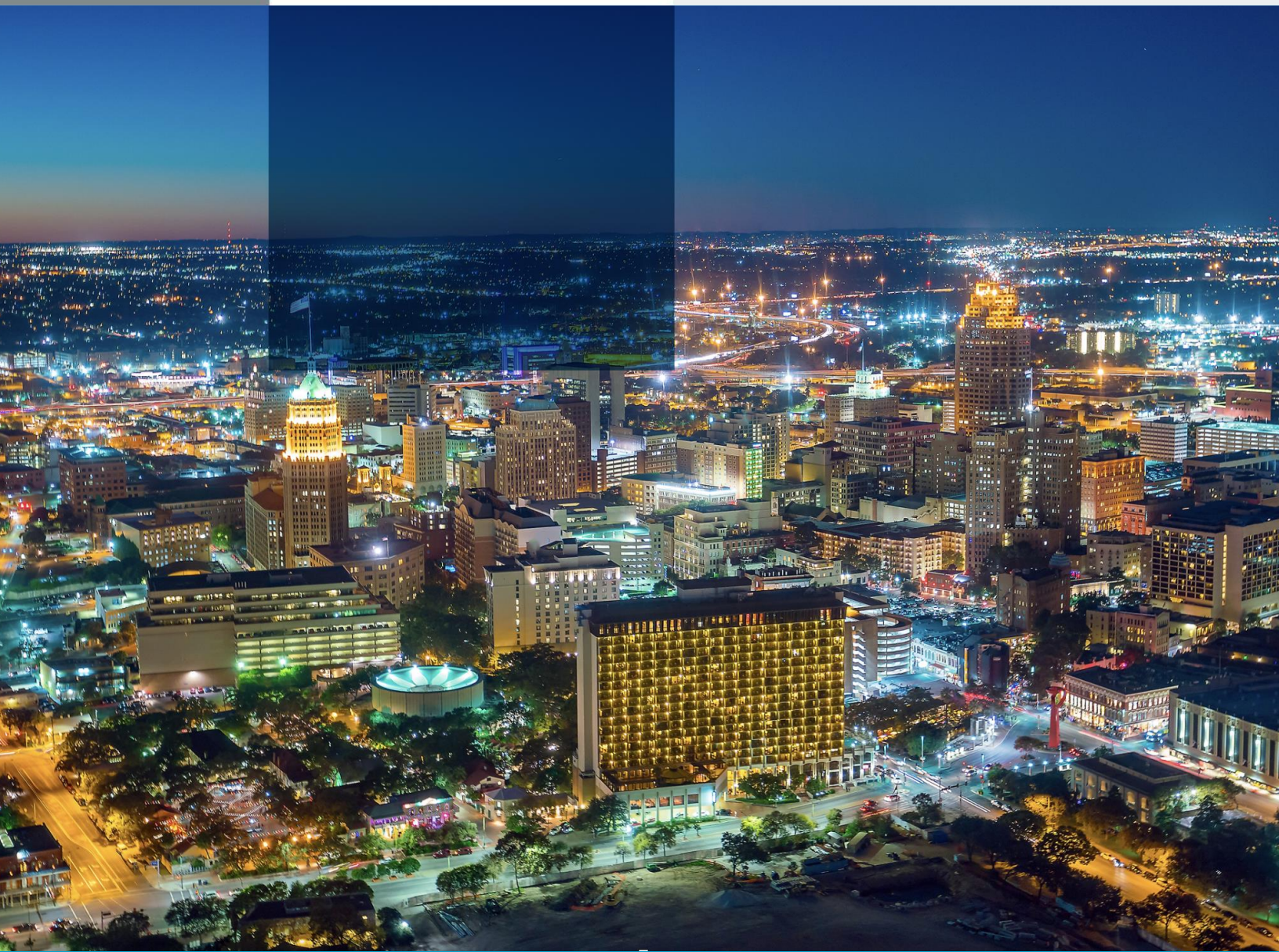




# CPS Energy: Save for Tomorrow Energy Plan ("STEP") Program Review

November 2019



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## KEY FINDINGS

The CPS Energy Save for Tomorrow Energy Plan (“STEP”) was established in 2009 by an ordinance of the City Council of San Antonio. The ordinance requires CPS Energy to save 771 MW of electricity demand by 2020 at a cost of no more than \$849 million. Key achievements of STEP to date include:

		
<p>STEP is on track to <b>achieve the required demand savings one year early</b>, and approximately 15% under the budget cap.</p>	<p>STEP saved a gross total of 1.4 TWh of electricity in FY 2019 - <b>enough energy to power 104,000 Greater San Antonio Area households</b> for the year. Over the life of STEP so far, it has yielded 6.3 TWh of electricity savings.</p>	<p>STEP has provided over <b>\$553 million in net benefits</b> (the difference between the present value of the energy and capacity savings and the program cost) putting downward pressure on current and future CPS Energy revenue requirements.</p>
		
<p>Over the FY 2009 to FY 2019 time period, STEP had a Utility Cost Test benefit cost ratio of 1.9, indicating that STEP provided <b>\$1.93 of benefit for every \$1 invested by CPS Energy</b>.</p>	<p>STEP resulted in an <b>estimated annual 680 added jobs and \$28 million in income from FY 2009 to FY 2019</b>. Over the duration of STEP, it has cumulatively generated 7,500 local job-years, \$312 million in labor income, and \$362 million in added value in addition to the utility net benefits noted above.</p>	<p>The CO<sub>2</sub> emissions reductions from STEP is approximately 3,366,000 (short) tons, which is equivalent to the carbon sequestered by 3,594,000 acres of forest for one year. Additionally, STEP has reduced SO<sub>2</sub> emissions by 6,639,000 lbs. and NO<sub>x</sub> emissions by 3,123,000 lbs.</p>

**This report only includes data that has already been verified by third-party evaluators. As such, any data from FY 2020 or later are not included. Where projections are used, they are highlighted as such.**

## EXECUTIVE SUMMARY

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Over the past decade, CPS Energy has made significant progress in achieving its demand reduction goals, rapidly growing the energy conservation portfolio into a robust collection of programs that serve its diverse population and provide an opportunity for all customers to benefit. Since the passage of the Save for Tomorrow Energy Plan (STEP) in 2009, CPS Energy has embraced the challenge set forth in the ordinance to save 771 MW by 2020 and has achieved greater savings than those forecasted by a potential study conducted in 2008.

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***CPS Energy is on track to achieve the savings goal one year early and at a cost approximately 15 percent under budget.***

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This achievement speaks to the willingness of CPS Energy to test new program concepts and continuously improve its programs to incorporate lessons learned, new technologies, evolving delivery models, and emerging best practices. STEP has also benefitted from having a consistent and significant funding source. A prime example of this continuous improvement is CPS Energy's transition to a Bring-Your-Own-Device (BYOD) model for smart thermostats. When first launched in 2003, customers could elect to have a CPS Energy contractor visit the home and install a qualifying thermostat. The transition to a BYOD model opens the program to a broader range of devices and significantly reduces the implementation cost, allowing the program to serve more customers at a lower unit cost. With continuous improvements like this, including taking advantage of declines in the cost of efficient technologies such as LED lightbulbs, CPS Energy has established a broad, balanced, and well-performing portfolio that provides a solid foundation for future innovation.

Consistent with national best practices, the STEP program offers incentives and assistance to residential and commercial customers to encourage them to reduce demand for power through adoption of a wide variety of energy efficient and clean energy technologies and behaviors. Reflecting CPS Energy's commitment to the community, the portfolio includes multiple program options for residents living in apartments, renters, and low to moderate income customers.

*Picture 1: Customer Care Fair*



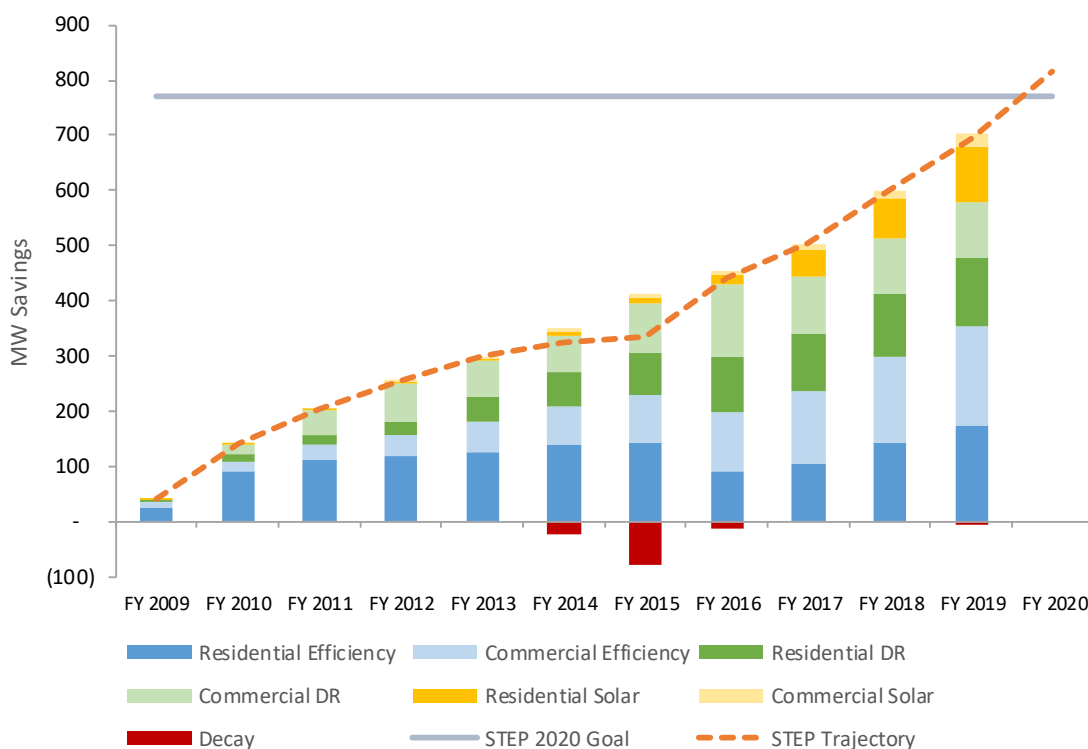
Source: CPS Energy

Further, the evolution of the STEP portfolio since its inception has generally been consistent with broad industry trends toward decarbonization and the adoption of distributed and renewable resources. The focus on demand reduction, as opposed to energy savings, and inclusion of solar energy, puts CPS Energy in a strong position to explore future demand side management opportunities. Such future programs may also expand the options available to customers, support market and economic growth, and facilitate CPS Energy's "Flexible Path" strategy, which relies on a diversity of technologies and approaches to meet the Greater San Antonio Area's future power needs.

***Through FY 2019, CPS Energy's efforts have resulted in cumulative demand savings of 714 MW. This is higher than the annual output of two natural gas combined cycle units.<sup>1</sup>***

This report only includes data that has already been verified by third-party evaluators. As such, any data from FY 2020 or later are not included. Where projections are used, they are discussed as such. Figure 1 highlights the increase in demand savings over time and the current trajectory to achieve the 771 MW goal in FY 2020 of the program - one year early.

Figure 1. Cumulative Demand Savings (MW)



As shown above, the largest contributors to the demand goals are the residential and commercial energy efficiency programs, followed by the demand response (DR) programs. On an annual basis, the DR programs contribute the greatest demand savings, but because they are only triggered on peak days, the savings do not accumulate year after year as is the case when installing high

<sup>1</sup> This is roughly equivalent to the power of two advanced natural gas combined cycle (ANGCC) units, which are rated at 320 MW each. <https://www.eia.gov/todayinenergy/detail.php?id=39912>

efficiency equipment. The difference between the program types is a strength, as the DR programs can respond quickly to shed load when needed for reliability or cost control, while the energy efficiency programs reduce the overall system load across all hours.

The solar programs are also experiencing strong growth. CPS Energy's suite of solar programs provides a range of alternatives to customers interested in solar energy, including customers without the ability to host solar (through Roofless Solar) and those without the ability or desire to self-finance deployment (through SolarHostSA), while still supporting the traditional solar contracting and ownership model with its rebate program.

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***Collectively, peak demand savings from the solar programs grew over 500 percent since FY 2012.***

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*Picture 2. SolarHostSA Installation*



Source: CPS Energy

In addition to reducing demand, the programs saved an annual gross total of 1.4 TWh of electricity in FY 2019, resulting in carbon emission reductions of approximately 771,000 tons. This has the same emissions benefit as taking approximately 148,000 passenger vehicles off of the road for the year, planting nearly 11.6 million trees, or preserving 1.2 times the total National Forest and Grasslands area in Texas.<sup>2</sup> Table 1 highlights the emissions reductions over time, including particulates that contribute to air pollution. Across all years so far, STEP has yielded a total net of 6.3 TWh of energy savings, resulting in 3,366,000 tons of carbon emissions reductions. This is equivalent to approximately 648,000 passenger vehicles off the road for a year or planting more than 50.5 million trees.

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<sup>2</sup> Calculated by entering into EPA's greenhouse gas equivalencies calculator. For the trees, it is carbon sequestered over 10 years. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>



*Table 1. Annual First-Year Emissions Reductions*

Emissions	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
CO <sub>2</sub> (tons)	44,506	45,788	36,798	46,382	65,922	56,816	73,707	58,486	112,966	121,470	120,481
NO <sub>x</sub> (lbs)	60,094	65,405	43,317	43,362	52,197	48,108	58,174	49,911	118,862	105,487	113,118
SO <sub>2</sub> (lbs)	164,547	142,234	107,033	115,482	81,015	89,328	130,619	96,533	300,183	209,277	223,057
PM <sub>2.5</sub> (lbs)	4,416	4,318	3,106	3,994	5,098	4,262	6,339	4,605	9,386	9,712	8,313

CPS Energy achieved these results cost-effectively and at a cost roughly 15 percent below the budget cap, resulting in significant savings for CPS Energy customers.

**For every \$1 invested in STEP, there is \$1.93 in benefit. In aggregate, the portfolio generated a total of \$553 million in net benefits, putting downward pressure on electric revenue requirements.**

The impact of such programs on utility revenue requirements is commonly measured by the Utility Cost Test (UCT) ratio. The UCT ratio divides the present worth of program benefits (specifically the avoided costs of supplying energy and capacity) by the program costs. A UCT ratio greater than 1.0 indicates that the benefits of the program exceed the costs.

The UCT ratio for the STEP portfolio has been above 1.0 in all years, averaging 1.9 across all years, and has been trending steadily upward. Table 2 presents the annual UCT test results by program year.

*Table 2. Annual STEP Utility Cost Test (UCT) Ratios*

Program Type	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Efficiency			2.41	1.17	0.83	1.54	1.27	1.31	1.50	1.55
Commercial Efficiency			2.38	1.76	2.24	3.82	3.67	2.98	3.08	3.06
Residential DR			1.59	2.16	2.87	0.81	1.38	1.80	2.76	3.49
Commercial DR			1.11	0.94	0.93	1.34	2.37	2.26	2.54	2.29
Residential Solar			0.82	0.55	0.82	1.12	1.13	1.43	2.70	3.30
Commercial Solar			0.74	0.76	0.92	1.30	1.44	1.28	2.34	6.54
<b>STEP Total</b>	<b>1.51</b>	<b>1.26</b>	<b>1.22</b>	<b>1.53</b>	<b>1.59</b>	<b>1.51</b>	<b>1.72</b>	<b>1.86</b>	<b>2.25</b>	<b>2.68</b>

Additionally, the STEP program is supporting the Greater San Antonio Area's economic growth. STEP provides jobs for local trade allies and incentives for participants to invest in a variety of energy efficient and clean energy technologies. These investments grow the market for energy services while producing significant bill savings for participants, which allows for greater consumer spending by households and continued investment by local businesses. These benefits are expected to grow over time as the bill savings persist, resulting in a cumulative \$3.1 billion in economic value for the Greater San Antonio Area through FY 2048.

**Cumulatively, between FY 2009 and FY 2019, STEP programs are estimated to have generated 7,500 local job-years and \$642 million in economy-wide benefits, including \$312 million in labor income.**

As evidenced by its numerous awards, CPS Energy, enabled by STEP, has significantly ramped up the level of demand savings achieved in a relatively short amount of time. The past decade of programs have provided valuable experience and offer a robust framework for future expansion and innovation.

*Picture 3. Rebates for School DR Projects*



Source: CPS Energy

## I. STEP ACHIEVEMENTS

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The San Antonio City Council created STEP in 2009 in support of its environmental and economic goals.<sup>3</sup> The ordinance requires CPS Energy to save 771 MW of demand by 2020 at a cost of no more than \$849 million.

The STEP Program is exceeding expectations by delivering savings faster than predicted and at a lower cost. This achievement is a testament to the ability of CPS Energy to engage the community, articulate the benefits of saving energy, and make it easy for Greater San Antonio Area residents to participate in programs. These benefits include:

- Lowering participating customers' energy use and monthly bills
- Reducing fuel costs for all customers
- Delaying or avoiding the need for costly new generation capacity and the transmission infrastructure to serve it
- Supporting job creation and economic growth
- Reducing carbon emissions and air pollution

CPS Energy offers myriad opportunities for residents to save energy, ensuring that nearly all customers have an opportunity to participate regardless of their location within the city, their housing status (renters or homeowners), or socio-economic status. CPS Energy's programs fall into three general categories, providing a diversity of options:

- Energy efficiency
- Demand response (DR)
- Solar energy

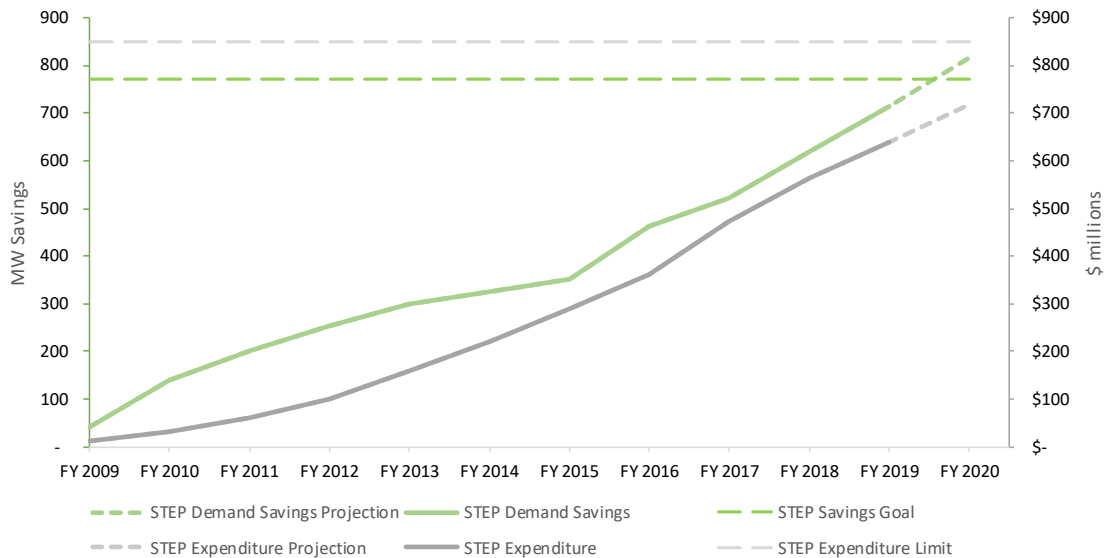
This report only includes data that has already been verified by third-party evaluators. As such, any data from FY 2020 or later are not included. Where projections are used, they are highlighted as such.

Taken together, through FY 2019, the STEP portfolio achieved 92 percent of its 2020 demand savings goal, reducing demand by 714 MW at 76 percent of the budget, for a total cost of \$641 million over the ten-year period. Based on the trajectory of savings, it is anticipated that the 2020 goal will be achieved at roughly 85 percent of the cost cap, as illustrated in Figure 2.

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<sup>3</sup> City of San Antonio Ordinance [#2009-05-21-399](#)

Figure 2. Cumulative STEP Performance and Goals



This review of STEP performance begins with an analysis of the entire STEP portfolio as a whole. Later sections provide an analysis on a program-by-program basis.

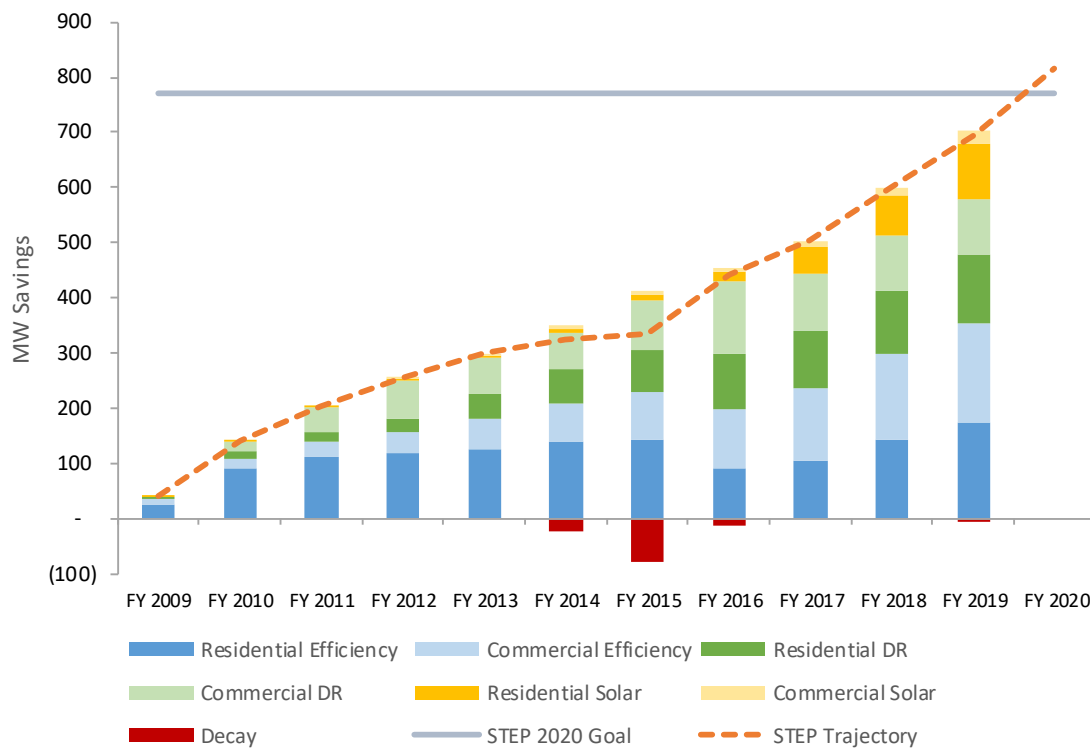
## Demand and Energy Savings

STEP achieved two main types of savings: demand savings and energy savings. Demand is how much power is used at any given moment in time, which is measured in Watts (W), and energy is the power used over a specific period of time, which is measured in Watt-hours (Wh). The ordinance establishing STEP specifies non-coincident peak demand savings of 771 MW by the year 2020 but does not set a goal for energy savings.

### Demand Savings

The cumulative demand savings from STEP have increased steadily over the years of the program, reaching a total of 714 MW in FY 2019, as seen in Figure 3. This represents the total amount of demand saved thus far for each year of implementation and the progress towards the goal. As visible in the trajectory in Figure 3, CPS Energy is set to achieve the plan's goal by 2019 (FY 2020) a year early.



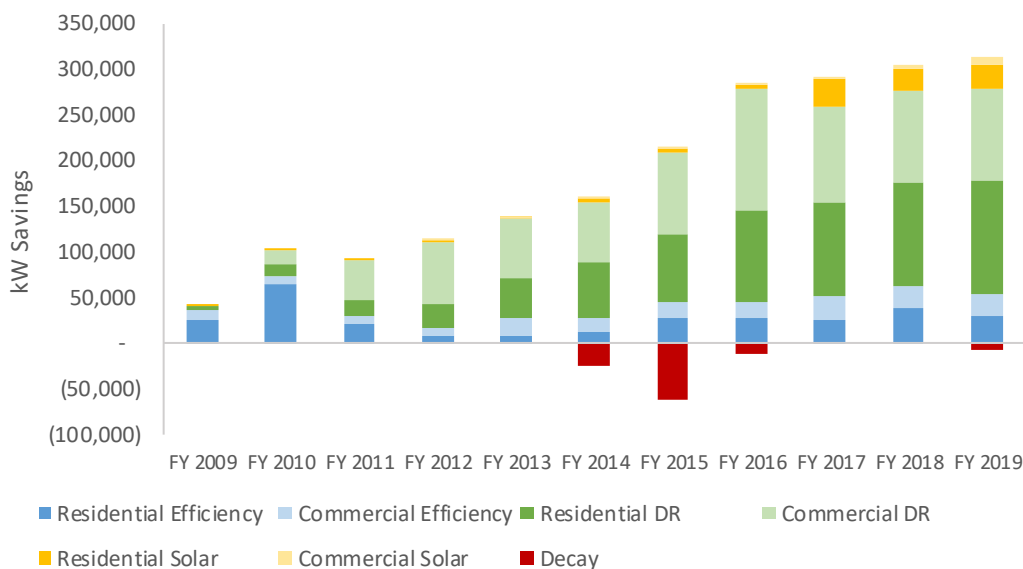
Figure 3. Cumulative STEP Demand Savings<sup>4</sup>

The annual incremental demand savings from STEP have increased close to three-fold in recent years as compared to the initial years. Annual incremental demand savings are approximately 306 MW per year in FY 2019, equivalent to approximately 6 percent of CPS Energy's retail system peak demand.

Figure 4 presents an annual view of STEP savings, showing the incremental savings achieved in each year.

<sup>4</sup> Decay represents the demand savings that are no longer active as an efficient measure reaches the end of its life. In the specific case above, new demand savings are added between FY 2009 and FY 2011 due to conversion of lighting from conventional incandescent bulbs to Compact Florescent Lights (CFLs). These savings decay when those measures reach the end of their life in FY 2014 to FY 2016. However, the loss of these measures allowed savings to be recaptured with more efficient LED lighting measures in the following years.

Figure 4. Annual STEP Demand Savings



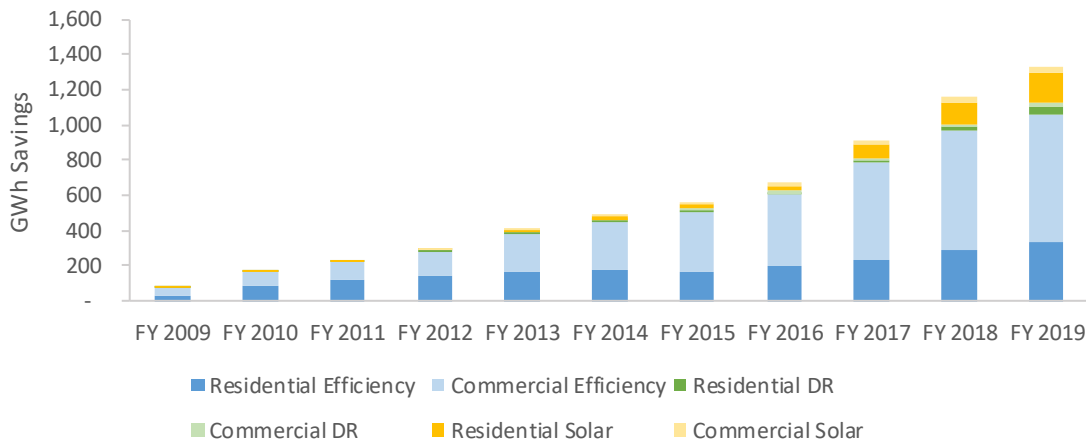
Except for the initial year, DR programs have contributed the greatest to annual savings, as shown in the green portions in Figure 4. Based on FY 2019 program results, the largest DR programs in terms of annual peak demand savings are the Smart Thermostat programs for residential customers and C&I Demand Response for business customers.

DR programs have the explicit focus of shifting or reducing the demand for power at times of system peak, which typically occurs on the hottest summer days when the need for air conditioning is highest. The savings from DR programs are considered to have a single year lifetime, meaning that the savings are only counted in the first year. However, all participants can be counted as participating in each year, even if they have participated in previous years. In contrast, for efficiency and solar measures, any associated demand savings are spread across all years of the measure's life, which can range from five to 25 years.

## Energy Savings

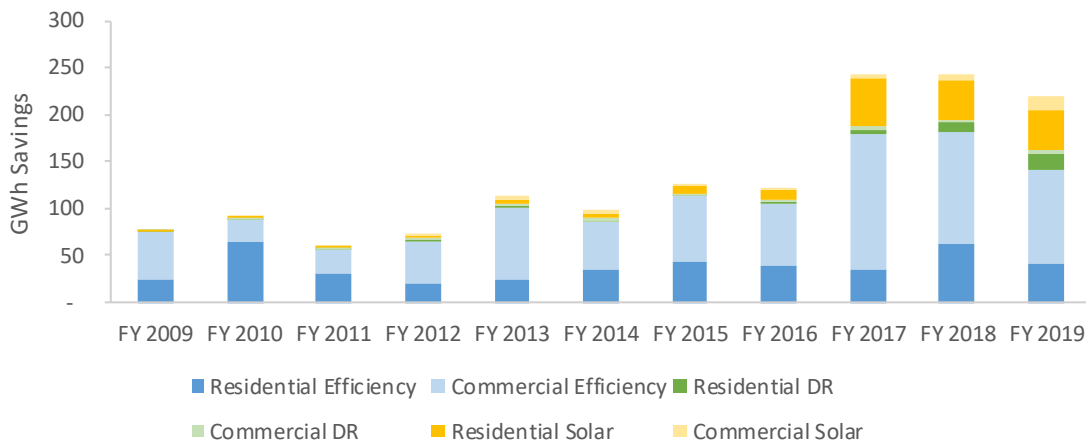
CPS Energy has significantly increased energy savings over the years, reaching an annual gross total of 1.4 TWh in FY 2019 for all active measures<sup>5</sup>. Shown in Figure 5 are the annual net total energy savings. This is enough energy to power roughly 104,000 Greater San Antonio area homes for the year. Across all years of STEP so far, this has resulted in 6.3 TWh of energy savings. Because energy efficiency focuses on lowering total energy usage through more efficient equipment and behaviors, those programs contribute the most to the total energy savings. The contribution of solar programs is also growing, as more households and businesses adopt solar, which is accelerating the overall portfolio savings achieved relative to expectations. DR programs are the smallest contributors as their focus is on demand and they are only active during a limited number of hours per year.

<sup>5</sup> The annual gross total of 1.4 TWh comes to an annual net total of 1.3 after accounting for free ridership and other adjustments in the net-to-gross ratio used to determine realized savings.

Figure 5. Annual Active Total STEP Energy Savings<sup>6</sup>

Annual first-year energy savings have increased significantly in recent years, reaching nearly 220 GWh per year, as shown in Figure 6. First-year energy savings account for only energy savings in that year from measures newly installed in that year. This is equivalent to approximately 1 percent of CPS Energy's annual retail sales, which is significant because many utilities have yet to reach the 1 percent benchmark and many of the utilities who are achieving this level of savings have been consistently operating programs for much longer than CPS Energy.

Figure 6. Annual First-Year STEP Energy Savings



This dramatic increase in annual savings is partly explained by the addition of measures to the program mix that yield greater energy savings, such as water conserving faucet aerators and low-flow showerheads plus water heater and piping insulation. The single largest program type contributing to the annual energy savings has been commercial efficiency. The proportion of annual

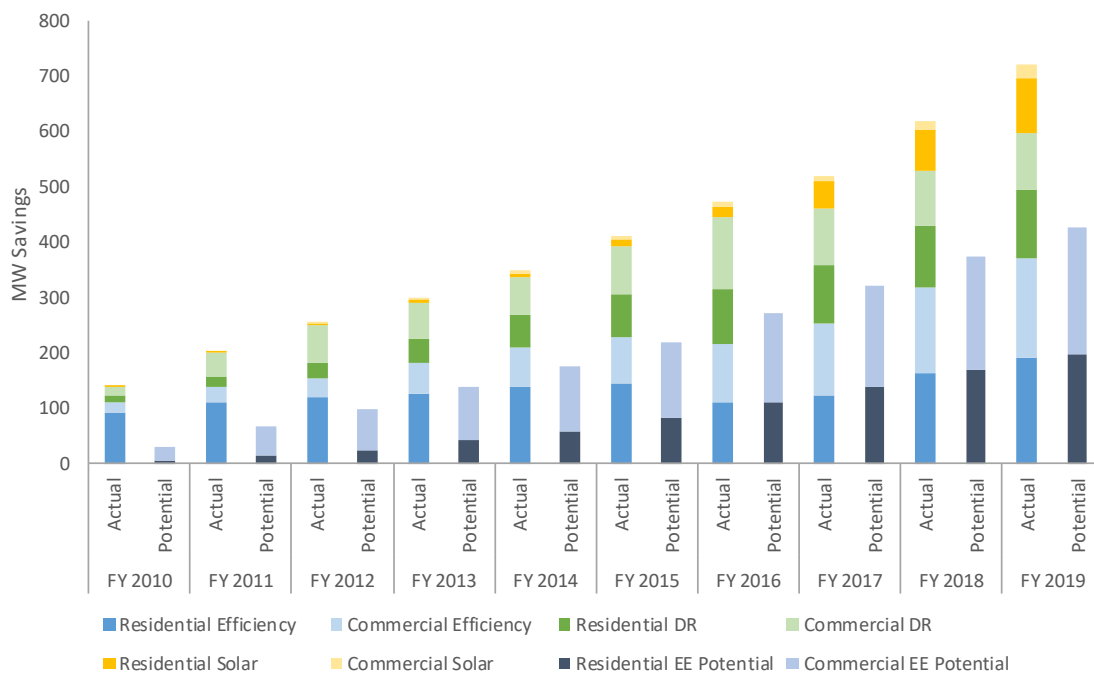
<sup>6</sup> Annual active total energy savings means the total energy savings in that year from all measures that remain active from STEP. Through FY 2013 this equates to a sum of all the annual first-year values. In FY 2014 the residential lighting measures begin to reach the end of their lifetime and no longer contribute new energy savings. By FY 2019, the annual active total energy savings exclude the first three years of residential lighting and the first year of commercial lighting because of measures reaching end of life.

energy savings from commercial efficiency programs has fluctuated over time but has increased significantly in recent years.

### Comparison to Potential Study

CPS Energy's achievements are exceeding what a 2008 potential study estimated would be feasible and cost-effective.<sup>7</sup> As illustrated in Figure 7, the demand savings achieved through residential efficiency programs have exceeded the potential estimates every year. The commercial efficiency programs have performed below the potential estimates, although in recent years they have been closing the gap. The savings associated with the DR and solar programs have more than made up for any shortfall in the commercial efficiency programs.

Figure 7. Cumulative STEP Demand Savings vs. 2008 Potential Study



### Cost-Effectiveness

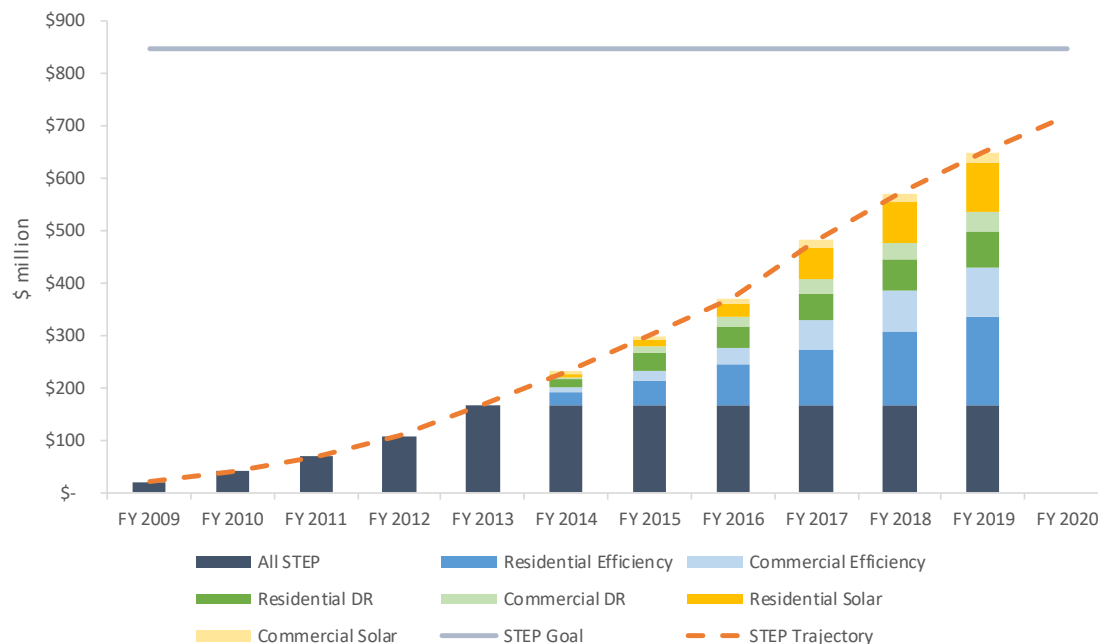
The STEP ordinance specifies a maximum cost of \$849 million through the year 2020.<sup>8</sup> As suggested by the trajectory in Figure 8, STEP expenditures to date have been tracking below the anticipated expenditures and are expected to remain below going forward, with total projected costs of approximately \$719 million.

<sup>7</sup> Nexant (2008), *Demand Side Management Potential Study*. The 2008 potential study only included energy efficiency, so STEP's actual DR and solar demand savings are separate from those included in the potential study.

<sup>8</sup> City of San Antonio Ordinance [#2009-05-21-399](#)



Figure 8. Cumulative STEP Expenditure



### Utility Cost Test

The impact of the programs on the present worth of future utility revenue requirements is often evaluated using the Utility Cost Test (UCT) ratio. The UCT ratio is the benefits, defined as the avoided cost of energy and demand, divided by the direct program costs. A UCT ratio greater than 1.0 indicates that the benefits of the program or portfolio exceed the costs.

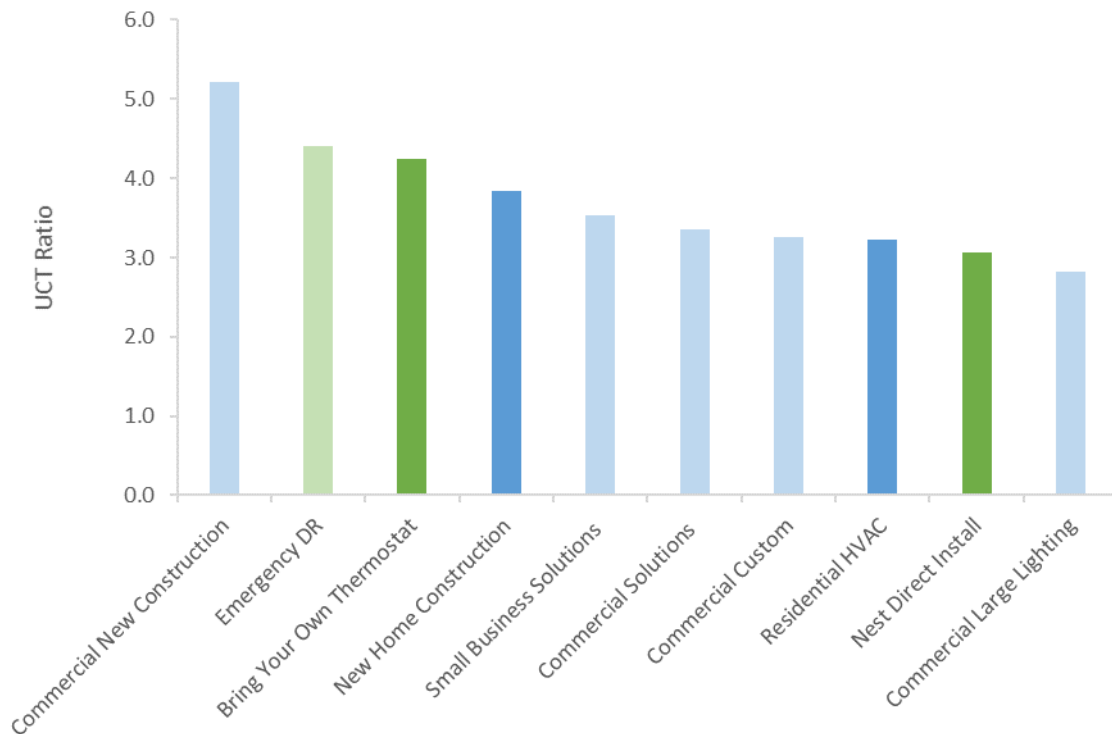
The UCT ratio for the STEP portfolio has been above a 1.0 in all years and has been improving steadily each year, as shown in Table 3. The FY 2019 UCT ratio of 2.68 means that for every \$1 invested by CPS Energy, there is \$2.68 in direct benefits. The large jump seen for Commercial Solar between FY 2018 and FY 2019 is due to an increase in the size of the projects in FY 2019 compared to previous years. This increase in size paired with the rebate cap for commercial solar projects resulted in savings doubling to quadrupling while costs decreased slightly.

Table 3: Annual STEP Utility Cost Test (UCT) Ratios

Program Type	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Efficiency			2.41	1.17	0.83	1.54	1.27	1.31	1.50	1.55
Commercial Efficiency			2.38	1.76	2.24	3.82	3.67	2.98	3.08	3.06
Residential DR			1.59	2.16	2.87	0.81	1.38	1.80	2.76	3.49
Commercial DR			1.11	0.94	0.93	1.34	2.37	2.26	2.54	2.29
Residential Solar			0.82	0.55	0.82	1.12	1.13	1.43	2.70	3.30
Commercial Solar			0.74	0.76	0.92	1.30	1.44	1.28	2.34	6.54
<b>STEP Total</b>	<b>1.51</b>	<b>1.26</b>	<b>1.22</b>	<b>1.53</b>	<b>1.59</b>	<b>1.51</b>	<b>1.72</b>	<b>1.86</b>	<b>2.25</b>	<b>2.68</b>

Figure 9 presents the average UCT ratio across all program years for the top performing programs with regard to UCT.

Figure 9. Average UCT Ratio for Top Performing Programs



Until recently, each year a few program types tended to outperform all others by a large margin, though which program types outperformed would vary across the years. In recent years this variation has diminished, as the UCT ratio has generally improved for all program types.

### Cost of Savings

The acquisition cost of savings is the total program cost divided by the total demand or energy savings and is expressed as \$/kW or \$/kWh saved. These metrics must be interpreted carefully since they attribute all costs to either the demand or energy savings and not both at once. The purpose of this is to allow comparison between the STEP savings and market costs of other resources. While demand savings and the cost of demand savings are the priority for the Greater San Antonio Area, the cost of energy savings has been evaluated as well.

### Cost of Demand Saved

The annual cost of lifetime demand savings is quite variable across the years of STEP implementation, as visible in Figure 10. The average cost of demand saved was roughly \$87/kW-yr, which is slightly above the ERCOT avoided capacity cost but, as previously indicated, this does not also account for the energy savings.

Figure 10. Annual STEP Cost of Demand Saved

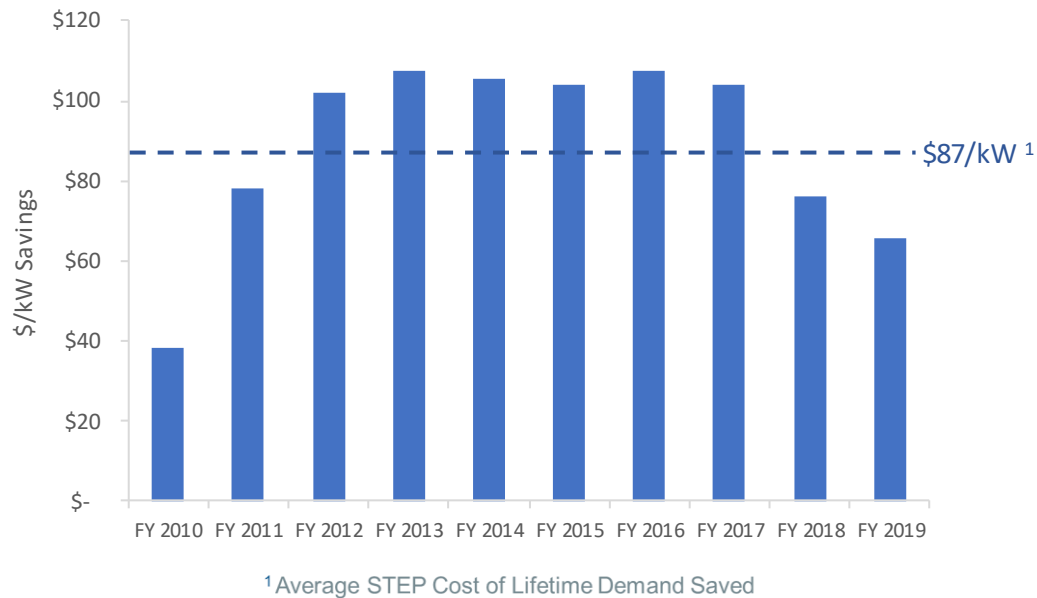


Figure 11 shows the top performers in terms of cost of demand saved.

Figure 11. Average Cost of Demand Saved for Top Performing Programs

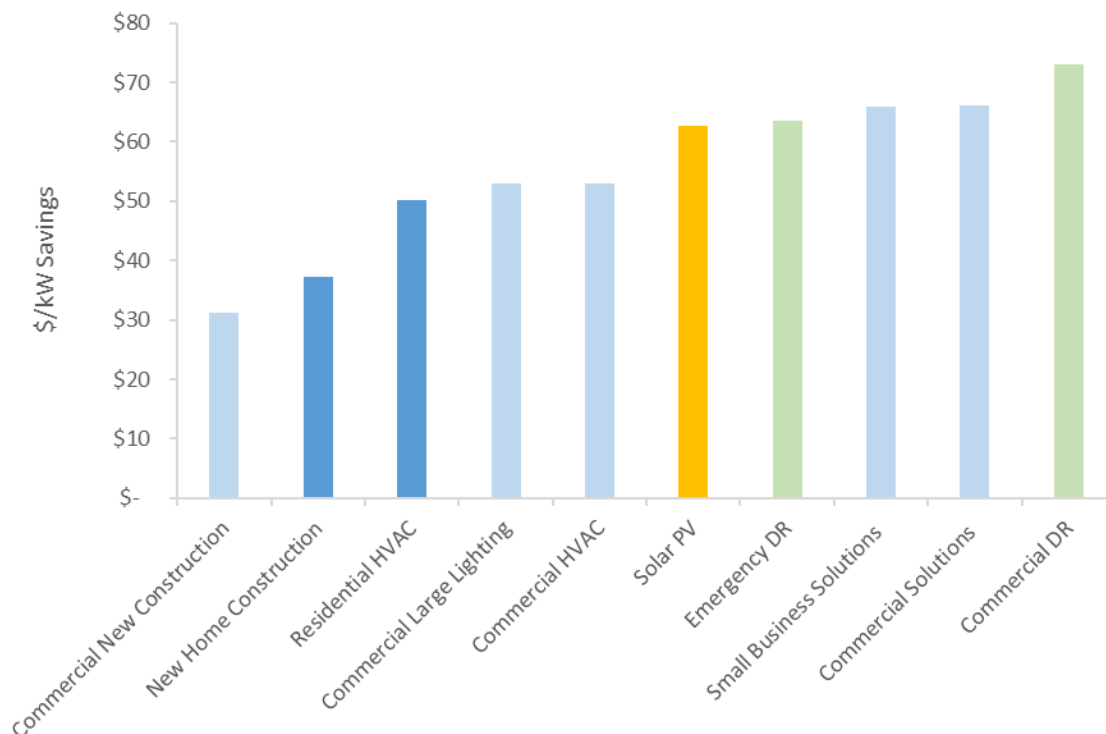
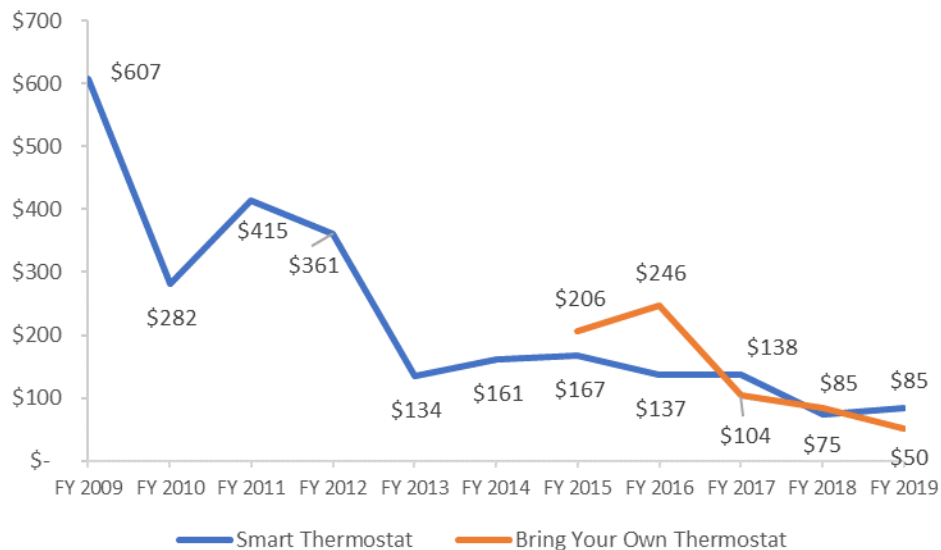


Figure 12 below provides another look at the improvement in program cost over time, specifically for the thermostat-based programs. The chart measures the \$ per kW saved on a lifetime basis. This illustrates the improvements in cost of acquisition for the programs over time.

Figure 12. Annual Thermostat Program Cost of Demand Saved

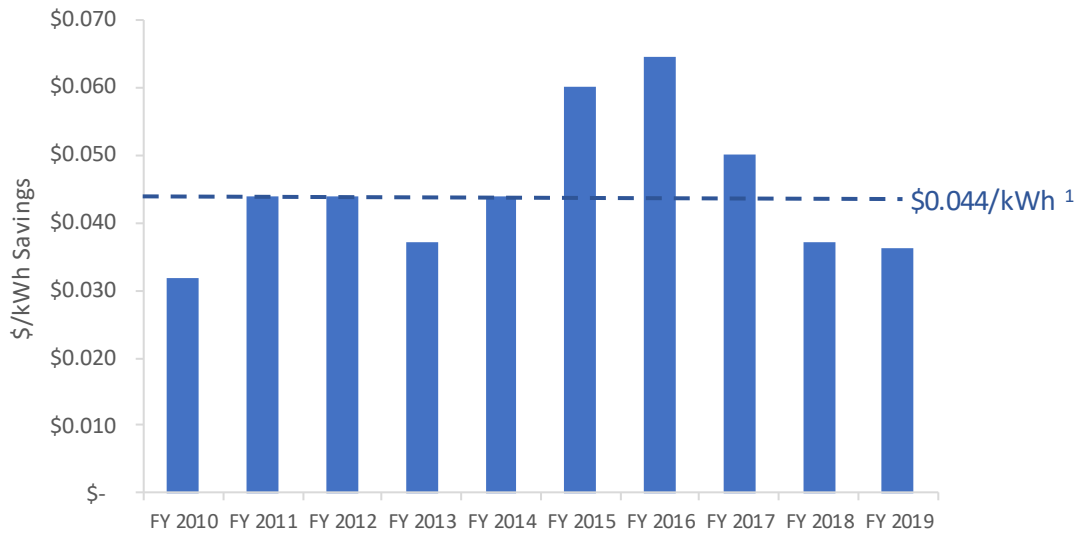


### Cost of Energy Saved

The annual cost of lifetime energy savings is somewhat less variable than the corresponding demand cost but still shows a wide range of values over time, as seen in Figure 13. In the case of the cost of energy savings, the average was \$0.044/kWh. Relative to other programs in the U.S., this cost of energy saved is on the higher end of the spectrum, but this is somewhat misleading as CPS Energy's goals are based on demand reduction not energy savings and features a strong mix of DR programs, which typically have low or no energy savings. Additionally, CPS Energy's portfolio includes a large low-income focused weatherization program, which meets an important community need, but has higher program costs.



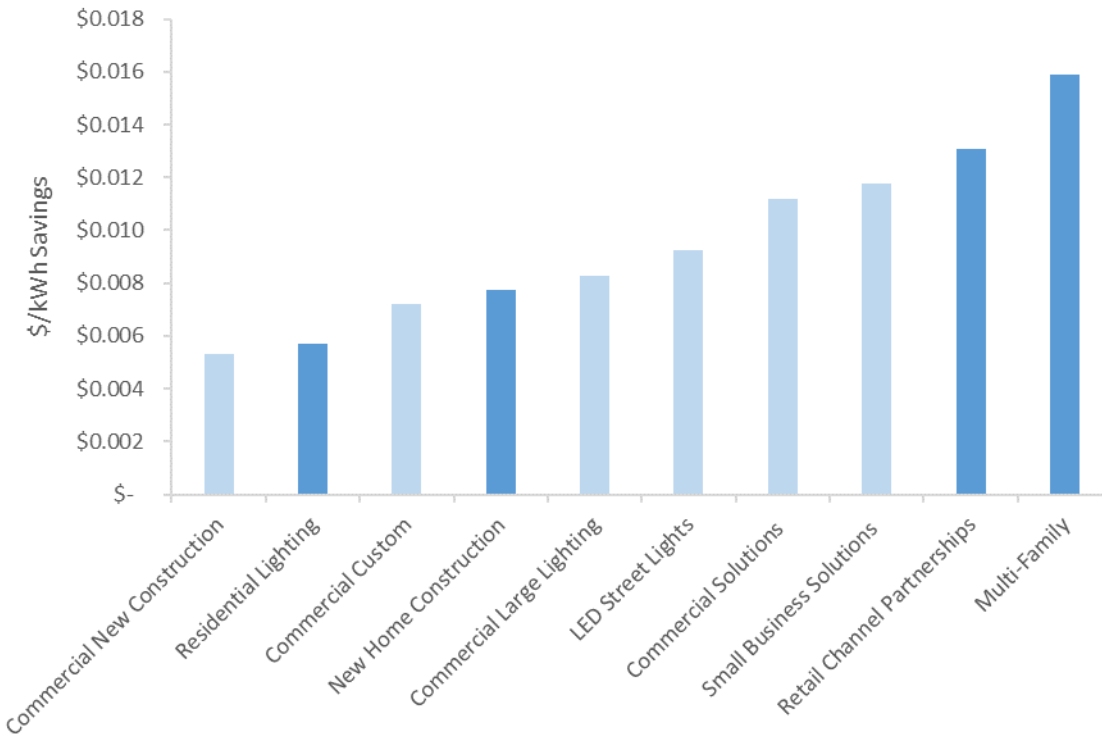
Figure 13. Annual STEP Cost of Lifetime Energy Saved



<sup>1</sup> Average STEP Cost of Lifetime Energy Saved

Figure 14 provides a more detailed view of the average cost of energy saved across program years for the top performing programs.

Figure 14. Average Cost of Energy Saved for Top Performing Programs



## Community Benefits

In FY 2019, STEP programs had a total of 275,000 customer interactions, with a total close to 1.4 million over the lifetime. This work with the community has provided significant benefit for customers of CPS Energy and for the region.

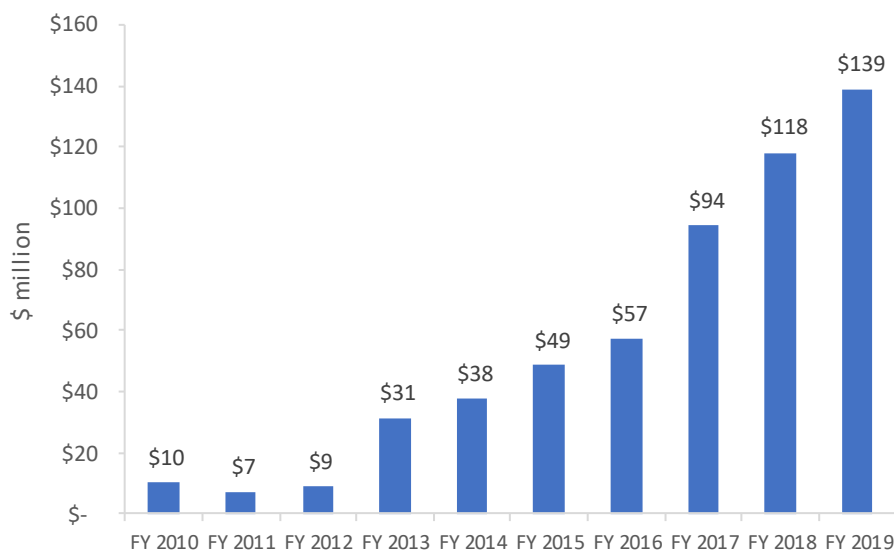
There are three main forms of benefits that STEP has provided to the community of San Antonio; financial benefits that come through as customer bill savings, local economic benefits in the form of jobs and boosts to the local economy, and environmental benefits from the reductions in emissions. Each of these are broken down in more detail in the following sections.

### Financial Benefits

At the core of the community benefits are the financial benefits STEP provides to all Greater San Antonio Area residents. The standard way to measure the net financial benefits of energy conservation programs is to compare the costs avoided by the programs (that is, the costs that are saved by not needing to serve the conserved load) with the total cost to administer the program. CPS Energy refers to the difference between the present value of avoided costs over the lifetime of the measure and the program costs as the Reduction in Revenue Requirements (RRR), and is also referred to as the program net benefits. It represents the reduction in costs that CPS Energy will not need to collect from its customers, potentially putting downward pressure on revenue requirements.

As shown in Figure 15, the RRR has increased each year, resulting in significant cost savings to CPS Energy's customers. STEP has generated a total of \$553 million in net benefits, peaking at \$139 million in the 2019 fiscal year. Values listed in Figure 15 are the annual lifetime net savings from measures installed in each year. The increase year on year is due to increased savings paired with smaller increases in expenditure.

Figure 15. Reduction in Revenue Requirement (RRR) from STEP



### Local Economic Benefits

The STEP program is successfully supporting economic growth in the Greater San Antonio Area. STEP provides incentives for participants to invest in a variety of energy efficient and clean energy technologies. It is estimated that between FY 2009 and FY 2019, STEP programs have generated 7,500 local job-years (i.e. provided a year of employment for 7,500 people), \$312 million in labor

income, and \$362 million in added gross regional product. Taking into account the expected lifetime of the equipment installed through the program, local job creation will continue through approximately FY 2048 with a cumulative 23,440 net job-years and \$1.7 billion in value added in the Greater San Antonio Area, including \$1.1 billion in net labor income. On average, the annual net impact of the program is 590 jobs and \$27 million in income between FY 2009 and FY 2048.

To evaluate the economic impact of STEP, the IMPLAN model was used to estimate how investments, savings, and costs of STEP have impacted the Greater San Antonio Area economy. The IMPLAN model is a widely-used economic impact model that traces spending through an economy and measures the cumulative effects of that spending on pre-specified economic regions, in this case the eight-county San Antonio Metropolitan Statistical Area (MSA). The model captures the fact that sectors are interdependent: one industry may purchase inputs from other industries and households (e.g., labor), and then produce and sell outputs to other industries, households, and government entities. Therefore, economic activity in one sector can cause an increased flow of money throughout the economy.

IMPLAN's outputs include three types of impacts on the economy:

- **Direct impacts**, which are impacts in the primary industries where investments made by STEP and its participants are focused. For example, installing rooftop solar requires direct construction jobs.
- **Indirect impacts**, which are impacts in the industries that supply or interact with the primary industries. For example, building new energy efficient structures requires the purchase of construction-related building materials, which requires workers and output from sectors producing those materials.
- **Induced impacts**, which represent increased spending by workers who earn money due to the proposed projects, such as when construction workers use their wages at local restaurants.

STEP, over its lifetime and beyond, has impacted the region through multiple pathways, from investments in running the program to electric bill savings that result from the program. Direct spending activities by CPS Energy and STEP participants included in the analysis are shown in Table 4. Administration and marketing, incentive investments, bill savings, and DR payments are derived from STEP data. Participant investments were estimated using assumptions about the percent of total spending on a particular measure typically covered by an incentive, with the assumption that the participant pays the remainder.

Table 4. Economic Analysis Inputs, FY 2009-FY 2019 (\$ million).<sup>9</sup>

Factors Increasing Consumer and Business Spending:			
Input Category	Description	Net	Gross
Admin & Marketing	Spending by CPS to run and advertise the program.	\$48	\$48
Incentive Investments	Incentive payments from CPS to program participants.	\$497	\$497
Participant Investments	Investments made by participants in the program.	\$842	\$881
Residential Bill Savings	Residential bill savings due to decreased grid electricity consumption.	\$310	\$338
Commercial Bill Savings	Commercial bill savings due to decreased grid electricity consumption.	\$282	\$316
Residential DR Payments	Payments made by CPS to residential participants in demand-response programs.	\$48	\$48
Commercial DR Payments	Payments made by CPS to commercial participants in demand-response programs.	\$47	\$47
Factors Decreasing Consumer and Business Spending:			
Input Category	Description	Net	Gross
Program Funding	Cost to residents of the Greater San Antonio Area to run STEP. Program funding was collected through increased electricity rates.	(\$640)	(\$640)
Participant Cost	Cost STEP participants to participate in the program. This is the income/revenue spent on energy efficiency upgrades that could have been spent elsewhere in the economy.	(\$842)	(\$881)

Source: CPS Energy, ICF analysis

Commercial and residential bill savings continue for the lifetimes of the products purchased during program years. To account for the impacts of these savings, effective useful life (EUL) from the Texas Technical Resource Manual (TRM) is used to estimate cumulative bill savings for each measure. The longest EUL is 30 years and, therefore, there are cumulative bill savings from FY 2020, when the last measures are installed, to FY 2048. The total bill savings from FY 2020 to FY 2048 are shown in Table 5.

Table 5. Bill Savings, FY 2020-FY 2048 (\$ million).

Input Category	Net	Gross
Residential Bill Savings	\$1,099	\$1,136
Commercial Bill Savings	\$830	\$919

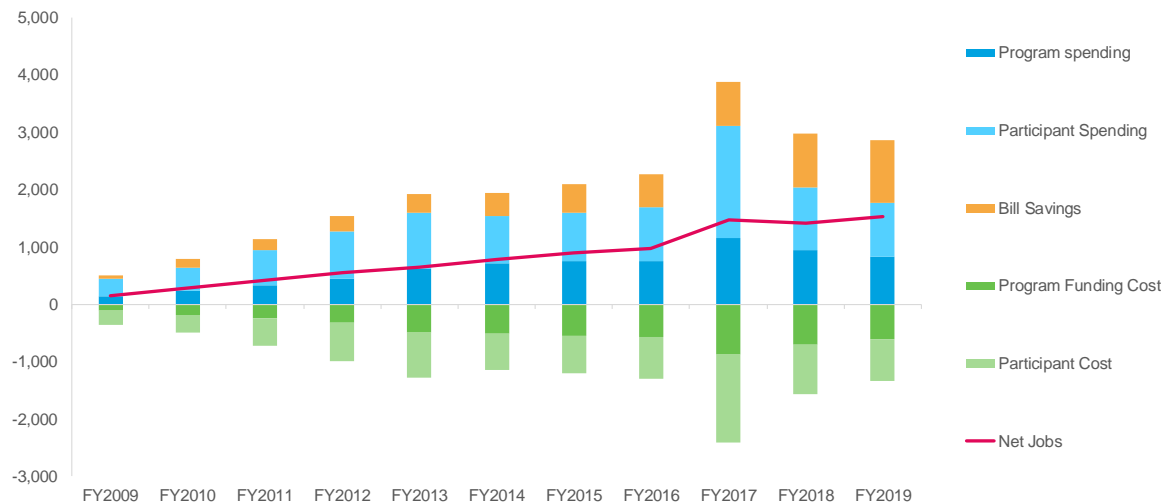
Source: CPS Energy, ICF analysis

<sup>9</sup> Two scenarios were considered when analyzing the impacts of STEP: a net scenario and a gross scenario. The gross scenario considered all the economic impacts supported by activity under the STEP programs, while the net scenario estimated the impacts the program has incentivized, which would not have occurred without the program.



Figure 16 illustrates the annual impact of STEP on local job creation during FY 2009 through FY 2019. Initially, the program's employment impact was small, but as the program expanded and bill savings accumulated, the number of jobs supported increased. The minimal difference between the net and gross scenarios is a result of an assumed small number of free riders.

Figure 16. Annual Local Job Impacts, FY 2009-FY 2019



Source: ICF analysis

Appendix C provides a more detailed discussion of the methodology and assumptions used in this analysis.

### Environmental Benefits

The energy and demand savings from STEP have resulted in significant environmental benefits, including emissions reduction. As with the savings, the cumulative emissions reductions achieved from STEP have climbed steadily across the years, contributing to a cleaner environment.

Picture 4: FY 2019 Gross Emissions Reduction Equivalent Infographic

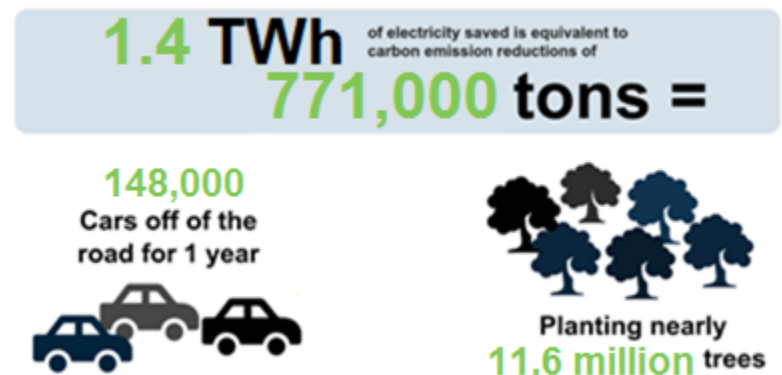


Figure 17. Net Cumulative STEP Emissions Reductions

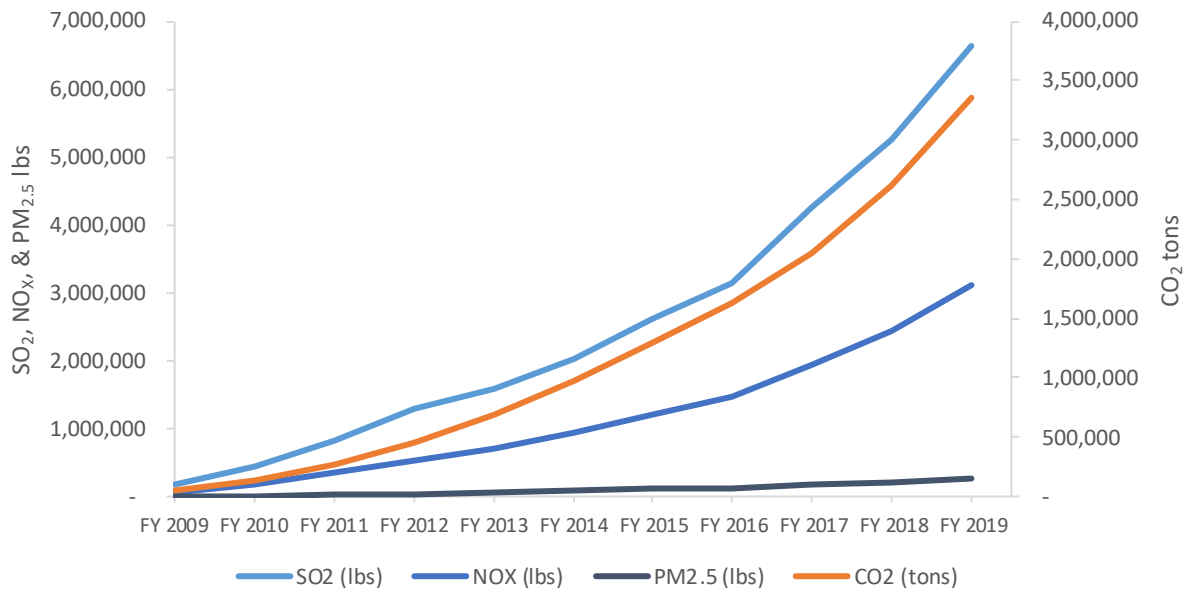


Figure 17 shows the estimated cumulative emissions reductions through each year of STEP.

Figure 18: Annual Net Total STEP Emissions Reductions

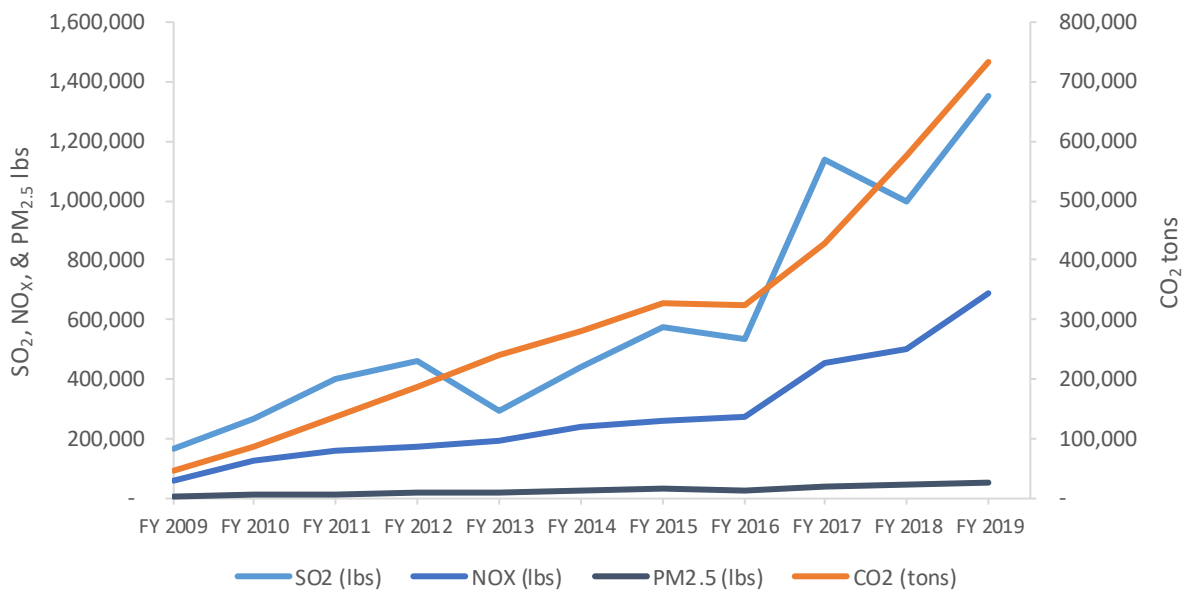


Figure 18 & Table 6 provides a summary of estimated annual emissions reductions in each year from FY 2009 to FY 2019. These emissions reductions account for all measures active in each of the years, not just the first-year savings.

*Table 6. Annual Net Total Emissions Reduction, FY 2009-2019*

	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
CO <sub>2</sub> (tons)	44,506	85,994	137,934	187,498	240,505	282,249	325,395	322,398	428,774	577,723	732,928
NO <sub>x</sub> (lbs)	60,094	122,836	162,368	175,290	190,430	238,987	256,822	275,129	451,150	501,703	688,134
SO <sub>2</sub> (lbs)	164,547	267,127	401,200	466,827	295,569	443,758	576,644	532,127	1,139,372	995,338	1,356,937
PM <sub>2.5</sub> (lbs)	4,416	8,109	11,641	16,145	18,600	21,172	27,985	25,385	35,627	46,192	50,573

The total reduction in carbon emissions of approximately 3,366,000 (short) tons is the equivalent of taking approximately 648,000 passenger vehicles off of the road for one year, planting nearly 50.5 million trees,<sup>10</sup> or preserving 5.3 times the total National Forest and Grasslands in Texas. Appendix D includes more details on carbon emission reduction equivalencies.

<sup>10</sup> Calculated by entering into EPA's greenhouse gas equivalencies calculator. For the trees, it is carbon sequestered over 10 years. <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

## II. PROGRAM PERFORMANCE

As previously noted, CPS Energy has a robust portfolio intended to provide savings opportunities for the full spectrum of customers it serves. CPS Energy has demonstrated its willingness to innovate and test new program concepts that have the potential to meet the needs of its customers and contribute to its demand goals.

Figure 19 identifies the programs with the greatest contributions to CPS Energy's demand savings goals across all years of STEP, while Figure 21 identifies the same for energy savings. Figure 20 and Figure 22 identify the annual contributions by the top five programs for demand and energy savings, respectively. These figures are provided to help gauge the relative ranking of the different programs. The annual contribution figures, Figure 20 and Figure 22, also provide some insight into how the mix of programs shifted over the lifetime of STEP.

*Figure 19. Top 15 Programs by Demand Savings*

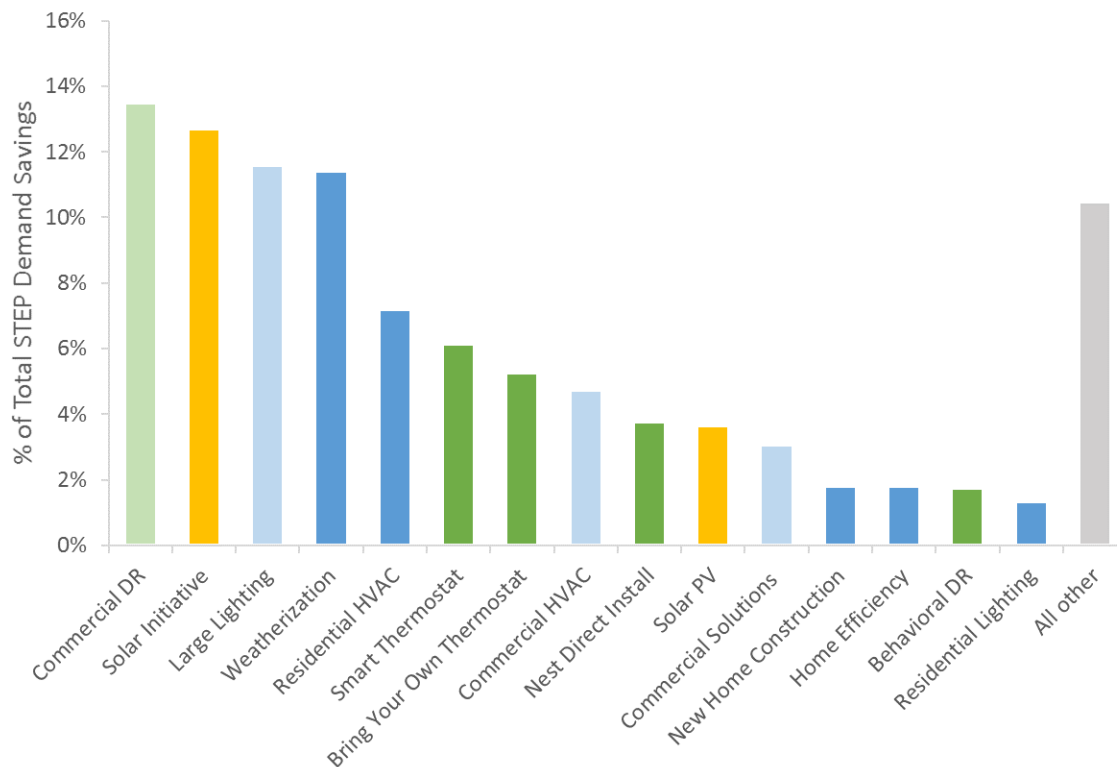


Figure 20. Top 5 Programs Contribution to Annual Demand Savings

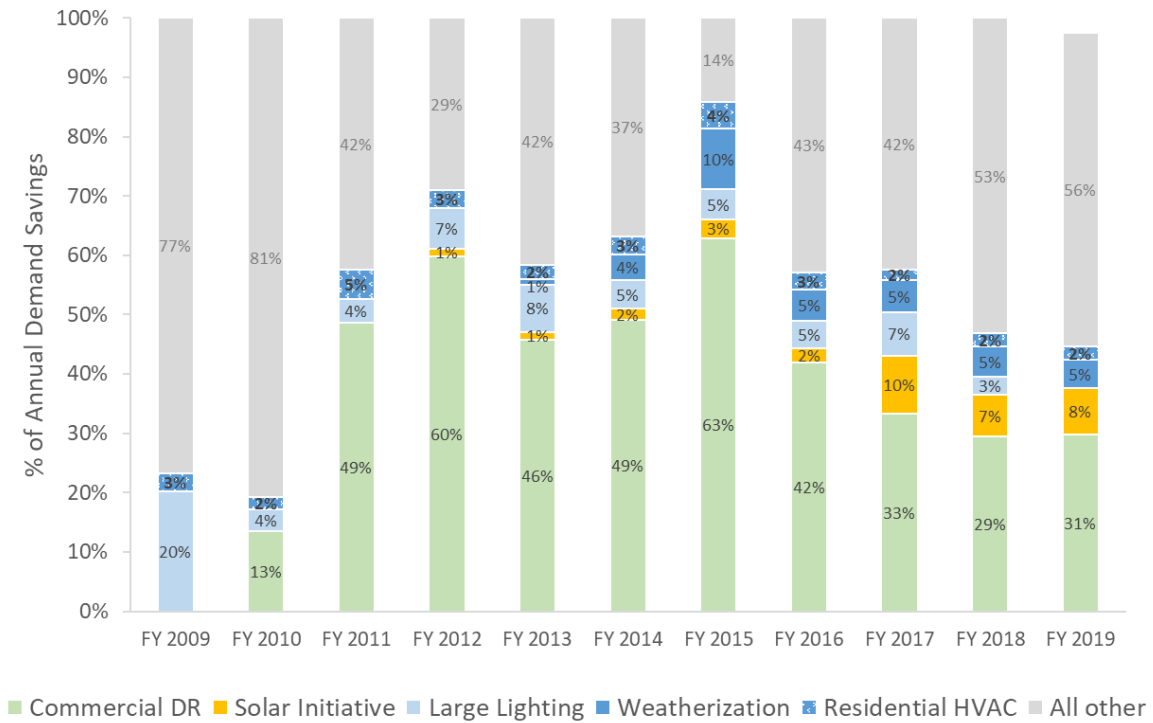


Figure 21. Top 15 Programs by Energy Savings

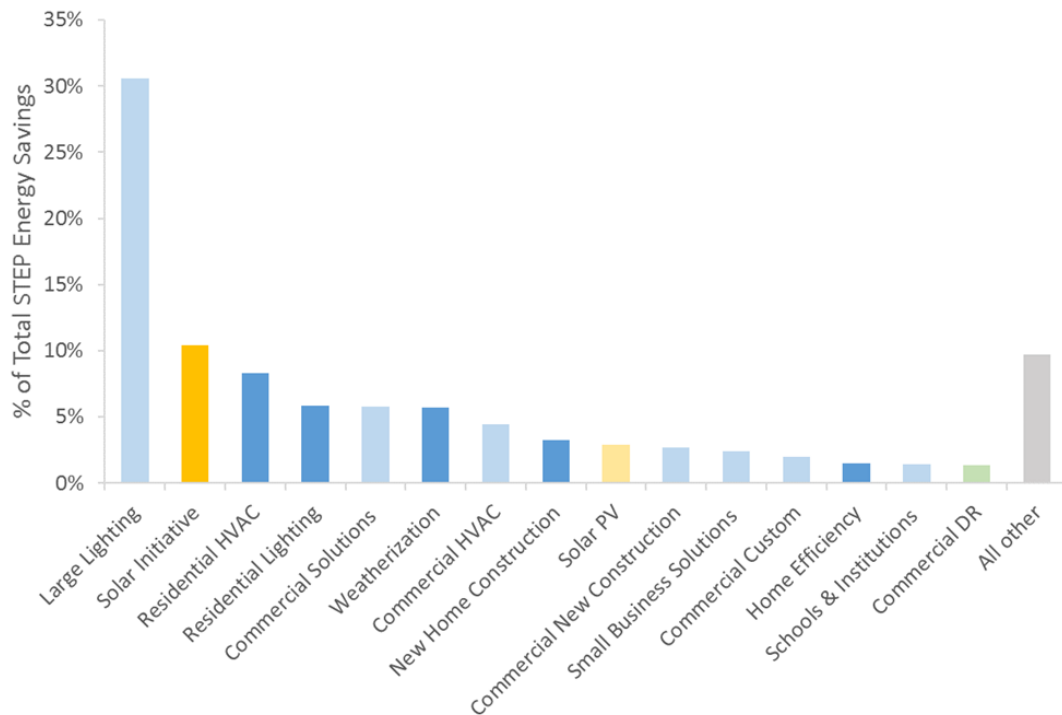
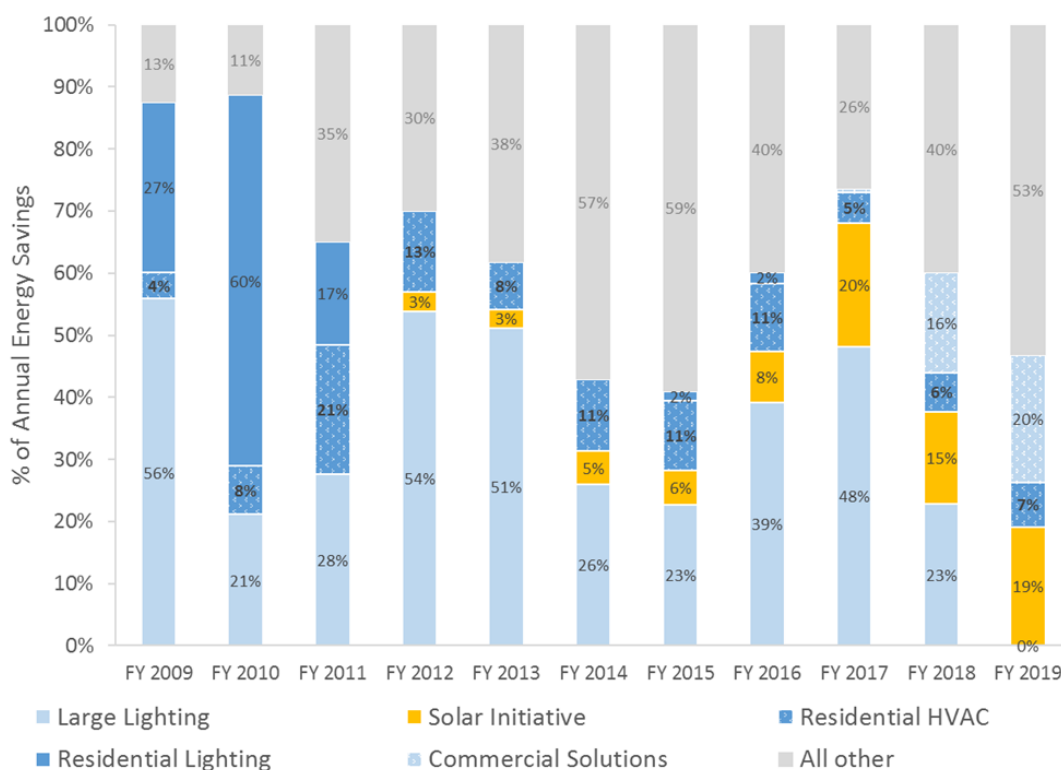


Figure 22. Top 5 Programs' Contribution to Annual Energy Savings



***The flexible nature of the STEP program allows for innovation at the program level by measuring the cost-effectiveness of the portfolio as a whole, as opposed to individual programs. This framework promotes program diversity and the pursuit of less cost-effective programs that serve unmet needs in the community.***

A prime example is the Weatherization program, which is a full-service offering that provides direct installation of a host of energy saving measures for income-qualified residents, helping ensure that low to moderate income residents have affordable energy bills and safer and more comfortable living spaces.

CPS Energy has demonstrated that they are leveraging ongoing program experience to improve programs over time or end programs that have achieved their objectives or are no longer meeting expectations. This is part of the continuous improvement cycle and a mark of a maturing portfolio. For example, CPS Energy made the decision to end the window air conditioner (AC) DR program after two seasons. Given the demand for AC in the Greater San Antonio Area and the prevalence of window units, they are natural targets for a DR program. However, the program could not overcome the challenges, namely that window AC units individually have lower power usage and thus do not provide the scale of savings of centralized systems. Thus, while the program did not produce the desired results, it tested a novel concept and provided useful insights that can inform future program strategy.

The growth and innovation in CPS Energy's STEP portfolio has drawn praise from the industry, including several awards in recent years and enhanced visibility at industry conferences and events.



Table 7. Industry Awards

<b>INDUSTRY AWARDS</b>
2019 - Alliance to Save Energy - <i>Chairman's Award</i> – STEP Program
2019 - Smart Energy Provider – APPA – STEP Program
2018 - Energy Innovator Award - APPA Demonstration of Energy & Efficiency Developments (DEED) – STEP Program
2017 - POWERGRID International Project of the Year - CPS Energy DR Program
2016 - Energy Innovator Award - APPA Demonstration of Energy & Efficiency Developments (DEED) – Solar Program
13 <sup>th</sup> Award - Peak Load Management Load Award for Thought Leadership – Thermostat Special

While there have been many lessons learned during STEP implementation, two key themes have emerged. First, it will be important to continue efforts to minimize free-ridership. In some of the early programs, free-ridership was higher than might be expected based on peer energy efficiency programs. This suggests that programs were paying rebates to a higher than anticipated number of customers who would have made the energy efficiency improvements in the absence of the program. While some degree of free-ridership is often a necessary byproduct of programs that encourage participation by a large number of customers, there are strategies for reducing free-ridership. For example, CPS Energy changed certain program designs and measures offered (e.g. focusing on more efficient but costly lighting that is less likely to be installed without a rebate) and adjusted how the measures are offered, such as changing the lighting program into a midstream program in order to reach more customers that might not already know about or install more efficient options. This review finds that such adjustments were appropriate and timely.

The second theme relates to the program evaluation process. In this case, CPS Energy shifted from a one-off approach in which each year yielded variable results to a more formalized process based on the Texas Technical Reference Manual (TRM). This change has yielded more predictable results and significantly benefited the planning process. It has also made it easier for others, such as regulators and program implementers, to review the evaluation process and provide feedback.

The following sections discuss the relative performance of individual programs, including program-level performance and rebate benchmarking.

## Methodology

The performance of the programs that comprise STEP was evaluated using a range of industry-accepted metrics. These include UCT ratio, net-to-gross (NTG) ratio, cost of demand saved (\$/kW), and cost of energy saved (\$/kWh). The UCT ratio is the avoided cost of energy and demand, divided by the direct program costs. The NTG ratio represents the proportion of customers that would not have purchased the measure or undertaken the action without the rebate provided. The cost of savings is the total program cost divided by the total demand or energy savings. Heat map versions of the data for the cost-effectiveness metrics are provided in Appendix E to allow for easy identification of high and low values.

The report ranks the programs against these individual metrics, as well as takes a view across the metrics to identify the highest and lowest performing programs. Again, as noted above, a lower ranking on any given metric does not imply that a program is “bad” or not worth continuing, but may suggest that its full benefits are not fully captured by these metrics. These cases are noted below where applicable.

## Performance Highlights

CPS Energy’s STEP portfolio consists of 34 programs serving residential, commercial, and industrial customers. The programs can be categorized into three general categories: energy efficiency, DR, and solar. Across these categories, a few programs stand out as high performers based on the metrics evaluated.

The residential space conditioning programs, including the Residential HVAC program and New Home Construction program, are strong performers given that space conditioning coincides strongly with overall system demand and is a major end-use of electricity for the residential sector. Thus, programs that target reductions in AC use typically lead the pack in terms of peak demand savings, energy savings, and cost savings, since it is during peak when power market prices are highest.

Similarly, the residential and commercial DR programs also perform very well, as they target demand savings during peak periods. The C&I DR program contributes the most non-coincident peak demand savings to the overall portfolio at 96 MW in FY 2019, down from a max of 107 MW in FY 2015. The program averaged a UCT ratio of 1.9 over the FY 2012-2019 period, making it a cost-effective way to engage C&I customers in lowering peak demand.

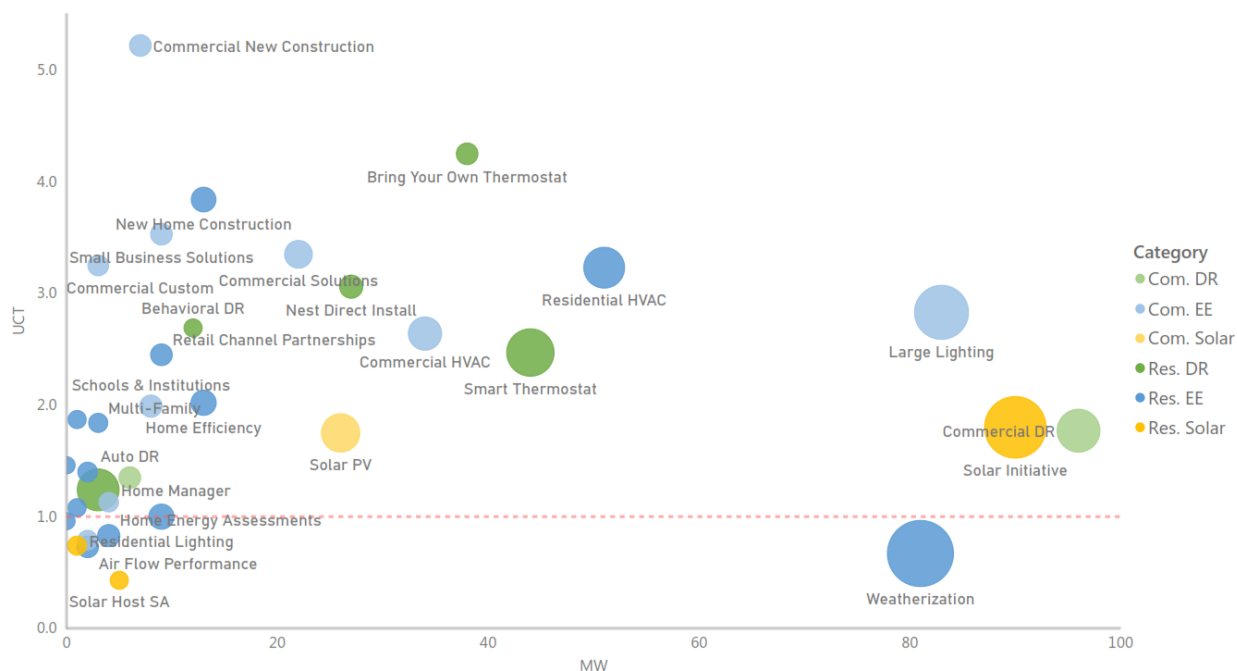
Other programs struggled with low NTG ratios and other challenges. For example, the downstream residential and commercial lighting programs performed poorly in the NTG ratio metric. CPS Energy took corrective action, switching to a midstream model with the rebate applied at the retailer level. This helps promote more efficient options that might not have been purchased otherwise, improves visibility of the program so more individuals participate (beyond those already aware of it), and lowers program costs for rebates and rebate processing.

The metric that best speaks to cost-effectiveness is the UCT, the average of which is shown in Figure 23. The most cost-effective programs are those higher on the chart, such as Commercial New Construction and Emergency DR, while the programs farther to the right are the largest contributors to total demand savings, such as Commercial DR and Large Lighting. The size of the dot represents the total expenditure for each program. This gives a sense of the magnitude of each program, as well as its performance. The colors remain consistent with the program-types throughout the rest of the report.

**In FY 2018, the Residential HVAC program provided rebates to over 7,150 projects, resulting in 6.7 MW of peak demand savings.**

**The New Home Construction program incentivized high efficiency equipment and construction practices in over 700 homes.**

Figure 23. Cost-Effectiveness of Selected Programs



## Energy Efficiency

The efficiency programs are most numerous and have the most varied performance across them due to the diversity of measures. DR and solar programs are more uniform in their implementation and outcomes. Due to this, a larger number of programs are discussed for the efficiency program type than for the others.

### Residential Space Heating & Cooling

The Residential HVAC and New Home Construction programs performed well across all the metrics used. The programs perform well because the residential space conditioning end-use of electricity tends to coincide strongly with overall system demand and is a major end-use of electricity for the residential sector.

### Commercial Efficiency

The commercial energy efficiency programs all performed well on the cost of energy saved metric. This can be attributed to scale, such that the large number of commercial customers reduced the softer program costs, such as marketing and processing customer applications. This does not result in as low a cost of demand saved because commercial energy use does not generally coincide with overall system peak demand as closely as residential energy use does.

### Lighting

The downstream residential and small commercial lighting programs are the traditional rebate programs in which customers apply for a rebate on a purchase that has already occurred or the program directly installs the measure for the customer. These programs performed poorly in the

NTG ratio metric, which indicates that many of the participants would already have undertaken the purchase even if there had been no rebate or direct installation.

Lighting is particularly challenging since it has a very short payback period and a much lower upfront cost than other energy efficiency measures, which results in high adoption, even without a rebate. The recent performance of lighting programs has improved as the design was switched to a midstream model with the rebate applied at the retail level and invisible to the customer. This helps cuts down on program costs for rebates and rebate processing. While the NTG ratio has slipped, other performance metrics have improved, which more than makes up for the free-ridership.

### **Refrigerator Recycling**

The Refrigerator Recycling program did not perform well in the NTG ratio metric and had higher program overhead costs. This is common for programs focused on appliance recycling since they target a very specific case, such as recycling a second operational fridge in the garage. The high NTG ratio suggests that many program participants would have recycled the refrigerator in the absence of an incentive. The program was discontinued in FY 2017.

### **Air Flow Performance**

The air flow performance program showed a large rise in the UCT ratio starting in FY 2015. This can be attributed to the shift in evaluation method from individualized evaluation to a standardized approach using the Texas Technical Reference Manual (TRM). This resulted in an increase in the demand and energy savings for most measures offered in the program. This program also benefits from a high NTG ratio.

### **Weatherization**

The weatherization program showed a similar increase in the UCT ratio starting in FY 2015, which can also be attributed to the shift in evaluation method. Results are more mixed, since the savings associated with some weatherization measures were reduced. The Weatherization program had another increase in the UCT ratio starting in FY 2017. This was a result of a change in program implementation: CPS Energy contracted out implementation to a third-party who has targeted higher savings opportunities for the lighting, ceiling insulation, and hot water pipe insulation measures that has resulted in higher demand savings for these.

### ***Demand Response***

All DR programs except for the window AC program performed extremely well on the cost of demand saved metric. This is the nature of well-run DR programs in general, since they almost exclusively provide demand savings. This also means the programs do not perform as strongly on other metrics, such as cost of energy saved. Since demand savings are the focus of the Greater San Antonio Area and STEP, this means that the DR programs are especially high performers.

## Residential & Commercial DR

### Auto DR

The Auto DR program showed a major trend upwards in the UCT ratio across the years of implementation. This was primarily due to a reduction in costs over time, as the program stopped adding new participants and thus stopped installing new switches, which have high upfront cost.

### Window AC DR

The Window AC DR program performed below other programs on both the UTC and cost of demand saved metrics. While most DR programs and programs targeting space conditioning perform well, window AC units individually have low power usage and thus do not provide the scale of savings of centralized systems. The DR switch is also much easier to override than those on other systems while also being similar in price while providing less savings. The program was discontinued in 2016.

## Solar

### SolarHostSA

The SolarHostSA program performed well, with low cost of energy and demand saved, but has not had the expected performance in the UCT ratio. The conflict between these metrics is due to the values used in calculating each. The cost of savings calculations only includes program costs but the costs of the initial rebate and payment for generated electricity are all recovered through the energy rider. This is because the initial rebate and payment for the generated electricity are handled through a Power Purchase Agreement (PPA), which is not recoverable through the STEP cost recovery mechanism. With so much of the costs being recovered through a different mechanism, the cost of savings is artificially low. To properly account for these costs, they are included in the UTC ratio calculation.

## Incentive Levels

One of the challenges in designing a program is setting the measure rebates. Benchmarking rebates against other utilities, including municipal and investor owned utilities in Texas and other states, is one way to gauge appropriate rebate levels. Utility selection was based on a range of criteria including climate similarity and number of customers served. Commercial rebate comparison was further refined by customer size.

### Data Processing

A list of the most impactful measure categories was compiled and provided the focus for the benchmarking process. These were the residential HVAC, lighting, weatherization, and solar programs. The measure prioritization was based on the demand savings in FY 2019.

The STEP data used for benchmarking were publicly published rebate values and the FY 2019 EM&V report. Similar data was used from each of the comparison utilities when available. The final list of utilities reviewed for rebate benchmarking are:

- Texas Muni's: Austin Energy, Denton Municipal Electric, and Garland Power & Light
- Texas IOUs: Oncor, CenterPoint, AEP Texas, Entergy TX, Xcel Energy, TNMP, & SWEPCO
- Other Muni's: SMUD (CA), SRP (AZ), Orlando Utilities Commission (FL), City of Tallahassee (FL), Lakeland Electric (FL), and Jacksonville (FL).

Once the incentive levels were collected for CPS Energy and other utilities, they had to be converted into comparable units. This meant both a consistent time-horizon and level of aggregation. Where measure-level information is available, this can mean aggregating up from performance-based (\$/kW, \$/kWh, etc.) or size-based (\$/ton, etc.) incentives to total project incentives. This is done for all utilities using an average STEP project for the measure.

Where only program-level information is available, this means converting to the appropriate performance-based measure, such as \$/kW for DR programs or both \$/kW and \$/kWh for more balanced programs. In order for these measures to be used, the program had to be consistent between CPS Energy and the comparison utilities.

### **FY 2019 Incentive Comparison**

The incentives offered through the FY 2019 STEP program are generally consistent with incentives offered by other peer utilities for similar programs.

However, it is instructive to note that the comparison of incentives that follows highlights a benefit and a limitation of contracting out program implementation: a) implementers are more familiar with pricing and incentive standards than an individual utility can be, and b) when programs are contracted across multiple implementation firms, information can be harder to find for potential program participants. The benefit of contracting out for program implementation is the expertise that firms can have when running programs for multiple utilities.

Additionally, while the utilities may be considered peers, there may be differences in local markets, program maturity, or utility priorities that drive differences in incentive levels. For example, Austin Energy offers the lowest rebates across a few of the evaluated measures, including solar and retail lighting, but the highest rebate for smart thermostats. Conversely, the City of Denton offers the highest rebates for solar, but the lowest for smart thermostats. This suggests that each utility is responding to its unique needs and priorities, just as CPS Energy is.

### **HVAC Rebates**

*Table 8. HVAC Rebate Level*

	Low	Incentive \$/ton	High
Central AC	\$175	\$196	\$208
Central HP	\$150	\$196	\$400

Within the HVAC category the primary two measures were central AC heat pumps and smart thermostats. The STEP rebate for central AC/HPs fell within the range of rebates provided by other utilities, though the AC rebate does fall in the high end of the range. This was true across all unit efficiency levels.

*Table 9. Smart Thermostat Rebate Level*

	Low	Incentive \$	High
Smart Thermostat	\$25	\$85	\$80

The rebates provided for smart thermostats through STEP were significantly higher than those provided by any other utilities during part of the year. That was based on an increased rebate of \$150 during sale periods while the non-sale period rebate shown above was more in line with the rebate provided by other utilities. The rebate for smart thermostats is changed throughout the year to coincide with large sale events such as Black Friday. This increase in the rebate does result in significantly increased participation in the program.



## Lighting Rebates

*Table 10. Lighting Rebate Levels*

	Low	Program \$/kW	High
Retail Partners	\$175	\$258	\$366
Legacy Lighting	\$240	\$576	\$420

The review of lighting rebates included both the retail channel partners program and the CPS Energy legacy lighting program. The rebate expenditure per demand unit was consistent with the other utilities for the retail channel partners. However, the rebates provided through the legacy lighting program, which were discontinued, were significantly higher than the rebates provided by other utilities.

## Weatherization & Solar Rebates

Both the weatherization and solar rebates lacked detailed breakdowns of measure rebates and were reviewed at the program-level. At the program scale, both the weatherization and solar rebates were within the range of rebates provided by other utilities.

*Table 11. Weatherization Rebate Levels*

	Low	Incentive \$/ft <sup>2</sup>	High
General	\$0.20	\$0.35	\$0.55
	Incentive \$/home		
Low-Income	\$2,000	\$5,000	\$6,000

Across the board, utility programs geared towards low-income customers were consistent with the design of the STEP weatherization program; measures are offered at little to no cost and in most cases are directly installed for the participant. The most generous program for low-income weatherization in the comparison group is Salt River Project in Arizona, which provides up to \$6,000 per eligible household for energy-efficiency home improvements.<sup>11</sup>

*Table 12. Solar Rebate Levels*

	Low	Incentive \$/W	High
Commercial	\$0.60	\$0.63	\$0.90
Residential	\$2,000	\$2,500	\$4,800

The solar rebate for commercial customers in particular was on par with the rebate design and level from other utilities. The residential solar rebate approach from STEP, a single value lump sum of \$2,500 for any project, is a very different design than other utilities, but on average results in a similar rebate payment to participants. Depending on the scale of the project and any special installation costs, the solar rebate from STEP may be slightly more or less than other rebate designs, such as a rebate based on \$(k)W or a performance of project cost.

<sup>11</sup> <https://www.srpnet.com/community/lipprograms.aspx>

### III. REPORTING REQUIREMENTS

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The San Antonio City Council created STEP in 2009 in support of its environmental and economic goals.<sup>12</sup> The ordinance requires CPS Energy to save 771 MW of demand by 2020 at a cost of no more than \$849 million.

Annual kW savings are verified by an independent third party and reported annually to City Council, along with program expenditure by customer class and program type. Cost recovery is based on the verified savings.

In practice, this means that the recovery of costs for STEP occurs based on a review of performance in the year after costs are incurred. This begins by determining the expenditures eligible for recovery through fuel adjustment as well as considering any over- or under-recovery from the previous year. Based on this, CPS Energy calculates an annual kWh charge. This charge is reviewed and approved by City of San Antonio staff before it is implemented. STEP does not provide for any additional incentive payment to CPS Energy over and above the recovery of program costs.

This review concludes that the information required by the ordinance has been provided consistently by CPS Energy, with the caveat that expenditure was not provided by customer class or program type until FY 2014.

The Office of Sustainability, acting pursuant to the ordinance, created additional reporting requirements that address other City priorities. These reporting and accountability requirements for STEP, to be filed quarterly by CPS Energy, include:

- Demand and energy savings by customer class and program type
- Dollar allocation by program area
- Map of allocation of rebates by Council district and income level
- Allocation of rebates by business size
- Number of firms employed
- Number of first-time and repeat participants
- Emissions reductions
- Including ozone, CO<sub>2</sub>, NO<sub>x</sub>, VOC

This review finds that all but two of these can be found in the annual or quarterly reports filed with the Office of Sustainability and available publicly. Only the number of first-time and repeat participants is missing from the reporting. One other requirement, the allocation of rebates by business size, is only partially addressed by the fact that there is a separate small business program. This level of detail may be less than was anticipated by the Office of Sustainability but is consistent with the information provided in annual reporting by other utilities outside of the Greater San Antonio Area.

Section 4 of the STEP ordinance requires CPS Energy to “reassess the STEP program in 2019 to determine if continuing the program beyond 2020 is a viable option based on projected annual reductions in energy consumption going forward and the costs that would be incurred to achieve such reductions.”<sup>13</sup> This report was commissioned pursuant to that directive.

#### Reporting Adjustments

The reporting requirements seek to ensure that interested parties can track the progress of STEP and understand how well it is performing. In general, the level of detail that has been reported

<sup>12</sup> City of San Antonio Ordinance [#2009-05-21-399](#)

<sup>13</sup> City of San Antonio Ordinance [#2009-05-21-399](#)

provides enough information to track the performance of STEP, as evidenced by this report, which was compiled based primarily on publicly reported data filed with the Office of Sustainability.

Going forward, minor adjustments are suggested for the reporting of recent years and long-term tracking.

### ***Past Years' Reporting***

As previously noted, in recent years, the STEP programs have been primarily implemented by third-party contractors or “implementers.” The reporting on expenditure breakdowns has been inconsistent due to this change. For example, some implementers’ expenses are presented together, as opposed to broken into spending categories, like administration and marketing. Due to potentially different reporting and accounting definitions between CPS Energy and the implementers, care should be taken when comparing costs between years, especially administrative expenses.

Going forward, it is recommended that program implementer expenses be broken down into the specific expense categories to aid program tracking.

### ***Long-Term Tracking***

It is instructive to note that changes in the programs and how they were reported create some challenges in assessing and comparing performance over time. For example, in the early years of STEP, the program expenditures were reported at the portfolio level. This was changed in FY 2014, with expenditures provided separately for each program.

Additionally, as STEP has evolved, both the programs and the measures offered within them have changed significantly, often as an appropriate response to changing market conditions. This makes drawing inferences about the performance of a program or end-use over time challenging. The most consistent categories over time have been the “residential” and “commercial” segments, as well as the distinction between “efficiency,” “demand response,” and “solar” programs. Within these categories, multiple programs implemented over different time frames often exist.

In order to track STEP performance in additional detail and permit comparison to end-use potential estimates, it may be helpful in the future to also report data based on categories that remain consistent across time but do not depend on the program definitions. Example categories include by end-use (e.g. lighting, HVAC, water heating, etc.) and by measure-type (e.g. CFL lighting, LED lighting, ceiling/attic insulation, central AC, central heat pumps, etc.).

## IV. CONCLUSION

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CPS Energy has made significant progress in achieving its demand reduction goals, rapidly growing the portfolio into a robust collection of programs that serve its diverse population and benefit all customers through lower electricity costs. Since the passage of STEP in 2009, CPS Energy has embraced the challenge set forth in the ordinance to save 771 MW by 2020 and is on track to achieve the goal a year early and at a cost approximately 15 percent under budget. Community engagement is a significant contributor to the portfolio's overall success.

The focus on demand reduction sets STEP apart from many other utility programs, making direct comparison challenging in some areas, but the metrics speak for themselves. For every \$1 spent on STEP programs, there is \$1.93 in benefit. In aggregate, the portfolio generated a total of \$553 million in net benefits, putting downward pressure on electric revenue requirements.

Additionally, the STEP program is supporting the Greater San Antonio Area's economic growth. Between FY 2009 and FY 2019, STEP programs are estimated to have cumulatively generated 7,500 local job-years and \$642 million in economy-wide benefits, including \$312 million in labor income. These benefits are expected to grow over time as the bill savings persist, culminating in \$3.1 billion in economic value in the Greater San Antonio Area by FY 2048.

Finally, the programs have saved an annual gross total of 1.4 TWh of electricity in FY 2019 and a cumulative total of 6.3 TWh across all years. The annual gross energy savings have resulted in carbon emission reductions of approximately 771,000 tons in FY 2019. This has the same emissions benefit as taking approximately 148,000 passenger vehicles off of the road for one year or planting nearly 11.6 million trees. Additionally, STEP has reduced SO<sub>2</sub> emissions by 1,427,000 lbs. and NO<sub>x</sub> emissions by 724,000 lbs. Cumulatively, this comes to a net of 3,366,000 tons of CO<sub>2</sub>, 6,639,000 lbs. of SO<sub>2</sub>, and 3,123,000 lbs. of NO<sub>x</sub> emissions reduced.

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***These achievements provide a solid foundation for future growth and innovation. CPS Energy's focus on demand reduction, as opposed to energy savings, puts it ahead of the curve in the next generation of demand side management programs.***

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The trend is towards more dynamic management of customer load to meet system needs. In response, program portfolios are expected to evolve to include greater emphasis on distributed resources, grid optimization, non-wires alternatives, geographically targeted DSM, and other non-traditional resources. Additionally, this evolution facilitates CPS Energy's "Flexible Path" strategy, which relies on a diversity of technologies and approaches to meet the Greater San Antonio Area's future power needs.

While this next generation of programs will deliver enhanced benefits to the electric system, they will also expand options available to customers and further support market and economic growth. With continued community support, CPS Energy has the potential to further reduce demand and generate increased economic and environmental benefits for all residents of the Greater San Antonio Area.

## APPENDICES

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### Appendix A: Program Descriptions

#### *Residential Efficiency*

##### **Residential Lighting**

The residential lighting program promotes the adoption of LED lighting. In FY 2017, CPS Energy provided LED lighting by handing out 9.5 Watt LEDs at Customer Care Fairs. The community fairs were target-marketed to the immediate area surrounding the location where CPS Energy held the event. This program was only run in FY 2010 to FY 2011 and FY 2015 to FY 2017.

##### **Home Efficiency**

The Home Efficiency program offers incentives for attic insulation, heat pump water heaters and variable-speed pool pumps. In FY 2017, CPS Energy incentivized 1,065 ceiling insulation, 6 heat pump water heaters and 318 variable-speed pool pumps. In FY 2018, CPS Energy incentivized 1,434 ceiling insulation and 442 variable-speed pool pumps. This program has run for all years of STEP.

##### **Residential HVAC**

The Residential HVAC program promotes the installation of energy efficient Heating, Ventilation, and Air Conditioning (HVAC) equipment. The program covers the installation of central air conditioners (ACs), central heat pumps (HPs), window air conditioners (WACs), and ground source heat pumps (GSHPs). In FY 2018, a total of 7,153 HVAC projects were incentivized through the CPS Energy Residential HVAC program. This program has run for all years of STEP.

##### **Air Flow Performance**

The Air Flow Performance program offers incentives to promote energy efficiency improvements of heating, ventilation, and air conditioning (HVAC) distribution systems through duct leakage testing and subsequent duct repair or replacement. This program was only run through FY 2016.

##### **New Home Construction**

The new residential construction program provides incentives for new homes based on the estimated savings. The site and source energy savings are estimates based on a comparison of the predicted energy use in the as-built home to the energy use the models predict for a reference model, which incorporates the features of a home built to the reference code (IECC 2015) and equipped to relevant standards. In FY 2018, the program provided incentives for 708 new homes. This program was started in FY 2011 and continues through FY 2019.

##### **Refrigerator Recycling**

The refrigerator efficiency program incorporates two elements: (1) a rebate program to encourage the purchase of ENERGY STAR new refrigerators and; (2) a recycling program to remove older, less-efficient units. Unlike other programs to promote the purchase of energy-efficient products, energy savings from programs to incentivize the purchase of more-efficient refrigerators are not immediately realized upon the installation of the more-efficient unit. This is because older units often are kept operating as secondary units. This program ran from FY 2011 to FY 2017.

##### **Weatherization**

Residential weatherization program provides comprehensive retrofits for income-eligible customers. In FY 2018, the program provided a range of services to 3,623 customers, compared with 3,900 customers in FY 2017. Installed measures included repair, health & safety, and energy-saving measures. The energy-saving measures may be categorized as follows: LED light bulbs, wall insulation, attic insulation, floor insulation, solar screens, water heater pipe insulation, water heater

insulation, low-flow showerheads, air infiltration reduction, duct system improvement, and faucet aerators. This program was started in FY 2013 and continues through FY 2019.

### **Retail Channel Partnerships**

The Residential Retail Partners program offers in-store rebates for ENERGY STAR certified lighting. There are 73 participating retailers in this program and rebates were offered for 144 different lighting products. This program was started in FY 2017 and continues through FY 2019.

### **AC/Duct Tune-up**

The AC Duct Tune-Up program consists of technicians performing diagnostic testing on HVAC systems and implementing improvements such as duct sealing, coil cleaning, and refrigerant recharge to improve overall HVAC system performance. This program was started in FY 2018 and continues through FY 2019.

### **Energy Savings Through Schools**

The Energy Savings Through Schools Program provides students with energy efficiency kits. The kits are comprised of three 9-Watt LED light bulbs, a high-efficiency showerhead, a kitchen faucet aerator, and a bathroom faucet aerator. 14,294 kits were distributed at 85 schools in FY 2018. The program kicked off during the middle of FY 2017. This program was started in FY 2017 and continues through FY 2019.

### **Home Energy Assessments**

The Home Energy Assessment (HEA) Program provides energy-saving products to CPS Energy customers by means of an in-person home energy assessment or through home energy assessment direct installation kits. The HEA Program provided 18,931 installations and kits in FY 2018. This program was started in FY 2018 and continues through FY 2019.

### **Multi-Family**

The Multifamily Energy Efficiency program provides energy efficient measures to multifamily property with more than five units. The Multifamily program includes installation of LED bulbs, high-efficiency showerheads, kitchen and bathroom faucet aerators, water heater pipe insulation, and power strips. The Multifamily program served 12,306 individual apartments in FY 2018. This program was started in FY 2017 and continues through FY 2019.

### **Cool Roof**

The Cool Roof program is a new program for FY 2018. The installation of a highly reflective roof decreases the roofing heat transfer coefficient and reduces the solar heat transmitted to the home. Qualifying projects receive an incentive for using Energy Star-rated cool roofing materials. The rebate is calculated per square foot of roofing area located above conditioned space. This program was started in FY 2018 and continues through FY 2019.

## **Commercial Efficiency**

### **Commercial Large Lighting**

Commercial large lighting program includes the installation of energy-efficient lighting and lighting controls. In FY 2017, a total of 656 lighting and/or lighting controls projects were incentivized through this program. In FY 2018, legacy projects that were in queue during earlier program years for the installation of energy-efficient lighting and lighting controls and all new projects were implemented under alternate programs.

### **Commercial HVAC**

Commercial Heating, Ventilation, and Air Conditioning (HVAC) program offers incentives to promote the installation of energy efficient HVAC equipment. The program covers the installation of split/unitary air conditioners and heat pumps (ACs/HPs), packaged terminal air conditioners and heat



pumps (PTACs/PTHPs), and air/water cooled water chilling packages (chillers). The program had 2 unique project sites in FY 2018 while the majority of HVAC projects were implemented under C&I Solutions. This program has run for all years of STEP.

### **Commercial New Construction**

During the course of FY 2017, the internal review process for commercial new construction, revised in FY 2013, was continued. Customers were required to submit whole building energy models in approved software and complete sets of design documents. Each project was reviewed by the EM&V consultant, with energy models first compared to design documents to confirm accurate modeling, and then compared to ASHRAE baselines to confirm calculations of savings relative to code. This program ran from FY 2011 to FY 2017.

### **Commercial Custom**

In FY 2017, CPS Energy offered incentives for commercial custom measures at \$0.08/kWh and \$200/kW. Customers were required to submit explanations for their projected savings, along with equipment information. Each project was reviewed individually, and an appropriate measurement and verification (M&V) plan was developed and provided to the customer. In FY 2018, CPS Energy processed the remaining custom projects from earlier years while new custom projects fell under the scope of the C&I Solutions. This program has run for all years of STEP.

### **LED Street Lights**

The LED street lights program offers incentives to customers who install efficient lighting in their facilities. This program was run from FY 2013 to FY 2015.

### **C&I Solutions**

This program includes the installation of the following commercial energy-efficiency measures: lighting, lighting controls, HVAC, HVAC tune-up, VFD, and custom. In FY 2018, a total of 458 projects were incentivized through the C&I Solutions program. This program kicked off during the middle of FY 2017 continues through FY 2019.

### **Schools & Institutions**

Schools & Institutions program includes the installation of the following commercial energy-efficiency measures: lighting, lighting controls, HVAC, HVAC tune-up, VFD, and custom. In FY 2018, a total of 122 projects were incentivized through the Schools & Institutions program. This program was kicked off during the middle of FY 2017 and continues through FY 2019.

### **Small Business Solutions**

Small business solutions program includes the installation of the following commercial energy-efficiency measures: lighting, lighting controls, Envelope, HVAC, HVAC tune-up, and custom. In FY 2018, a total of 223 projects were incentivized through the Small Business Solutions program. This program was kicked off during the middle of FY 2017 and continues through FY 2019.

### **Whole Building Optimization**

The Whole Building Optimization program is a new program for FY 2018. The program consists of a toolbox of measures related to optimizing settings and conditions for the building's HVAC equipment. These can range from changing setpoints, schedules, and static pressures in a Building Automation System (BAS) to physical changes such as coil cleaning and valve repair. A third-party company evaluated buildings to identify opportunities for optimization among the eligible options specified in Express Building Tune-up Methodology. This program began in FY 2018 and continues through FY 2019.

## ***Residential Demand Response***

### **Smart Thermostat**

The Smart Thermostat direct load control program has been available to residential sector participants in single-family homes since 2003. It was expanded to include multifamily and small commercial customers in FY 2010. Through the program, Honeywell installs a programmable, controllable thermostat (PCT) at a participant's home or place of business at no cost to the customer. In return, CPS Energy is permitted to remotely control their central air conditioning systems during DR events. Once an event is called, CPS Energy can cycle the air conditioner compressor on and off for short periods of time on event days.

### **Home Manager**

Launched in FY 2012, Home Manager is a comprehensive electric load monitoring and direct load control program. This system controls three types of devices: HVAC units, electric water heaters, and pool pumps. When CPS Energy calls an event, all Home Manager thermostats are adjusted upward by three degrees from their pre-event set points. Water heaters and pool pumps are powered off for the duration of the event. Customers can reset their thermostat set points or drop completely out of the event at any time. The Home Manager population is shrinking as customers are being transitioned to the Nest Direct Installation (DI) program. The transition provides customers a newer technology and mobile app while also enabling CPS Energy to replace the Home Manager meter gateway with an AMI meter.

### **Bring Your Own Thermostat (BYOT)**

BYOT is a program that integrates customers' own thermostats with load curtailment events. The program began in FY 2015 when CPS Energy partnered with Nest Labs to implement the Rush Hour Rewards (RHR) pilot program for customers with Nest thermostats. Rush Hour Rewards uses a combination of pre-cooling in anticipation of a 'rush hour' – a DR event initiated by CPS Energy – and air conditioner cycling during the events to achieve load reduction. Because of Nest's 'learning' capabilities, reductions may vary based on whether the home is occupied at the time of the event, or other variables.

### **Window AC DR**

Through the ThinkEco Room Air Conditioner Pilot Program (ThinkEco Pilot), CPS Energy customers with one or more room air conditioners (RACs) are offered a free SmartAC kit from ThinkEco (valued at \$139) and a participation incentive in the form of a \$30 end-of-season bill credit. Each customer can receive up to 3 free SmartAC kits. In return, participants allow CPS Energy to adjust the RAC setpoints during peak summer day events. The SmartAC kit also allows consumers to remotely control the thermostat on their RAC. This remote displays a "DR" indicator during a demand response event, during which time the customer's thermostat setpoint is raised. This program ran in FY 2015 and FY 2016 before being shut down.

### **Nest Direct Install**

Nest Direct Install (DI) is a new program implemented in FY 2018. Starting in early summer FY 2017, Home Manager customers were gradually migrated to the Nest DI program. CPS Energy offers these customers free Nest(s) and free installation to replace the older Home Manager Consort devices in their home. After the customer has installed a Nest, customers are automatically enrolled in the Nest RHR (Rush Hour Rewards) in synchronization with BYOT Nest customers. As with BYOT customers, at the end of each September, a \$30 bill credit will also be applied to customers' bills.

### **Behavioral DR (Reduce My Use)**

CPS Energy partnered with Opower to implement a pilot behavioral demand response (BDR) program for residential customers beginning in the summer of FY 2017. This program was implemented as an opt-out randomized controlled trial (RCT). Participating households were all equipped with AMI meters, and did not participate in other CPS Energy DR programs. Participants received a welcome letter before the program started. One day before each Reduce My Use event,

participants received a notification message through email and/or a phone call. This notification also contained information explaining what a peak day is and personalized energy conservation tips.

### ***Commercial Demand Response***

CPS Energy's Commercial DR programs are voluntary load curtailment programs for commercial and industrial customers. They are designed to reduce peak load by incentivizing customers to shed electric loads on peak summer days. The programs run from June 1st through September 30th. Participating customers commit to be available to participate in events from 1 p.m. to 7 p.m., with events typically on weekdays till 5:30 p.m. DR customers lower their energy demand for a 1 to 3 hour curtailment period. Incentives are tied to performance during this period. After each event, customers received a follow-up call and/or email with personalized customer performance feedback to participants. The Commercial DR programs consisted of Options 1, 2, and 3 of C&I DR, Emergency DR (EDR), and Automated DR (ADR). CPS Energy uses these programs differently because they have different purposes, capabilities, and contractual stipulations.

### ***Solar Programs***

#### **Roofless Solar (Community Solar)**

The Roofless Solar program presents a means for some customers who cannot or do not wish to install solar on their own property to purchase a share in a larger "community" solar installation elsewhere and see the benefits monthly on their electric bill. The community solar system became commercially operational on August 26, 2016, with 245 CPS Energy customers owning shares. CPS Energy monitors production from the community system, and offers bill credits to participating customers designed to approximate the value customers would have received had the generation occurred behind the customer's meter, less 15% held in escrow to pay for operations and maintenance on the community solar system.

#### **SolarHostSA**

Under SolarHostSA, CPS Energy has contracted with a developer to install solar PV systems on residential and commercial rooftops within CPS Energy's service area. Unlike typical customer-owned residential and commercial PV systems, which are interconnected on the customer's side of the utility meter and reduce a customer's metered demand and energy consumption, these systems inject energy directly onto the CPS Energy distribution system. CPS Energy pays the developer a contracted price for energy generated from the systems, and in addition credits host customers 3 cents/kWh generated for the use of their rooftops for this purpose. The SolarHostSA program thus works as a long-term generation contract for solar energy that is produced locally, on the distribution system. An advantage of the program design is that it enables customers who otherwise could not afford to make an investment in solar PV the opportunity to host such generators and to earn financial rewards for doing so. All installed systems are directly metered by CPS Energy.

#### **Residential Solar PV Rebate**

CPS Energy offers rebates for residential solar PV systems. The current rebate limit is \$25,000 for residential projects. Rebates are also capped at 50% of project cost. The rebate for non-local installers is reduced to 75% of the local installer rebate amount, starting at \$0.45 per AC watt. All residential solar PV systems are required to be installed by a CPS Energy-registered contractor. Rebates are not available for leased equipment. All systems are required to be interconnected to the CPS Energy distribution system on the customer's side of the meter. Net metering is available to systems less than 25 kW per CPS Energy's ES Tariff. Systems must be permitted, pass all required inspections, and comply with CPS Energy's requirements for interconnection.

#### **Commercial Solar PV Rebate**

CPS Energy offers rebates for solar PV systems installed on commercial buildings. The current rebate limit is \$80,000 for commercial projects. Rebates are also capped at 50% of project cost. The

rebate for non-local installers is reduced to 75% of the local installer rebate amount, starting at \$0.45 per AC watt, applicable to both residential and commercial projects. Rebates are not available for leased equipment. All systems are required to be interconnected to the CPS Energy distribution system on the customer's side of the meter. Systems must be permitted, pass all required inspections, and comply with CPS Energy's requirements for interconnection.

## Appendix B: Program-Level Summary Tables

This appendix contains a set of tables with the data reported for each program. Some of the data was not reported for all years but what data is available has been reported.

### Net Energy Savings (kWh)

Program	Net Energy Savings (kWh)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting	20,409,031	55,234,024	9,969,578				1,906,720	2,054,729	87,354		
Home Efficiency	1,797,568	1,815,706	2,321,792	2,209,950	1,864,887	1,600,016	1,920,450	1,931,079	2,105,647	3,209,782	2,903,160
Residential HVAC	3,173,195	6,814,768	12,437,505	9,579,104	8,549,361	11,290,482	14,275,837	13,401,849	11,816,563	15,163,326	15,697,173
Air Flow Performance		441,698	505,483	405,574	394,374	461,797	858,815	889,053			
New Home Construction			4,406,780	6,361,699	9,872,843	9,137,801	11,738,507	6,734,139	440,324	114,067	
Refrigerator Recycling			859,811	1,175,223	1,064,287	492,521	497,482	402,432	212,893		
Weatherization					2,843,308	11,603,145	12,935,654	13,758,521	15,211,611	15,261,975	13,463,844
WashRight			1,145,856	23,710							
New Home Construction - Franklin										990,436	1,584,930
Retail Channel Partnerships									1,263,511	11,625,723	5,061,832
AC/Duct Tune up										151,493	
Energy Savings Through Schools									1,265,003	1,734,151	1,184,254
Home Energy Assessments									1,584,885	6,510,930	2,267,904
Multi-Family									1,011,265	7,392,774	153,548
Cool Roof										12,780	31,348
<b>Residential Efficiency Total</b>	<b>25,379,794</b>	<b>64,306,196</b>	<b>31,646,805</b>	<b>19,755,260</b>	<b>24,589,060</b>	<b>34,585,762</b>	<b>44,133,465</b>	<b>39,171,802</b>	<b>34,999,056</b>	<b>62,167,437</b>	<b>42,347,993</b>
Large Lighting	41,687,581	18,478,590	16,520,883	39,672,489	57,531,863	25,501,204	28,717,624	47,723,649	116,062,320	55,666,401	
Commercial HVAC	6,977,605	4,830,881	6,142,509	4,108,763	6,849,717	5,747,478	9,921,735	10,580,739	10,428,666	184,406	
Commercial New Construction			58,636	-	3,420,560	5,001,811	20,547,891	3,353,474	8,016,167		
Commercial Custom		225,337	823,731	900,893	6,140,233	7,072,068	2,343,510	4,001,682	7,678,459	20,881	
LED Street Lights					3,048,190	7,714,442	7,490,446				1,309,113
Motors		1,798	179,793								
Window Film			144,700								
Roof Coating	262,354	191,366	181,405	93,572	61,939						
Restaurant Equipment			19,969	1,872							

CPS ENERGY: SAVE FOR TOMORROW ENERGY PLAN (STEP) PROGRAM REVIEW

Program	Net Energy Savings (kWh)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Lean Clean Energy			595,441	384,495							
Commercial Solutions									1,536,628	39,267,943	44,870,338
Schools & Institutions									-	12,082,465	9,748,345
Small Business Solutions									324,767	8,773,980	27,988,174
Whole Building Optimization									-	3,008,363	14,185,675
<b>Commercial Efficiency Total</b>	<b>48,927,540</b>	<b>23,727,972</b>	<b>24,667,067</b>	<b>45,162,084</b>	<b>77,052,502</b>	<b>51,037,003</b>	<b>69,021,206</b>	<b>65,659,544</b>	<b>144,047,007</b>	<b>119,004,439</b>	<b>98,101,645</b>
<b>Efficiency Total</b>	<b>74,307,334</b>	<b>88,034,168</b>	<b>56,313,872</b>	<b>64,917,344</b>	<b>101,641,562</b>	<b>85,622,765</b>	<b>113,154,671</b>	<b>104,831,346</b>	<b>179,046,063</b>	<b>181,171,876</b>	<b>140,449,638</b>
Smart Thermostat	153,154	735,677	460,676	1,870,517	995,279	1,028,788	931,047	1,002,740	740,707	1,112,260	918,788
Home Manager					89,365	181,394	325,611	728,387	504,961	453,946	49,284
Bring Your Own Thermostat							15,569	28,187	3,653,236	6,071,376	9,072,235
Window AC DR							2,426	1,152			
Nest Direct Install										2,355,640	7,632,510
Behavioral DR										25,111	564,638
<b>Residential DR Total</b>	<b>153,154</b>	<b>735,677</b>	<b>460,676</b>	<b>1,870,517</b>	<b>1,084,644</b>	<b>1,210,182</b>	<b>1,274,653</b>	<b>1,760,466</b>	<b>4,898,904</b>	<b>10,018,333</b>	
Emergency DR							4,476	19,833			
Commercial DR		615,439	1,283,346	2,030,450	2,795,334	2,430,507	1,749,042	2,168,927	2,625,434	3,143,263	2,658,296
Auto DR							20,237	81,251	149,111	272,075	122,441
<b>Commercial DR Total</b>	<b>-</b>	<b>615,439</b>	<b>1,283,346</b>	<b>2,030,450</b>	<b>2,795,334</b>	<b>2,430,507</b>	<b>1,773,755</b>	<b>2,270,011</b>	<b>2,774,545</b>	<b>3,415,338</b>	<b>2,780,737</b>
<b>DR Total</b>	<b>153,154</b>	<b>1,351,116</b>	<b>1,744,022</b>	<b>3,900,967</b>	<b>3,879,978</b>	<b>3,640,689</b>	<b>3,048,408</b>	<b>4,030,477</b>	<b>7,673,449</b>	<b>13,433,671</b>	<b>21,018,192</b>
Community Solar								-	2,159,271		
Solar Host SA								-	1,984,985	5,582,045	1,131,040
Solar Initiative	145,223	327,694	1,729,383	2,342,898	3,393,361	5,292,733	7,018,005	10,000,580	47,800,667	36,054,456	41,991,569
<b>Residential Solar Total</b>	<b>145,223</b>	<b>327,694</b>	<b>1,729,383</b>	<b>2,342,898</b>	<b>3,393,361</b>	<b>5,292,733</b>	<b>7,018,005</b>	<b>10,000,580</b>	<b>51,944,923</b>	<b>41,636,501</b>	<b>43,122,609</b>
Solar PV				2,498,757	3,520,372	3,683,857	3,524,325	2,929,448	3,638,996	7,010,621	14,799,189
<b>Commercial Solar Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>2,498,757</b>	<b>3,520,372</b>	<b>3,683,857</b>	<b>3,524,325</b>	<b>2,929,448</b>	<b>3,638,996</b>	<b>7,010,621</b>	<b>14,799,189</b>
<b>Solar Total</b>	<b>145,223</b>	<b>327,694</b>	<b>1,729,383</b>	<b>4,841,655</b>	<b>6,913,733</b>	<b>8,976,590</b>	<b>10,542,330</b>	<b>12,930,028</b>	<b>55,583,919</b>	<b>48,647,122</b>	<b>57,921,798</b>
<b>STEP Total</b>	<b>74,605,711</b>	<b>89,712,978</b>	<b>59,787,277</b>	<b>73,659,966</b>	<b>112,435,273</b>	<b>98,240,044</b>	<b>126,745,409</b>	<b>121,791,851</b>	<b>242,303,431</b>	<b>243,252,669</b>	<b>219,389,628</b>

**Net Peak Demand Savings (kW)**

Program	Net Peak Demand Savings (kW)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting	2,083	5,186	993				59	65	9		
Home Efficiency	515	737	944	384	247	209	549	505	964	1,336	1,018
Residential HVAC	964	2,078	3,634	2,885	2,557	3,279	4,368	6,648	5,140	6,430	6,826
Air Flow Performance		219	281	192	243	265	392	386			
New Home Construction			745	1,445	1,924	1,969	2,490	1,304	256	66	
Refrigerator Recycling			91	108	98	45	66	57	28		
Weatherization					951	3,674	3,198	3,843	7,279	6,552	5,516
WashRight			478	10							
New Home Construction - Franklin										577	967
Retail Channel Partnerships									127	1,168	508
AC/Duct Tune up										54	
Energy Savings Through Schools									100	106	71
Home Energy Assessments									142	604	216
Multi-Family									85	784	16
Cool Roof										5	27
<b>Residential Efficiency Total</b>	<b>3,562</b>	<b>8,220</b>	<b>7,166</b>	<b>5,024</b>	<b>6,020</b>	<b>9,441</b>	<b>11,122</b>	<b>12,808</b>	<b>14,130</b>	<b>17,682</b>	<b>15,165</b>
Large Lighting	7,099	4,151	3,223	6,905	9,847	5,934	3,704	7,194	19,240	7,326	
Commercial HVAC	2,001	2,163	2,537	1,361	4,360	4,230	4,089	3,541	2,715	35	
Commercial New Construction			42	-	643	861	2,946	1,282	1,159		
Commercial Custom		4	115	27	634	318	635	87	391	74	
LED Street Lights					-	-	-				25
Motors		1	62								
Window Film			42								
Roof Coating	85	131	123	10	8						
Restaurant Equipment			2	-							
Lean Clean Energy			68	18							
Commercial Solutions									337	7,235	7,467
Schools & Institutions									-	2,012	3,372
Small Business Solutions									13	1,400	5,199



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Program	Net Peak Demand Savings (kW)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization									-	414	1,946
<b>Commercial Efficiency Total</b>	<b>9,185</b>	<b>6,450</b>	<b>6,214</b>	<b>8,321</b>	<b>15,492</b>	<b>11,343</b>	<b>11,374</b>	<b>12,104</b>	<b>23,855</b>	<b>18,496</b>	<b>18,009</b>
<b>Efficiency Total</b>	<b>12,747</b>	<b>14,670</b>	<b>13,380</b>	<b>13,345</b>	<b>21,512</b>	<b>20,784</b>	<b>22,496</b>	<b>24,912</b>	<b>37,985</b>	<b>36,178</b>	<b>33,174</b>
Smart Thermostat	3,173	13,048	17,785	25,764	30,836	36,688	39,851	43,103	34,757	32,179	37,457
Home Manager					14,461	24,115	34,058	45,593	40,170	20,682	2,182
Bring Your Own Thermostat							1,412	3,268	10,928	20,832	32,895
Window AC DR							128	204			
Nest Direct Install										6,457	22,911
Behavioral DR										12,555	7,617
<b>Residential DR Total</b>	<b>3,173</b>	<b>13,048</b>	<b>17,785</b>	<b>25,764</b>	<b>45,297</b>	<b>60,803</b>	<b>75,449</b>	<b>92,168</b>	<b>85,855</b>	<b>92,705</b>	<b>103,062</b>
Emergency DR							4,476	19,833			
Commercial DR		16,884	45,028	68,562	63,969	66,802	82,050	105,550	81,507	71,574	79,216
Auto DR							1,868	4,576	6,189	7,881	3,987
<b>Commercial DR Total</b>	<b>-</b>	<b>16,884</b>	<b>45,028</b>	<b>68,562</b>	<b>63,969</b>	<b>66,802</b>	<b>88,394</b>	<b>129,959</b>	<b>87,696</b>	<b>79,455</b>	<b>83,203</b>
<b>DR Total</b>	<b>3,173</b>	<b>29,932</b>	<b>62,813</b>	<b>94,326</b>	<b>109,266</b>	<b>127,605</b>	<b>163,843</b>	<b>222,127</b>	<b>173,551</b>	<b>172,160</b>	<b>186,265</b>
Community Solar								-	576		-
Solar Host SA								-	571	1,626	340
Solar Initiative	105	176	1,090	1,461	1,760	2,747	2,476	2,893	13,741	10,365	12,072
<b>Residential Solar Total</b>	<b>105</b>	<b>176</b>	<b>1,090</b>	<b>1,461</b>	<b>1,760</b>	<b>2,747</b>	<b>2,476</b>	<b>2,893</b>	<b>14,888</b>	<b>11,991</b>	<b>12,412</b>
Solar PV				1,636	2,011	2,110	1,281	887	1,094	2,108	4,450
<b>Commercial Solar Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,636</b>	<b>2,011</b>	<b>2,110</b>	<b>1,281</b>	<b>887</b>	<b>1,094</b>	<b>2,108</b>	<b>4,450</b>
<b>Solar Total</b>	<b>105</b>	<b>176</b>	<b>1,090</b>	<b>3,097</b>	<b>3,771</b>	<b>4,857</b>	<b>3,757</b>	<b>3,780</b>	<b>15,982</b>	<b>14,099</b>	<b>16,862</b>
<b>STEP Total</b>	<b>16,025</b>	<b>44,778</b>	<b>77,283</b>	<b>110,768</b>	<b>134,549</b>	<b>153,246</b>	<b>190,096</b>	<b>250,819</b>	<b>227,518</b>	<b>222,437</b>	<b>236,301</b>

**Net Non-Coincident Demand Savings (kW)**

Program	Net Non-Coincident Demand Savings (kW)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting	23,896	61,157	11,673				4,556	4,814	43		
Home Efficiency	739	801	1,031	671	560	479	736	930	2,012	2,606	2,283
Residential HVAC	1,205	2,597	4,543	3,606	3,197	4,099	5,836	7,384	5,277	6,573	6,901
Air Flow Performance		274	281	192	243	265	525	399			
New Home Construction			1,544	2,978	1,924	1,969	2,490	1,509	379	101	
Refrigerator Recycling			114	135	122	57	70	57	32		
Weatherization					1,415	5,969	13,365	13,337	15,661	15,775	15,749
WashRight			1,949	40							
New Home Construction - Franklin										816	1,362
Retail Channel Partnerships									628	5,786	2,515
AC/Duct Tune up										69	
Energy Savings Through Schools									383	608	412
Home Energy Assessments									627	2,825	1,058
Multi-Family									341	2,638	73
Cool Roof										6	55
<b>Residential Efficiency Total</b>	<b>25,840</b>	<b>64,829</b>	<b>21,135</b>	<b>7,622</b>	<b>7,461</b>	<b>12,838</b>	<b>27,578</b>	<b>28,430</b>	<b>25,383</b>	<b>37,803</b>	<b>30,408</b>
Large Lighting	8,077	4,757	3,693	7,745	11,097	6,406	6,564	11,901	21,230	9,125	
Commercial HVAC	2,533	2,855	3,295	1,648	6,009	5,386	5,009	3,753	2,856	39	
Commercial New Construction			51	-	643	861	2,946	1,299	1,183		
Commercial Custom		4	116	35	634	318	638	647	513	70	
LED Street Lights					716	1,761	1,880				316
Motors	6	1	62								
Window Film			54								
Roof Coating	94	157	155	13	9						
Restaurant Equipment			3	-							
Lean Clean Energy			78	21							
Commercial Solutions									390	10,368	10,921
Schools & Institutions									-	3,623	3,919
Small Business Solutions									82	2,137	6,808

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Program	Net Non-Coincident Demand Savings (kW)										
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization									-	400	2,009
<b>Commercial Efficiency Total</b>	<b>10,710</b>	<b>7,774</b>	<b>7,507</b>	<b>9,462</b>	<b>19,108</b>	<b>14,732</b>	<b>17,037</b>	<b>17,600</b>	<b>26,254</b>	<b>25,763</b>	<b>23,973</b>
<b>Efficiency Total</b>	<b>36,550</b>	<b>72,603</b>	<b>28,642</b>	<b>17,084</b>	<b>26,569</b>	<b>27,570</b>	<b>44,615</b>	<b>46,030</b>	<b>51,637</b>	<b>63,565</b>	<b>54,381</b>
Smart Thermostat	3,173	13,048	17,785	25,764	30,836	36,688	39,851	47,266	43,863	44,157	43,632
Home Manager					14,461	24,115	34,058	49,158	45,703	24,539	3,351
Bring Your Own Thermostat							1,412	3,845	13,197	24,241	37,539
Window AC DR							128	256			
Nest Direct Install										7,347	26,732
Behavioral DR										12,555	12,327
<b>Residential DR Total</b>	<b>3,173</b>	<b>13,048</b>	<b>17,785</b>	<b>25,764</b>	<b>45,297</b>	<b>60,803</b>	<b>75,449</b>	<b>100,525</b>	<b>102,763</b>	<b>112,839</b>	<b>123,581</b>
Emergency DR							4,476	19,833			
Commercial DR		16,884	45,028	68,562	63,969	66,802	82,050	106,639	97,039	89,823	96,152
Auto DR							1,868	5,172	7,290	9,703	5,835
<b>Commercial DR Total</b>	<b>-</b>	<b>16,884</b>	<b>45,028</b>	<b>68,562</b>	<b>63,969</b>	<b>66,802</b>	<b>88,394</b>	<b>131,644</b>	<b>104,329</b>	<b>99,526</b>	<b>101,987</b>
<b>DR Total</b>	<b>3,173</b>	<b>29,932</b>	<b>62,813</b>	<b>94,326</b>	<b>109,266</b>	<b>127,605</b>	<b>163,843</b>	<b>232,169</b>	<b>207,092</b>	<b>212,365</b>	<b>225,568</b>
Community Solar								-	1,133		
Solar Host SA								-	1,176	3,311	673
Solar Initiative	105	176	1,090	1,461	1,760	2,747	4,144	5,735	28,328	21,367	24,885
<b>Residential Solar Total</b>	<b>105</b>	<b>176</b>	<b>1,090</b>	<b>1,461</b>	<b>1,760</b>	<b>2,747</b>	<b>4,144</b>	<b>5,735</b>	<b>30,637</b>	<b>24,678</b>	<b>25,558</b>
Solar PV				1,636	2,011	2,110	2,044	1,685	2,164	4,169	8,801
<b>Commercial Solar Total</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>1,636</b>	<b>2,011</b>	<b>2,110</b>	<b>2,044</b>	<b>1,685</b>	<b>2,164</b>	<b>4,169</b>	<b>8,801</b>
<b>Solar Total</b>	<b>105</b>	<b>176</b>	<b>1,090</b>	<b>3,097</b>	<b>3,771</b>	<b>4,857</b>	<b>6,188</b>	<b>7,420</b>	<b>32,801</b>	<b>28,847</b>	<b>34,359</b>
Savings Decay	-	-	-	-	-	(23,896)	(61,157)	(11,673)	-	-	(8,077)
<b>STEP Total</b>	<b>39,828</b>	<b>102,711</b>	<b>92,545</b>	<b>114,507</b>	<b>139,606</b>	<b>136,136</b>	<b>153,489</b>	<b>273,946</b>	<b>291,530</b>	<b>304,777</b>	<b>306,231</b>

**Net-To-Gross (NTG) Ratios**

Program	NTG Ratio									
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting	0.80	0.80				0.85	0.85	0.85		
Home Efficiency	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Residential HVAC	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Air Flow Performance	0.90	0.90	0.90	0.90	0.90	0.90	0.90			
New Home Construction		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Refrigerator Recycling		0.63	0.63	0.63	0.63	0.63	0.63	0.63		
Weatherization				0.93	0.93	1.00	1.00	1.00	1.00	1.00
WashRight		0.93	0.93							
New Home Construction - Franklin									1.00	1.00
Retail Channel Partnerships								0.77	0.77	0.77
AC/Duct Tune up									0.95	
Energy Savings Through Schools								0.95	0.95	0.95
Home Energy Assessments								0.84	0.84	0.84
Multi-Family								0.92	0.92	0.92
Cool Roof									1.00	1.00
<b>Residential Efficiency Total</b>	<b>0.86</b>	<b>0.89</b>	<b>0.93</b>	<b>0.94</b>	<b>0.95</b>	<b>0.96</b>	<b>0.96</b>	<b>0.95</b>	<b>0.91</b>	<b>0.93</b>
Large Lighting	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.96	
Commercial HVAC	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Commercial New Construction		1.00	1.00	1.00	1.00	1.00	0.92	1.00		
Commercial Custom	0.92	0.96	0.96	0.96	0.96	0.96	0.92	1.00	0.96	
LED Street Lights				0.90	0.90	0.85				0.96
Motors	0.90	0.94								
Window Film		0.89								
Roof Coating	0.89	0.90	0.90	0.90						
Restaurant Equipment		0.94	0.94							
Lean Clean Energy		0.91	0.91							
Commercial Solutions								0.85	0.96	0.96
Schools & Institutions								1.00	0.96	0.96
Small Business Solutions								0.85	0.95	0.85

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Program	NTG Ratio									
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization								1.00	0.96	0.96
<b>Commercial Efficiency Total</b>	<b>0.86</b>	<b>0.88</b>	<b>0.86</b>	<b>0.87</b>	<b>0.90</b>	<b>0.91</b>	<b>0.87</b>	<b>0.87</b>	<b>0.96</b>	<b>0.93</b>
<b>Efficiency Total</b>	<b>0.86</b>	<b>0.89</b>	<b>0.88</b>	<b>0.89</b>	<b>0.92</b>	<b>0.93</b>	<b>0.90</b>	<b>0.89</b>	<b>0.94</b>	<b>0.93</b>
Smart Thermostat	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Home Manager				1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bring Your Own Thermostat						1.00	1.00	1.00	1.00	1.00
Window AC DR						1.00	1.00			
Nest Direct Install									1.00	1.00
Behavioral DR									1.00	1.00
<b>Residential DR Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Emergency DR						1.00	1.00			
Commercial DR	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Auto DR						1.00	1.00	1.00	1.00	1.00
<b>Commercial DR Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>DR Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Community Solar							1.00	1.00		
Solar Host SA							1.00	1.00	1.00	1.00
Solar Initiative	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>Residential Solar Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
Solar PV			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>Commercial Solar Total</b>	<b>-</b>	<b>-</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>Solar Total</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>STEP Total</b>	<b>0.84</b>	<b>0.89</b>	<b>0.89</b>	<b>0.90</b>	<b>0.93</b>	<b>0.94</b>	<b>0.92</b>	<b>0.91</b>	<b>0.95</b>	<b>0.95</b>

**Cost Effectiveness: Utility Cost Test (UCT) ratio**

Program	Cost Effectiveness								
	Program Administrator Cost (UCT) Test Ratio								
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Residential Lighting				1.1	0.9	0.8			1.0
Home Efficiency	1.5	0.9	0.8	1.7	1.7	3.6	2.8	3.0	2.0
Residential HVAC	2.5	2.1	2.3	3.3	4.4	2.9	3.8	4.2	3.2
Air Flow Performance	0.5	0.4	0.4	1.0	1.2				0.7
New Home Construction	3.5	2.8	2.5	6.0	5.1	1.5	1.5		3.8
Refrigerator Recycling	3.5	1.9	1.2	1.5	1.1	1.0			1.9
Weatherization		0.3	0.3	0.6	0.5	0.9	0.9	0.9	0.7
WashRight	0.8								0.8
New Home Construction - Franklin							1.3	1.5	1.4
Retail Channel Partnerships						2.4	2.4	2.7	2.5
AC/Duct Tune up							1.0		1.0
Energy Savings Through Schools						0.9	1.1	1.4	1.1
Home Energy Assessments						0.8	0.8	0.9	0.8
Multi-Family						1.2	2.0	0.8	1.8
Cool Roof							0.4	2.8	1.5
<b>Residential Efficiency Total</b>	<b>2.4</b>	<b>1.2</b>	<b>0.8</b>	<b>1.5</b>	<b>1.3</b>	<b>1.3</b>	<b>1.5</b>	<b>1.5</b>	<b>1.4</b>
Large Lighting	2.5	1.9	2.1	2.9	3.3	3.3	3.3		2.8
Commercial HVAC	1.7	1.9	2.1	3.5	4	2.4	1.0		2.6
Commercial New Construction	-	2.4	2.8	6.7	8.8	4.6			5.2
Commercial Custom	6.7	3.7	3.3	3.7	3.5	2.8	9.2		3.3
LED Street Lights		0.4	NA*	2.9				1.3	1.1
Motors									
Window Film									
Roof Coating	1.1	0.6							0.9
Restaurant Equipment	3.3								3.3
Lean Clean Energy	54.4								54.4
Commercial Solutions						1.0	3.5	3.6	3.3
Schools & Institutions						-	2.2	2.2	2.2

CPS ENERGY: SAVE FOR TOMORROW ENERGY PLAN (STEP) PROGRAM REVIEW

Program	Cost Effectiveness								
	Program Administrator Cost (UCT) Test Ratio								
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Small Business Solutions						0.3	3.0	4.2	3.5
Whole Building Optimization						-	0.6	0.9	0.8
<b>Commercial Efficiency Total</b>	<b>2.4</b>	<b>1.8</b>	<b>2.2</b>	<b>3.8</b>	<b>3.7</b>	<b>3.0</b>	<b>3.1</b>	<b>3.1</b>	<b>3.0</b>
<b>Efficiency Total</b>	<b>2.4</b>	<b>1.5</b>	<b>1.2</b>	<b>2.2</b>	<b>1.9</b>	<b>2.1</b>	<b>2.1</b>	<b>2.1</b>	<b>2.0</b>
Smart Thermostat	1.7	5.5	4.7	0.5	1.1	1.7	3.1	3.6	2.5
Home Manager		1.0	1.8	1.0	1.7	1.5	-	-	1.2
Bring Your Own Thermostat				1.5	1.9	3.1	5.1	5.7	4.2
Window AC DR				0.1	0.2				0.1
Nest Direct Install							2.9	3.2	3.1
Behavioral DR							2.9	2.5	2.7
<b>Residential DR Total</b>			<b>2.9</b>	<b>0.8</b>	<b>1.4</b>	<b>1.8</b>	<b>2.8</b>	<b>3.5</b>	<b>2.1</b>
Emergency DR				2.8	4.8				4.4
Commercial DR	1.1	0.9	0.9	1.5	2.8	2.5	2.3	2.3	1.8
Auto DR				0.4	0.5	1.5	4.4	3.1	1.3
<b>Commercial DR Total</b>	<b>1.1</b>	<b>0.9</b>	<b>0.9</b>	<b>1.3</b>	<b>2.4</b>	<b>2.3</b>	<b>2.5</b>	<b>2.3</b>	<b>1.8</b>
<b>DR Total</b>	<b>1.4</b>	<b>1.9</b>	<b>2.4</b>	<b>1.0</b>	<b>1.8</b>	<b>2.0</b>	<b>2.7</b>	<b>3.1</b>	<b>2.0</b>
Community Solar					-	0.8			0.8
Solar Host SA					-	0.5	0.9	1.0	0.5
Solar Initiative	0.8	0.6	0.8	1.1	1.2	1.5	2.7	3.3	1.8
<b>Residential Solar Total</b>			<b>0.8</b>	<b>1.1</b>	<b>1.1</b>	<b>1.4</b>	<b>2.7</b>	<b>3.3</b>	<b>1.8</b>
Solar PV	0.7	0.8	0.9	1.3	1.4	1.3	2.3	6.5	1.7
<b>Commercial Solar Total</b>			<b>0.9</b>	<b>1.3</b>	<b>1.4</b>	<b>1.3</b>	<b>2.3</b>	<b>6.5</b>	<b>1.7</b>
<b>Solar Total</b>	<b>0.8</b>	<b>0.7</b>	<b>0.9</b>	<b>1.2</b>	<b>1.2</b>	<b>1.4</b>	<b>2.6</b>	<b>3.8</b>	<b>1.8</b>
<b>STEP Total</b>	<b>1.8</b>	<b>1.4</b>	<b>1.5</b>	<b>1.6</b>	<b>1.8</b>	<b>1.9</b>	<b>2.3</b>	<b>2.7</b>	<b>1.9</b>



**Cost of Lifetime Energy Savings**

Program	Cost of Lifetime Energy Savings											
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Residential Lighting	\$0.00	\$0.00	\$0.01				\$0.03	\$0.03	\$0.04			\$0.01
Home Efficiency	\$0.03	\$0.02	\$0.02	\$0.03	\$0.03	\$0.03	\$0.03	\$0.03	\$0.02	\$0.02	\$0.02	\$0.02
Residential HVAC	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02
Air Flow Performance		\$0.05	\$0.05	\$0.07	\$0.09	\$0.09	\$0.05	\$0.05				\$0.06
New Home Construction			\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.05	\$0.05		\$0.01
Refrigerator Recycling			\$0.02	\$0.02	\$0.03	\$0.04	\$0.03	\$0.04	\$0.04			\$0.03
Weatherization					\$0.10	\$0.07	\$0.06	\$0.08	\$0.07	\$0.06	\$0.07	\$0.07
WashRight			\$0.04	\$0.04								\$0.05
New Home Construction - Franklin										\$0.06	\$0.06	\$0.06
Retail Channel Partnerships									\$0.01	\$0.01	\$0.01	\$0.01
AC/Duct Tune up										\$0.07		\$0.07
Energy Savings Through Schools									\$0.04	\$0.03	\$0.02	\$0.03
Home Energy Assessments									\$0.04	\$0.04	\$0.04	\$0.04
Multi-Family									\$0.02	\$0.01	\$0.04	\$0.02
Cool Roof										\$0.15	\$0.05	\$0.08
<b>Residential Efficiency Total</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.02</b>	<b>\$0.03</b>	<b>\$0.04</b>	<b>\$0.03</b>	<b>\$0.04</b>	<b>\$0.04</b>	<b>\$0.03</b>	<b>\$0.04</b>	<b>\$0.03</b>
Large Lighting	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01		\$0.01
Commercial HVAC	\$0.01	\$0.02	\$0.02	\$0.03	\$0.03	\$0.03	\$0.02	\$0.02	\$0.02	\$0.05		\$0.02
Commercial New Construction			\$0.02		\$0.01	\$0.01	\$0.00	\$0.01	\$0.01			\$0.01
Commercial Custom		\$0.05	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.05		\$0.01
LED Street Lights					\$0.04		\$0.01				\$0.01	\$0.01
Motors			\$0.01									\$0.01
Window Film			\$0.06									\$0.06
Roof Coating	\$0.04		\$0.00	\$0.05	\$0.04							\$0.02
Restaurant Equipment			\$0.01									\$0.01
Lean Clean Energy			\$0.01									\$0.00
Commercial Solutions									\$0.04	\$0.01	\$0.01	\$0.01
Schools & Institutions										\$0.01	\$0.02	\$0.02
Small Business Solutions									\$0.11	\$0.01	\$0.01	\$0.01

CPS ENERGY: SAVE FOR TOMORROW ENERGY PLAN (STEP) PROGRAM REVIEW

Program	Cost of Lifetime Energy Savings											
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Whole Building Optimization										\$0.07	\$0.05	\$0.05
<b>Commercial Efficiency Total</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>
<b>Efficiency Total</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.02</b>	<b>\$0.01</b>	<b>\$0.02</b>	<b>\$0.02</b>	<b>\$0.02</b>	<b>\$0.02</b>	<b>\$0.02</b>
Smart Thermostat	\$12.57	\$6.40	\$16.01	\$4.98	\$4.17	\$5.74	\$7.16	\$5.12	\$5.58	\$2.38	\$3.46	\$5.54
Home Manager					\$130.46	\$54.99	\$29.35	\$4.84	\$7.00	\$3.86	\$12.48	\$17.41
Bring Your Own Thermostat							\$18.71	\$22.41	\$0.30	\$0.25	\$0.18	\$0.27
Window AC DR							\$173.27	\$280.71				\$207.87
Nest Direct Install										\$1.18	\$0.52	\$0.68
Behavioral DR										\$18.39	\$0.76	\$1.51
<b>Residential DR Total</b>	<b>\$12.57</b>	<b>\$6.40</b>	<b>\$16.01</b>	<b>\$5.17</b>	<b>\$14.57</b>	<b>\$13.12</b>	<b>\$13.28</b>	<b>\$5.46</b>	<b>\$1.79</b>	<b>\$0.91</b>	<b>\$0.54</b>	<b>\$2.63</b>
Emergency DR							\$26.61	\$24.27				\$24.70
Commercial DR		\$1.59	\$2.35	\$2.48	\$1.67	\$2.05	\$3.41	\$2.40	\$1.85	\$1.35	\$1.92	\$2.05
Auto DR							\$49.25	\$22.34	\$8.98	\$2.42	\$1.79	\$7.79
<b>Commercial DR Total</b>	<b>\$ -</b>	<b>\$1.59</b>	<b>\$2.35</b>	<b>\$2.48</b>	<b>\$1.67</b>	<b>\$2.05</b>	<b>\$3.99</b>	<b>\$3.30</b>	<b>\$2.24</b>	<b>\$1.44</b>	<b>\$1.91</b>	<b>\$2.24</b>
<b>DR Total</b>	<b>\$12.57</b>	<b>\$4.21</b>	<b>\$5.96</b>	<b>\$3.45</b>	<b>\$5.18</b>	<b>\$5.73</b>	<b>\$7.88</b>	<b>\$4.25</b>	<b>\$1.95</b>	<b>\$1.05</b>	<b>\$0.72</b>	<b>\$2.50</b>
Community Solar									\$0.02			\$0.02
Solar Host SA									\$0.00	\$0.00		\$0.00
Solar Initiative	\$0.06	\$0.07	\$0.07	\$0.05	\$0.04	\$0.04	\$0.03	\$0.03	\$0.03	\$0.01	\$0.01	\$0.02
<b>Residential Solar Total</b>	<b>\$0.06</b>	<b>\$0.07</b>	<b>\$0.07</b>	<b>\$0.05</b>	<b>\$0.04</b>	<b>\$0.04</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.02</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.02</b>
Solar PV				\$0.05	\$0.05	\$0.04	\$0.03	\$0.03	\$0.03	\$0.02	\$0.01	\$0.02
<b>Commercial Solar Total</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$0.05</b>	<b>\$0.05</b>	<b>\$0.04</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.02</b>	<b>\$0.01</b>	<b>\$0.02</b>
<b>Solar Total</b>	<b>\$0.06</b>	<b>\$0.07</b>	<b>\$0.07</b>	<b>\$0.05</b>	<b>\$0.04</b>	<b>\$0.04</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.02</b>
<b>STEP Total</b>	<b>\$0.01</b>	<b>\$0.01</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.03</b>	<b>\$0.02</b>	<b>\$0.02</b>	<b>\$0.02</b>	<b>\$0.02</b>

**Cost of Lifetime Demand Savings**

Program	Cost of Lifetime Demand Savings											
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Residential Lighting	\$33	\$50	\$54				\$912	\$860	\$373			\$59
Home Efficiency	\$91	\$52	\$47	\$148	\$192	\$229	\$92	\$99	\$39	\$56	\$58	\$75
Residential HVAC	\$64	\$67	\$78	\$78	\$73	\$70	\$50	\$35	\$48	\$41	\$36	\$52
Air Flow Performance		\$93	\$95	\$144	\$141	\$156	\$104	\$108				\$118
New Home Construction			\$36	\$35	\$35	\$36	\$33	\$40	\$82	\$88		\$37
Refrigerator Recycling			\$174	\$241	\$299	\$463	\$263	\$305	\$330			\$276
Weatherization					\$305	\$232	\$251	\$302	\$147	\$150	\$178	\$198
WashRight		\$143	\$100	\$98								\$100
New Home Construction - Franklin										\$102	\$91	\$95
Retail Channel Partnerships									\$129	\$134	\$121	\$130
AC/Duct Tune up										\$190		\$190
Energy Savings Through Schools									\$464	\$422	\$350	\$419
Home Energy Assessments									\$419	\$454	\$400	\$437
Multi-Family									\$252	\$138	\$412	\$154
Cool Roof										\$378	\$53	\$104
<b>Residential Efficiency Total</b>	<b>\$49</b>		<b>\$67</b>	<b>\$72</b>	<b>\$103</b>	<b>\$130</b>	<b>\$112</b>	<b>\$128</b>	<b>\$109</b>	<b>\$112</b>	<b>\$105</b>	<b>\$103</b>
Large Lighting	\$31	\$37	\$45	\$57	\$56	\$42	\$52	\$55	\$49	\$62		\$50
Commercial HVAC	\$42		\$47	\$94	\$42	\$36	\$42	\$51	\$89	\$273		\$51
Commercial New Construction			\$23		\$44	\$40	\$29	\$14	\$41			\$31
Commercial Custom		\$2,898	\$47	\$258	\$62	\$145	\$34	\$281	\$108	\$14		\$87
LED Street Lights											\$727	\$727
Motors			\$15									\$15
Window Film			\$199									\$199
Roof Coating	\$121		\$6	\$463	\$339							\$51
Restaurant Equipment			\$60									\$60
Lean Clean Energy			\$64									\$51
Commercial Solutions									\$192	\$57	\$65	\$64
Schools & Institutions										\$89	\$64	\$74
Small Business Solutions									\$2,641	\$92	\$53	\$66

CPS ENERGY: SAVE FOR TOMORROW ENERGY PLAN (STEP) PROGRAM REVIEW

Program	Cost of Lifetime Demand Savings											
	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Whole Building Optimization										\$535	\$335	\$370
<b>Commercial Efficiency Total</b>	<b>\$35</b>	<b>\$43</b>	<b>\$46</b>	<b>\$63</b>	<b>\$60</b>	<b>\$42</b>	<b>\$46</b>	<b>\$50</b>	<b>\$57</b>	<b>\$67</b>	<b>\$70</b>	<b>\$55</b>
<b>Efficiency Total</b>	<b>\$38</b>	<b>\$51</b>	<b>\$57</b>	<b>\$66</b>	<b>\$72</b>	<b>\$82</b>	<b>\$78</b>	<b>\$89</b>	<b>\$76</b>	<b>\$90</b>	<b>\$89</b>	<b>\$76</b>
Smart Thermostat	\$607	\$361	\$415	\$361	\$134	\$161	\$167	\$119	\$119	\$82	\$85	\$175
Home Manager					\$806	\$414	\$281	\$77	\$88	\$85	\$282	\$224
Bring Your Own Thermostat							\$206	\$193	\$99	\$72	\$50	\$74
Window AC DR							\$3,284	\$1,585				\$2,240
Nest Direct Install										\$431	\$175	\$231
Behavioral DR										\$37	\$57	\$44
<b>Residential DR Total</b>	<b>\$607</b>	<b>\$361</b>	<b>\$415</b>	<b>\$375</b>	<b>\$349</b>	<b>\$261</b>	<b>\$224</b>	<b>\$104</b>	<b>\$102</b>	<b>\$99</b>	<b>\$96</b>	<b>\$178</b>
Emergency DR							\$27	\$24				\$25
Commercial DR		\$58	\$67	\$73	\$73	\$75	\$73	\$49	\$60	\$59	\$64	\$65
Auto DR							\$534	\$397	\$216	\$83	\$55	\$205
<b>Commercial DR Total</b>	<b>\$ -</b>	<b>\$58</b>	<b>\$67</b>	<b>\$73</b>	<b>\$73</b>	<b>\$75</b>	<b>\$80</b>	<b>\$58</b>	<b>\$71</b>	<b>\$62</b>	<b>\$64</b>	<b>\$68</b>
<b>DR Total</b>	<b>\$607</b>	<b>\$190</b>	<b>\$166</b>	<b>\$156</b>	<b>\$187</b>	<b>\$164</b>	<b>\$147</b>	<b>\$77</b>	<b>\$86</b>	<b>\$82</b>	<b>\$82</b>	<b>\$118</b>
Community Solar									\$82			\$82
Solar Host SA									\$7	\$10	\$ -	\$8
Solar Initiative	\$77	\$127	\$110	\$80	\$80	\$79	\$94	\$114	\$89	\$51	\$44	\$71
<b>Residential Solar Total</b>	<b>\$77</b>	<b>\$127</b>	<b>\$110</b>	<b>\$80</b>	<b>\$80</b>	<b>\$79</b>	<b>\$94</b>	<b>\$121</b>	<b>\$87</b>	<b>\$47</b>	<b>\$43</b>	<b>\$69</b>
Solar PV				\$80	\$80	\$67	\$80	\$93	\$99	\$58	\$21	\$61
<b>Commercial Solar Total</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$80</b>	<b>\$80</b>	<b>\$67</b>	<b>\$80</b>	<b>\$93</b>	<b>\$99</b>	<b>\$58</b>	<b>\$21</b>	<b>\$61</b>
<b>Solar Total</b>	<b>\$77</b>	<b>\$127</b>	<b>\$110</b>	<b>\$80</b>	<b>\$80</b>	<b>\$73</b>	<b>\$89</b>	<b>\$114</b>	<b>\$88</b>	<b>\$49</b>	<b>\$37</b>	<b>\$67</b>
<b>STEP Total</b>	<b>\$46</b>	<b>\$65</b>	<b>\$82</b>	<b>\$88</b>	<b>\$93</b>	<b>\$96</b>	<b>\$96</b>	<b>\$89</b>	<b>\$81</b>	<b>\$75</b>	<b>\$66</b>	<b>\$83</b>

**Implementation and Incentive Expenditure (\$)**

Program	Implementation and Incentive Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting		\$ 1,000,000	\$ 1,050,040	\$ 63,647		
Home Efficiency	\$ 745,558	\$ 844,194	\$ 878,975	\$ 677,978	\$ 1,362,019	\$ 1,059,219
Residential HVAC	\$ 3,424,560	\$ 3,403,050	\$ 3,706,733	\$ 4,070,510	\$ 4,260,826	\$ 3,949,136
Air Flow Performance	\$ 709,169	\$ 750,280	\$ 789,090			
New Home Construction	\$ 1,455,100	\$ 1,777,100	\$ 1,144,500	\$ 468,832	\$ 131,300	
Refrigerator Recycling	\$ 56,055	\$ 53,740	\$ 45,155	\$ 56,570		
Weatherization	\$ 14,256,958	\$ 13,382,366	\$ 18,881,535	\$ 18,005,102	\$ 16,969,245	\$ 16,566,801
WashRight						
New Home Construction - Franklin					\$ 1,326,225	\$ 1,952,173
Retail Channel Partnerships				\$ 321,825	\$ 3,063,740	\$ 1,194,821
AC/Duct Tune up					\$ 100,337	
Energy Savings Through Schools				\$ 547,602	\$ 523,495	\$ 289,987
Home Energy Assessments				\$ 944,227	\$ 4,324,332	\$ 1,338,810
Multi-Family				\$ 352,793	\$ 1,767,084	\$ 105,499
Cool Roof					\$ 8,458	\$ 15,109
<b>Residential Efficiency Total</b>	<b>\$ 20,647,400</b>	<b>\$ 21,210,730</b>	<b>\$ 26,496,028</b>	<b>\$ 25,509,086</b>	<b>\$ 33,837,061</b>	<b>\$ 26,471,555</b>
Large Lighting	\$ 4,374,086	\$ 3,511,901	\$ 7,438,476	\$ 18,192,066	\$ 8,835,129	
Commercial HVAC	\$ 2,246,077	\$ 2,660,635	\$ 2,851,072	\$ 3,894,956	\$ 153,275	
Commercial New Construction	\$ 679,396	\$ 1,799,501	\$ 390,573	\$ 1,061,486		
Commercial Custom	\$ 655,629	\$ 315,052	\$ 368,510	\$ 664,742	\$ 15,445	
LED Street Lights		\$ 916,012				\$ 350,679
Motors						
Window Film						
Roof Coating						
Restaurant Equipment						
Lean Clean Energy						
Commercial Solutions				\$ 923,734	\$ 5,769,623	\$ 6,713,486
Schools & Institutions				\$ 628,549	\$ 2,468,233	\$ 2,966,322
Small Business Solutions				\$ 411,674	\$ 1,529,714	\$ 3,206,468

CPS ENERGY: SAVE FOR TOMORROW ENERGY PLAN (STEP) PROGRAM REVIEW

Program	Implementation and Incentive Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization				\$ 155,089	\$ 644,884	\$ 1,877,322
<b>Commercial Efficiency Total</b>	<b>\$ 7,955,188</b>	<b>\$ 9,203,101</b>	<b>\$ 11,048,631</b>	<b>\$ 25,932,296</b>	<b>\$ 19,416,303</b>	<b>\$ 15,114,277</b>
<b>Efficiency Total</b>	<b>\$ 28,602,588</b>	<b>\$ 30,413,831</b>	<b>\$ 37,544,659</b>	<b>\$ 51,441,382</b>	<b>\$ 53,253,364</b>	<b>\$ 41,585,832</b>
Smart Thermostat	\$ 5,855,338	\$ 6,176,118	\$ 4,903,769	\$ 3,966,166	\$ 2,565,728	\$ 3,077,518
Home Manager	\$ 7,414,497	\$ 7,615,747	\$ 3,150,298	\$ 3,340,585	\$ 1,590,347	\$ 560,775
Bring Your Own Thermostat		\$ 202,249	\$ 441,454	\$ 963,456	\$ 1,465,579	\$ 1,572,783
Window AC DR		\$ 337,538	\$ 301,831			
Nest Direct Install					\$ 2,723,900	\$ 3,890,848
Behavioral DR					\$ 450,000	\$ 419,000
<b>Residential DR Total</b>	<b>\$ 13,269,835</b>	<b>\$ 14,331,652</b>	<b>\$ 8,797,352</b>	<b>\$ 8,270,207</b>	<b>\$ 8,795,554</b>	<b>\$ 9,520,924</b>
Emergency DR		\$ 109,148	\$ 456,084			
Commercial DR	\$ 4,894,008	\$ 5,463,450	\$ 4,928,551	\$ 4,700,074	\$ 4,119,614	\$ 4,910,195
Auto DR		\$ 913,358	\$ 1,720,079	\$ 1,286,639	\$ 637,961	\$ 212,435
<b>Commercial DR Total</b>	<b>\$ 4,894,008</b>	<b>\$ 6,485,956</b>	<b>\$ 7,104,714</b>	<b>\$ 5,986,713</b>	<b>\$ 4,757,575</b>	<b>\$ 5,122,630</b>
<b>DR Total</b>	<b>\$ 18,163,843</b>	<b>\$ 20,817,608</b>	<b>\$ 15,902,066</b>	<b>\$ 14,256,920</b>	<b>\$ 13,553,129</b>	<b>\$ 14,643,554</b>
Community Solar			\$ -	\$ 1,289,375		
Solar Host SA			\$ 222,489	\$ -	\$ -	\$ -
Solar Initiative	\$ 5,739,276	\$ 6,482,046	\$ 9,315,955	\$ 35,345,295	\$ 15,274,749	\$ 15,118,988
<b>Residential Solar Total</b>	<b>\$ 5,739,276</b>	<b>\$ 6,482,046</b>	<b>\$ 9,538,444</b>	<b>\$ 36,634,670</b>	<b>\$ 15,274,749</b>	<b>\$ 15,118,988</b>
Solar PV	\$ 3,755,814	\$ 2,811,929	\$ 2,330,041	\$ 3,125,011	\$ 3,538,621	\$ 2,744,191
<b>Commercial Solar Total</b>	<b>\$ 3,755,814</b>	<b>\$ 2,811,929</b>	<b>\$ 2,330,041</b>	<b>\$ 3,125,011</b>	<b>\$ 3,538,621</b>	<b>\$ 2,744,191</b>
<b>Solar Total</b>	<b>\$ 9,495,090</b>	<b>\$ 9,293,975</b>	<b>\$ 11,868,485</b>	<b>\$ 39,759,681</b>	<b>\$ 18,813,370</b>	<b>\$ 17,863,179</b>
<b>STEP Total</b>	<b>\$ 56,261,521</b>	<b>\$ 60,525,414</b>	<b>\$ 65,315,210</b>	<b>\$ 105,457,983</b>	<b>\$ 85,619,863</b>	<b>\$ 74,092,565</b>

**CPS Energy Admin Expenditure (\$)**

Program	CPS Energy Admin Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting		\$ 76,072	\$ 67,736	\$ 3,404		
Home Efficiency	\$ 143,080	\$ 98,383	\$ 49,240	\$ 21,245	\$ 33,497	\$ 38,451
Residential HVAC	\$ 428,144	\$ 240,343	\$ 154,975	\$ 106,443	\$ 109,291	\$ 145,785
Air Flow Performance	\$ 118,292	\$ 66,875	\$ 42,838			
New Home Construction	\$ 179,915	\$ 118,576	\$ 54,124	\$ 12,127	\$ 2,836	
Refrigerator Recycling	\$ 89,815	\$ 67,946	\$ 76,704	\$ 8,171		
Weatherization	\$ 1,726,884	\$ 1,693,265	\$ 2,922,249	\$ 2,125,699	\$1,546,895	\$1,886,917
WashRight						
New Home Construction - Franklin					\$ 32,623	\$ 75,089
Retail Channel Partnerships				\$ 5,574	\$ 74,969	\$ 34,389
AC/Duct Tune up					\$ 2,417	
Energy Savings Through Schools				\$ 9,485	\$ 12,954	\$ 8,346
Home Energy Assessments				\$ 16,354	\$ 105,732	\$ 56,186
Multi-Family				\$ 6,110	\$ 42,949	\$ 4,729
Cool Roof					\$ 19,877	\$ 6,493
<b>Residential Efficiency Total</b>	<b>\$2,686,130</b>	<b>\$2,361,460</b>	<b>\$3,367,866</b>	<b>\$2,314,612</b>	<b>\$1,984,040</b>	<b>\$2,256,385</b>
Large Lighting	\$ 628,334	\$ 355,444	\$ 454,737	\$ 636,929	\$ 273,104	
Commercial HVAC	\$ 331,697	\$ 250,158	\$ 154,384	\$ 147,008	\$ 7,540	
Commercial New Construction	\$ 111,328	\$ 158,362	\$ 18,246	\$ 30,462		
Commercial Custom	\$ 98,234	\$ 35,898	\$ 31,090	\$ 29,264	\$ 1,676	
LED Street Lights		\$ 92,711				\$ 12,875
Motors						
Window Film						
Roof Coating						
Restaurant Equipment						
Lean Clean Energy						
Commercial Solutions				\$ 17,671	\$ 179,495	\$ 285,382
Schools & Institutions				\$ 12,024	\$ 74,660	\$ 124,573
Small Business Solutions				\$ 7,875	\$ 47,099	\$ 129,739



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Program	CPS Energy Admin Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization				\$ 2,967	\$ 19,174	\$ 76,408
<b>Commercial Efficiency Total</b>	<b>\$1,169,593</b>	<b>\$ 892,573</b>	<b>\$ 658,457</b>	<b>\$ 884,200</b>	<b>\$ 602,748</b>	<b>\$ 628,977</b>
<b>Efficiency Total</b>	<b>\$3,855,723</b>	<b>\$3,254,033</b>	<b>\$4,026,323</b>	<b>\$3,198,812</b>	<b>\$2,586,788</b>	<b>\$2,885,362</b>
Smart Thermostat	\$ 48,981	\$ 487,662	\$ 231,488	\$ 168,578	\$ 82,914	\$ 102,706
Home Manager	\$2,559,548	\$1,941,292	\$ 378,080	\$ 193,131	\$ 160,817	\$ 54,066
Bring Your Own Thermostat		\$ 89,057	\$ 190,136	\$ 118,104	\$ 37,919	\$ 48,300
Window AC DR		\$ 82,825	\$ 21,548			
Nest Direct Install					\$ 59,440	\$ 115,664
Behavioral DR					\$ 11,825	\$ 11,458
<b>Residential DR Total</b>	<b>\$2,608,529</b>	<b>\$2,600,836</b>	<b>\$ 821,252</b>	<b>\$ 479,813</b>	<b>\$ 352,915</b>	<b>\$ 332,194</b>
Emergency DR		\$ 9,950	\$ 25,274			
Commercial DR	\$ 91,750	\$ 498,042	\$ 273,336	\$ 167,113	\$ 130,101	\$ 189,998
Auto DR		\$ 83,261	\$ 95,320	\$ 52,868	\$ 19,493	\$ 7,183
<b>Commercial DR Total</b>	<b>\$ 91,750</b>	<b>\$ 591,253</b>	<b>\$ 393,930</b>	<b>\$ 219,981</b>	<b>\$ 149,594</b>	<b>\$ 197,181</b>
<b>DR Total</b>	<b>\$2,700,279</b>	<b>\$3,192,089</b>	<b>\$1,215,182</b>	<b>\$ 699,794</b>	<b>\$ 502,509</b>	<b>\$ 529,375</b>
Community Solar			\$ 182,719	\$ 126,326		\$ 18,040
Solar Host SA			\$ 186,974	\$ 78,323	\$ 337,869	\$ -
Solar Initiative	\$ 754,636	\$ 502,714	\$ 575,402	\$1,442,717	\$ 557,176	\$ 655,569
<b>Residential Solar Total</b>	<b>\$ 754,636</b>	<b>\$ 502,714</b>	<b>\$ 945,095</b>	<b>\$1,647,366</b>	<b>\$ 895,045</b>	<b>\$ 673,609</b>
Solar PV	\$ 456,473	\$ 253,561	\$ 156,661	\$ 128,431	\$ 128,349	\$ 118,987
<b>Commercial Solar Total</b>	<b>\$ 456,473</b>	<b>\$ 253,561</b>	<b>\$ 156,661</b>	<b>\$ 128,431</b>	<b>\$ 128,349</b>	<b>\$ 118,987</b>
<b>Solar Total</b>	<b>\$1,211,109</b>	<b>\$ 756,275</b>	<b>\$1,101,756</b>	<b>\$1,775,797</b>	<b>\$1,023,394</b>	<b>\$ 792,596</b>
<b>STEP Total</b>	<b>\$7,767,111</b>	<b>\$7,202,397</b>	<b>\$6,343,261</b>	<b>\$5,674,403</b>	<b>\$4,112,691</b>	<b>\$4,207,333</b>

**Total Program Expenditure (\$)**

Program	Total Program Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Residential Lighting		\$ 1,076,072	\$ 1,117,776	\$ 67,051		
Home Efficiency	\$ 888,638	\$ 942,578	\$ 928,215	\$ 699,223	\$ 1,395,516	\$ 1,097,670
Residential HVAC	\$ 3,852,704	\$ 3,643,393	\$ 3,861,708	\$ 4,176,953	\$ 4,370,118	\$ 4,094,921
Air Flow Performance	\$ 827,461	\$ 817,155	\$ 831,927			
New Home Construction	\$ 1,635,015	\$ 1,895,676	\$ 1,198,624	\$ 480,959	\$ 134,136	
Refrigerator Recycling	\$ 145,870	\$ 121,686	\$ 121,859	\$ 64,741		
Weatherization	\$ 15,983,842	\$ 15,075,631	\$ 21,803,784	\$ 20,130,801	\$ 18,516,140	\$ 18,453,718
WashRight						
New Home Construction - Franklin					\$ 1,358,848	\$ 2,027,262
Retail Channel Partnerships				\$ 327,399	\$ 3,138,709	\$ 1,229,210
AC/Duct Tune up					\$ 102,754	
Energy Savings Through Schools				\$ 557,087	\$ 536,449	\$ 298,333
Home Energy Assessments				\$ 960,581	\$ 4,430,064	\$ 1,394,996
Multi-Family				\$ 358,903	\$ 1,810,033	\$ 110,228
Cool Roof					\$ 28,335	\$ 21,602
<b>Residential Efficiency Total</b>	<b>\$ 23,333,530</b>	<b>\$ 23,572,191</b>	<b>\$ 29,863,893</b>	<b>\$ 27,823,698</b>	<b>\$ 35,821,102</b>	<b>\$ 28,727,940</b>
Large Lighting	\$ 5,002,420	\$ 3,867,345	\$ 7,893,213	\$ 18,828,995	\$ 9,108,233	
Commercial HVAC	\$ 2,577,774	\$ 2,910,793	\$ 3,005,455	\$ 4,041,964	\$ 160,815	
Commercial New Construction	\$ 790,724	\$ 1,957,863	\$ 408,819	\$ 1,091,948		
Commercial Custom	\$ 753,863	\$ 350,950	\$ 399,600	\$ 694,006	\$ 17,121	\$ 363,554
LED Street Lights		\$ 1,008,723				
Motors						
Window Film						
Roof Coating						
Restaurant Equipment						
Lean Clean Energy						
Commercial Solutions				\$ 941,405	\$ 5,949,118	\$ 6,998,867
Schools & Institutions				\$ 640,573	\$ 2,542,893	\$ 3,090,894
Small Business Solutions				\$ 419,549	\$ 1,576,813	\$ 3,336,207

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Program	Total Program Expenditure (\$)					
	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019
Whole Building Optimization				\$ 158,056	\$ 664,058	\$ 1,953,730
<b>Commercial Efficiency Total</b>	<b>\$ 9,124,781</b>	<b>\$ 10,095,674</b>	<b>\$ 11,707,087</b>	<b>\$ 26,816,496</b>	<b>\$ 20,019,051</b>	<b>\$ 15,743,252</b>
<b>Efficiency Total</b>	<b>\$ 32,458,311</b>	<b>\$ 33,667,865</b>	<b>\$ 41,570,980</b>	<b>\$ 54,640,194</b>	<b>\$ 55,840,153</b>	<b>\$ 44,471,192</b>
Smart Thermostat	\$ 5,904,319	\$ 6,663,780	\$ 5,135,257	\$ 4,134,744	\$ 2,648,642	\$ 3,180,223
Home Manager	\$ 9,974,045	\$ 9,557,039	\$ 3,528,379	\$ 3,533,717	\$ 1,751,164	\$ 614,841
Bring Your Own Thermostat		\$ 291,306	\$ 631,590	\$ 1,081,560	\$ 1,503,498	\$ 1,621,083
Window AC DR		\$ 420,363	\$ 323,379			
Nest Direct Install					\$ 2,783,340	\$ 4,006,512
Behavioral DR					\$ 461,825	\$ 430,458
<b>Residential DR Total</b>	<b>\$ 15,878,364</b>	<b>\$ 16,932,488</b>	<b>\$ 9,618,605</b>	<b>\$ 8,750,021</b>	<b>\$ 9,148,469</b>	<b>\$ 9,853,117</b>
Emergency DR		\$ 119,098	\$ 481,358			
Commercial DR	\$ 4,985,758	\$ 5,961,492	\$ 5,201,887	\$ 4,867,187	\$ 4,249,715	\$ 5,100,193
Auto DR		\$ 996,618	\$ 1,815,399	\$ 1,339,507	\$ 657,454	\$ 219,618
<b>Commercial DR Total</b>	<b>\$ 4,985,758</b>	<b>\$ 7,077,208</b>	<b>\$ 7,498,644</b>	<b>\$ 6,206,694</b>	<b>\$ 4,907,169</b>	<b>\$ 5,319,811</b>
<b>DR Total</b>	<b>\$ 20,864,122</b>	<b>\$ 24,009,696</b>	<b>\$ 17,117,249</b>	<b>\$ 14,956,715</b>	<b>\$ 14,055,638</b>	<b>\$ 15,172,928</b>
Community Solar			\$ 182,719	\$ 1,415,701		\$ 18,040
Solar Host SA			\$ 409,463	\$ 78,323	\$ 337,869	\$ -
Solar Initiative	\$ 6,493,912	\$ 6,984,760	\$ 9,891,358	\$ 36,788,012	\$ 15,831,925	\$ 15,774,557
<b>Residential Solar Total</b>	<b>\$ 6,493,912</b>	<b>\$ 6,984,760</b>	<b>\$ 10,483,540</b>	<b>\$ 38,282,036</b>	<b>\$ 16,169,794</b>	<b>\$15,792,597</b>
Solar PV	\$ 4,212,287	\$ 3,065,490	\$ 2,486,702	\$ 3,253,442	\$ 3,666,970	\$ 2,863,178
<b>Commercial Solar Total</b>	<b>\$ 4,212,287</b>	<b>\$ 3,065,490</b>	<b>\$ 2,486,702</b>	<b>\$ 3,253,442</b>	<b>\$ 3,666,970</b>	<b>\$ 2,863,178</b>
<b>Solar Total</b>	<b>\$ 10,706,199</b>	<b>\$ 10,050,250</b>	<b>\$ 12,970,242</b>	<b>\$ 41,535,478</b>	<b>\$ 19,836,764</b>	<b>\$ 18,655,775</b>
<b>STEP Total</b>	<b>\$ 64,028,632</b>	<b>\$ 67,727,811</b>	<b>\$ 71,658,471</b>	<b>\$111,132,387</b>	<b>\$ 89,732,555</b>	<b>\$ 78,299,895</b>

## Appendix C: Local Job Creation

STEP provides incentives for participants to invest in a variety of energy efficient and clean energy technologies. These investments grow energy service, installation, and other jobs while producing significant direct savings for participants, which frees up spending for households and reduces costs for businesses. STEP's economic impact, in terms of jobs creation and economic development, is assessed using the economic modeling software IMPLAN.

This study finds that the STEP programs, between FY 2009 and FY 2019 cumulatively generated 7,500 local job-years<sup>14</sup>, \$312 million in labor income, and \$362 million in value added. Taking into account the effective useful life of equipment installed under the program, local job creation continues to FY 2048 and produces lifetime (FY 2009 to FY 2048) cumulative impacts of 23,400 net job-years, \$1.1 billion in labor income, and \$1.7 billion in value added in the Greater San Antonio Area.

### Methodology

To estimate the economic impact of STEP, the IMPLAN model is used to estimate how investments, savings, and costs of STEP have impacted the Greater San Antonio Area economy. The IMPLAN model is a static input-output framework used to analyze the effects of an economic stimulus on pre-specified economic regions, in this case the eight-county San Antonio Metropolitan Statistical Area (MSA). The model includes 536 sectors based on the North American Industry Classification System (NAICS).

The model captures the fact that sectors are interdependent: one industry purchases inputs from other industries and households (e.g., labor), and then produces and sells outputs to other industries, households, and government entities. Therefore, economic activity in one sector causes an increased flow of money throughout the economy. IMPLAN's outputs include three types of impacts:

- **Direct impacts**, which are impacts in the primary industries where investments made by STEP and its participants are focused. For example, installing rooftop solar requires direct construction jobs.
- **Indirect impacts**, which are impacts in the industries that supply or interact with the primary industries. For example, building new energy efficient structures requires the purchase of construction-related building materials, which requires workers and output from sectors producing those materials.
- **Induced impacts**, which represent increased spending by workers who earn money due to the proposed projects, such as when construction workers use their wages at local restaurants.

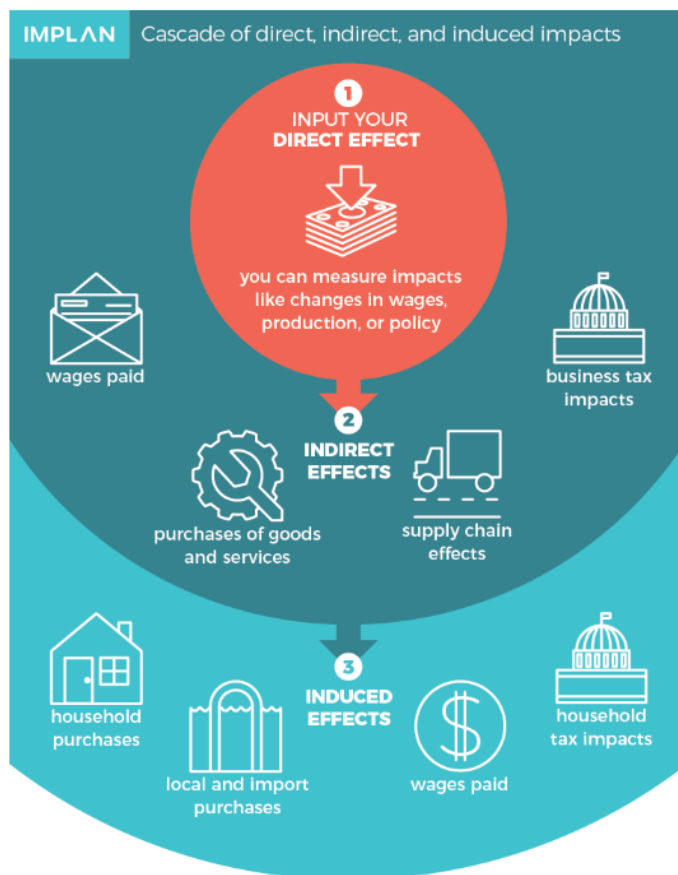
The results of this analysis are reported using four metrics:

- **Employment**, which represents the job-years created in each industry, based on the output per worker for each industry.
- **Labor Income**, which includes all forms of employment income generated by the direct input, including employee compensation (wages and benefits) and proprietor income.
- **Gross Regional Product (Value Added)**, which is the net value of output, including labor income, indirect business taxes, and business income.
- **Output**, which represents the total value of industry activity generated by the direct spending.

<sup>14</sup> When presenting cumulative impacts we refer to job-years and annual impacts refer to jobs. These result represent the same thing as an annual job is one job-year. As a static model, IMPLAN is unable to estimate how long a job is permanent for. So, for example, 10 job-years could be interpreted as 1 individual employed for 10 years or 10 individuals for a single year.

Figure 24 offers a visual representation of the models inputs and outputs.

Figure 24. IMPLAN Model Schematic



## Modeling Inputs

Two scenarios were considered when analyzing the impacts of STEP: a net scenario and a gross scenario. The gross scenario considered all the economic impacts supported by activity under the STEP programs, while the net scenario estimated the impacts the program has incentivized, which would not have occurred without the program.

STEP, over its lifetime and beyond, has impacted the region through multiple pathways, from investments in running the program to electric bill savings that result from the program. Direct spending activities by CPS Energy and STEP participants included in the analysis are shown in Table 13. Administration and marketing, incentive investments, bill savings, and demand response payments are derived from STEP data. Participant investments were estimated using assumptions about the percent of total spending on a particular measure typically covered by an incentive, with the assumption that the participant pays the remainder.

Table 13. Economic Analysis Inputs, FY 2009-FY 2019 (\$ million).

Factors Increasing Consumer and Business Spending:			
Input Category	Description	Net	Gross
Admin & Marketing	Spending by CPS to run and advertise the program.	\$48	\$48
Incentive Investments	Incentive payments from CPS to program participants.	\$497	\$497

Factors Increasing Consumer and Business Spending:			
Input Category	Description	Net	Gross
Participant Investments	Investments made by participants in the program.	\$842	\$881
Residential Bill Savings	Residential bill savings due to decreased grid electricity consumption.	\$310	\$338
Commercial Bill Savings	Commercial bill savings due to decreased grid electricity consumption.	\$282	\$316
Residential DR Payments	Payments made by CPS to residential participants in demand-response programs.	\$48	\$48
Commercial DR Payments	Payments made by CPS to commercial participants in demand-response programs.	\$47	\$47
Factors Decreasing Consumer and Business Spending:			
Input Category	Description	Net	Gross
Program Funding	Cost to residents of the Greater San Antonio Area to run STEP. Program funding was collected through increased electricity rates.	(\$640)	(\$640)
Participant Cost	Cost STEP participants to participate in the program. This is the income/revenue spent on energy efficiency upgrades that could have been spent elsewhere in the economy.	(\$842)	(\$881)

Source: CPS Energy, ICF analysis

Commercial and residential bill savings continue for the lifetimes of the products purchased during program years. To account for the impacts of these savings, effective useful life (EUL) from the Texas TRM is used to estimate cumulative bill savings for each measure. The longest EUL is 30 years and therefore there are cumulative bill savings from FY 2019, when the last measures are installed, to FY 2048. The total bill savings from FY 2020 to FY 2048 are shown in Table 14.

*Table 14. Bill Savings, FY 2020-FY 2048 (\$ million).*

Input Category	Net	Gross
Residential Bill Savings	\$1,099	\$1,136
Commercial Bill Savings	\$830	\$919

Source: CPS Energy, ICF analysis

## Mapping Inputs to IMPLAN

The investments in Table 13 represent aggregated spending on a variety of STEP programs, which cover multiple measures. Different measures must be produced, sold, and installed by different sectors of the economy. Therefore, when input to IMPLAN, the investments made for each measure are mapped to sectors assumed to be directly impacted by those investments within the IMPLAN model. Total spending (program spending and participant spending) is split into installation costs, margins (retail markup), and direct investments in the measure being installed. Installation is typically mapped to the construction sector and direct spending on the measure is mapped to the sector producing it. For example, programs involving residential refrigeration are mapped to NAICS 335222; household refrigerator and home freezer manufacturing.

Bill savings and program costs are assumed to impact households and businesses differently. For households, bill savings are assumed to increase household income, which represents additional spending in the economy. Costs are represented as decreases to income, resulting in less spending in the economy.

For businesses, there are some limitations in the ability to model changes in their spending on energy. Costs and savings to businesses are modeled in IMPLAN as changes to output, which is a conservative assumption for two reasons. First, savings or costs of the program impact the production costs for businesses, which in a static IO model can only be approximated with changes to output. Second, this treats two different behaviors in the same way. In the long run, electricity savings reduce the cost of doing business and produce benefits, which align with the rationale for businesses to implement energy saving measures. In the short run, up-front investments required to purchase and install equipment are treated as increased costs to doing business, resulting in negative economic impacts. However, it is unlikely that businesses are making decisions to participate in programs that would result in short-term hardship. Therefore, the negative impact of the upfront, short-term costs to businesses is likely an over-estimate.

### Net versus Gross Impacts

To differentiate between the net and gross scenarios, all the inputs are modified by net-to-gross ratios that proxy the amount of investments and bill savings that occur because of STEP. The net-to-gross ratios used are the same ones that were used to determine energy savings that have occurred because of the program that would not have occurred otherwise. This is assumed to be a reasonable proxy for investments incentivized by STEP that would not have occurred otherwise.

### Results

Between FY 2009 and FY 2019, STEP is estimated to have cumulatively supported over 7,500 net job-years and \$312 million in net labor income. On average, the annual net impact of the program was 680 jobs and \$28 million in income. These values for the net scenario are presented in Table 15. The negative induced impacts reflect that costs to participants were higher than bill savings from FY 2009 to FY 2019. Beyond FY 2019, savings continue, generating positive induced impacts in the long run.

As discussed previously, the modeling may overestimate negative impacts to businesses. On the other side, bill savings represent a loss of revenue for CPS, with some ability to adjust electricity rates to recover revenue. The modeling does not include the negative impact from slightly increasing electricity rates to recover lost revenue, as IMPLAN is not able to incorporate price effects. The net effect of both overestimating and underestimating negative impacts is not quantified but is not expected to change the overall message of the results, which is that STEP drove positive net economic impacts for the Greater San Antonio Area.

*Table 15. Net FY 2009-FY 2019 Economic Impacts (2019 \$ millions).*

Impact Type	Employment (# of job-years)	Labor Income	Total Value Added	Output
Direct Effect	9,650	\$335	\$411	\$724
Indirect Effect	1,690	\$86	\$141	\$249
Induced Effect	(2,410)	(\$109)	(\$190)	(\$332)
<b>Total Effect</b>	<b>7,500</b>	<b>\$312</b>	<b>\$362</b>	<b>\$642</b>

Source: ICF analysis, numbers may not sum due to rounding

As expected, the gross impacts, presented in Table 16, are greater than net impacts. The direct effects of the net and gross scenarios are similar, but the negative effect of the induced impacts is significantly smaller due to higher gross bill savings, generating greater overall positive impacts.

*Table 16. Gross FY 2009-FY 2019 Economic Impact (2019 \$ millions).*

Impact Type	Employment (# of job-years)	Labor Income	Total Value Added	Output
Direct Effect	10,000	\$347	\$427	\$753
Indirect Effect	1,750	\$89	\$146	\$259

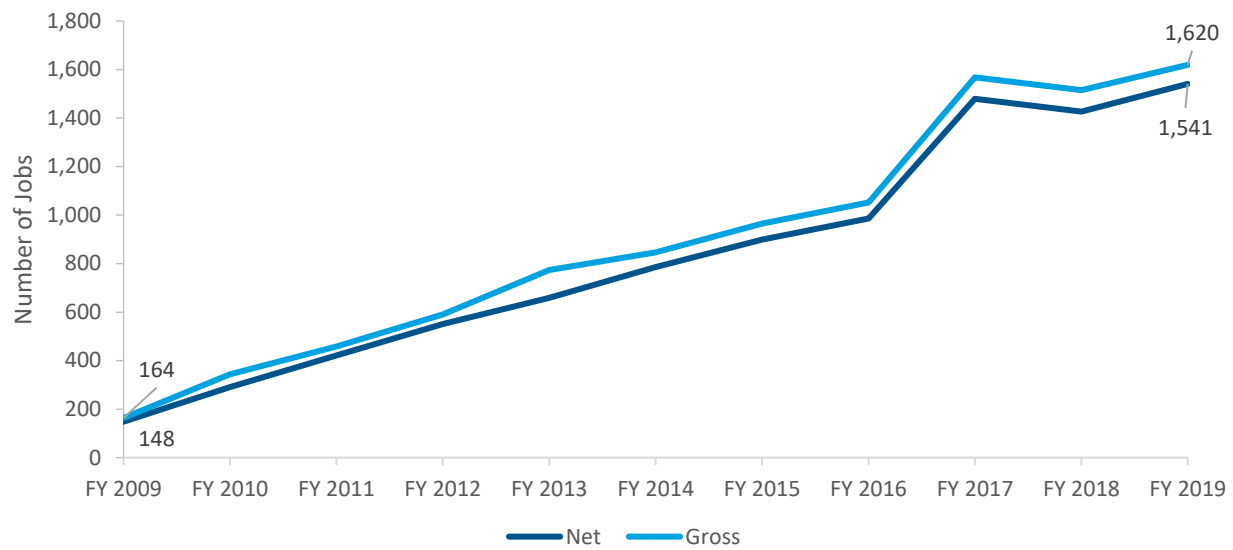


Induced Effect	(2,160)	(\$98)	(\$171)	(\$298)
<b>Total Effect</b>	<b>8,110</b>	<b>\$339</b>	<b>\$403</b>	<b>\$714</b>

Source: ICF analysis, numbers may not sum due to rounding

Figure 25 illustrates the annual impact of STEP on local job creation. Initially, the program's employment impact was small, but as the program expanded and bill savings accumulated, the number of jobs supported increased. Because of high NTG ratios, there is minimal difference between the annual impacts of the net and gross scenarios.

Figure 25. Local Job Impacts, FY 2009-FY 2019



Source: ICF analysis

As previously discussed, commercial and residential bill savings continue until the useful life of products purchased through STEP end. Savings are anticipated to extend to FY 2048 based on EUL, and the impact of savings on the Greater San Antonio Area are included in the net and gross scenarios below. The inclusion of lifetime bill savings causes the induced effects to become positive as the long-run bill savings are larger than costs of the program. Including the lifetime impact of bill savings increases the total cumulative impact of the net scenario to 23,440 job-years and \$1.1 billion in labor income, as shown in Table 17.

Table 17. Net FY 2009-FY 2048 Economic Impact (2019 \$ millions).

Impact Type	Employment (# of job-years)	Labor Income	Total Value Added	Output
Direct Effect	13,220	\$545	\$815	\$1,453
Indirect Effect	3,860	\$194	\$312	\$576
Induced Effect	7,780	\$351	\$607	\$1,052
<b>Total Effect</b>	<b>23,440</b>	<b>\$1,089</b>	<b>\$1,734</b>	<b>\$3,081</b>

Source: ICF analysis, numbers may not sum due to rounding

In the gross scenario, examining impacts up to FY 2048 increases STEP's total impact to 25,150 job-years and over \$1.2 billion in labor income, as shown in Table 18.

*Table 18: Gross FY 2009-FY 2048 Economic Impact (2019 \$ millions).*

Impact Type	Employment (# of job-years)	Labor Income	Total Value Added	Output
Direct Effect	13,940	\$579	\$874	\$1,559
Indirect Effect	4,150	\$209	\$335	\$620
Induced Effect	8,530	\$384	\$665	\$1,153
<b>Total Effect</b>	<b>25,150</b>	<b>\$1,172</b>	<b>\$1,875</b>	<b>\$3,332</b>

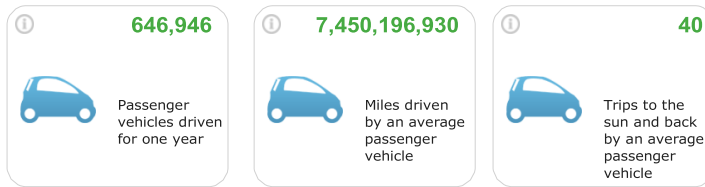
Source: ICF analysis, numbers may not sum due to rounding

Accordingly, STEP has played an important role, supporting the Greater San Antonio Area economy by driving net positive economic impacts, whether considering impacts during program years of FY 2009 to FY 2019, or over the EUL of the measures installed (i.e., FY 2009 to FY 2048). This economic activity is produced by incentivizing local investment in energy-efficient measures and clean energy technologies. It supports local jobs and generates energy savings, freeing up money for households to spend and increasing the long-term competitiveness of businesses as they reduce electricity expenditures.

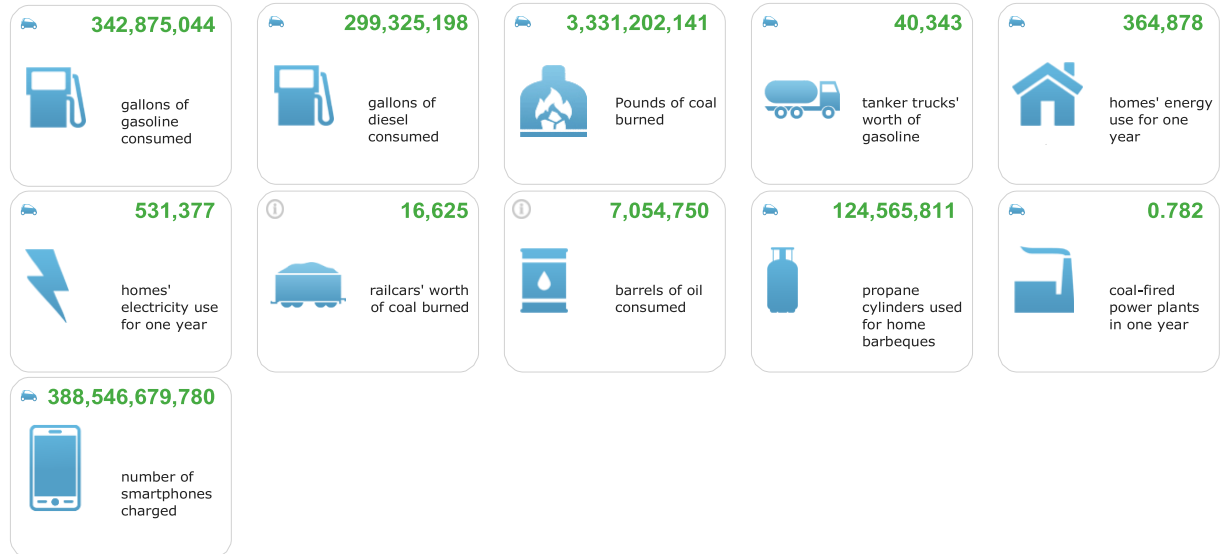
STEP supported cumulative net impact of 7,500 local job-years, \$312 million in labor income, and \$362 million in value added between FY 2009 and FY 2019. Local job creation continues beyond the FY 2009 to FY 2019 time period due to continued bill savings. These savings, lasting up to FY 2048, are estimated to support an additional net 15,940 annual job-years, \$777 in income, and \$1.4 billion in value added. Altogether, the program is estimated to produce lifetime impacts of 23,440 net job-years, \$1.1 billion in labor income, and \$1.7 billion in value added in the Greater San Antonio Area.

## Appendix D: Emission Reduction Equivalency Results

### Greenhouse gas emissions from:



### CO2 emissions from:



### Greenhouse gas emissions avoided by:



### Carbon sequestered by:



## Appendix E: Cost-Effectiveness Heat Maps

This appendix contains a set of heat map tables with the cost-effectiveness metrics data reported for each program. These allow for easy identification of high and low values. Some of the data was not available for all years but what data is available has been reported. DR programs are supplied in a separate table due to the high \$/kWh values washing out the nuance in values for the efficiency and solar programs.

Program	Utility Cost Test (UCT) Ratio									Cost of Lifetime Peak Demand Savings									Cost of Lifetime Energy Savings								
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	Avg
Residential Lighting				1.1	0.9	0.8			1.0				\$ 912	\$ 707	\$ 239			\$ 744				\$ 0.028	\$ 0.027	\$ 0.038			\$ 0.028
Home Efficiency	1.5	0.9	0.8	1.7	1.7	3.6	2.8	3.0	2.0	\$ 148	\$ 192	\$ 229	\$ 92	\$ 107	\$ 47	\$ 67	\$ 58	\$ 89	\$ 0.026	\$ 0.025	\$ 0.030	\$ 0.026	\$ 0.026	\$ 0.018	\$ 0.023	\$ 0.020	\$ 0.024
Residential HVAC	2.5	2.1	2.3	3.3	4.4	2.9	3.8	4.2	3.2	\$ 78	\$ 73	\$ 70	\$ 50	\$ 34	\$ 56	\$ 47	\$ 36	\$ 50	\$ 0.023	\$ 0.022	\$ 0.020	\$ 0.015	\$ 0.017	\$ 0.021	\$ 0.017	\$ 0.016	\$ 0.018
Air Flow Performance	0.5	0.4	0.4	1.0	1.2				0.7	\$ 144	\$ 141	\$ 156	\$ 104	\$ 115				\$ 128	\$ 0.068	\$ 0.087	\$ 0.090	\$ 0.048	\$ 0.047			\$ 0.062	
New Home Construction	3.5	2.8	2.5	6.0	5.1	1.5	1.5		3.8	\$ 35	\$ 35	\$ 36	\$ 33	\$ 43	\$ 68	\$ 73		\$ 37	\$ 0.008	\$ 0.007	\$ 0.008	\$ 0.007	\$ 0.008	\$ 0.047	\$ 0.051	\$ 0.008	
Refrigerator Recycling	3.5	1.9	1.2	1.5	1.1	1.0			1.9	\$ 241	\$ 299	\$ 463	\$ 263	\$ 300	\$ 319			\$ 297	\$ 0.022	\$ 0.028	\$ 0.042	\$ 0.035	\$ 0.043	\$ 0.043		\$ 0.031	
Weatherization		0.3	0.3	0.6	0.5	0.9	0.9	0.9	0.7	\$ 305	\$ 232	\$ 251	\$ 321	\$ 154	\$ 159	\$ 178		\$ 204	\$ 0.102	\$ 0.073	\$ 0.062	\$ 0.084	\$ 0.070	\$ 0.065	\$ 0.073	\$ 0.072	
WashRight	0.8								0.8	\$ 98								\$ 98	\$ 0.041							\$ 0.041	
New Home Construction - Franklin							1.3	1.5	1.4						\$ 89	\$ 91		\$ 90						\$ 0.060	\$ 0.056	\$ 0.057	
Retail Channel Partnerships						2.4	2.4	2.7	2.5						\$ 82	\$ 86	\$ 121	\$ 93					\$ 0.013	\$ 0.013	\$ 0.012		\$ 0.013
AC/Duct Tune up							1.0		1.0						\$ 201			\$ 201						\$ 0.068		\$ 0.068	
Energy Savings Through Schools						0.9	1.1	1.4	1.1						\$ 390	\$ 349	\$ 350	\$ 365					\$ 0.037	\$ 0.026	\$ 0.021	\$ 0.028	
Home Energy Assessments							0.8	0.9	0.8						\$ 310	\$ 400	\$ 400	\$ 328					\$ 0.042	\$ 0.038		\$ 0.041	
Multi-Family						1.2	2.0	0.8	1.8						\$ 199	\$ 108	\$ 412	\$ 121					\$ 0.021	\$ 0.015	\$ 0.043	\$ 0.016	
Cool Roof							0.4	2.8	1.5						\$ 472	\$ 53		\$ 107					\$ 0.148	\$ 0.046		\$ 0.075	
Residential Efficiency Total	2.4	1.2	0.8	1.5	1.3	1.3	1.5	1.5	1.4	\$ 72	\$ 103	\$ 130	\$ 112	\$ 131	\$ 114	\$ 113	\$ 105	\$ 113	\$ 0.018	\$ 0.025	\$ 0.035	\$ 0.028	\$ 0.041	\$ 0.045	\$ 0.032	\$ 0.038	\$ 0.034
Large Lighting	2.5	1.9	2.1	2.9	3.3	3.3	3.3		2.8	\$ 57	\$ 56	\$ 42	\$ 52	\$ 57	\$ 49	\$ 61		\$ 53	\$ 0.010	\$ 0.010	\$ 0.010	\$ 0.007	\$ 0.008	\$ 0.008		\$ 0.009	
Commercial HVAC	1.7	1.9	2.1	3.5	4.0	2.4	1.0		2.6	\$ 94	\$ 42	\$ 36	\$ 42	\$ 53	\$ 92	\$ 252		\$ 53	\$ 0.031	\$ 0.027	\$ 0.027	\$ 0.017	\$ 0.017	\$ 0.023	\$ 0.052	\$ 0.022	
Commercial New Construction	0.0	2.4	2.8	6.7	8.8	4.6			5.2	\$ 44	\$ 40	\$ 29	\$ 14	\$ 42				\$ 31	\$ 0.008	\$ 0.007	\$ 0.004	\$ 0.005	\$ 0.006			\$ 0.005	
Commercial Custom	6.7	3.7	3.3	3.7	3.5	2.8	9.2	1.3	3.3	\$ 258	\$ 62	\$ 145	\$ 34	\$ 226	\$ 120	\$ 17	\$ 888	\$ 94	\$ 0.008	\$ 0.006	\$ 0.007	\$ 0.009	\$ 0.006	\$ 0.006	\$ 0.050	\$ 0.017	\$ 0.007
LED Street Lights		0.4		2.9					1.1										\$ 0.039			\$ 0.007				\$ 0.009	
Roof Coating	1.1	0.6							0.9	\$ 463	\$ 339							\$ 408	\$ 0.049	\$ 0.044						\$ 0.047	
Restaurant Equipment	3.3																									\$ -	
Lean Clean Energy	54.4																	\$ -								\$ -	
Commercial Solutions						1.0	3.5	3.6	3.3						\$ 194	\$ 62	\$ 65	\$ 66					\$ 0.042	\$ 0.010	\$ 0.011	\$ 0.011	
Schools & Institutions						0.0	2.2	2.2	2.0						\$ 94	\$ 64	\$ 75	\$ 75					\$ 0.015	\$ 0.022		\$ 0.018	
Small Business Solutions						0.3	3.0	4.2	3.5						\$ 2,641	\$ 92	\$ 53	\$ 66					\$ 0.106	\$ 0.015	\$ 0.010	\$ 0.012	
Whole Building Optimization						0.0	0.6	0.9	0.8						\$ 509	\$ 335	\$ 366	\$ 366					\$ 0.074	\$ 0.046		\$ 0.051	
Commercial Efficiency Total	2.4	1.8	2.2	3.8	3.7	3.0	3.1	3.1	2.9	\$ 63	\$ 60	\$ 42	\$ 46	\$ 52	\$ 58	\$ 68	\$ 70	\$ 59	\$ 0.011	\$ 0.012	\$ 0.009	\$ 0.007	\$ 0.009	\$ 0.009	\$ 0.010	\$ 0.013	\$ 0.010
Efficiency Total	2.4	1.5	1.2	2.2	1.9	2.1	2.1	2.1	2.0	\$ 66	\$ 72	\$ 82	\$ 78	\$ 91	\$ 77	\$ 92	\$ 89	\$ 83	\$ 0.014	\$ 0.015	\$ 0.020	\$ 0.015	\$ 0.021	\$ 0.016	\$ 0.018	\$ 0.023	\$ 0.018
Community Solar					0.0	0.8			0.7														\$ 0.022			\$ 0.022	
Solar Host SA					0.0	0.5	0.9	1.0	0.4						\$ 8	\$ 12	\$ -	\$ 9					\$ 0.002	\$ 0.003	\$ -	\$ 0.002	
Solar Initiative	0.8	0.6	0.8	1.1	1.2	1.5	2.7	3.3	1.8	\$ 80	\$ 80	\$ 79	\$ 94	\$ 131	\$ 99	\$ 57	\$ 44	\$ 74	\$ 0.050	\$ 0.041	\$ 0.041	\$ 0.033	\$ 0.033	\$ 0.026	\$ 0.015	\$ 0.013	\$ 0.022
Residential Solar Total	0.8	0.6	0.8	1.1	1.1	1.4	2.7	3.3	1.8	\$ 80	\$ 80	\$ 79	\$ 94	\$ 139	\$ 100	\$ 52	\$ 43	\$ 73	\$ 0.050	\$ 0.041	\$ 0.041	\$ 0.033	\$ 0.035	\$ 0.025	\$ 0.014	\$ 0.012	\$ 0.021
Solar PV	0.7	0.8	0.9	1.3	1.4	1.3	2.3	6.5	1.7	\$ 80	\$ 80	\$ 67	\$ 80	\$ 107	\$ 114	\$ 67	\$ 21	\$ 63	\$ 0.053	\$ 0.046	\$ 0.038	\$ 0.029	\$ 0.028	\$ 0.030	\$ 0.017	\$ 0.006	\$ 0.023
Commercial Solar Total	0.7	0.8	0.9	1.3	1.4	1.3	2.3	6.5	1.7	\$ 80	\$ 80	\$ 67	\$ 80	\$ 107	\$ 114	\$ 67	\$ 21	\$ 63	\$ 0.053	\$ 0.046	\$ 0.038	\$ 0.029	\$ 0.028	\$ 0.030	\$ 0.017	\$ 0.006	\$ 0.023
Solar Total	0.8	0.7	0.9	1.2	1.2	1.4	2.6	3.8	1.8	\$ 80	\$ 80	\$ 73	\$ 89	\$ 132	\$ 101	\$ 55	\$ 37	\$ 71	\$ 0.051	\$ 0.044	\$ 0.040	\$ 0.032	\$ 0.033	\$ 0.025	\$ 0.014	\$ 0.011	\$ 0.021

Program	Utility Cost Test (UCT) Ratio								Avg	Cost of Lifetime Peak Demand Savings								Avg	Cost of Lifetime Energy Savings								Avg
	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019		FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019		FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019	
Smart Thermostat	1.7	5.5	4.7	0.5	1.1	1.7	3.1	3.6	2.5	\$ 361	\$ 134	\$ 161	\$ 167	\$ 137	\$ 138	\$ 75	\$ 85	\$ 150	\$ 4.98	\$ 4.17	\$ 5.74	\$ 7.16	\$ 5.12	\$ 5.58	\$ 2.38	\$ 3.46	\$ 4.78
Home Manager		1.0	1.8			1.0	1.7	1.5	0.0	0.0	\$ 806	\$ 414	\$ 281	\$ 85	\$ 98	\$ 80	\$ 282	\$ 233	\$ 130	\$ 55.0	\$ 29.4	\$ 4.84	\$ 7.00	\$ 3.86	\$ 12.5	\$ 17.4	
Bring Your Own Thermostat				1.5	1.9	3.1	5.1	5.7	4.2				\$ 206	\$ 246	\$ 104	\$ 85	\$ 50	\$ 80				\$ 18.7	\$ 22.4	\$ 0.296	\$ 0.248	\$ 0.179	\$ 0.272
Window AC DR				0.1	0.2				0.1				\$ 3,284	\$ 1,720				\$ 2,354				\$ 173	\$ 281			\$ 208	
Nest Direct Install							2.9	3.2	3.1						\$ 512	\$ 175	\$ 240							\$ 1.18	\$ 0.525	\$ 0.680	
Behavioral DR							2.9	2.5	2.7						\$ 147	\$ 57	\$ 83						\$ 18.4	\$ 0.762	\$ 1.51		
Residential DR Total	1.6	2.2	2.9	0.8	1.4	1.8	2.8	3.5	2.1	\$ 375	\$ 349	\$ 261	\$ 224	\$ 117	\$ 114	\$ 109	\$ 96	\$ 173	\$ 5.17	\$ 14.6	\$ 13.1	\$ 13.3	\$ 5.46	\$ 1.79	\$ 0.913	\$ 0.540	\$ 2.37
Emergency DR				2.8	4.8				4.4				\$ 27	\$ 97				\$ 64				\$ 26.6	\$ 24.3			\$ 24.7	
Commercial DR	1.1	0.9	0.9	1.5	2.8	2.5	2.3	2.3	1.8	\$ 73	\$ 73	\$ 75	\$ 73	\$ 78	\$ 74	\$ 78	\$ 64	\$ 73	\$ 2.48	\$ 1.67	\$ 2.05	\$ 3.41	\$ 2.40	\$ 1.85	\$ 1.35	\$ 1.92	\$ 2.04
Auto DR				0.4	0.5	1.5	4.4	3.1	1.3				\$ 534	\$ 513	\$ 238	\$ 91	\$ 55	\$ 226				\$ 49.2	\$ 22.3	\$ 8.98	\$ 2.42	\$ 1.79	\$ 7.79
Commercial DR Total	1.1	0.9	0.9	1.3	2.4	2.3	2.5	2.3	1.8	\$ 73	\$ 73	\$ 75	\$ 80	\$ 99	\$ 86	\$ 80	\$ 64	\$ 79	\$ 2.48	\$ 1.67	\$ 2.05	\$ 3.99	\$ 3.30	\$ 2.24	\$ 1.44	\$ 1.91	\$ 2.25
DR Total	1.4	1.9	2.4	1.0	1.8	2.0	2.7	3.1	2.0	\$ 156	\$ 187	\$ 164	\$ 147	\$ 109	\$ 101	\$ 97	\$ 82	\$ 125	\$ 3.77	\$ 5.28	\$ 5.73	\$ 7.88	\$ 4.25	\$ 1.95	\$ 1.05	\$ 0.722	\$ 2.33

