2.9	3.1	3.5	3.9	4.3	4.7	4.9
Non-Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

At a glance, the City of Needles results include:

- A 2022-2031 average annual gross savings target of 0.02% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.02% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Needles with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Palo Alto  
**FROM** GDS Associates, Inc.  
**DATE** March 10, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Palo Alto with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Palo Alto service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Palo Alto as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Palo Alto's energy efficiency program target for the next 10 years (2022 to 2031) is set at 44,302 MWh. This results in an average annual target of 0.51 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

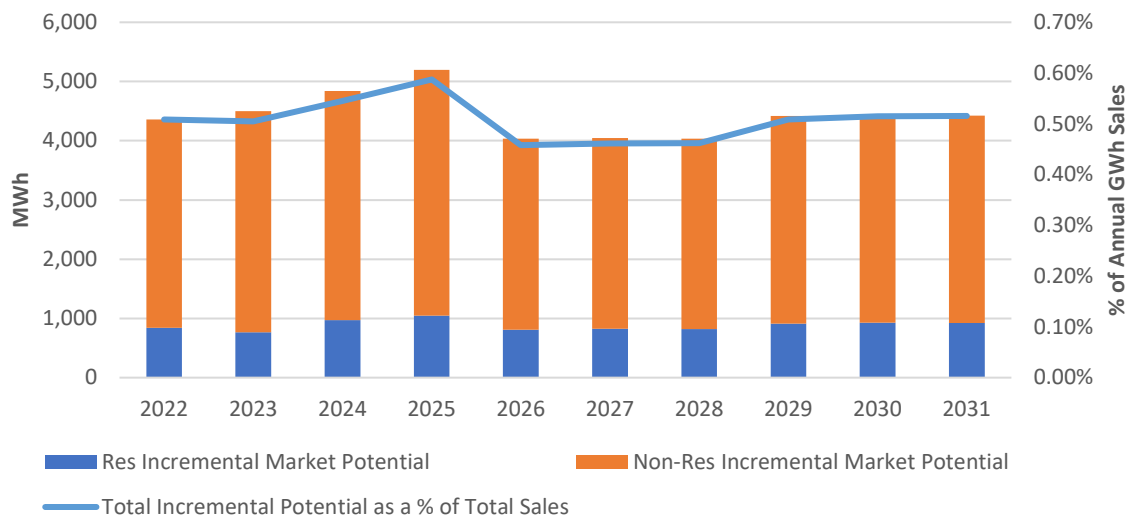


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 4,032 MWh to 4,430 MWh, which corresponds to 0.46% to 0.59% of forecasting sales.

**TABLE 29 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	4,357	4,501	4,840	5,197	4,037	4,047	4,032	4,419	4,447	4,426
Res Market Potential	840	766	969	1,048	807	827	820	911	927	922
Non-Res Market Potential	3,517	3,735	3,871	4,149	3,230	3,220	3,212	3,507	3,519	3,503
Total Potential as a % of Total Sales	0.51%	0.50%	0.54%	0.59%	0.46%	0.46%	0.46%	0.51%	0.51%	0.52%
Res Potential as a % of Res Sales	0.61%	0.54%	0.69%	0.75%	0.58%	0.60%	0.59%	0.66%	0.68%	0.68%
Non-Res Potential as a % of Non-Res Sales	0.49%	0.50%	0.52%	0.56%	0.44%	0.44%	0.44%	0.48%	0.48%	0.48%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	714	750	793	846	649	652	643	700	700	690
Res Market Potential	101	97	123	132	102	104	102	113	116	115
Non-Res Market Potential	613	653	670	714	548	548	541	586	584	575

At a glance, Palo Alto’s results include:

- A 2022-2031 average annual gross savings target of 0.59% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.51% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Palo Alto with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

## Conservation Voltage Reduction

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for conservation voltage reduction (CVR). Table 2 below provides the base market potential and the estimate of CVR savings. The CVR estimates are considered as secondary to the base market potential.

**TABLE 30 NET INCREMENTAL MARKET POTENTIAL– BASE AND CVR**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	4,357	4,501	4,840	5,197	4,037	4,047	4,032	4,419	4,447	4,426
Conservation Voltage Reduction	0	0	0	0	2,577	2,553	2,529	2,504	2,477	2,451

# MEMORANDUM

**TO** City of Pasadena  
**FROM** GDS Associates, Inc.  
**DATE** March 8, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Pasadena with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Pasadena service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Pasadena as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Pasadena's energy efficiency program target for the next 10 years (2022 to 2031) is set at 117,200 MWh. This results in an average annual target of 1.06 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

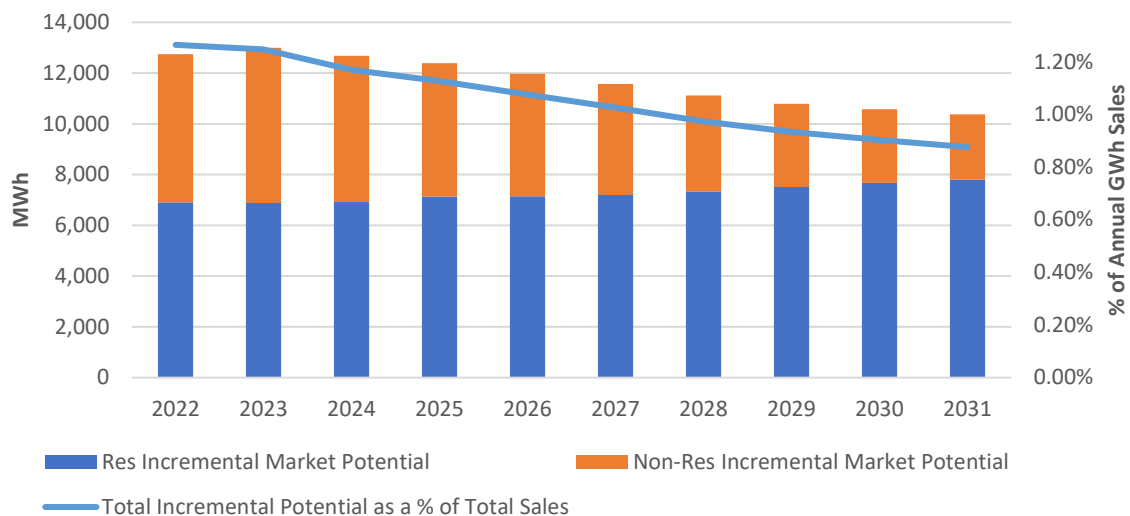


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 10,368 MWh to 12,995 MWh, which corresponds to 0.88% to 1.26% of forecasting sales.<sup>21</sup>

**TABLE 31 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	12,741	12,995	12,686	12,390	11,974	11,566	11,115	10,792	10,573	10,368
Res Market Potential	6,900	6,874	6,917	7,128	7,148	7,194	7,340	7,510	7,675	7,800
Non-Res Market Potential	5,840	6,120	5,769	5,262	4,827	4,372	3,776	3,282	2,898	2,568
<b>Total Potential as a % of Total Sales</b>	1.26%	1.25%	1.17%	1.13%	1.08%	1.03%	0.97%	0.93%	0.90%	0.88%
<b>Res Potential as a % of Res Sales</b>	2.22%	2.04%	2.03%	2.06%	2.04%	2.03%	2.04%	2.06%	2.08%	2.09%
<b>Non-Res Potential as a % of Non-Res Sales</b>	0.84%	0.87%	0.78%	0.70%	0.63%	0.57%	0.48%	0.41%	0.36%	0.32%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,985	2,012	1,930	1,868	1,808	1,745	1,656	1,596	1,559	1,529
Res Market Potential	1,023	1,005	978	994	1,000	1,009	1,022	1,040	1,065	1,091
Non-Res Market Potential	962	1,007	952	875	808	736	634	556	494	438

At a glance, the City of Pasadena’s results include:

- A 2022-2031 average annual gross savings target of 1.08% of forecasted retail sales
- A 2022-2031 average annual net savings target of 1.06% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Pasadena with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand

<sup>21</sup> The Pasadena market potential is based off a sensitivity scenario which includes a greenhouse gas adder in the avoided costs. GDS also first produced a base market potential without using the adder in the avoided costs.

- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the sensitivity case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the sensitivity market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the sensitivity market potential.

**TABLE 32 NET INCREMENTAL MARKET POTENTIAL– SENSITIVITY AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Sensitivity Market Potential	12,741	12,995	12,686	12,390	11,974	11,566	11,115	10,792	10,573	10,368
Codes & Standards Advocacy	9,377	9,745	9,418	9,149	8,601	8,065	7,310	6,335	5,406	4,639

### Base vs. Sensitivity Case

The summary of potential described above represents the results of a sensitivity scenario that included a GHG adder in the avoided costs. GDS also initially produced a base case, which did not include the GHG adder in the avoided costs. Table 3 below provides a comparison of the net incremental market potential in the base case and in the sensitivity case.

**TABLE 33 NET INCREMENTAL MARKET POTENTIAL–SENSITIVITY AND BASE**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	12,711	12,937	12,589	12,275	11,842	11,276	10,986	10,641	10,420	10,297
Sensitivity Market Potential	12,741	12,995	12,686	12,390	11,974	11,566	11,115	10,792	10,573	10,368

# MEMORANDUM

**TO** Pittsburgh Power Company  
**FROM** GDS Associates, Inc.  
**DATE** February 26, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Pittsburgh Power Company with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Pittsburgh Power Company service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the Pittsburgh Power Company as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Pittsburgh Power Company energy efficiency program target for the next 10 years (2022 to 2031) is set at 627 MWh. This results in an average annual target of 0.25 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

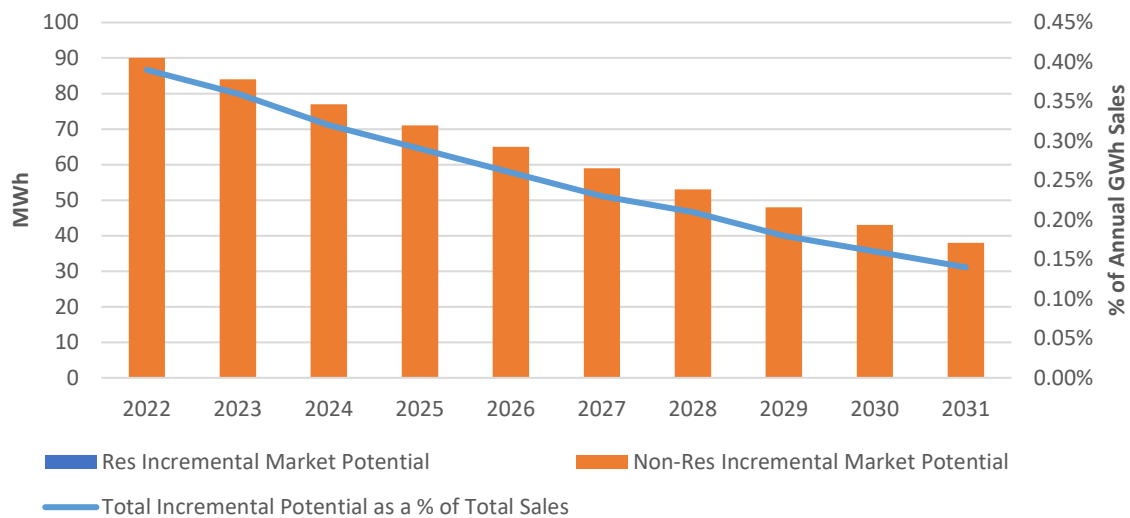


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 38 MWh to 90 MWh, which corresponds to 0.14% to 0.39% of forecasting sales.

**TABLE 34 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	90	84	77	71	65	59	53	48	43	38
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	90	84	77	71	65	59	53	48	43	38
Total Potential as a % of Total Sales	0.39%	0.36%	0.32%	0.29%	0.26%	0.23%	0.21%	0.18%	0.16%	0.14%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.42%	0.39%	0.35%	0.32%	0.29%	0.26%	0.23%	0.20%	0.18%	0.16%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	17	16	15	14	13	11	10	9	8	7
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	17	16	15	14	13	11	10	9	8	7

At a glance, the Pittsburgh Power Company results include:

- A 2022-2031 average annual gross savings target of 0.27% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.25% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided the Pittsburgh Power Company with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Plumas-Sierra Rural Electric Cooperative  
**FROM** GDS Associates, Inc.  
**DATE** March 9, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Plumas-Sierra Rural Electric Cooperative with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Plumas-Sierra service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Plumas-Sierra as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

Plumas-Sierra’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 1,471 MWh. This results in an average annual target of 0.10 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

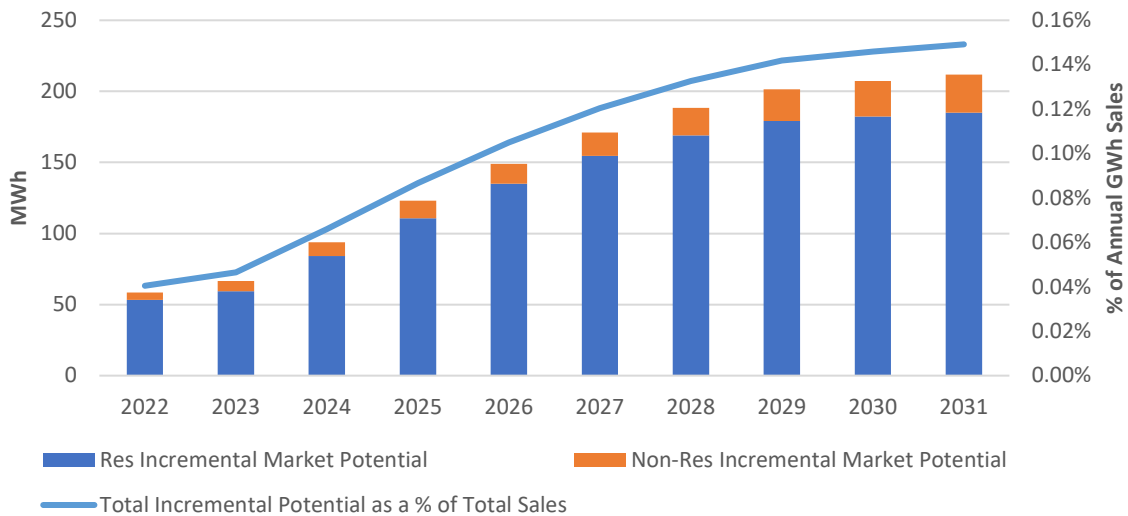


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 59 MWh to 212 MWh, which corresponds to 0.04% to 0.15% of forecasting sales.

**TABLE 35 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	59	66	94	123	149	171	188	201	207	212
Res Market Potential	53	59	84	111	135	155	169	179	182	185
Non-Res Market Potential	5	7	10	12	14	16	19	22	25	27
Total Potential as a % of Total Sales	0.04%	0.05%	0.07%	0.09%	0.10%	0.12%	0.13%	0.14%	0.15%	0.15%
Res Potential as a % of Res Sales	0.09%	0.11%	0.15%	0.20%	0.25%	0.28%	0.31%	0.33%	0.34%	0.34%
Non-Res Potential as a % of Non-Res Sales	0.01%	0.01%	0.01%	0.01%	0.02%	0.02%	0.02%	0.03%	0.03%	0.03%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	8	9	13	16	19	22	24	26	26	27
Res Market Potential	7	7	10	14	16	19	20	21	22	22
Non-Res Market Potential	1	2	2	3	3	3	4	4	5	5

At a glance, Plumas-Sierra’ results include:

- A 2022-2031 average annual gross savings target of 0.13% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.10% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Plumas-Sierra with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Port of Oakland  
**FROM** GDS Associates, Inc.  
**DATE** March 5, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

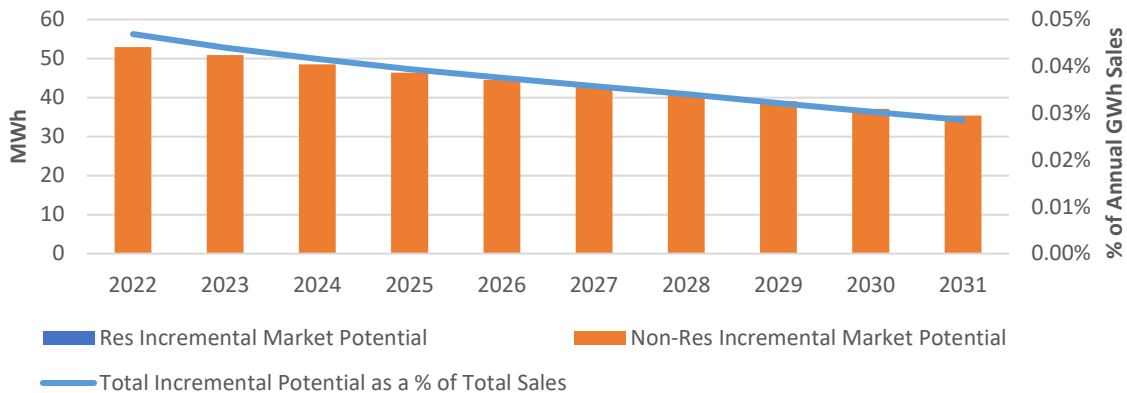
This memo provides Port of Oakland with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Port of Oakland service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Port of Oakland as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Port of Oakland energy efficiency program target for the next 10 years (2022 to 2031) is set at 439 MWh. This results in an average annual target of 0.04 percent of total projected energy sales.<sup>22</sup> Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**



<sup>22</sup> It is important to note that only a fraction of Port of Oakland’s energy sales is eligible to be impacted by traditional energy efficiency measures due to the unique characteristics of the load. Based on feedback from utility staff, it was assumed that only 30% of airport load, 20% of Harbor and Army Base load, and 0% of the Shore Power load is eligible for energy efficiency technology improvements. The .04%-point estimate is relative to Port of Oakland’s total forecasted load, not the eligible load. As a fraction of eligible, the average EE Forecast savings represents approximately 0.7% of sales.

Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 35 MWh to 53 MWh, which corresponds to 0.03% to 0.05% of forecasting sales.

**TABLE 36 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	53.0	50.9	48.5	46.4	44.5	42.8	41.0	39.0	37.1	35.4
Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Res Market Potential	53.0	50.9	48.5	46.4	44.5	42.8	41.0	39.0	37.1	35.4
Total Potential as a % of Total Sales	0.05%	0.04%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.05%	0.04%	0.04%	0.04%	0.04%	0.04%	0.03%	0.03%	0.03%	0.03%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	8.2	7.9	7.5	7.2	6.9	6.7	6.4	6.1	5.7	5.4
Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Res Market Potential	8.2	7.9	7.5	7.2	6.9	6.7	6.4	6.1	5.7	5.4

At a glance, Port of Oakland’s results include:

- A 2022-2031 average annual gross savings target of 0.04% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.04% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Port of Oakland with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Rancho Cucamonga  
**FROM** GDS Associates, Inc.  
**DATE** March 13, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Rancho Cucamonga with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Rancho Cucamonga service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Rancho Cucamonga as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

Rancho Cucamonga’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 3,843 MWh. This results in an average annual target of 0.50 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

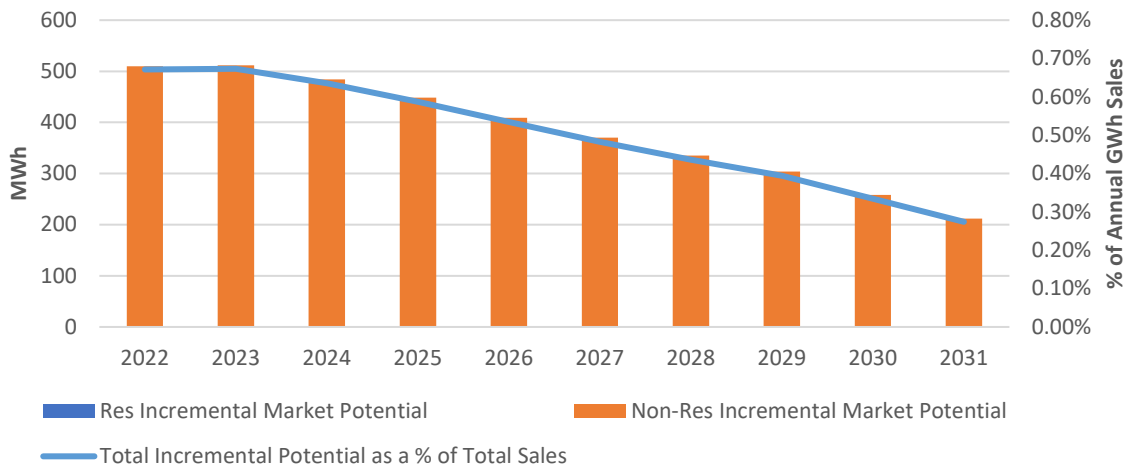


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 212 MWh to 512 MWh, which corresponds to 0.27% to 0.67% of forecasting sales.

**TABLE 37 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	510	512	484	449	409	370	335	304	258	212
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	510	512	484	449	409	370	335	304	258	212
Total Potential as a % of Total Sales	0.67%	0.67%	0.64%	0.59%	0.53%	0.48%	0.44%	0.39%	0.33%	0.27%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.69%	0.69%	0.65%	0.60%	0.55%	0.49%	0.45%	0.40%	0.34%	0.28%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	90	89	84	78	72	65	60	55	48	40
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	90	89	84	78	72	65	60	55	48	40

At a glance, Rancho Cucamonga’s results include:

- A 2022-2031 average annual gross savings target of 0.50% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.50% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Rancho Cucamonga with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Redding Electric Utility  
**FROM** GDS Associates, Inc.  
**DATE** March 5, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Redding Electric Utility with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Redding service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Redding Electric Utility as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Redding's energy efficiency program target for the next 10 years (2022 to 2031) is set at 8,690 MWh. This results in an average annual target of 0.12 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

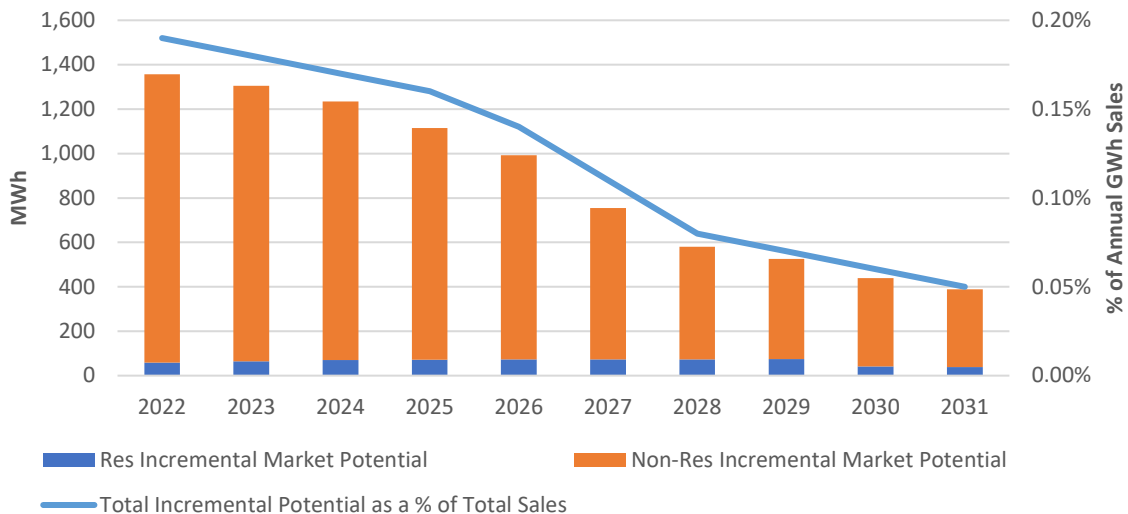


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 388 MWh to 1,358 MWh, which corresponds to 0.05% to 0.19% of forecasting sales.

**TABLE 38 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,358	1,305	1,233	1,115	992	755	581	525	439	388
Res Market Potential	59	65	70	72	73	73	73	74	42	38
Non-Res Market Potential	1,298	1,240	1,164	1,043	919	681	508	451	397	350
Total Potential as a % of Total Sales	0.19%	0.18%	0.17%	0.16%	0.14%	0.11%	0.08%	0.07%	0.06%	0.05%
Res Potential as a % of Res Sales	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.02%	0.01%	0.01%
Non-Res Potential as a % of Non-Res Sales	0.36%	0.34%	0.32%	0.29%	0.25%	0.19%	0.14%	0.12%	0.11%	0.10%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	205	194	180	161	142	110	87	77	66	58
Res Market Potential	1	1	1	1	1	1	1	1	1	1
Non-Res Market Potential	204	193	179	160	142	110	86	77	66	58

At a glance, Redding Electric Utility’s results include:

- A 2022-2031 average annual gross savings target of 0.18% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.12% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Redding with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Riverside  
**FROM** GDS Associates, Inc.  
**DATE** March 15, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Riverside with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Riverside service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Riverside as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Riverside energy efficiency program target for the next 10 years (2022 to 2031) is set at 137,276 MWh. This results in an average annual target of 0.59 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

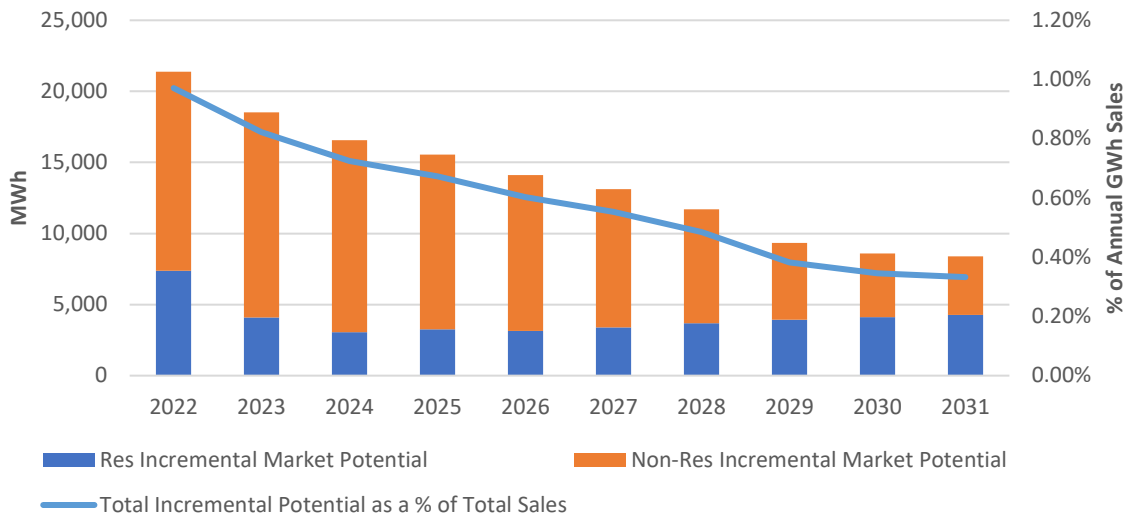


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 8,394 MWh to 21,383 MWh, which corresponds to 0.33% to 0.97% of forecasting sales.

**TABLE 39 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	21,383	18,523	16,569	15,551	14,120	13,117	11,694	9,340	8,584	8,394
Res Market Potential	7,383	4,099	3,045	3,253	3,142	3,385	3,684	3,934	4,123	4,276
Non-Res Market Potential	13,999	14,425	13,524	12,298	10,978	9,732	8,010	5,407	4,461	4,118
Total Potential as a % of Total Sales	0.97%	0.82%	0.72%	0.67%	0.60%	0.55%	0.48%	0.38%	0.35%	0.33%
Res Potential as a % of Res Sales	1.04%	0.57%	0.42%	0.45%	0.43%	0.46%	0.50%	0.53%	0.55%	0.56%
Non-Res Potential as a % of Non-Res Sales	0.94%	0.94%	0.86%	0.78%	0.68%	0.59%	0.48%	0.32%	0.26%	0.23%
10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	5,261	4,453	3,982	3,714	2,978	2,638	2,301	1,763	1,590	1,539
Res Market Potential	2,510	1,616	1,351	1,348	891	836	866	906	952	998
Non-Res Market Potential	2,752	2,837	2,631	2,366	2,087	1,801	1,434	857	638	541

At a glance, Riverside’s results include:

- A 2022-2031 average annual gross savings target of 0.59% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.59% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Riverside with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Roseville  
**FROM** GDS Associates, Inc.  
**DATE** March 11, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Roseville with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Roseville service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Roseville as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Roseville’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 98,971 MWh. This results in an average annual target of 0.89 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

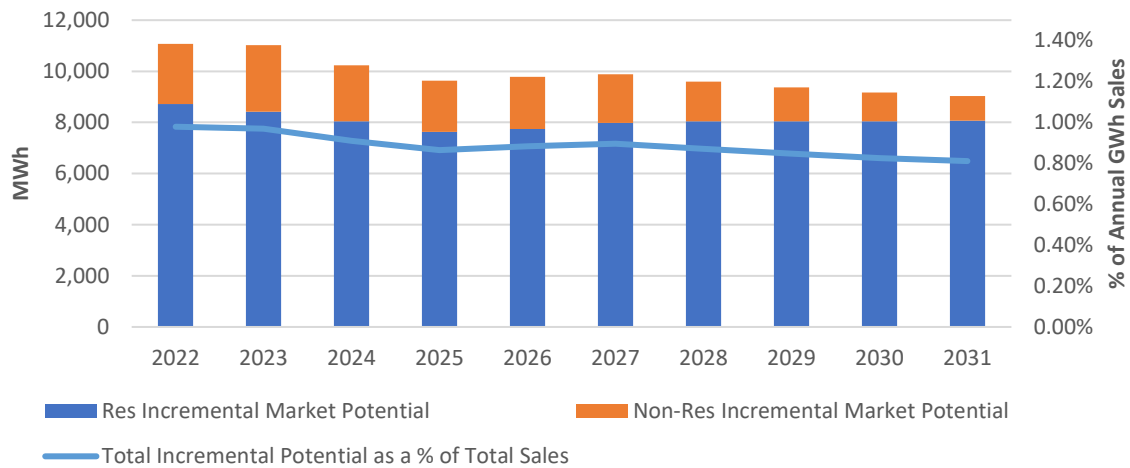


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 9,028 MWh to 11,070 MWh, which corresponds to 0.81% to 0.98% of forecasting sales.

**TABLE 40 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	11,070	11,024	10,240	9,632	9,786	9,881	9,591	9,366	9,172	9,028
Res Market Potential	8,721	8,415	8,048	7,633	7,739	7,976	8,046	8,042	8,048	8,066
Non-Res Market Potential	2,349	2,609	2,191	1,999	2,047	1,904	1,545	1,324	1,124	962
Total Potential as a % of Total Sales	0.98%	0.97%	0.91%	0.86%	0.88%	0.90%	0.87%	0.85%	0.83%	0.81%
Res Potential as a % of Res Sales	1.94%	1.87%	1.79%	1.69%	1.70%	1.73%	1.72%	1.68%	1.64%	1.63%
Non-Res Potential as a % of Non-Res Sales	0.34%	0.38%	0.32%	0.30%	0.31%	0.30%	0.24%	0.21%	0.18%	0.16%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2,156	2,022	1,331	833	856	1,045	984	898	833	823
Res Market Potential	1,793	1,613	1,004	551	571	795	806	745	701	711
Non-Res Market Potential	363	409	327	282	285	249	178	153	132	112

At a glance, the City of Roseville’s results include:

- A 2022-2031 average annual gross savings target of 1.26% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.89% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided the City of Roseville with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Sacramento Municipal Utility District  
**FROM** GDS Associates, Inc.  
**DATE** March 15, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

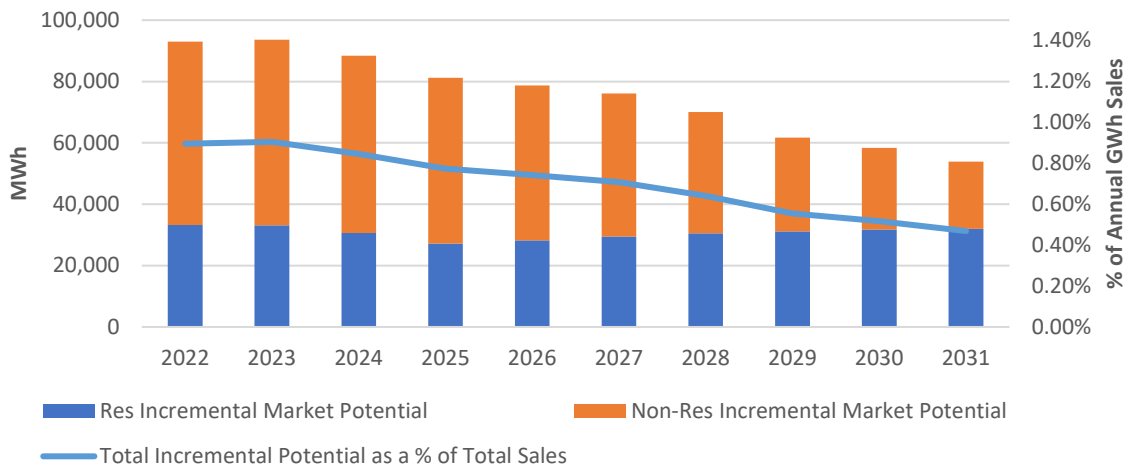
This memo provides the Sacramento Municipal Utility District (SMUD) with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team.<sup>23</sup> The results described here are specific to the SMUD service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for SMUD as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The SMUD energy efficiency program target for the next 10 years (2022 to 2031) is set at 755,039 MWh. This results in an average annual target of 0.71 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**



<sup>23</sup> SMUD has yet to reconcile EE potentials with its 2030 Zero Carbon Plan, released March 31, 2021. As such, SMUD’s 10-year EE targets may see a significant change in 2022.

Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 53,871 MWh to 93,679 MWh, which corresponds to 0.47% to 0.90% of forecasting sales.<sup>24</sup>

**TABLE 41 GROSS INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	92,984	93,679	88,453	81,184	78,738	76,056	70,024	61,661	58,390	53,871
Res Market Potential	33,200	33,108	30,599	27,143	28,231	29,464	30,513	31,182	31,741	31,972
Non-Res Market Potential	59,785	60,570	57,854	54,041	50,507	46,592	39,511	30,479	26,648	21,899
Total Potential as a % of Total Sales	0.90%	0.90%	0.85%	0.77%	0.74%	0.71%	0.64%	0.56%	0.52%	0.47%
Res Potential as a % of Res Sales	0.74%	0.74%	0.68%	0.60%	0.62%	0.63%	0.64%	0.64%	0.64%	0.62%
Non-Res Potential as a % of Non-Res Sales	1.03%	1.03%	0.98%	0.91%	0.84%	0.77%	0.64%	0.49%	0.42%	0.35%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	14,082	14,364	13,559	12,451	12,022	11,518	10,539	8,926	8,275	7,928
Res Market Potential	5,240	5,240	5,001	4,685	4,974	5,257	5,498	5,665	5,772	5,834
Non-Res Market Potential	8,842	9,124	8,557	7,767	7,048	6,261	5,041	3,261	2,503	2,094

At a glance, SMUD’s results include:

- A 2022-2031 average annual gross savings target of 0.71% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.56% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

<sup>24</sup> The potential as a % of sales are based on the 2021 Load Forecast – Expected scenario without EE.

## Detailed Results

GDS has provided SMUD with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

## Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 42 GROSS INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	92,984	93,679	88,453	81,184	78,738	76,056	70,024	61,661	58,390	53,871
Codes & Standards Advocacy	83,520	84,452	80,885	78,549	73,272	68,231	61,151	53,413	45,295	39,231

# MEMORANDUM

**TO** San Francisco Public Utilities Commission  
**FROM** GDS Associates, Inc.  
**DATE** March 5, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

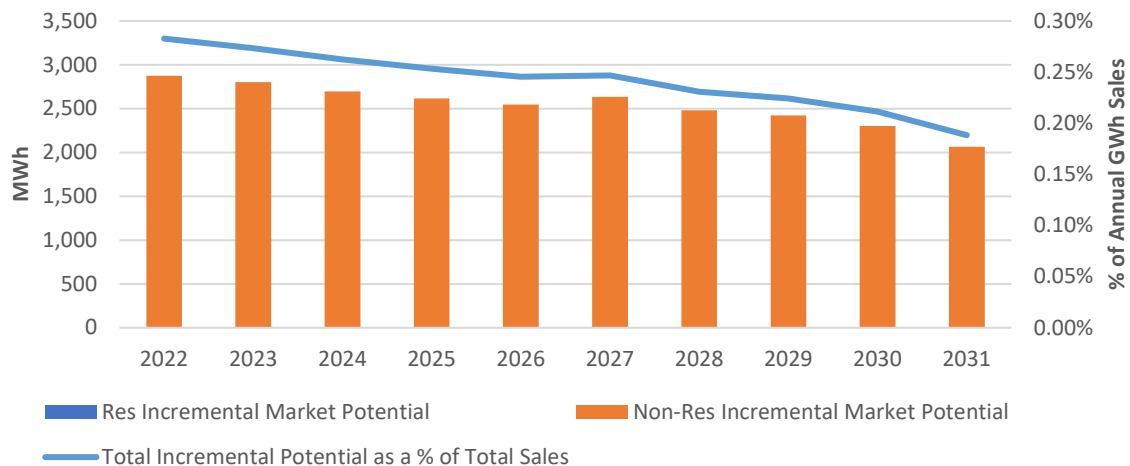
This memo provides San Francisco Public Utilities Commission (SFPUC) with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the SFPUC service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the San Francisco Public Utilities Commission as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The San Francisco Public Utilities Commission’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 25,440 MWh. This results in an average annual target of 0.24 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors<sup>25</sup>, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**



<sup>25</sup> San Francisco Public Utilities Commission primarily serves nonresidential loads, and as a result, energy efficiency savings potential is focused in the nonresidential sector.

Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 2,064 MWh to 2,875 MWh, which corresponds to 0.19% to 0.28% of forecasting sales.

**TABLE 43 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	2,875	2,801	2,698	2,616	2,546	2,633	2,479	2,424	2,303	2,064
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	2,875	2,801	2,698	2,616	2,546	2,633	2,479	2,424	2,303	2,064
Total Potential as a % of Total Sales	0.28%	0.27%	0.26%	0.25%	0.25%	0.25%	0.23%	0.22%	0.21%	0.19%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.29%	0.28%	0.27%	0.26%	0.25%	0.25%	0.23%	0.23%	0.22%	0.19%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	535	521	501	486	472	489	457	446	419	365
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	535	521	501	486	472	489	457	446	419	365

At a glance, San Francisco Public Utilities Commission’s results include:

- A 2022-2031 average annual gross savings target of 0.24% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.24% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided San Francisco Public Utilities Commission’s with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Shasta Lake  
**FROM** GDS Associates, Inc.  
**DATE** February 26, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Shasta Lake with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Shasta Lake service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Shasta Lake as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Shasta Lake energy efficiency program target for the next 10 years (2022 to 2031) is set at 4,288 MWh. This results in an average annual target of 0.21 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

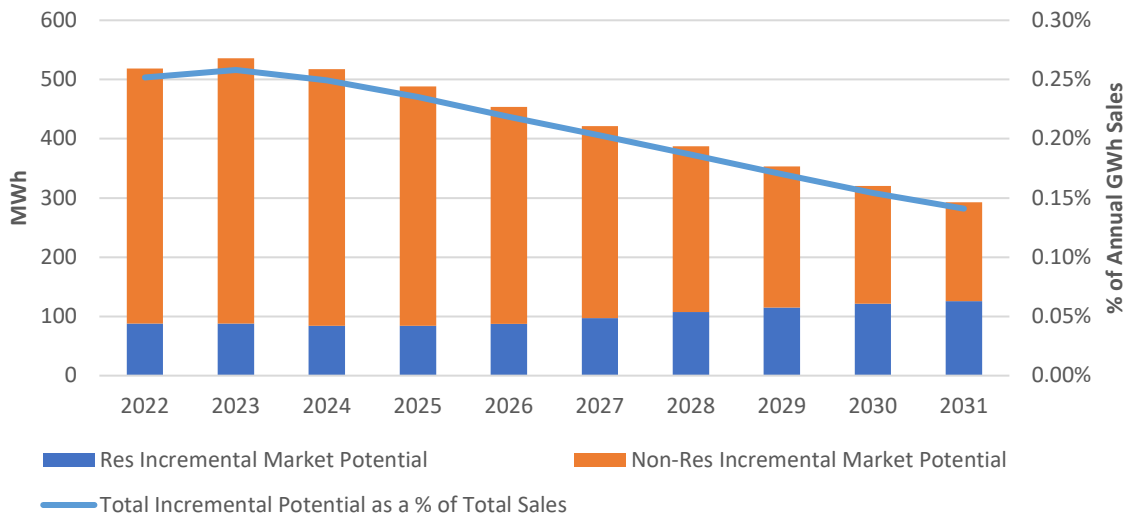


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 293 MWh to 536 MWh, which corresponds to 0.14% to 0.26% of forecasting sales.

**TABLE 44 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	518	536	518	488	454	421	387	353	320	293
Res Market Potential	88	88	84	84	87	97	107	115	122	126
Non-Res Market Potential	430	448	433	404	366	324	280	238	199	167
Total Potential as a % of Total Sales	0.25%	0.26%	0.25%	0.24%	0.22%	0.20%	0.19%	0.17%	0.15%	0.14%
Res Potential as a % of Res Sales	0.22%	0.21%	0.20%	0.20%	0.21%	0.23%	0.26%	0.27%	0.29%	0.30%
Non-Res Potential as a % of Non-Res Sales	0.26%	0.27%	0.26%	0.24%	0.22%	0.20%	0.17%	0.14%	0.12%	0.10%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	63	65	63	58	52	47	42	37	33	29
Res Market Potential	5	5	5	5	5	5	6	7	9	10
Non-Res Market Potential	58	60	58	53	48	42	36	30	24	19

At a glance, Shasta Lake’s results include:

- A 2022-2031 average annual gross savings target of 0.25% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.21% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Shasta Lake with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Silicon Valley Power  
**FROM** GDS Associates, Inc.  
**DATE** March 12, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Silicon Valley Power with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the SVP service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Silicon Valley Power as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The SVP energy efficiency program target for the next 10 years (2022 to 2031) is set at 84,602 MWh. This results in an average annual target of 0.19 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

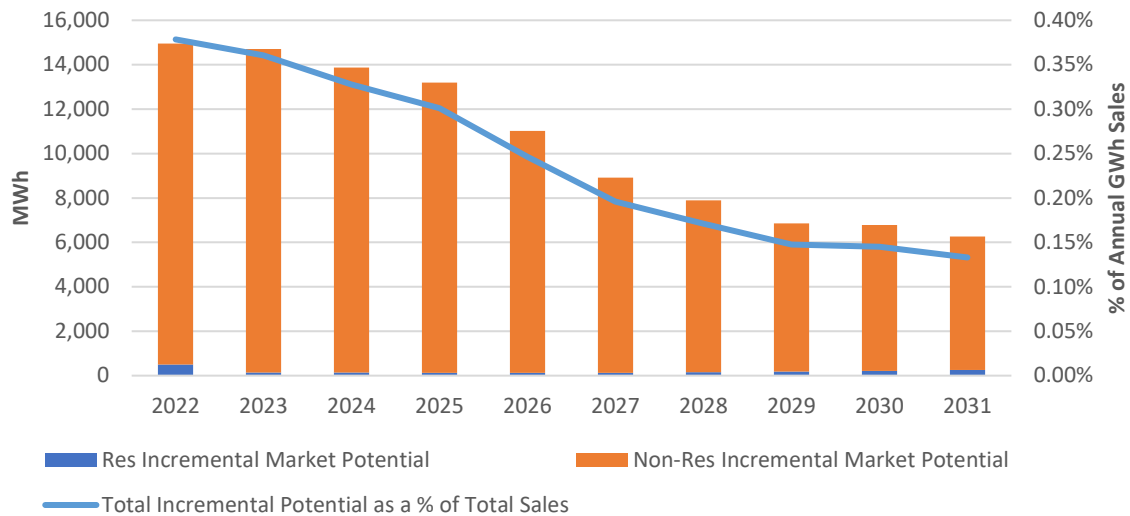


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 5,372 MWh to 11,584 MWh, which corresponds to 0.11% to 0.29% of forecasting sales.

**TABLE 45 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	11,584	11,536	11,013	10,604	8,913	7,305	6,651	5,808	5,817	5,372
Res Market Potential	146	49	54	57	64	75	95	120	151	187
Non-Res Market Potential	11,438	11,487	10,959	10,547	8,848	7,230	6,556	5,688	5,666	5,186
Total Potential as a % of Total Sales	0.29%	0.28%	0.26%	0.24%	0.20%	0.16%	0.14%	0.13%	0.12%	0.11%
Res Potential as a % of Res Sales	0.06%	0.02%	0.02%	0.02%	0.02%	0.03%	0.03%	0.04%	0.05%	0.06%
Non-Res Potential as a % of Non-Res Sales	0.31%	0.30%	0.28%	0.26%	0.21%	0.17%	0.15%	0.13%	0.13%	0.12%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,665	1,695	1,618	1,542	1,254	1,033	877	725	759	682
Res Market Potential	11	5	8	12	15	21	29	38	50	62
Non-Res Market Potential	1,654	1,689	1,610	1,530	1,238	1,012	848	686	709	620

At a glance, the SVP results include:

- A 2022-2031 average annual gross savings target of 0.24% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.19% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Silicon Valley Power with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Trinity Public Utilities Department  
**FROM** GDS Associates, Inc.  
**DATE** February 19, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Trinity PUD with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Trinity PUD service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Trinity PUD as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Trinity PUD’s energy efficiency program target for the next 10 years (2022 to 2031) is set at 14.5 MWh. This results in an average annual target of 0.001 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

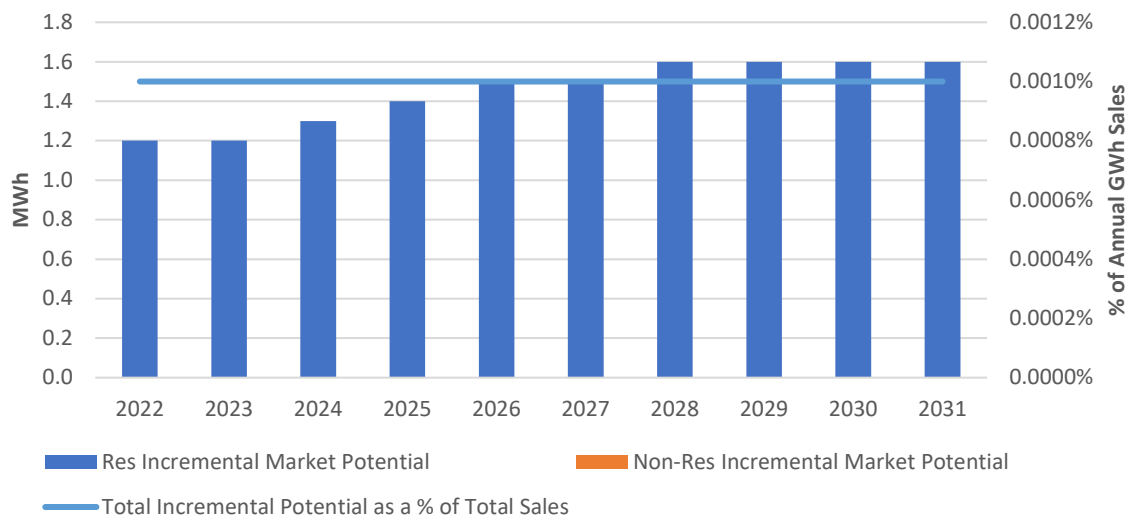


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 1.2 MWh to 1.6 MWh, which corresponds to 0.001% of forecasting sales.

**TABLE 46 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1.2	1.2	1.3	1.4	1.5	1.5	1.6	1.6	1.6	1.6
Res Market Potential	1.2	1.2	1.3	1.4	1.5	1.5	1.6	1.6	1.6	1.6
Non-Res Market Potential	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Potential as a % of Total Sales	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%	0.001%
Res Potential as a % of Res Sales	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%	0.002%
Non-Res Potential as a % of Non-Res Sales	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%	0.000%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Res Market Potential	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Res Market Potential	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

At a glance, Trinity PUD’s results include:

- A 2022-2031 average annual gross savings target of 0.002% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.001% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Trinity PUD with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** Truckee Donner Public Utility District  
**FROM** GDS Associates, Inc.  
**DATE** February 26, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides Truckee Donner PUD with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Truckee Donner PUD service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for the Truckee Donner PUD as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The Truckee Donner PUD energy efficiency program target for the next 10 years (2022 to 2031) is set at 3,894 MWh. This results in an average annual target of 0.21 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total cumulative annual potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. GROSS CUMULATIVE ANNUAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**



Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Cumulative annual savings range from 606 MWh to 3,894 MWh, which corresponds to 0.37% to 2.15% of forecasting sales.

**TABLE 47 GROSS CUMULATIVE ANNUAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Cumulative Gross MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	606	1,201	1,748	2,249	2,679	3,015	3,292	3,505	3,703	3,894
Res Market Potential	177	356	531	702	865	965	1,022	1,073	1,122	1,173
Non-Res Market Potential	429	845	1,217	1,547	1,814	2,050	2,271	2,431	2,581	2,721
Total Potential as a % of Total Sales	0.37%	0.73%	1.04%	1.32%	1.57%	1.75%	1.88%	1.98%	2.06%	2.15%
Res Potential as a % of Res Sales	0.19%	0.38%	0.56%	0.73%	0.89%	0.98%	1.01%	1.05%	1.08%	1.11%
Non-Res Potential as a % of Non-Res Sales	0.60%	1.17%	1.67%	2.11%	2.48%	2.78%	3.07%	3.27%	3.44%	3.61%

10 Year Demand Goals (Cumulative kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	87	172	247	313	363	397	424	441	452	460
Res Market Potential	20	40	58	74	88	94	95	96	96	97
Non-Res Market Potential	67	132	189	239	275	303	329	345	355	364

At a glance, the Truckee Donner PUD results include:

- A 2022-2031 average annual gross savings target of 0.21% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.17% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Truckee Donner PUD with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# Turlock Irrigation District

## INTRODUCTION

The results herein are from the California Municipal Utilities Association (CMUA) Energy Efficiency (EE) Potential Forecasting Study conducted in 2020-2021 by GDS Associates, Inc. (GDS). These results are specific to the Turlock Irrigation District (TID) service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for TID as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The TID energy efficiency program target for the next 10 years (2022 to 2031) is set at 102,257 MWh. This results in an average annual target of 0.45 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

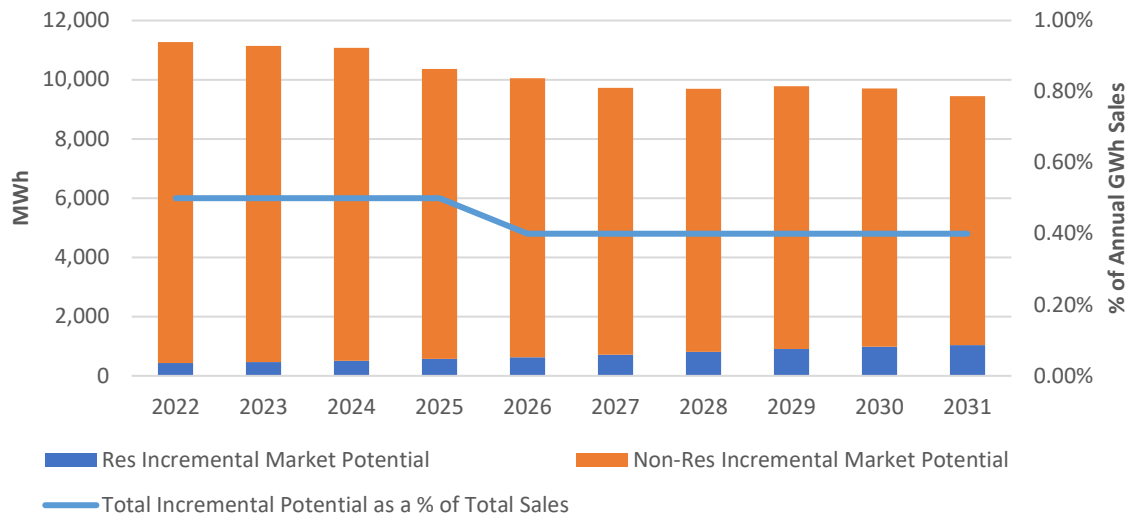


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total retail sales. Incremental annual savings range from 9,447 MWh to 11,275 MWh, which corresponds to 0.40% to 0.51% of forecasted sales.

**TABLE 48 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	11,275	11,139	11,078	10,359	10,055	9,728	9,697	9,779	9,700	9,447
Res Market Potential	437	467	511	571	629	717	813	908	987	1,042
Non-Res Market Potential	10,837	10,672	10,567	9,788	9,426	9,011	8,884	8,870	8,713	8,405
Total Potential as a % of Total Sales	0.51%	0.50%	0.50%	0.46%	0.44%	0.42%	0.42%	0.42%	0.41%	0.40%
Res Potential as a % of Res Sales	0.06%	0.06%	0.07%	0.07%	0.08%	0.09%	0.10%	0.11%	0.12%	0.13%
Non-Res Potential as a % of Non-Res Sales	0.75%	0.74%	0.73%	0.66%	0.63%	0.60%	0.59%	0.58%	0.56%	0.54%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	1,463	1,440	1,423	1,309	1,252	1,202	1,192	1,197	1,190	1,182
Res Market Potential	79	85	97	109	122	143	169	196	223	249
Non-Res Market Potential	1,384	1,355	1,326	1,200	1,130	1,059	1,024	1,000	968	934

At a glance, TID’s results include:

- A 2022-2031 average annual gross savings target of 0.46% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.45% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below).

### Detailed Results

GDS provided TID with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program

- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

### Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. **These C&S estimates are not included in the market potential described above which represents TID’s Board adopted energy efficiency targets for the 10-year period of 2022 to 2031.**

**TABLE 49 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

		10 Year Energy Goals (Incremental Net MWh)									
ALL Sectors (MWh)		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential		11,275	11,139	11,078	10,359	10,055	9,728	9,697	9,779	9,700	9,447
Codes & Standards Advocacy		12,715	12,530	11,864	11,511	10,716	9,974	8,906	7,842	6,661	5,794

# MEMORANDUM

**TO** City of Ukiah  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Ukiah with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Ukiah service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Ukiah as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Ukiah's energy efficiency program target for the next 10 years (2022 to 2031) is set at 4,147 MWh. This results in an average annual target of 0.37 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

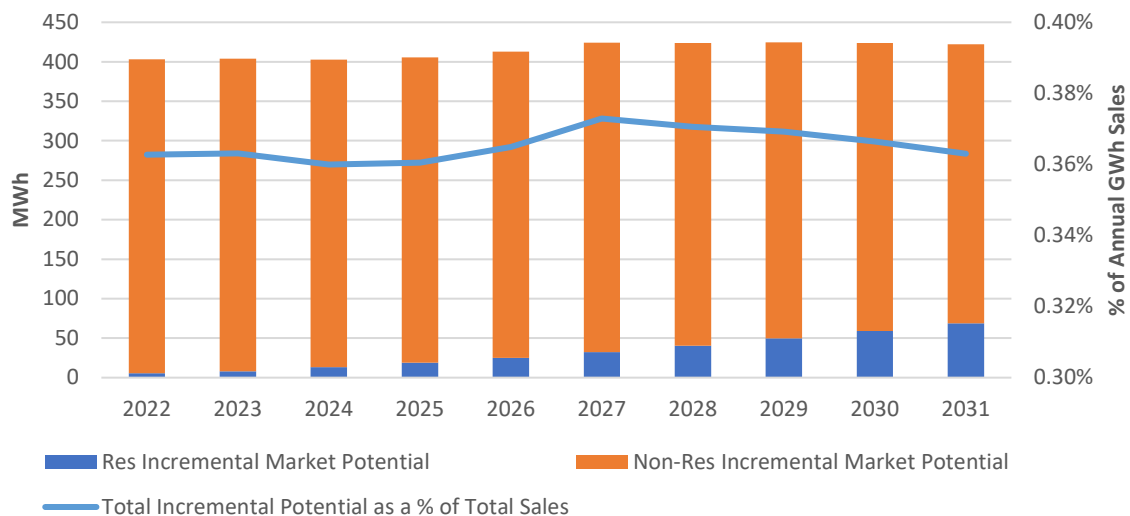


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 403 MWh to 425 MWh, which corresponds to 0.36% to 0.37% of forecasting sales.

**TABLE 50 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	403	404	403	405	413	424	424	425	424	422
Res Market Potential	6	8	13	19	25	32	41	50	59	69
Non-Res Market Potential	397	396	389	387	388	392	383	375	365	353
Total Potential as a % of Total Sales	0.36%	0.36%	0.36%	0.36%	0.36%	0.37%	0.37%	0.37%	0.37%	0.36%
Res Potential as a % of Res Sales	0.01%	0.02%	0.03%	0.05%	0.06%	0.08%	0.10%	0.12%	0.14%	0.17%
Non-Res Potential as a % of Non-Res Sales	0.56%	0.55%	0.54%	0.53%	0.53%	0.53%	0.52%	0.50%	0.49%	0.47%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	72	71	68	66	64	62	61	59	56	53
Res Market Potential	0	0	0	1	1	1	2	2	2	3
Non-Res Market Potential	72	71	68	66	63	61	59	57	54	50

At a glance, Ukiah’s results include:

- A 2022-2031 average annual gross savings target of 0.44% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.37% of forecasted retail sales
- No claim of savings from codes and standards (C&S)

### Detailed Results

GDS has provided Ukiah with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program
- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

# MEMORANDUM

**TO** City of Vernon  
**FROM** GDS Associates, Inc.  
**DATE** March 14, 2021  
**RE** 2020 CMUA Energy Efficiency Potential Forecasting Study

## INTRODUCTION

This memo provides the City of Vernon with the results of the CMUA EE Potential Forecasting Study conducted in 2020 by the GDS Team. The results described here are specific to the Vernon service territory and account for unique characteristics of the service area, customer base, climate zone, economic conditions, and other relevant factors. This memo provides a summary of potential, and a description of the data provided in a detailed results spreadsheet file.

## SUMMARY OF POTENTIAL

This potential study provides a roadmap for Vernon as they develop strategies and programs for energy efficiency. The development of market potential estimates for a range of feasible measures is useful for program planning and modification purposes.

The City of Vernon's energy efficiency program target for the next 10 years (2022 to 2031) is set at 25,665 MWh. This results in an average annual target of 0.22 percent of total projected energy sales. Figure 1 provides the market potential for the residential and non-residential sectors, as well as the total incremental potential as a percentage of total sales for the 10-year period of 2022 to 2031.

**FIGURE 1. NET INCREMENTAL MARKET POTENTIAL BY SECTOR (MWH) AND PERCENT OF SALES**

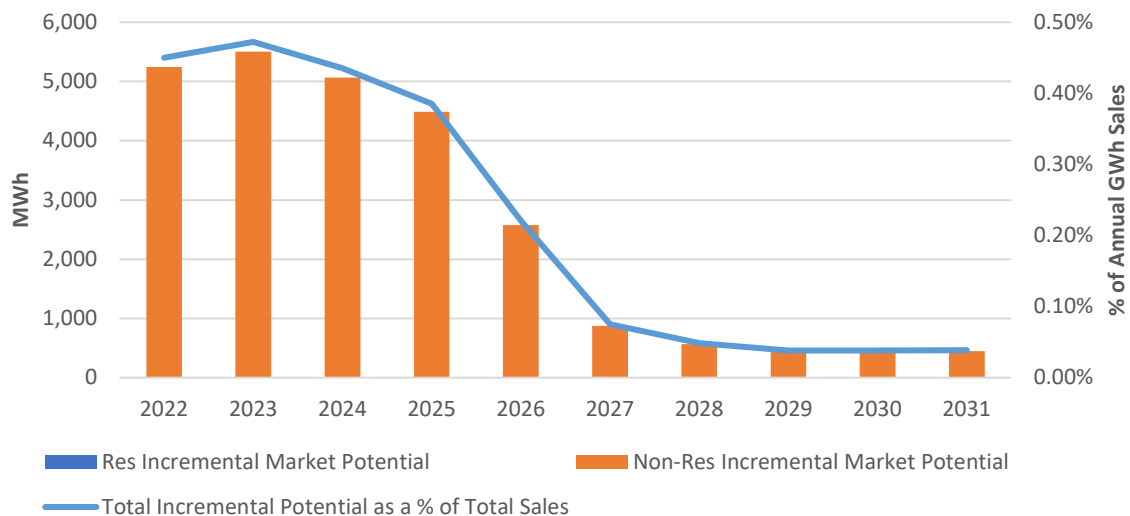


Table 1 below includes the specific inputs used to create Figure 1. The annual energy and demand impacts are provided. The energy impacts are shown as a percentage of forecasted sector-level and total sales. Incremental annual savings range from 2,622 MWh to 9,912 MWh, which corresponds to 0.04% to 0.47% of forecasting sales.

**TABLE 51 NET INCREMENTAL MARKET POTENTIAL BY SECTOR – ENERGY AND DEMAND**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	5,247	5,504	5,069	4,489	2,575	876	564	446	445	449
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	5,247	5,504	5,069	4,489	2,575	876	564	446	445	449
Total Potential as a % of Total Sales	0.45%	0.47%	0.44%	0.39%	0.22%	0.08%	0.05%	0.04%	0.04%	0.04%
Res Potential as a % of Res Sales	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Non-Res Potential as a % of Non-Res Sales	0.45%	0.47%	0.44%	0.39%	0.22%	0.08%	0.05%	0.04%	0.04%	0.04%

10 Year Demand Goals (Incremental kW)										
ALL Sectors (kW)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Market Potential	749	765	694	604	356	103	40	16	17	18
Res Market Potential	0	0	0	0	0	0	0	0	0	0
Non-Res Market Potential	749	765	694	604	356	103	40	16	17	18

At a glance, the City of Vernon’s results include:

- A 2022-2031 average annual gross savings target of 0.22% of forecasted retail sales
- A 2022-2031 average annual net savings target of 0.22% of forecasted retail sales
- The results also include separate estimates of future claims of savings from codes and standards (C&S) advocacy (see codes and standards section below)

### Detailed Results

GDS has provided Vernon with a detailed results file which includes the summary information described above, as well as additional detailed results. The results file includes the following information:

- 10-yr gross incremental and cumulative annual energy and demand savings
- 10-yr net incremental and cumulative annual energy and demand savings
- 20-yr cumulative annual technical, economic and market potential by sector – energy and demand
- 20-yr incremental annual market potential by sector – energy and demand
- 20-yr market potential by program

- 20-yr market potential by end-use
- 20-yr costs by program
- Comprehensive measure mapping list

## Codes and Standards

The summary of potential described above represents the base case results. GDS also produced estimates of savings claims for C&S advocacy. Table 2 below provides the base market potential and the estimate of C&S advocacy savings. The C&S estimates are considered as secondary to the base market potential.

**TABLE 52 NET INCREMENTAL MARKET POTENTIAL– BASE AND CODES & STANDARDS**

10 Year Energy Goals (Incremental Net MWh)										
ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Base Market Potential	5,247	5,504	5,069	4,489	2,575	876	564	446	445	449
Codes & Standards Advocacy	4,209	4,118	3,790	3,699	3,547	3,390	3,153	2,766	2,450	2,138