COUNTY OF SAN DIEGO

Zero Carbon Portfolio Plan

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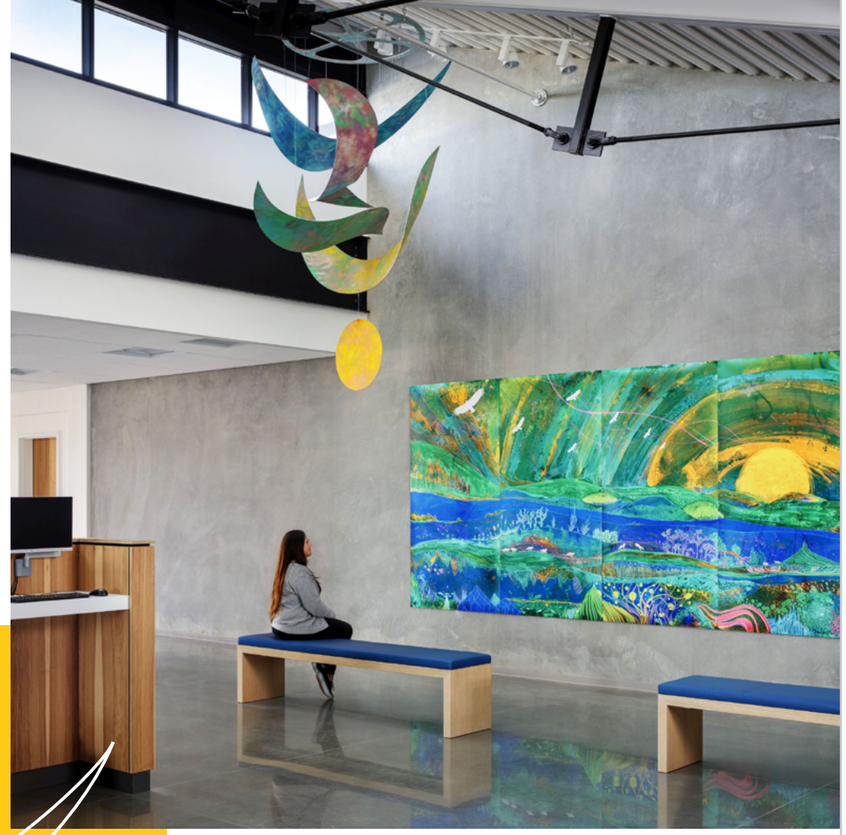


I. Executive Summary

The County of San Diego has made significant progress on the goal of carbon neutrality through various programs such as the Strategic Energy Plan (SEP), the Zero Energy Portfolio Plan (ZPP), the 2018 Climate Action Plan (CAP), and the Electric Vehicle Roadmap but more immediate action is necessary to achieve carbon neutrality in the next twenty years.

This plan presents a strategy and specific measures that will result in a reduction in operational carbon emissions of 90% by 2030, relative to its 2008 Baseline.

County Occupied Facilities in Numbers (FY 20-21):

10,800,000 ft²
OWNED & OCCUPIED

NET ELECTRICITY:
95,000,000 kWh

NATURAL GAS:
2,600,000 Therms

GHG EMISSIONS:
34,000 MTCO2e

In order to avoid the worst climate impacts caused by global temperature rise and maintain a livable climate, carbon neutrality must be met by mid-century to limit global warming to less than 2.0 degrees Celsius, according to the Intergovernmental Panel on Climate Change (IPCC).

In 2018 California Governor Brown signed Executive Order B-55 establishing a state goal of achieving carbon neutrality by 2045.

The County of San Diego has made progress on this goal through various programs such as the Strategic Energy Plan (SEP), the Zero Energy Portfolio Plan (ZPP), the 2018 Climate Action Plan (CAP), and the Electric Vehicle Roadmap but more immediate action is necessary to achieve significant decarbonization in the next twenty years.

In January 2021 the Board of Supervisors voted unanimously to move the San Diego region to zero carbon emissions by 2035 and is in the process of developing a Regional Decarbonization Framework (RDF). San Diego County is the largest County in the United States to set this goal.

The County's Department of General Services (DGS) is taking a leading role in identifying opportunities for and implementing feasible projects in the areas of zero emissions, climate safety, clean energy and resiliency.

This Zero Carbon Portfolio Plan (ZCPP), which applies to all facilities occupied by the County, is being led by the Energy & Sustainability Division (ESD) of the Department of General Services which will be responsible for the management and implementation.

The goal of this Zero Carbon Portfolio Plan is to implement meaningful carbon reduction measures in County-occupied facilities. This will support the County's related carbon emissions reduction commitments through 2030 and set the County up for success beyond 2030. To align with the Regional Decarbonization Framework, implementation of these recommendations will put the County in the forefront of climate actions. By testing these actions on County facilities and operations, the region will benefit from lessons learned about the successes as well as shortcomings of implementation processes, strengthening the County of San Diego's leadership position and keeping us ahead of the curve. The County has researched industry best practices for carbon reduction and analyzes usage data to determine where carbon reduction efforts will have the largest impact. Studies and pilot projects have been commissioned to determine which options can be implemented most effectively, given constraints of resources, funding, and time.

Pilot project results are highlighted in case studies throughout the ZCPP. This effort has resulted in the inclusion of six carbon reduction Measures, summarized on the right.

The success and evolution of this plan relies on smart/thoughtful development and planning, including replacing assets at the end of their life with low carbon equipment, smart building re-use, Zero Energy new construction and adding renewable systems where possible.

This Plan will be a Living document that will incorporate active learning, experimentation, adaptive management and adjustment along the way as new technologies and funding sources are identified with the goal of achieving zero carbon emissions within a meaningful timeframe.

Measure	Description	Estimated Carbon Reduction in 2030 (MT CO2e/yr)	Cumulative Carbon Reduction, FY21-22 through 2030 (MT CO2e/yr)
M1: Green Energy Supply	Commit to purchasing increasingly renewable-sourced electricity from Direct Access (DA) agreements and Community Choice Aggregation (CCA) programs.	12,500	29,000
M2: Building Electrification	Reduce on-site combustion of fossil fuel by replacing fossil fuel burning equipment in existing buildings with electric equipment.	5,300	13,200
M3: Energy Efficiency Projects	Reduce energy consumption at existing County-owned and occupied facilities through implementation of energy efficiency measures (EEMs). Increasing efficiency of existing building stock will be critical to meeting overall GHG goals.	1,200	10,700
M4: Proactive Energy Management	Reduce energy consumption by implementing ongoing monitoring of energy performance at all existing County facilities and performing retrocommissioning (RCx) and Monitoring-Based Commissioning (MBCx) where applicable.	3,700	23,500
M5: Zero Net Energy Building	Require all-electric, Zero Net Energy for all new construction capital projects.	1,500	9,600
M6: Renewable Energy	Install photovoltaic (PV) systems on existing County properties.	700	4,800
	Total	**24,900**	**90,800**

II.
Background and Purpose

This Zero Carbon Portfolio Plan will support and build on existing State, County and industry goals through implementation of proven measures and introduction of new emissions-focused measures.

Path to Carbon Neutrality

2006
CA AB 32
1990 levels by 2020

2006
Architecture 2030
Carbon Neutral by 2030

2015
CA EO B-30
Reduce GHG to 40% below 1990 levels by 2030

2015
CoSD Strategic Energy Plan (SEP)

2017
CoSD Zero Energy Portfolio Plan

2018
CA EO B-55
Zero Carbon by 2045

2018
CA AB 32
1990 levels by 2020

2018
CoSD Climate Action Plan (currently in rework)

2021
CoSD Regional Decarbonization Framework for Zero Carbon by 2035

In 2006, California passed the Global Warming Act, Assembly Bill (AB) 32 with the goal of reducing GHG emissions to 1990 levels by 2020. This goal was achieved for the state in 2016 mostly due to the greening of the electricity grid.

The County has maintained a Strategic Energy Plan (SEP) as a guideline for reducing energy use in County operations and implementing other sustainable practices. As the plan ages out it is being replaced with more specific resource plans that deal with waste, energy, renewable energy, transportation, etc.

In 2017 ESD published the County's Zero Energy Portfolio Plan (ZPP) which has resulted in significant energy savings in County-owned and occupied facilities and demonstrated strategic, climate-focused planning far beyond the status-quo.

The County of San Diego Climate Action Plan (CAP) was developed in 2018 and is currently in re-development. It is expected to be implemented in late 2023, however this ZCPP Plan follows the general goals of the original CAP and provides significant support for the new CAP. The original CAP used a 2014 baseline and identified that Energy Emissions from buildings was responsible for 24% of the GHG emissions, second highest to On-Road Transportation (45%).

In addition to State and County goals, carbon reduction has been targeted by industry influencers such as Architecture 2030. In 2006 Architecture 2030 issued the 2030 Challenge which states that all new buildings, developments, and major renovations shall be carbon-neutral by 2030.

This Plan will support and build on these existing State, County and industry goals through implementation of proven measures and introduction of new emissions-focused measures.

Zero Energy Portfolio Plan (ZPP) Recap

In 2017 ESD published the County's Zero Energy Portfolio Plan (ZPP) with the goal to cut non-renewable sourced energy use by 50% by 2030. From its inception through the end of the 2020-2021 fiscal year, the strategies within the ZPP have resulted in a 22% reduction in operational source energy consumption across the County's facility portfolio. The ZPP was the first-of-its-kind plan developed by a local government in California and laid out actions through which the County can cost-effectively cut its energy footprint in half by 2030 across more than 10 million square feet of real estate.

The ZPP identified six (6) Key Strategies to prioritize activities and meet the targeted reduction. The County has implemented projects in five (5) of the Key Strategies since publishing the ZPP. Measure 6 is considered a future measure.

County ZPP Accomplishments (2017-2021)

26%

ELECTRICITY AND NATURAL GAS REDUCTION

1. **Expand Proactive Energy Management**

26% reduction in electricity and natural gas at sites where implemented and 180 buildings added to central BAS

10.8

MW PV INSTALLED

2. **On-Site Renewable Energy, Phase 1**

7 PV Systems added to existing CoSD buildings

130,000

SF ZNE BUILDINGS

3. **ZNE Buildings**

6 ZNE Buildings Occupied

6,400

MWH/YR CARBON-FREE ELECTRICITY

4. **Community Solar**

All applicable meters enrolled in Eco-Choice. SDG&E has discontinued this program.

610

MWH/YR ONGOING SAVINGS

5. **Energy Reduction Projects**

24 sites with implemented projects or completed audits

Phase 2

6. **On-Site Renewable Energy, Phase 2**

Future measure planned for implementation in 2025 or later.

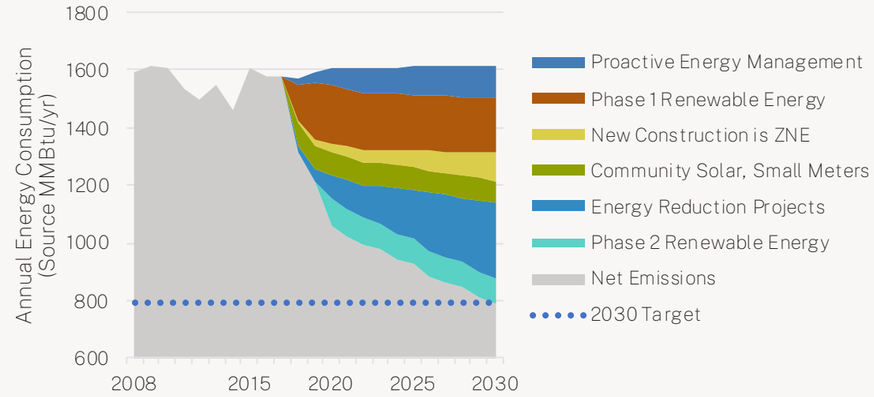
Zero Energy Portfolio Plan Tracking

The ZPP has been tracked and a progress report issued every year since it was written to capture projects that were completed and adjustments to predictions. The images below show the progression of the plan each year since the initial publication of the plan.

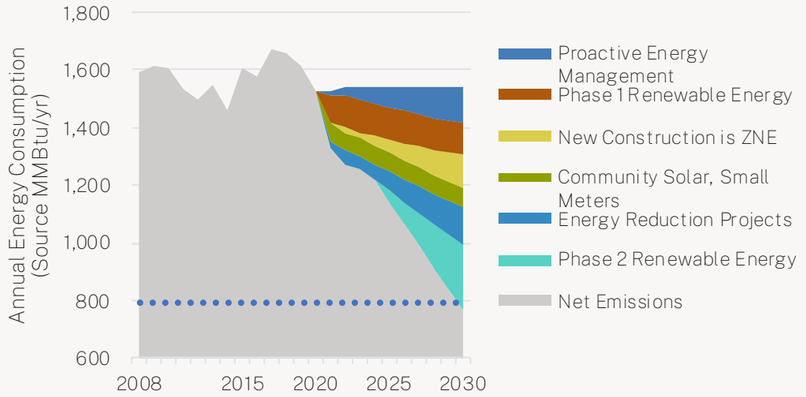
Zero Energy Portfolio Plan Tracking (continued)

Significant progress towards the overall 2030 energy goal has been made each year since the publication of the original ZPP and the annual reporting has been a valuable tool to help track this progress and readjust Strategy prioritization on an annual basis. Going forward, annual updates to the ZPP will be retired, and will be replaced with annual updates to this new Zero Carbon Portfolio Plan. More specific measure-by-measure progress will be included in annual updates to allow for better tracking and prioritization going forward.

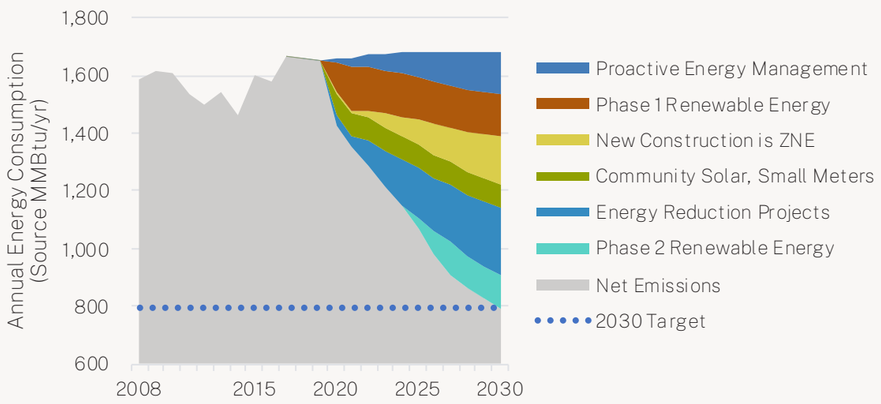
Initial Energy Plan, Published 2017



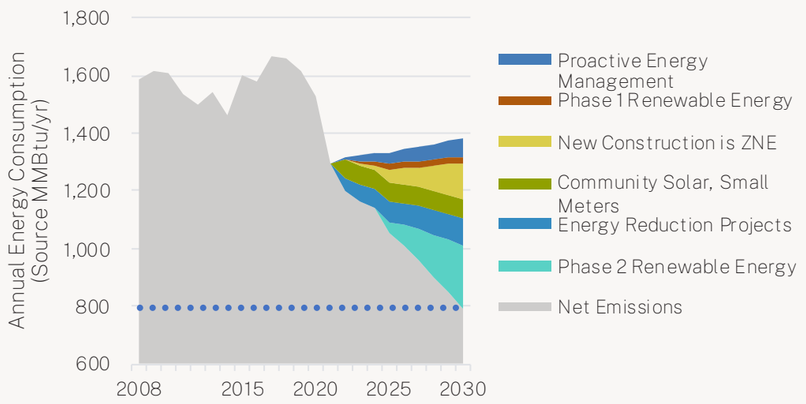
FY19-20 ZPP Update

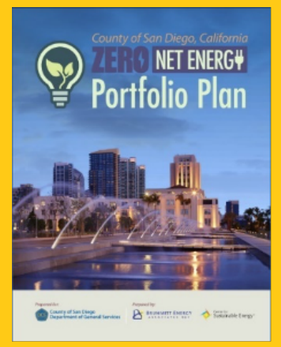


FY18-19 ZPP Update



FY20-21 ZPP Update





Lessons Learned

The ZPP was written at a time when energy efficiency needed increased visibility, in terms of institutional support and funding, and was crafted to walk the line between aggressively promoting energy reduction while achieving fiscal responsibility. It was groundbreaking at its publication and set the stage for sustainable actions as an enterprise goal.

In the five years since its adoption, both the industry and global thinking about climate change have continued to transition. Lessons learned from implementing the ZPP can be applied to this renewal plan, focused on zero carbon as the major goal.

Following is a summary of lessons learned and course changes in the years since the ZPP was written:

1.

Energy has long been a proxy for greenhouse gas emissions, and at the time of the ZPP publication it made sense to follow the State's goal for energy reduction. At this time it is imperative to focus directly on the carbon reduction metric in order to comply with new state and local goals.

2.

Plans and priorities change over time. Changes in political leadership and advances in technology have created the need to update the ZPP. Additionally, unexpected early successes with several goals, well ahead of the 2030 horizon, also required the need to revisit our goals and look to push our boundaries even further.

3.

The County General Management System (GMS) and our Capital Improvement Needs Assessment (CINA) have a five-year trajectory. Accurately planning for future new construction and significant Major Maintenance (MM) projects is subject to change and may impact achievement of some goals. This new plan uses the most current 5-year planning information.

4.

The ZPP achieved a monumental goal of placing large scale PV at the County sites with ample surface parking square footage. Those opportunities have largely been realized, so further opportunities will be fewer and farther between and will not follow a directed planning effort but will likely happen ad hoc.

5.

Monitoring energy use is increasingly important for preserving gains made through EE projects, renewables, new ZNE buildings, and for finding new opportunities. Data access to enable measurement of actual impact of projects is important to not only gauge progress against goals, but also to protect investment made through Energy Efficiency (EE) projects. Energy efficiency is as much about preservation as it is about exploration.

6.

Energy efficiency projects are still an important strategy to continue at least for the near future while the grid remains fossil fuel based. These projects contribute to grid harmonization and save money with quick paybacks, but their impact on carbon reduction will fade as the grid gets closer to 100% renewable. Efficiency projects will begin to swap places in importance and focus with electrification projects which reduce on-site greenhouse gas emissions.

Energy to Carbon Transition

The Zero Energy Portfolio Plan (ZPP) had a goal of reducing source energy consumption by 50% below 2008 levels by the year 2030. Translating the 2017 ZPP strategies to a carbon emissions basis would result in a 70% emissions reduction from the 2008 Baseline.

In early 2021 the County of San Diego Board of Supervisors voted unanimously to move San Diego to zero carbon emissions by 2035.

In order to shift the measured metric from Source Energy Consumption to Operational Carbon Emissions to align with the 2021 Board of Supervisors guidance and state and County goals, the County is transitioning the 2017 ZPP into this new Zero Carbon Portfolio Plan (ZCPP).

To create alignment with the Board of Supervisors carbon emissions commitment, and in recognition of the State of California's commitments to greening the electric grid and emphasis on carbon emissions reduction, the County will shift the measured metric of their energy plan from Source Energy Consumption to Operational Carbon Emissions going forward.

This new emphasis on emissions reduction also creates new opportunities and priorities for efficiency across the portfolio. For example, recognizing that the grid-supplied electricity in California will have greatly reduced emissions factors over time means that transitioning from natural gas to electricity for space and water heating (electrification) will be an important measure to achieve reduced emissions goals. In addition, the change in emissions factors over time means that implementation of energy efficiency measures should initially be prioritized over electrification, until the time that electricity has lower emissions than the existing natural gas systems.

Maintaining the Trajectory of the ZPP

It is crucial to the County's climate action goals that the progress from the 2017 ZPP continue into the future, and that the change to a Carbon emissions-based metric, does not sacrifice the overall commitment for significant reduction in energy consumption. To validate the efficacy of the revised Zero Carbon Portfolio Plan (ZCPP) towards meeting the previous energy goals, the new plan was evaluated in the context of Source Energy Consumption. The result is that this Zero Carbon Portfolio Plan (ZCPP) reduces source energy consumption by 90% from the 2008 Baseline, which far exceeds the original goal. In 2030 there will still be a few sites remaining with natural gas use. In order to achieve 100% reduction at that time the County would need to purchase carbon offsets. The County will evaluate this strategy as 2030 approaches but the current focus is on actively reducing emissions.

2022 Portfolio Plan Summary (Emissions Basis)

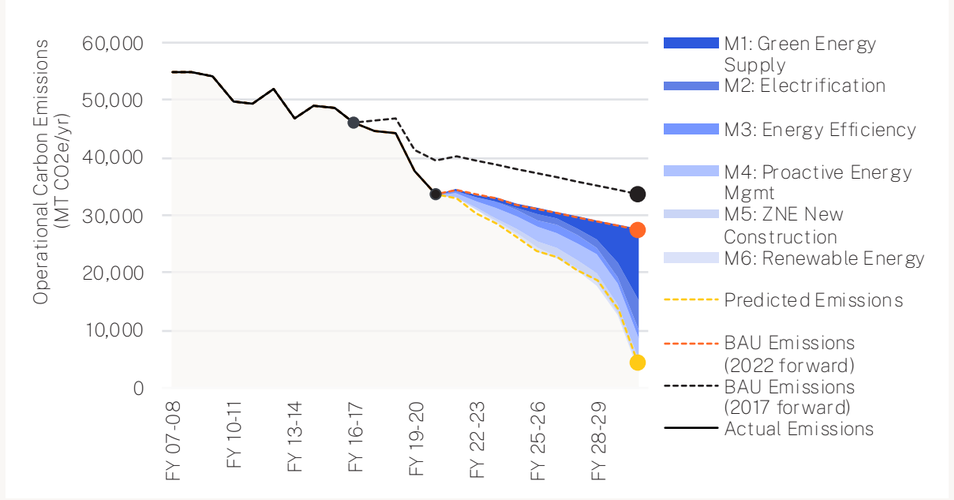


Figure 1: 2022 Portfolio Plan Summary (Emissions Basis). A high-level summary of the new Zero Carbon Portfolio Plan shows the expected operational carbon emissions of the portfolio to be reduced by more than 90% relative to the 2008 Baseline. The downward trend of the BAU lines is largely due to the forecasts that electric grid emissions factors (MT CO2e/yr per kWh) will trend downwards over time.

2022 Portfolio Plan Summary (Energy Basis)

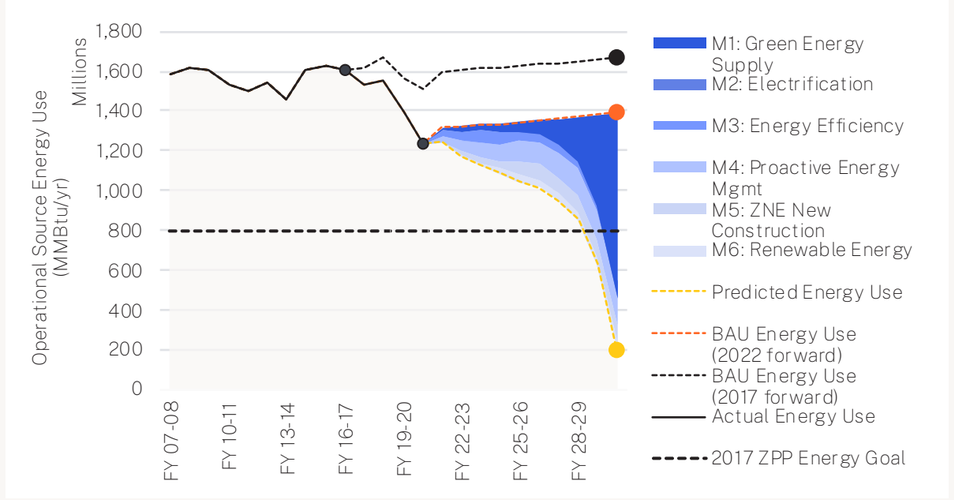


Figure 2: 2022 Portfolio Plan Summary (Energy Basis). Translating the new ZCPP from carbon emissions back to the original metric of Source Energy validates that the measures identified in the ZCPP will result in overall energy net use well below the original ZPP goal. The resulting net energy use is expected to show a 90% reduction by 2030 relative to the intial ZPP reduction goal of 50%

III.
Plan Goals and Processes

The goal of this Zero Carbon Portfolio Plan is to recommend meaningful carbon reduction measures that support the County's related carbon emissions reduction commitments through 2030 and position the County with a path to achieve these goals by 2030 and beyond.

Goals

The purpose of this plan is to clearly articulate a path to take bold action on cutting County carbon emissions. This plan seeks to lay out clear steps, including costs, over time to reach as far as possible by 2030. This methodology is intended to support funding and resource requests needed for implementation. In order to align with the Regional Decarbonization Framework, implementation of these recommendations will put the County in the forefront of climate actions. By testing these actions on County facilities and operations, the region will benefit from lessons learned about the successes as well as shortcomings of implementation processes, strengthening the County of San Diego's leadership position and keeping us ahead of the curve. The measures identified in this plan will result in a 90% reduction in operation emissions from County occupied facilities.

Focus of this Plan

This Plan addresses operational carbon within Scopes 1 and 2 and acknowledges the need for further development of Scope 3 reductions to achieve carbon neutrality.

Boundary of this Plan

- County occupied facilities
- Scope 1 on-site fuel consumption
- Scope 2 purchased electricity

Baseline Year

- 2008

Metric Used

- CO2e in metric tons per year.

OVERVIEW OF THE
Three carbon emission scopes

Scope 1

Direct Emissions

- Fuel Combustion on site
- Company-owned Vehicles (excluded)

Scope 2

Indirect Emissions

- Purchased Electricity

Scope 3

Indirect Emissions (excluded)

- Production of purchased materials
- Product Use
- Employee Business Travel
- Contractor Owned Vehicle
- Outsourced Activities

The Process

5

key steps

for achieving net-zero carbon

1. Calculate Operational GHG Emissions Inventory
2. Develop Business-As-Usual Case (Baseline)
3. Quantify Carbon Reduction Measures and Potential
4. Implement Measures
5. Track Progress & Adjust Course

Step 1 Calculate Operational GHG Emissions Inventory

- Gather energy consumption (electricity & natural gas)
- Define boundary (County occupied facilities)
- Define GHG emissions Scope(s) to be included: Scope 1 on-site fuel consumption and Scope 2 purchased electricity

Step 2 Develop Business-As-Usual Case (Baseline)

- Establish expectations for future changes to County's real estate footprint using planning tools
  - Identify new capacity needed to serve County population by 2030. These are new facilities or leases that do not currently exist that are expected to be added to the portfolio by 2030.
  - Identify facilities targeted for replacement or demolition. Certain existing facilities are expected to be demolished, replaced, and/or enlarged by 2030.
  - Create assumptions for changes to the portfolio for later years where specific information is not known. These assumptions are largely based on historical trends.
  - Assign expected carbon reduction values to any of these changes listed above
- Based on historical trends and industry research, add 0.3% per year for energy drift for both electricity and natural gas consumption
- Based on historical trends and industry research, de-rate existing PV system production by 0.5% per year for typical losses over time
- Create annual energy consumption forecasts through 2030 based on the information listed above
- Using annual estimates for emissions factors described above, calculate associated portfolio-wide emissions through 2030.

Step 3

Quantify Carbon Reduction Measures and Potential

- Identify major carbon reduction projects and group these into Measures. For this ZCPP, six Measures have been identified to aggregate the most important carbon reduction projects that will be undertaken by the County by 2030.
- Gather information on future proposed projects and calculate estimated carbon emissions reductions for each project. Associate these projects with each major Measure
- Estimate unknown future projects based on historical precedent and best planning information available
- Identify estimated timeframe for project implementation.

Step 4

Implement Measures

- Evaluate recommendations from ZCPP relative to planned ZPP programs and develop strategy for transitioning from current project planning and funding to carbon-based programs.
- Present findings to leadership and gain consensus for carbon-based reductions which may not have the short term simple payback timeframes that accompanied previously implemented energy reduction projects
- Develop strategy for socializing goals with other County departments
- Develop long term strategy for funding projects as the programs transition away from energy efficiency and cost savings
- Re-evaluate carbon reduction strategies in upcoming years that were not considered viable during this initial publishing given, site, time or funding constraints.

Step 5

Track Progress & Adjust Course

- Each year, a succinct summary of potential projects will be outlined and reviewed with County staff.
- If necessary, timing for potential projects will be adjusted in the master plan
- An estimation of the energy and emissions savings will be summarized, organized by each impacted facility, or by portfolio-wide strategy, by year.
- As projects are completed and validated, they will be added to an ongoing list that will be summarized into a summary report at the end of each fiscal year
- As needed, the long-term plan will be adjusted to account for any changes required to keep the plan on course.

The Intergovernmental Panel on Climate Change (IPCC) defines a "business-as-usual" baseline as **the level of emissions that would result if future development trends follow those of the past and no changes in policies take place.**

Establishing a Business-As-Usual Baseline

The County's portfolio is dynamic, with new assets being added, existing assets being demolished, new leases being put in place, and existing leases expiring. Capturing these expected changes in the analysis is important to developing an appropriate baseline from which expected carbon savings will be measured. This future baseline case is referred to as the "business as usual" (or BAU) baseline.

The process of developing an appropriate BAU baseline involves combining known near-and medium-term information about upcoming changes to the portfolio with estimates for future growth based on historic trends.

Major Inputs into the BAU Baseline:

- Capital Improvement Needs Assessment 2021-2026 (CINA) for predictions of new construction and major renovations for the next five years. Some of these projects are adding new capacity, while others are replacements for existing assets.
- Major Maintenance Improvement Program (MMIP)
- Expected decrease in revenue leases between FY21-22 and FY30-31, estimated at 2% decrease per year
- Expected increase in acquisition leases between FY21-22 and FY30-31, largely due to new hiring in HHSA division, estimated at 2% increase per year
- Expected increase in electricity and natural gas consumption by 0.3% per year in like-for-like facilities across the portfolio due to decreasing equipment efficiency, maintenance issues, and controls issues.
- Expected decrease in existing PV system production by 0.5% per year due to typical losses over time.
- Emissions factors in the BAU Baseline are based on several factors and rely on forward-looking predictions for change over time. In summary, the emissions factors used in the BAU analysis are shown to the right:

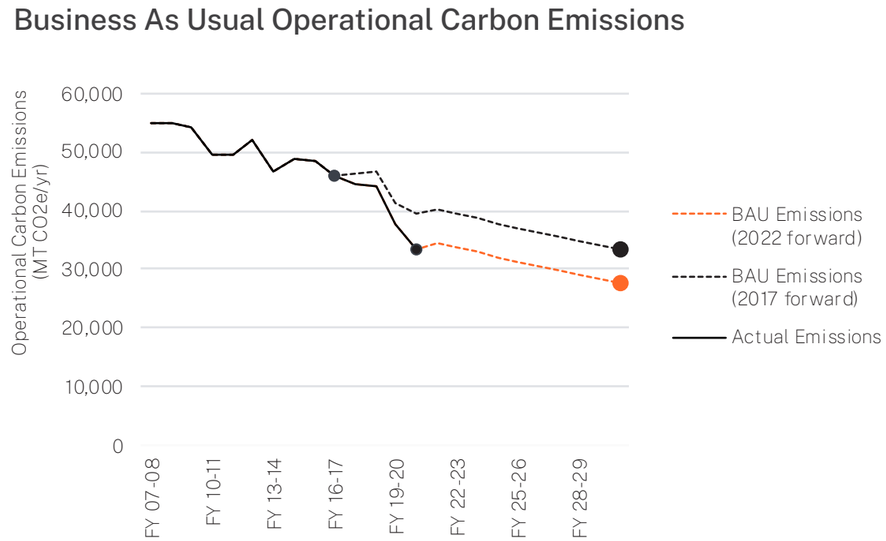


Figure 3: Business As Usual Operational Carbon Emissions. The results from the BAU analysis are shown above. The upper dashed line shows the BAU based on the original 2017 ZPP. The difference between the two dashed lines represents the progress made to date based on all Strategies that have been implemented from 2017 through 2021. The downward trend of the BAU lines is largely due to the forecasts that electric emissions factors will trend downwards over time.

Emissions Factors

are representative values that attempt to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant.

- EPA

Natural Gas

- 1 Therm = 0.0053 MT CO2e
- Source: United States Environmental Protection Agency (EPA)

Electricity

- Historical Emission Factors:
  - Source: EPA Emissions & Generated Resource Integrated Database (eGrid)
- Future Emission Factor Predictions (BAU Assumption):
  - SDG&E Electricity: Predictions for emissions factors from grid-purchased electricity have been calculated using linear regression with the assumption that the SDG&E grid will be 100% renewable in 2045 and is currently approximately 40% renewable.
  - Direct Access (DA) Electricity: Predictions for emissions factors from DA electricity provided by Calpine have been calculated using linear regression starting with the current (2020) Renewable Portfolio Standard (RPS) of 35% and meeting the 60% RPS requirement by 2030.
  - Community Choice Aggregates (CCA) Electricity: Predictions for emissions factors from CCA electricity provided by San Diego Community Power (SDCP) and Clean Energy Alliance (CEA)have been calculated using linear regression starting with the current (2020) Renewable Portfolio Standard (RPS) of 50% and meeting the 60% RPS requirement by 2030.
- Strategies to accelerate the adoption of clean electricity are outlined in the Measure 1 section of this report.

Baseline Electrical Emissions Factors (SDG&E)

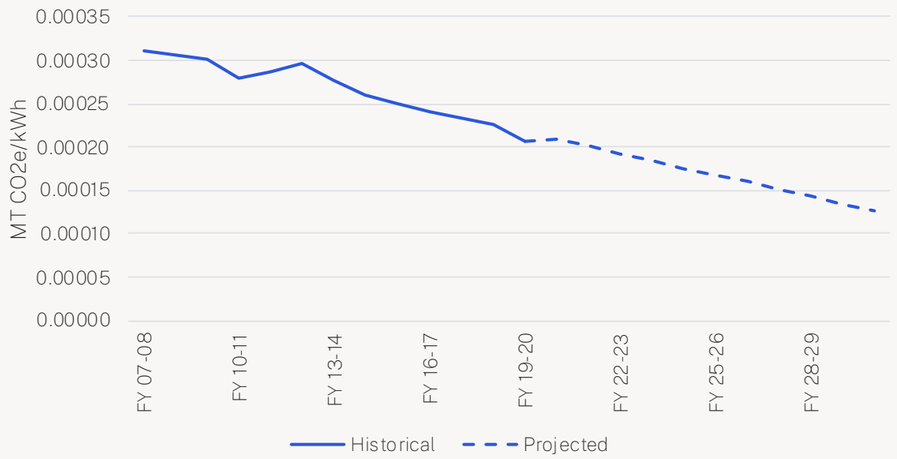
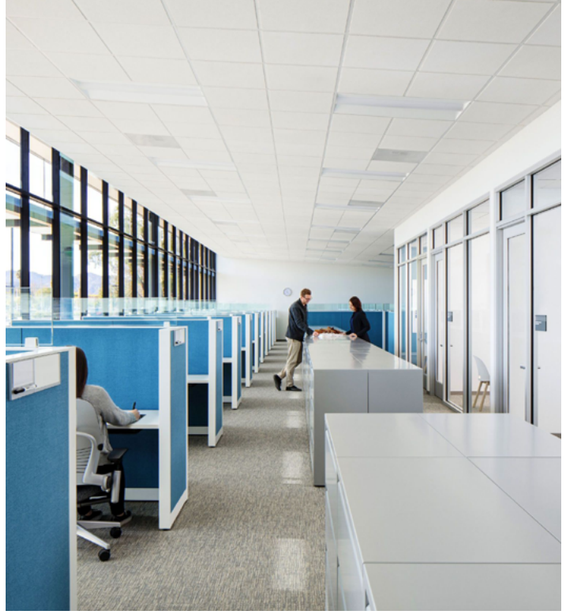


Figure 4: Baseline Electrical Emissions Factors. Predictions for emissions factors from grid-purchased electricity have been calculated using linear regression with the assumption that the SDG&E grid will be 100% renewable in 2045 and is currently approximately 40% renewable.

IV.
Plan Measures

This section summarizes the groupings of emissions reduction actions into six major Measures that will be tracked as part of this ZCPP.

6 major measures



Measure-by-Measure Impact

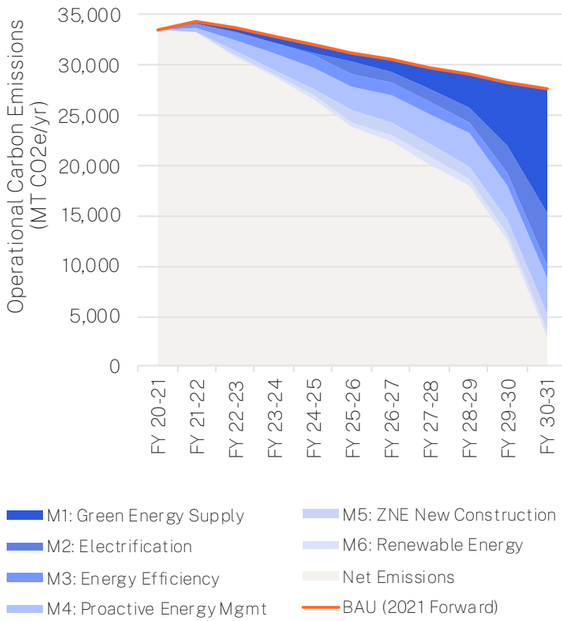


Figure 5: Measure-by-Measure Impact. The expected contribution by Measure by year towards the overall targeted reduction in operational carbon footprint of the County's portfolio.

As described earlier in this report, these six measures have been identified in response to:

- The additional focus on carbon emissions reduction for the portfolio.
- The recognition that although the electricity provided by the grid is getting cleaner, there are opportunities for the County to go beyond that trajectory and accelerate the transition to clean electricity.
- The recognition that energy efficiency projects will remain important to reduce emissions until the cleaner fuel mix of the future grid allows for significant gains in emissions reduction through electrification.

Measure	Description	Estimated Carbon Reduction in 2030 (MT CO2e/yr)	Cumulative Carbon Reduction, FY21-22 through 2030 (MT CO2e/yr)
M1: Green Energy Supply	Commit to purchasing increasingly renewable-sourced electricity from Community Choice Aggregation (CCA) programs and Direct Access (DA) agreements.	12,500	29,000
M2: Building Electrification	Reduce on-site combustion of fossil fuel by replacing fossil fuel burning equipment in existing buildings with electric equipment.	5,300	13,200
M3: Energy Efficiency Projects	Reduce energy consumption at existing County-owned and occupied facilities through implementation of energy efficiency measures (EEMs). Increasing efficiency of existing building stock will be critical to meeting overall GHG goals.	1,200	10,700
M4: Proactive Energy Management	Reduce energy consumption by implementing ongoing monitoring of energy performance at all existing County facilities and performing retrocommissioning (RCx) and Monitoring-Based Commissioning (MBCx) where applicable.	3,700	23,500
M5: Zero Net Energy Building	Require all-electric, Zero Net Energy for all new construction capital projects.	1,500	9,600
M6: Renewable Energy	Install photovoltaic (PV) systems on existing County properties.	700	4,800
	Total	**24,900**	**90,800**

Synergy with County's Climate Action Plan:

In February 2018, the County of San Diego published the Climate Action Plan (CAP). The CAP has been rescinded by the Board of Supervisors but measures are still being tracked and a new CAP is underway. This Plan will be incorporated into the new CAP. While all of the proposed measures in this Zero Carbon Portfolio Plan (ZCPP) will support the County's goal to reduce GHG emissions there are three (3) measures that feed directly into the CAP Measures, as shown in graphic below. More detail is provided in the description of each Measure.

Carbon Reduction Plan Measures

1 **Green Energy Supply**

2 **Building Electrification**

3 **Energy Efficiency Projects**

4 **Proactive Energy Management**

5 **ZNE Buildings**

6 **Renewable Energy**

SD County Climate Action Plan Measures

E-2.4: **Increase Use of On-Site Renewable Electricity Generation for County Operations**

E-1.4: **Reduce Energy Use Intensity at County Facilities**

E-2.1: **Increase Renewable Electricity**

MEASURE 1

GREEN ENERGY SUPPLY

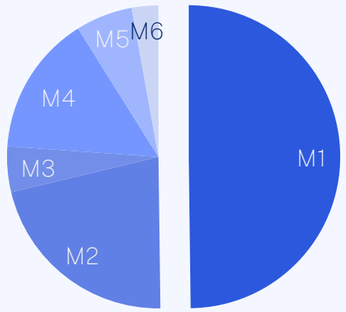
Summary:

Commit to purchasing increasingly renewable-sourced electricity from Community Choice Aggregation (CCA) programs and Direct Access (DA) agreements.

With CCA's, communities can band together to purchase clean energy and promote local renewable projects. CoSD joined SDCP in 2021 and will begin serving customers in 2023

Estimated Impact:
12,500 MT CO2e/yr reduction in 2030 (vs. BAU)

29,000 MT CO2e cumulative reduction by 2030



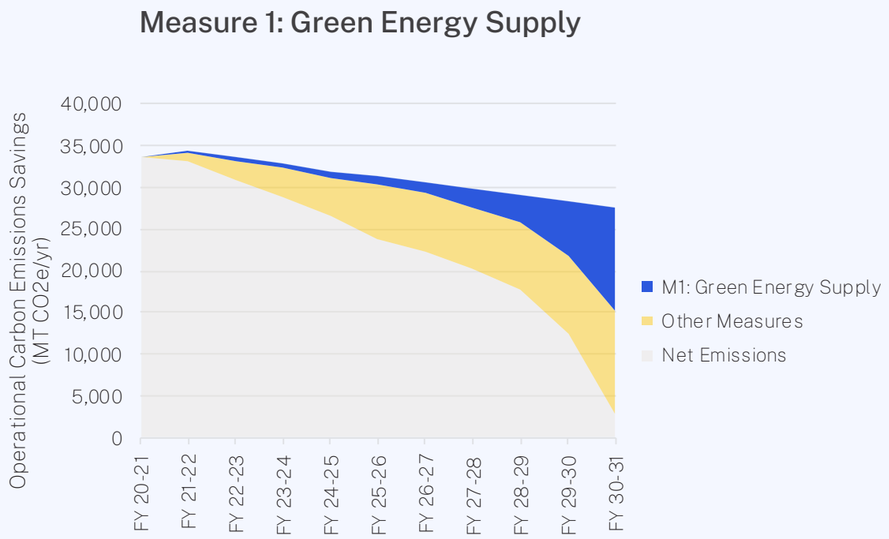


Figure 6: Annual targeted emissions savings from Measure 1, Green Energy Supply

CALPINE®

67%*

of gross CoSD electricity consumption in FY20-21

Description:

The county procures electricity delivery from several sources, depending on the physical location and energy loads of each asset.

County-occupied facilities had gross electrical consumption of approximately 115M kWh, and net electrical consumption of approximately 95M kWh in FY 20-21. Approximately 17% of gross consumption was offset with onsite PV systems, and the remainder was provided through Calpine (67%), SDG&E (16%), and CEA (0.2%).

Direct Access (DA)

- In 2002 the County began enrolling accounts in the Direct Access (DA) program. **Calpine** currently provides DA service to 130 County accounts. The sites originally chosen were the largest consumers. If any of these existing accounts/sites get replaced with a ZNE facility or drop for another reason, the account is replaced with the next largest consumer available.
- Calpine is currently required to meet California Public Utilities Commission (CPUC) Renewable Portfolio Standard (RPS) minimum percentage and is currently at 35% Renewables.
- As part of this Measure, the County is committed to accelerating the percentage renewable electricity and will procure 100% renewable from Calpine by 2030. Ramping to 100% renewable electricity can be accelerated if needed.

Community Choice Aggregation (CCA)

- For facilities located in areas served by the CCA provider **San Diego Community Power (SDCP)**, that are not already under a DA contract, all electric meters will be enrolled with SDCP in 2022. In 2023, unincorporated San Diego County will also join SDCP.

Areas served: Cities of San Diego, Chula Vista, La Mesa, Encinitas, Imperial Beach, Unincorporated Areas of San Diego County (Approved August 2021)

8%

of predicted gross CoSD electricity consumption in FY 21-22 by enrolled accounts

- For facilities located in areas served by the CCA provider **Clean Energy Alliance (CEA)**, that are not already under a DA contract, all electric meters have been enrolled with CEA.

Areas served: Cities of Carlsbad, Solana Beach and Del Mar

0.2%

of predicted gross CoSD electricity consumption in FY 21-22 by enrolled accounts

- Both available CCA's are currently providing 50% renewables as the default strategy with the commitment to be 100% renewable by 2035, which is 10 years in advance of SDG&E's commitment of 100% renewable by 2045. The projections used in this report for percent renewable from CCA's are estimates and actual renewable proportion will be determined by each CCA's board.
- As part of this Measure, the County is committed to transitioning to 100% renewable electricity by 2030 for all facilities on a CCA and will be switching to a higher renewable percentage prior to 2030. The County Board of Supervisors has provided direction to attain 100% renewable by 2030 via CCA Guiding Principles.

SDG&E

- In facilities not served by either CCA, and not already under a DA contract, electricity will continue to be delivered by SDG&E, until those areas join a new or exisitng CCA
- As part of this measure, it is assumed that all electricity that is currently provided by SDG&E will be enrolled in a CCA by 2030 and the County will participate at that time to procure 100% renewably sourced electricity in alignment with the commitments for current CCA procurement

Percent Renewable by Electric Source over Time

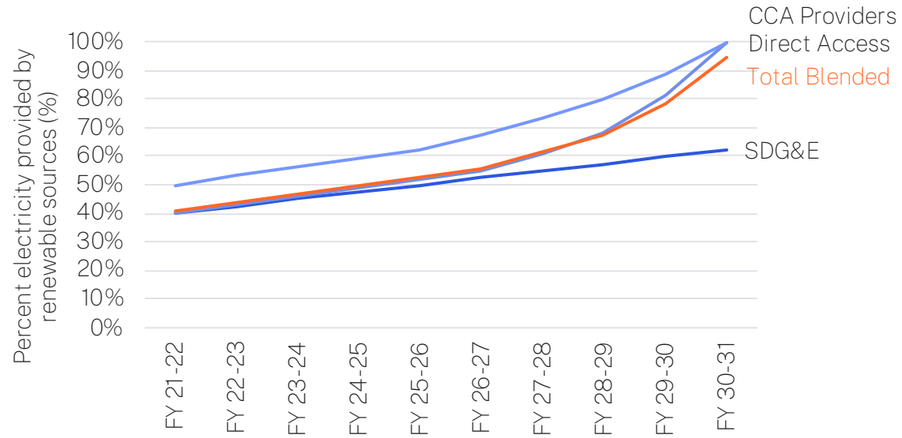


Figure 7: Percent Renewable by Electric Source. The County is committed to accelerating the percentage renewable electricity and will procure 100% renewable from Direct Access and CCA Providers by 2030.

Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-2.1: Increase Renewable Electricity
- SD County Strategic Energy Plan (SEP) 2015-2020

Case Study / Project Spotlight

Transition to Community Choice Energy

On August 31, 2021, the County Board of Supervisors voted to make San Diego Community Power (SDCP) the community choice energy program for the unincorporated areas of San Diego serving approximately 180,000 energy users.

View News Announcement

Community Choice Aggregates (CCA's) were created by the California legislature to promote an increase in cleaner energy sources such as wind and solar. CCA's purchase power based on government decisions and use their generated revenue to invest in local renewable energy projects.

180,000

energy users served in unincoporated areas of San Diego

Participating Partners in Community Choice

Community Choice Aggregate

CCA procures clean energy sources

Utility Company

(SDG&E) delivers energy and maintains the grid

Customer

County of San Diego gets cleaner energy, local control, and competitive rates!

What California CCA's are doing

6,117

MEGAWATTS

New Solar Energy Systems

1,044

MEGAWATTS

New Wind Turbines

2,646

MEGAWATTS

New Energy Storage

14

MEGAWATTS

New Geothermal

7

MEGAWATTS

New Biogas

Calculation Process:

- Identify which provider (SDG&E, Calpine, SDCP, CEA) supplies electricity to each facility.
- Project emissions factors for Calpine, SDCP and CEA based on County's renewable energy purchasing plan.
- Calculate total kWh from each provider by year
- Calculate delta of emissions relative to SDG&E baseline, using the committed percent renewable by year by provider.

Calculation Process for Future Unknown Projects:

- Future emissions factors by year have been estimated based on public commitments by providers, and County's plan to achieve 100% renewable from Calpine, SDCP and CEA by 2030.
- The County anticipates the entire region will eventually be part of a CCA.

Projection of Annual Measure 1 Carbon Savings

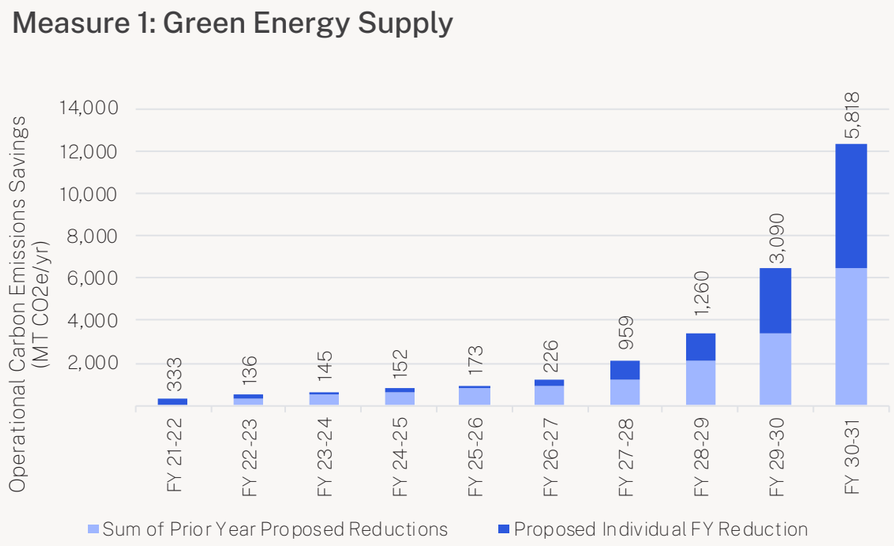


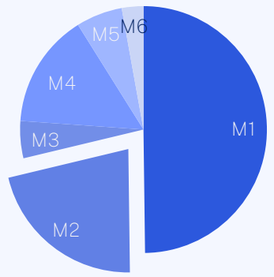
Figure 8: Annual and cumulative targeted emissions savings from Measure 1, Green Energy Supply

MEASURE 2

BUILDING ELECTRIFICATION

Summary:

Eliminate on-site combustion of fossil fuel by replacing fossil fuel burning equipment in existing buildings with electric equipment.



Estimated Impact:
5,300 MT CO2e/yr reduction in 2030 (vs. BAU)

13,200 MT CO2e cumulative reduction by 2030

Estimated Impact (When Combined with the related benefits of Measure 1, Green Energy Supply):

8,000 MT CO2e/yr reduction in 2030 (vs. BAU)

17,300 MT CO2e cumulative reduction by 2030

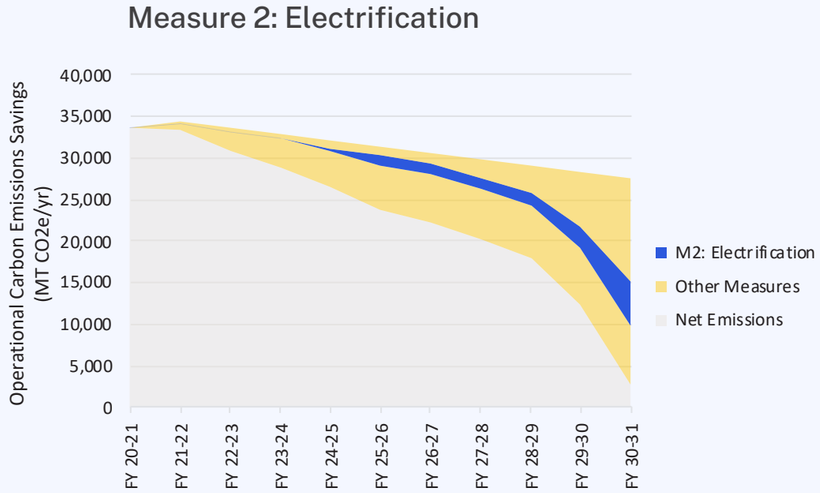
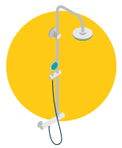


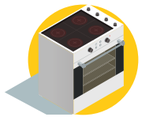
Figure 9: Annual targeted emissions savings from Measure 2, Electrification

END-USES

Space Heating



Water Heating



Cooking

Clothes Drying and Laundry

Description:

The County is evaluating all existing buildings that have natural gas or propane use to determine feasibility of replacing equipment with all-electric alternatives. The shift from gas appliances to all-electric appliances and technologies powered by an increasingly clean electricity grid is widely recognized as a critical pathway for achieving significant GHG emission reduction.

It is important to recognize that with current emissions factors, implementing electrification projects will not significantly reduce emissions. However, with the continued downward trajectory of electric emissions factors over time, it will be beneficial during the time period of this plan.

The County currently has approximately $2M/yr allocated for energy efficiency projects. It is expected that during the initial years of the ZCPP the majority of that funding will continue to be prioritized towards implementation of energy efficiency projects, but these expenditures will shift towards electrification projects during the latter years of the ZCPP.

Electrification studies will be performed for all facilities that include onsite fuel combustion, starting with the highest users. The top fifteen (15) natural gas users in the County's portfolio account for 90% of the total natural gas use. The studies evaluate the existing equipment, the available electrical infrastructure and provide cost and product data for all-electric replacement equipment. As the natural gas equipment in these facilities nears end of life these studies will present the case to replace them with all-electric alternatives.

Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-1.4: Reduce Energy Use Intensity at County Facilities by 20% below 2014 levels by 2030

Case Study / Project Spotlight

Kearny Mesa Health & Human Services Agency (North Central Regional Center)

Building Electrification Study

5055 Ruffin Road, San Diego

COMPLETED: AUGUST 2021

Carbon Reduction Potential:

up to 32

MT CO2e/yr

The Health & Human Services Agency (HHSA) North Central Regional Center is a 46,000 sf facility located in Kearny Mesa, San Diego. Natural gas is used in the building for both domestic hot water and space heating.

The Electrification Feasibility Study evaluated options for replacing the existing equipment with either electric resistance or heat pump technologies. The heat pump replacement option is preferred for electrification which reduces the GHG emission of the current natural gas use portion by 69% and the overall building GHG emission by 21%. The study also included the technical and physical constraints on upgrading the existing electrical infrastructure to accommodate new electrical loads, the rough financial costs of the electrification upgrade are also provided for the financial planning and decision-making purpose for the county equipment.

Calculation Process for Proposed Projects:

- Gather information on proposed Electrification projects provided by County, proposed and completed.
- Assign Fiscal Year (FY) to each project based on when the project is completed or anticipated to be completed.
- Assign energy reductions
  - › From Feasibility Studies, when available
  - › Where specific studies have not been completed at targeted facilties, assume all natural gas will be converted to electricity at a Coefficient of Performance (COP) of 2.0.

Calculation Process for Future Unknown Projects:

- Only specific targeted facilities are included. No generic estimates have been made for this measure

Projection of Annual Measure 2 Carbon Savings

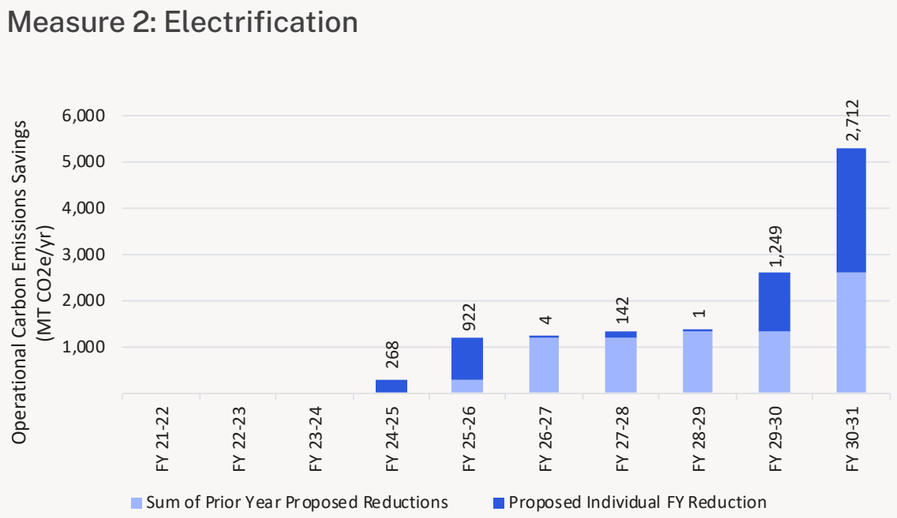
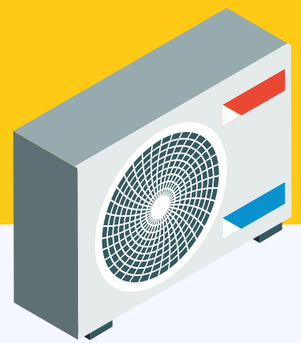


Figure 10: Annual and cumulative targeted emissions savings from Measure 2, Electrification



MEASURE 3

ENERGY EFFICIENCY PROJECTS

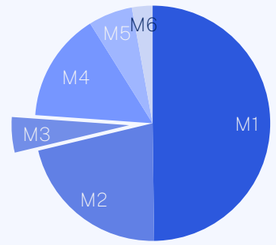
Summary:

Reduce energy consumption at existing County-owned and occupied facilities through implementation of energy efficiency measures (EEMs). Increasing efficiency of existing building stock will be critical to meeting overall GHG goals.

Estimated Impact:

1,200 MT CO2e/yr reduction in 2030 (vs. BAU)

10,700 MT CO2e cumulative reduction by 2030



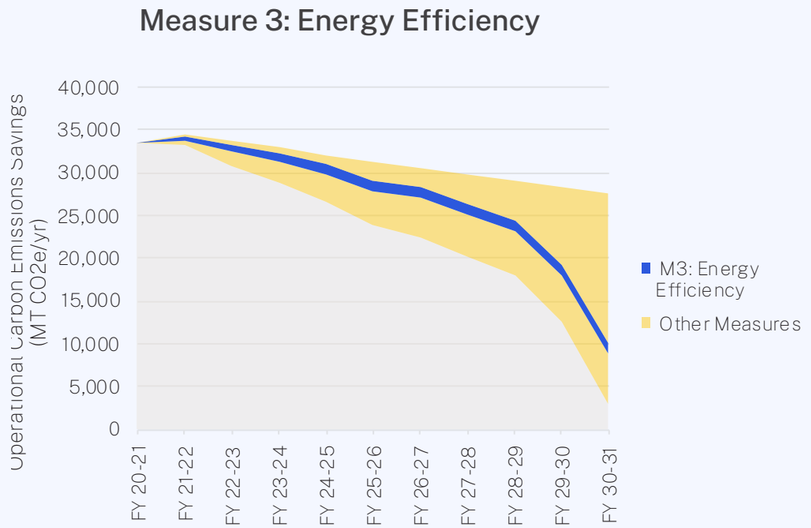


Figure 11: Annual and cumulative targeted emissions savings from Measure 2, Electrification

Description:

The County will continue this successful ZPP measure to decrease energy consumption in existing facilities. These projects will be prioritized early in this Plan, while the grid is still comprised of carbon emitting sources. As the grid gets cleaner the County's focus will shift toward Building Electrification projects to remove on-site fossil fuel combustion.

This measure will be implemented by completing initial investigations, such as energy audits, to determine opportunities and then utilizing County funds augmented by rebates or incentive programs offered by local utilities.

Examples of energy reduction measures include: upgrading existing lighting to LED, adding smart lighting controls, upgrading HVAC equipment to newer, more efficient systems, demand response, etc

Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-1.4: Reduce Energy Use Intensity at County Facilities by 20% below 2014 levels by 2030
- SD County Strategic Energy Plan (SEP) 2015-2020

Case Study / Project Spotlight

Parking Structure A, County Operations Center Campus

Energy Efficiency Project: Lighting upgrade (fluorescent to LED + controls)

5515 Overland Avenue, San Diego

COMPLETED: AUGUST 2021

Carbon Reduction:

74

MT CO2E/YR

The Parking Structure interior lighting was upgraded from fluorescent without controls to LED using retrofit kits with fixture-based controls. This reduced the energy consumption by 50% and increased the interior light levels by almost three times. The lighting controls were updated with a motion sensor and photocell integral to each LED fixture. The perimeter lights are programmed to be off when sensing daylight, the balance of fixtures are programmed to dim to 15% with a delay of 15 minutes when sensing no motion.

Calculation Process for Proposed Projects:

- Gather information on energy reduction projects provided by County, proposed and completed.
- Assign Fiscal Year (FY) to each project based on when the project is completed, and which FY will benefit from the energy reductions.
- Assign energy reductions:
  - From audit reports, if available
  - Estimated as percent of historical energy consumption at the facility if no study has been provided per chart below:
    - Lighting Projects: 7% reduction in electricity
    - Sensors& Controllers Projects: 10% reduction in electricity and natural gas
    - HVAC Projects: 10% reduction in electricity and natural gas
    - Major upgrade: 20% reduction in electricity and natural gas

Calculation Process for Future Unknown Projects:

- Based on reduced opportunities for major projects in the future, additional savings from future unknown projects are estimated at 500,000 kWh/yr and 10,000 therms per year in FY 23-24 and FY 24-25 only.
- As the grid becomes cleaner the focus on this measure will be reduced and emphasis will be shifted towards electrification projects.

Projection of Annual Measure 3 Carbon Savings

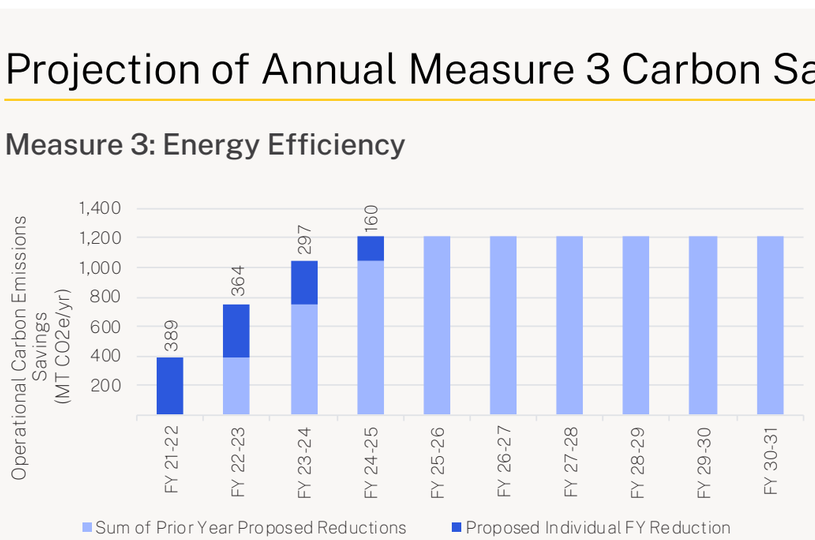


Figure 12: Annual and cumulative targeted emissions savings from Measure 3, Energy Efficiency

MEASURE 4

PROACTIVE ENERGY MANAGEMENT

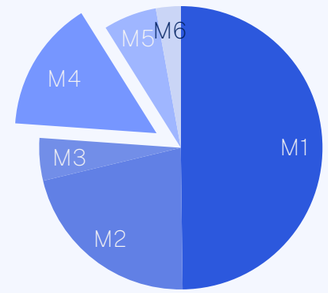
Summary:

Reduce energy consumption by implementing ongoing monitoring of energy performance at all existing County facilities.

Estimated Impact:

3,700 MT CO2e/yr reduction in 2030 (vs. BAU)

23,500 MT CO2e cumulative reduction by 2030



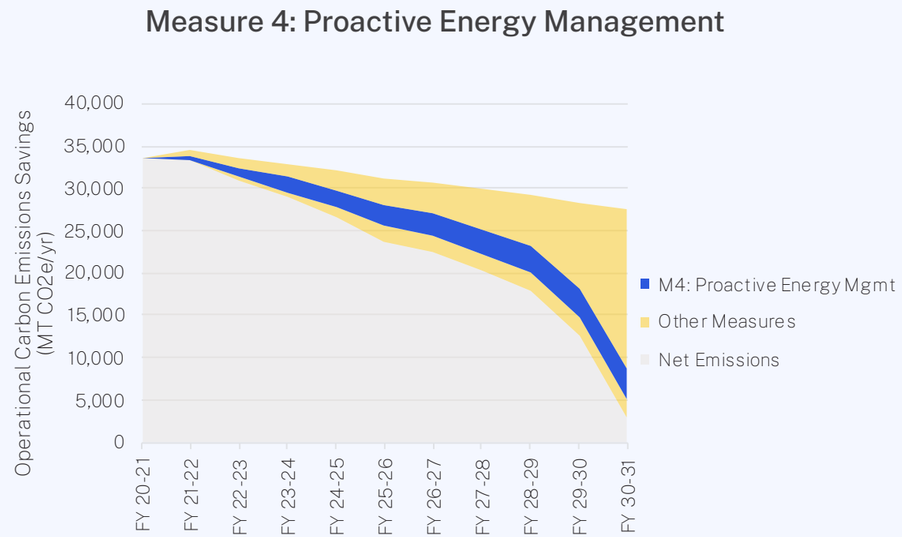


Figure 13: Annual targeted emissions savings from Measure 4, Proactive Energy Management

Program Achievements:

RCx/MBCx Program Cumulative Sustained Savings (2019 - 2021):

9,219,000 kWh
297,000 therms
$1,775,000

RCx/MBCx Program Annual Savings: 4,763,000 kWh, 156,000 therms, $908,000

- Fallbrook Library: 108,000 kWh, 7,300 therms, $30,000
- Edgemoor SNF: 1,550,000 kWh, 56,200 therms, $270,000
- San Diego Central Jail: 964,000 kWh, $176,000
- East Mesa Juvenile Detention Facility: 673,000 kWh, 22,000 therms, $148,000
- South Bay Regional Center: 917,000 kWh, 58,000 therms, $168,000
- Juvenile Probation Center: 345,000 kWh, 12,000 therms, $78,000 (not yet in MBCx Program)
- East Mesa CPC: 206,000 kWh, $38,000 (not yet in MBCx Program)

RCx in Process Annual Savings: 577,000 kWh, 6,500 therms, $133,000

- El Cajon Family Resource Center: 135,000 kWh, $31,000
- Spring Valley Library: 70,000 kWh, $21,000
- East Mesa H1H2: 272,000 kWh, 6,500 therms, $60,000
- McClellan Palomar Airport: 100,000 kWh, $21,000
- NCRC: TBD

Description:

This measure includes Retro-Commissioning (RCx) and Monitoring-Based Commissioning (MBCx) projects in addition to continuous monitoring of energy consumption at County facilities.

The County will continue this successful ZPP measure to monitor ongoing energy performance through submeter and equipment data that is trended in the central Building Automation System (BAS). Access to that data in the BAS and in the Atrius (formerly Lucid) dashboard allows the County to implement RCx and MBCx activities for all buildings that are connected to the system.

Retro-Commissioning

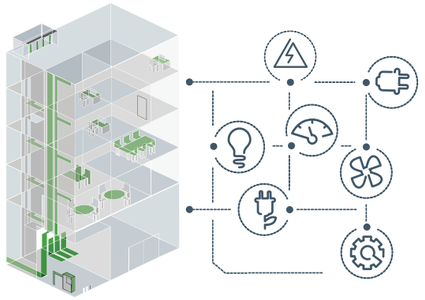
Retro-Commissioning (RCx) is a process to improve the efficiency of an existing building's equipment and systems. An RCx project can identify if and when existing systems are operating outside expected schedules or setpoints and identify measures to correct the discrepancy to ensure optimum energy performance.

Monitoring-Based Commissioning

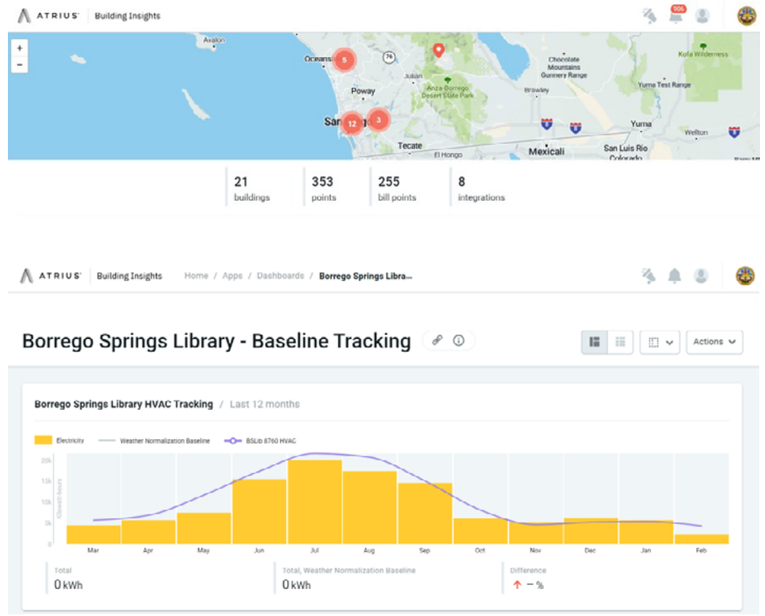
The goal of Monitoring-Based Commissioning (MBCx) projects is to maintain the savings identified during RCx projects or through regular reviews of energy consumption from submetering data.

Continuous Monitoring

Data for Proactive Energy Management is gathered, stored and processed in the County's central Building Automation System (BAS). The BAS trends HVAC equipment data points and energy and water submetering data for 172 existing buildings.



In 2020 the County engaged Atrius to create a cloud-based dashboard that would provide a centralized location for all energy consumption and production data from facilities. There are currently 20 facilities piloted in the Atrius dashboard, with plans to expand to 100 facilities within FY 2021-22 The cloud-based monitoring tool aggregates data from a variety of sources, including utility bills, interval data, submeter data, and internal tenant data, to provide actionable feedback on how these facilities use resources and whether or not that usage is within predicted parameters.



Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-1.4: Reduce Energy Use Intensity at County Facilities by 20% below 2014 levels by 2030
- SD County Strategic Energy Plan (SEP) 2015-2020

Case Study / Project Spotlight

San Diego Central Jail

Retro-Commissioning (RCx) Project

DECEMBER 2019

Carbon Reduction Potential:

202 MT CO2e/yr

964,000 kWh/yr and 530 Therms/yr

This RCx project at the San Diego Central Jail identified four (4) energy saving measures:

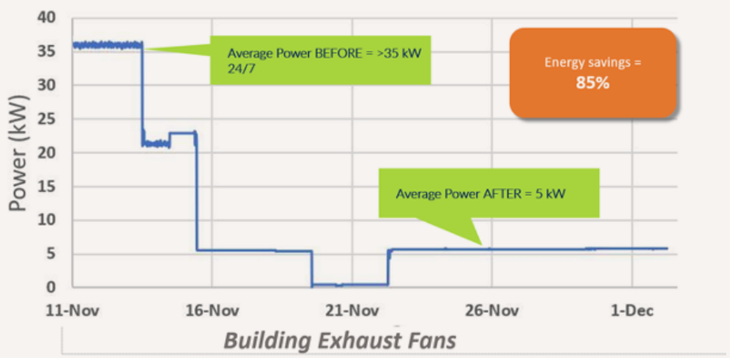
Measure 1 – Exhaust Fans VFD Controls

Measure 2 – Air Flow Adjustment at Terminal Units

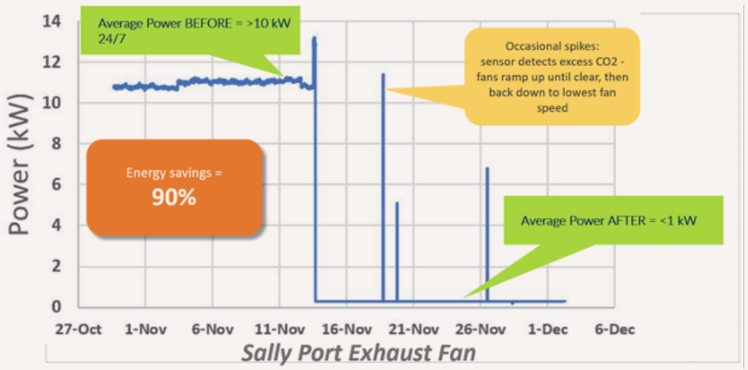
Measure 3 – Kitchen Exhaust Demand Controls

Measure 4 – Sallyport Exhaust Demand Controls

MEASURE 1 SAVINGS



MEASURE 4 SAVINGS



Calculation Process for Proposed Projects:

- Gather information on Proactive Energy Management projects provided by County, proposed and completed. These may include MBCx projects, RCx projects, or other findings identified by reviewing submeter data on the dashboard.
- Assign Fiscal Year (FY) to each project based on when the project is completed and which FY will benefit from the measure.

Calculation Process for Future Unknown Projects:

- Based on the assumption that many major projects will be completed during the initial years of this plan, the estimate for future savings from new future projects is 900,000 kWh/yr and 30,000 therms per year in FY23-24, and reducing to 760,000 kWh/yr and 26,500 therms/yr by 2030.

Projection of Annual Measure 4 Carbon Savings

Measure 4: Proactive Energy Management

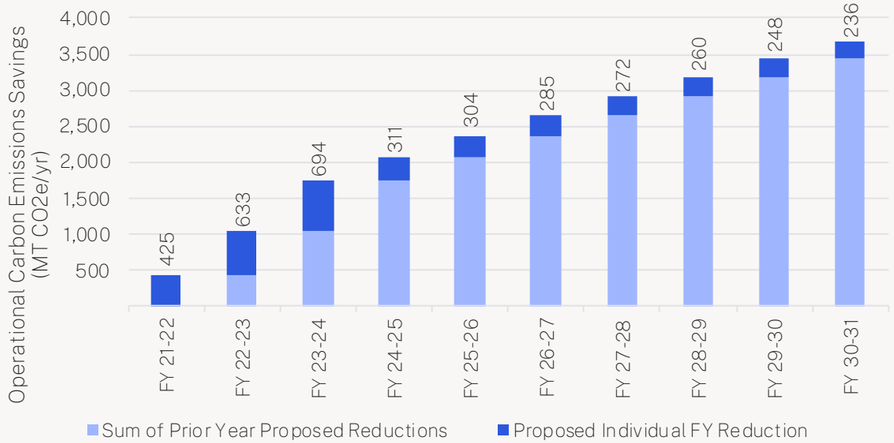
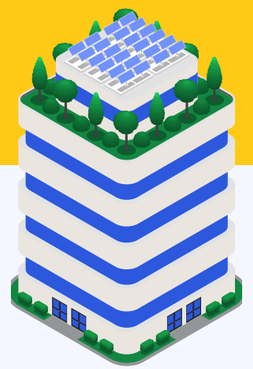


Figure 14: Annual and cumulative targeted emissions savings from Measure 4, Proactive Energy Management

MEASURE 5

ZERO NET ENERGY BUILDINGS



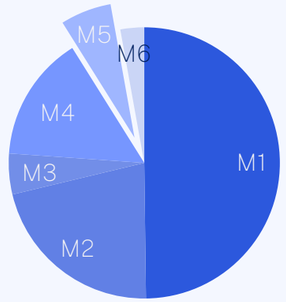
Summary:

Require all-electric, Zero Net Energy for all new construction capital projects.

Estimated Impact:

1,500 MT CO2e/yr reduction in 2030 (vs. BAU)

9,600 MT CO2e cumulative reduction by 2030



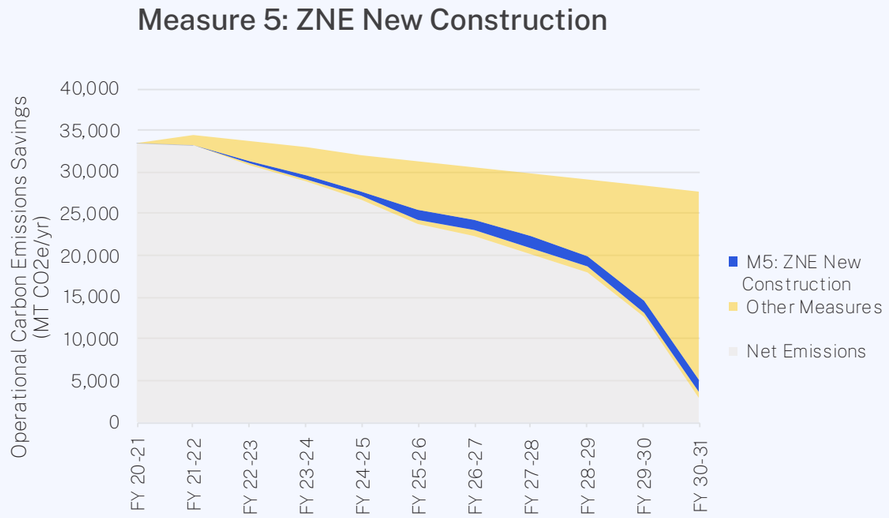


Figure 15: Annual targeted emissions savings from Measure 5, ZNE New Construction

Description:

The County has been requiring all-electric and ZNE on all new construction capital projects since 2014. The process includes first designing a highly-efficient, all-electric facility and then offsetting anticipated energy consumption with on-site renewables. This practice is consistent with the State of California's mandate for ZNE for its own new facilities.

Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-1.4: Reduce Energy Use Intensity at County Facilities by 20% below 2014 levels by 2030
- SD County Strategic Energy Plan (SEP) 2015-2020

7 Completed ZNE Projects:

- Alpine Branch Library
- Imperial Beach Branch Library
- North Coastal Health & Human Services Facility
- Borrego Springs Branch Library
- Santa Ysabel Nature Center
- East County Assessor, Recorder & County Clerk
- Ohio Street Probation Center

6 Upcoming ZNE Projects:

- Lakeside Branch Library
- Juvenile Justice Center
- Southeastern Livewell Center
- Ramona Community Resource Center
- East Otay Mesa Fire Station
- Central Animal Shelter

Case Study / Project Spotlight

East County Assessor, Recorder & County Clerk Offices

New Construction ZNE Project

10144 Mission Gorge Road, Santee, CA 92071

COMPLETED: 2020

Certifications: LEED v4 Gold Certified, ILFI Zero Energy Certified

Carbon Reduction:

43

MT CO2e/yr avoided in FY20-21

This new ZNE building is a public resource that combines several governmental and administrative departments that provides services including property records, tax collecting, historical records, and civil wedding ceremonies. The facility includes a 5,000-sf archive space that has stringent temperature and humidity requirements, which increased the overall energy consumption. The project demonstrates exceptional performance across the green building spectrum and is the first Archive facility to achieve ZNE in the United States. View the Web Article.

Calculation Process for Proposed Projects:

- Gather information on ZNE projects provided by County, proposed and completed. Data provided in Capital Improvement Needs Assessment (CINA) FY 21-26.
- Identify if ZNE building is replacing an existing facility or will be a new facility.
- Assign energy reductions:
  - If replacing an existing building, remove existing facility energy use from future predictions.
  - If project is a “new capacity” facility, the associated energy consumption will be added to the BAU case, and no new energy consumption will be reported within the portfolio. This allows for the benefit of these “new capacity” projects to be shown as avoided carbon in the overall portfolio plan.
- Assign Fiscal Year (FY) to each project based on when the project is completed, and which FY will benefit from the removal of existing meters.

Calculation Process for Future Unknown Projects:

- Starting in FY27-28, assumptions are based on historical estimates for small-sized projects, with a net benefit of 300,000 kWh/yr to be removed from the portfolio, which is consistent with 1-2 libraries or equivalent facilities per year.

Projection of Annual Measure 5 Carbon Savings

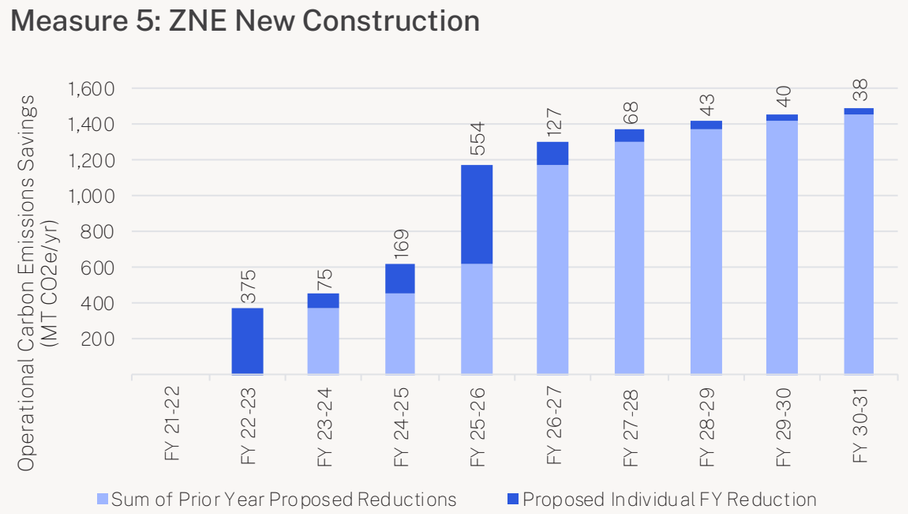
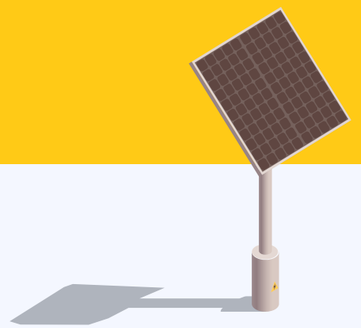


Figure 16: Annual and cumulative targeted emissions savings from Measure 5, ZNE New Construction

MEASURE 6

RENEWABLE ENERGY



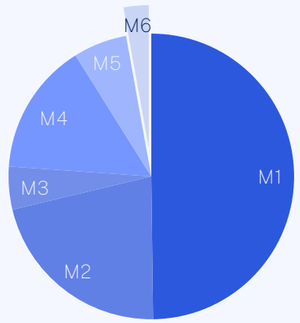
Summary:

Install photovoltaic (PV) systems and Battery Energy Storage Systems (BESS) on existing County properties.

Estimated Impact:

700 MT CO2e/yr reduction in 2030 (vs. BAU)

4,800 MT CO2e cumulative reduction by 2030



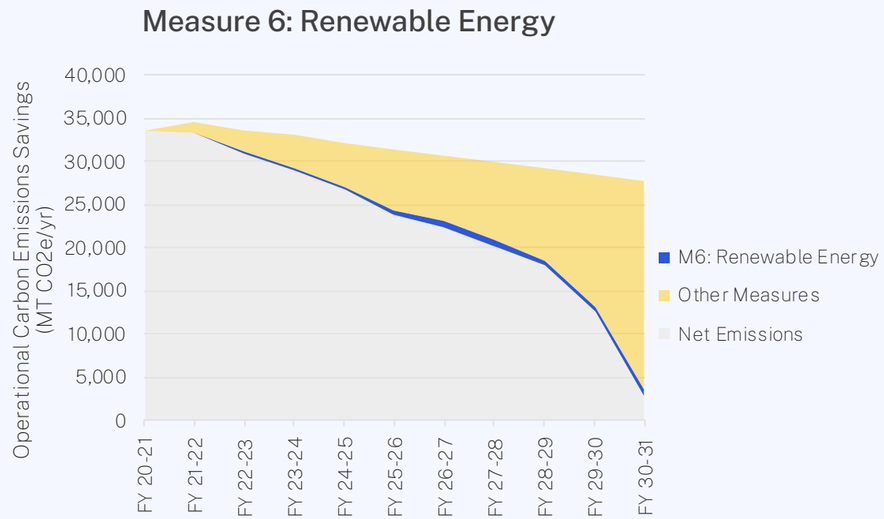


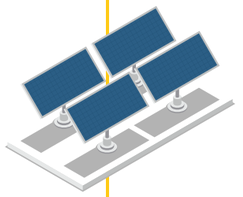
Figure 17: Annual and cumulative targeted emissions savings from Measure 5, ZNE New Construction

Description:

The County will continue this successful ZPP measure to add photovoltaic (PV) systems to existing sites either through owned installations or through a Power Purchase Agreement (PPA).

Battery Energy Storage Systems (BESS) have been proven to save money on demand charges and can help stabilize the grid during times of high usage, as evidenced by over 12 months of experience with a 400kW unit at the County Operations Center.

As opportunities arise to place BESS's at other sites, the County's battery inventory will grow.



Power Purchase Agreements

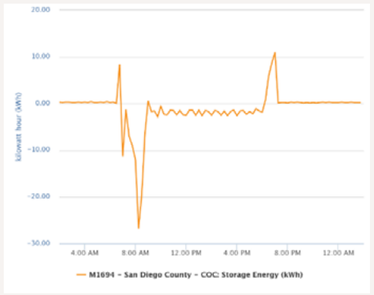
Through the PPA funding mechanism, the County licenses its property to a developer who installs and owns the PV equipment and sells the produced electricity to the County. This procedure is a pay-per-use strategy with a defined schedule of kWh rates, usually representing a cost savings for the lifetime of the agreement.

Synergies with Other County Programs

- 2018 SD County Climate Action Plan Measure E-2.4: Increase Use of On-Site Renewable Electricity Generation for County Operations
- SD County Strategic Energy Plan (SEP) 2015-2020

Case Study / Project Spotlight

County Operations Center (COC) PV and Battery Systems



Graph of Daily Operation of Battery Energy Storage System at the County Operations Center

COMPLETED: 2020

Carbon Reduction:

689 MT CO2e/yr

(using 2020 emissions factors)
3,300,000 kWh/yr

In 2020 the County installed a 2.2 MW photovoltaic system through a 25-year PPA on the roofs of multiple office buildings and a parking garage at the County Operation Center (COC) in Kearny Mesa. 77% of the PV modules are mounted with a dual tilt racking system that increases production potential by reducing inter-panel shading, allowing for more panels to be installed, capturing solar during early morning and later evening hours and reducing accumulation of dirt. This system is estimated to save $4 million dollars over its life.

In conjunction with the PV system, the County installed a 400 kW Fluence battery which has bidirectional capabilities to absorb power from the PV system and deliver to the building distribution system at high speeds. The system can also sell energy to the grid when prices are high and is programmed to reduce demand charges. This Battery Energy Storage System (BESS) is a 10-year PPA system and since the installation (June 2020 – November 2021) the system has saved the County just over $500k in energy demand charges.

Calculation Process for Proposed Projects:

- Gather information on future renewable projects provided by County, proposed and completed.
- Assign Fiscal Year (FY) to each project based on when the project is completed, and which FY will benefit from the measure.

Estimate of Future (Unknown) Energy Reductions

- Most opportunities for large-scale PV have already been implemented or are in planning. The potential for additional future on-site renewable energy systems is limited, but the assumption is made that systems will be added as funding becomes available. For future systems that are not yet explicitly identified, the assumption is based on new system sizing of 330,000 kWh/yr (~220 kW DC) in FY 25-26, reducing to 270,000 kWh/yr (~180 kW DC) in FY 27-28.

Projection of Annual Measure 6 Carbon Savings

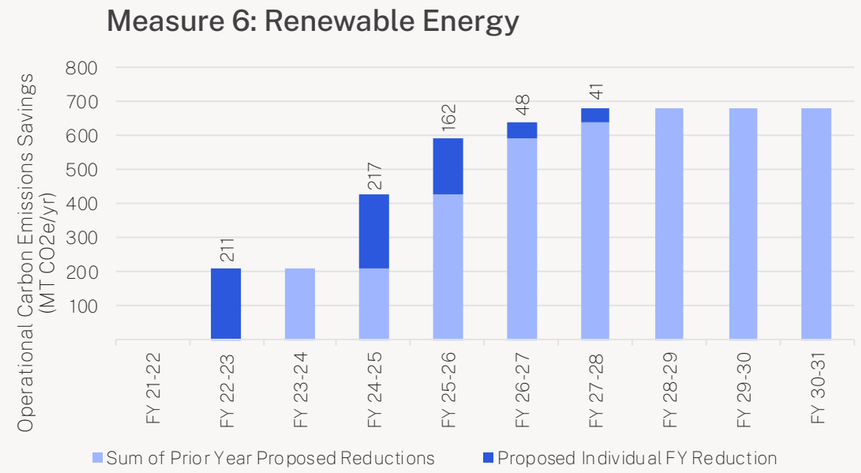


Figure 18: Annual and cumulative targeted emissions savings from Measure 6, Renewable Energy

V.
Funding Sources & Financial Considerations

The Energy and Sustainability Division (ESD) is responsible for managing the County's Utility Internal Service Fund (ISF) which covers all utilities (not just electricity and natural gas) and for developing and implementing Countywide sustainability efforts related to County Operations. County funding sources vary between the six measures identified in this Plan.

Funding was approved previously as part of Department of General Services (DGS) rates that are charged to client County Departments to cover costs related to existing energy management software (part of Measure 4), as well as an annual $2M set-aside for energy efficiency (Measure 3). The Board of Supervisors has already taken action to approve Policy changes implementing ZNE Buildings (Measure 5) and authorizing Green Energy Supply (Measure 1).

Funding for other measures and accelerating the timing of currently funded efforts will require further consideration and approval by the County Board of Supervisors. In order to implement this plan effectively, additional funding will be needed for Measure 2 as further discussed below.

Funding Sources by Measure:

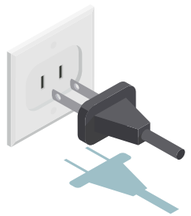
Measure	Funding Sources
M1: Green Energy Supply	Utility Budget
M2: Building Electrification	General Fund (One Time Only) Major Maintenance Improvement Plan (MMIP)
M3: Energy Efficiency Projects	DGS Internal Services Fund Rates ($2M annually)
M4: Proactive Energy Management	Reallocated Measure 3 (Energy Efficiency) funding will be used to cover costs for this measure
M5: Zero Net Energy Buildings	County Budget – Capital Improvement Needs Assessment (CINA)
M6: Renewable Energy	3rd Party Agreements like PPAs. Reallocated Measure 3 (Energy Efficiency) funding will be used to cover purchase costs for one hosted system

Description of Cost Estimates By Measure:

Following are descriptions of how cost estimates were determined for each measure. Where cost estimates are provided, an annual escalation factor of 3% has been included.

M1: Green Energy Supply

Funding for this measure is covered through each facility's utility budget, and no additional cost is included within this plan for this Measure. The cost for cleaner electricity is expected to increase as the County ramps up towards 100% renewable. In order to minimize cost impact, quantities of renewable electricity purchased will be strategically increased over time. It is expected that the cost delta for cleaner electricity will continue to go down over time and that prices will be competitive with non-renewable power as we get closer to FY30-31.

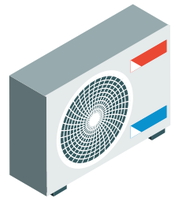


M2: Building Electrification

Preliminary Building Electrification feasibility studies have included rough cost estimates for replacement of natural gas equipment, including material cost and estimated labor costs. Some facilities will also require upgrades to electrical infrastructure to feed new equipment. Estimated cost includes new equipment and installation costs ($20/therm replaced), electrical infrastructure cost ($5/therm), and soft costs for feasibility and design ($5/therm), for a total of $30/therm replaced.

Estimated Cost	$30/Therm removed based on seven prior electrification studies
Estimated Funding Needed Through FY30-31	$61 million ($10M of this can be shifted from the $2M/yr set-aside for energy efficiency)
Funding Source Needed?	Yes, budget via CINA or MMIP process. Partial funding proposed via DGS rates beginning in FY24/25.

Beginning in FY24-25, part of the funding from the $2M/year set-aside allocated to Measure 3 (Energy Efficiency) will be shifted towards Electrification Projects. Preliminary analysis indicates that between FY24-25 and FY30-31, a total of approximately $10M can be shifted from the energy efficiency set-aside to help fund electrification projects. However, approximately $51M of additional new funding will be required to realize the total estimated savings associated with this measure.



M3: Energy Efficiency Projects

Based on historical energy efficiency projects the County has implemented and cost estimates included in recent audit reports, this measure is likely to cost approximately $0.30/kBtu reduction. As noted previously in this report, as the grid becomes greener and approaches 100% renewable, the need for Energy Efficiency Projects will decrease and the funding allocated for this measure will shift to help offset costs for Measure 2, Building Electrification.

Estimated Cost	$0.30/kBtu reduction based on historic projects
Estimated Funding Needed Through FY30-31	$4.5 million
Funding Source Needed?	No, funding already part of DGS rates.

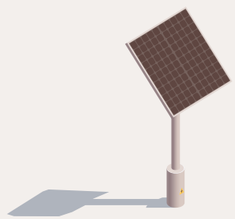
M4: Proactive Energy Management

Costs for the Proactive energy management Measure have been estimated at approximately $350K/yr based on prior year expenditures and expected future opportunity.

Estimated Cost	$350K/yr
Estimated Funding Needed Through FY30-31	$3.2 million
Funding Source Needed?	No. Available funding from Measure 3 will be used to fund this measure.

M5: Zero Net Energy Buildings

Funding for future ZNE Buildings and their related renewable energy systems is already captured in the CINA, and no additional cost is included within this plan for this Measure.



M6: Renewable Energy

Renewable energy systems that are not part of new construction ZNE Buildings (See Measure 5) are planned to be procured via Power Purchase Agreements (PPAs), at no upfront cost to the County.

Funding needs for this measure only include the purchase of a hosted PV system at the County Operations Center Parking Garage in 2026 at an estimated cost of $750K.

Estimated Cost	N/A – Procured via PPA
Estimated Funding Needed Through FY30-31	$750K for one-time purchase at COC
Funding Source Needed?	No. Available funding from Measure 3 will be used to fund this measure.

Financial Considerations

As part of this plan, a rough order of magnitude (ROM) estimate of costs by measure and by year has been calculated in alignment with the scheduling identified in the MMIP and includes estimates for future unknown projects.

The total estimated funding for ESD measures (2,3,4 and 6) to achieve 90% carbon reduction between FY22-23 and FY30-31 is approximately $69 million. $18M of funding is already identified through the $2M/year set-aside for energy efficiency as described below leaving $51M in new funding to be identified for this plan.

$51M

additional funding is needed between FY22-23 and FY30-31 to implement the measures identified in this plan.

ZCPP Cost Estimate by Measure

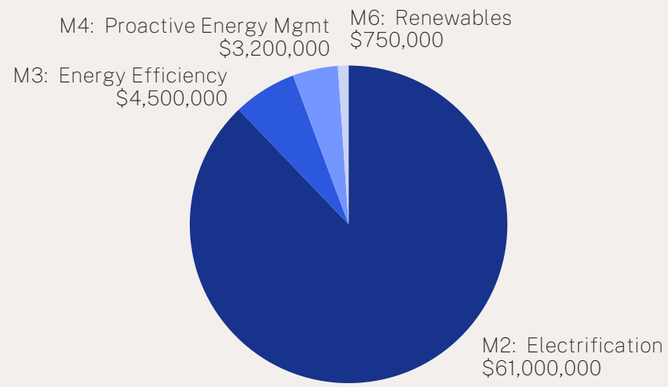


Figure 19: A total of approximately $69M is needed to fund these measures. $18M is already identified through the $2M/year set-aside for energy efficiency and can be allocated to other measures.

The ESD has traditionally implemented energy-related projects (Measure 3, Energy Efficiency) through $2 million per year obtained annually through the General Fund. In FY21-22 this funding stream was incorporated into the rates DGS charges to client Departments. This guarantees funding for this measure into the foreseeable future.

Measure 2, Building Electrification projects have typically been implemented using the Major Maintenance Improvement Plan (MMIP) schedule which prioritizes projects based on emergency need or remaining useful life of facilities and/or major equipment within facilities. This measure carries a significant cost (approximately $61M) compared to the other measures but provides the 2nd highest carbon reduction potential in this Zero Carbon Plan. Following the MMIP schedule would delay the benefits of decarbonization and result in the County not achieving the targeted goal of 90% reduction until well beyond FY30-31, and likely not until 2035 or 2040. In addition, the costs associated with this measure would fluctuate significantly by year, between $0 and $30M.

To help support the capital costs for electrification projects, this plan recommends shifting existing funding for energy efficiency towards electrification starting in FY24-25 as shown below. Of the total $18M from the $2M/yr energy efficiency funding, this plan recommends shifting a total of $10M to help fund electrification projects, which would leave $51M in new funding to be identified by FY30-31.

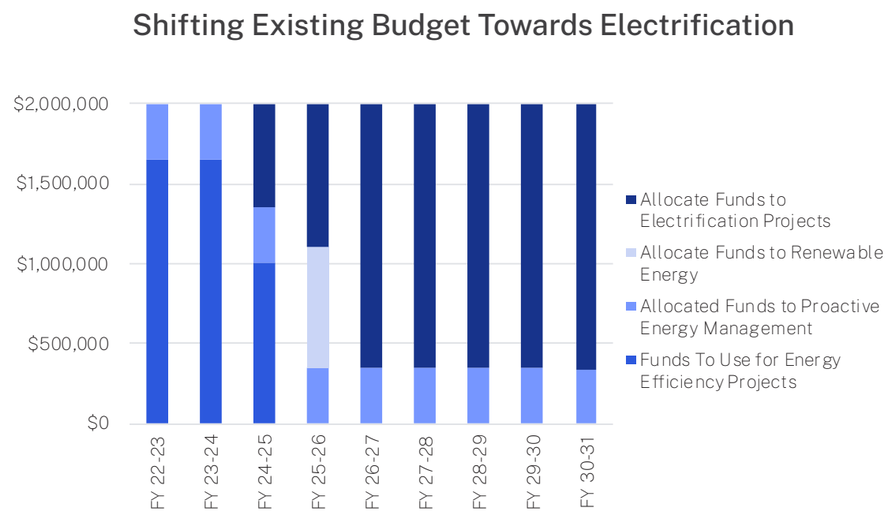


Figure 20: Shifting Existing Energy Efficiency Budget Towards Electrification. Approximately $10M can be shifted from energy efficiency projects towards electrification projects by FY30-31.

There needs to be a concerted effort to bring these high impact projects forward, as well as to identify an appropriate steady funding stream. This response to climate urgency means that projects will need to be implemented out of the normal sequence and trajectory of the Major Maintenance Improvement Plan (MMIP) and prioritized instead based on decarbonization potential.

Two different electrification implementation timelines are identified below, referred to as the Baseline Plan and the Accelerated Plan. The Baseline Plan follows the timing that would follow the trajectory of the MMIP and delays decarbonization efforts until FY30-31 or later. The Accelerated Plan emphasizes earlier decarbonization, brings future projects forward, and smooths out the annual funding needs.

In both the Baseline and Accelerated plans, electrification of approximately 96,000 therms in 11 facilities has been proposed as near-term target projects for FY24-25 (see table below). The cost of those projects is estimated at $3M, based on the high-level cost assumptions described above.

Year	Facility	Electrification Scope
FY 24-25	South Bay Regional Center	Partial Facility: DHW + laundry
FY 24-25	North County Animal Shelter	Partial Facility: 8 Gas/electric packaged units
FY 24-25	San Marcos RMS Div II HQ	Partial Facility: 19 Gas/electric packaged units
FY 24-25	HHSA North Central Regional Center	All gas HVAC + DHW + equipment
FY 24-25	Encinitas Sheriff Station	All gas HVAC + DHW + equipment
FY 24-25	Fallbrook Park & Community Center	Partial Facility: 2 Gas/electric packaged units + kitchen equipment
FY 24-25	County Office - San Marcos 141 Carmel St.	All gas HVAC + DHW + equipment
FY 24-25	Lakeside Community Center	Partial Facility: DHW
FY 24-25	County Office - San Marcos 151 Carmel St	All gas HVAC + DHW + equipment
FY 24-25	East Mesa Regional Firing Range	All gas HVAC + DHW + equipment
FY 24-25	Gillespie Field Airport	Partial Facility: DHW (Maintenance Hangar)

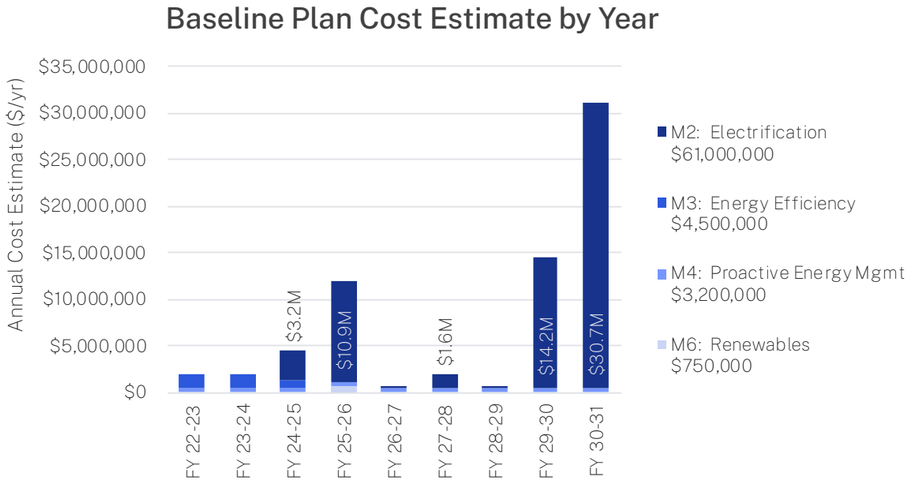


Figure 21: Baseline Plan Cost Estimate by Year. Annual Electrification Costs are Highlighted. By following standard MMIP procedure and schedule, most electrification projects are delayed until FY30-31 or beyond and targeted emissions reductions will likely not be achieved until 2035 or 2040.

To respond to the need to accelerate decarbonization efforts, a second plan (identified as Accelerated Plan) is shown below. This plan keeps the same overall general budget for all Measures but moves electrification projects forward and distributes the costs more evenly throughout the latter half of the plan duration. The total cost of Measure 4, Electrification, is approximately equal to the Baseline Plan cost of ~$61M.

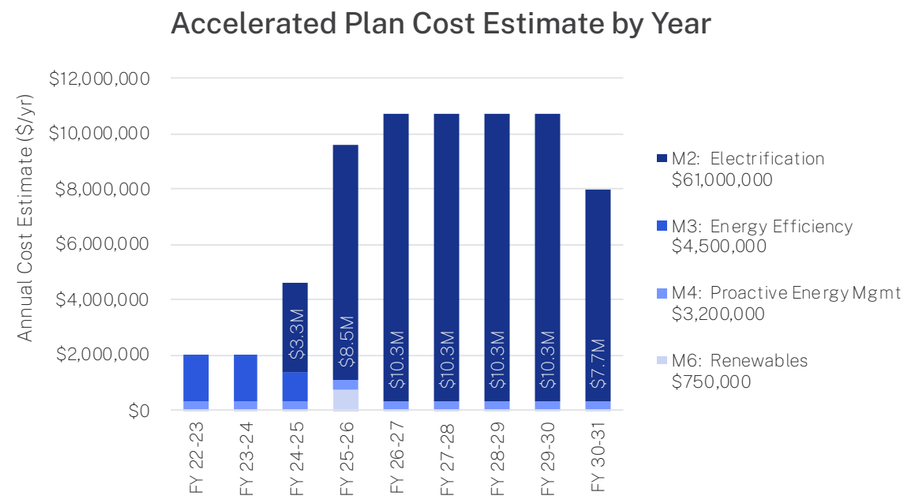
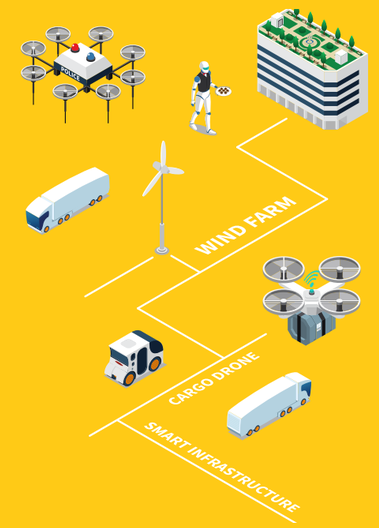


Figure 22: Accelerated Plan Cost Estimate by Year. Annual Electrification Costs are Highlighted. Moving high-impact electrification projects forward emphasizes earlier decarbonization and higher cumulative emissions reduction, brings future projects forward, and smooths out the annual funding needs.



Importance of Electrification:

Electrification is a key component of the County's pathway to significant carbon reduction. In FY20-21, 41% of the County's total building operational carbon emissions were created by natural gas combustion. Without building electrification (Measure 2), this will remain a substantial source of emissions with significant climate impacts.

The value of the Electrification Measure to the Zero Carbon Strategy includes:

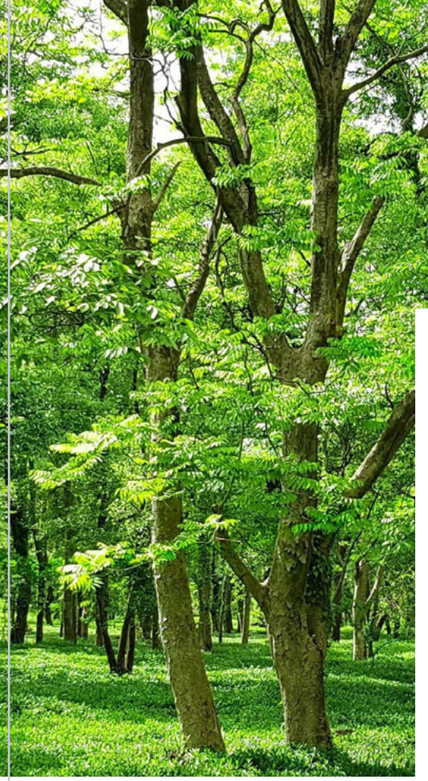
- The County will take immediate initiative to seriously address its reliance on fossil fuel combustion, allowing them to meet 2030, 2035, and 2045 goals related to decarbonization
- When completed Electrification projects are powered by largely renewable energy sources (Measure 1, Green Energy Supply) the emissions reduction potential increases from 5,300 MT CO2e/yr to 8,000 MT CO2e/yr in FY30-31. This represents 32% of the total emissions reductions in FY30-31 that are predicted by this plan.
- From a cumulative standpoint (summing the emissions reductions through FY30-31), when completed Electrification projects are combined with the renewable electricity from Measure 1, the carbon emissions reduction through FY30-31 could reach at least 17,300 MT CO2e (Baseline Plan) and 23,900 MT CO2e (Accelerated Plan). This is equivalent to the emissions from between 43M – 59M passenger vehicle miles driven, according to the EPA Greenhouse Gas Equivalencies Calculator

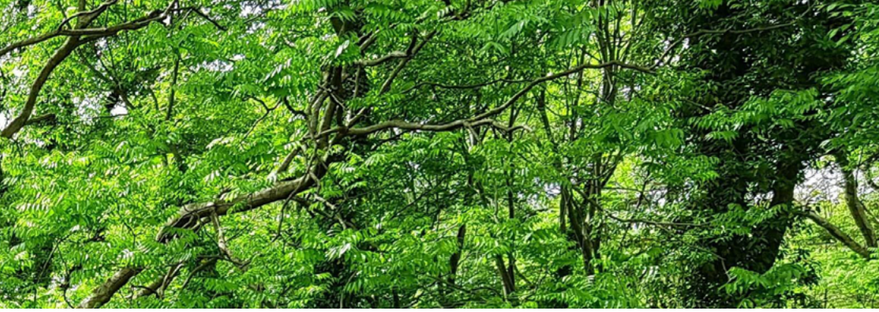
The time to act is now.

If the County of San Diego is going to seriously address the climate change impacts of the carbon emissions generated by the operation of its facilities, the time to act is now. Action will require a substantial amount of resources over time. As described in this report, significantly reducing County operational carbon emissions is not something that can be done quickly. The work needed to electrify major County facilities is not only expensive and will replace key equipment out of sequence, but it will also be disruptive to the sites and therefore will take significant time and effort to accomplish, with many projects likely taking a year or longer to complete. However, with proper funding and a determination to take action now, the County can become 90% carbon free in its operations by FY30-31.

VI. Supporting Efforts

- Embodied Carbon Reduction
- Water Efficiency





Supporting efforts are carbon reduction strategies that are either not currently quantifiable, financially viable or widely available but could become a significant contributor to the County's overall GHG reduction strategy, particularly as operational carbon is eliminated.

These supporting efforts do not reduce the carbon emissions that are a direct result of County operations, however focusing on these sources will have an impact on overall global carbon emissions and will function as a test bed for these practices influencing the actions of other regional entities. The County is in the process of developing a long-range plan for Water Efficiency that will help reduce the operational use of increasingly diminishing potable water resources and has included the requirement for design and construction of new capital projects to reduce embodied carbon from construction materials and processes. Carbon sequestration using sustainable wood products as substitutes in structural systems is being explored in a current new construction project.

Embodied Carbon Reduction

Embodied Carbon is the sum of emissions that arise from the extraction, processing, transportation, installation, use, and ultimate disposal of products and materials in a building.

Buildings account for 39% of annual greenhouse gas emissions worldwide. Operational emissions (from energy required to heat, cool, and power our buildings) represent 28%. However, as buildings increase energy efficiency, trend towards electrification, and take advantage of grid cleaning, this percentage is expected to decrease in the coming years. This pushes us to focus on the remaining 11% of building-related emissions, known as **embodied carbon**, which are the emissions associated with materials and construction processes throughout the building's lifecycle.

11%

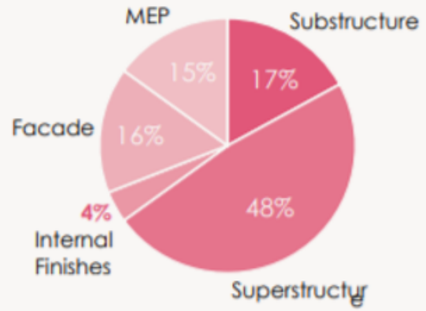
of global emissions come from embodied carbon

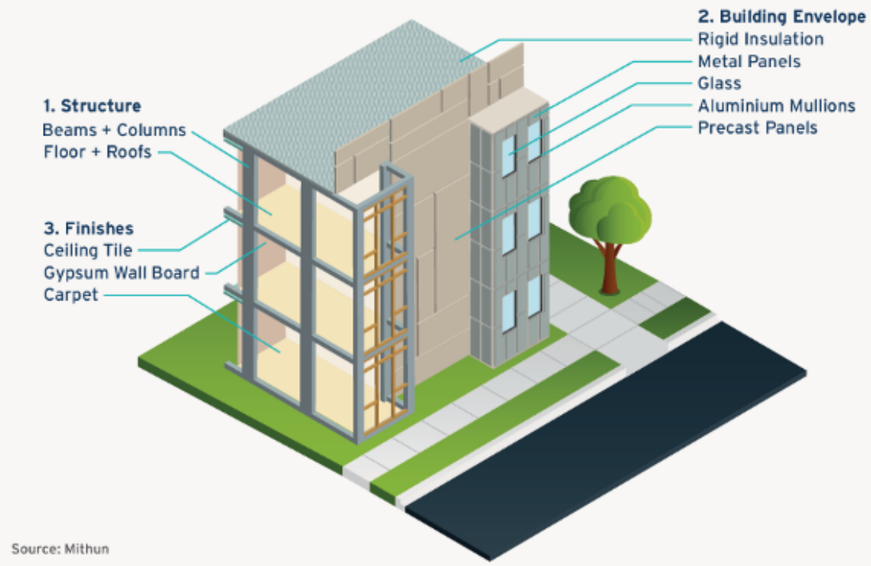
The County of San Diego has required project teams to include embodied carbon reductions on one of the current projects and will likely include in several other projects that are in solicitation phase.

It is crucial to factor embodied carbon into the County's decarbonization strategy to truly encompass the full spectrum of emissions that need to be accounted for as it leads the way towards net zero.

Building Life Cycle														Beyond Building Life Cycle
Product Stage			Construction Stage		Use Stage					End of Life Stage				
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
Raw Material Extraction	Raw Material Transport	Manufacturing	Transport to Site	Construction or Installation	Use	Maintenance	Repair	Refurbishment	Replacement	Demolition	Transport from Site	Waste Processing	Disposal	Reuse, Recycling or Recovery Potential

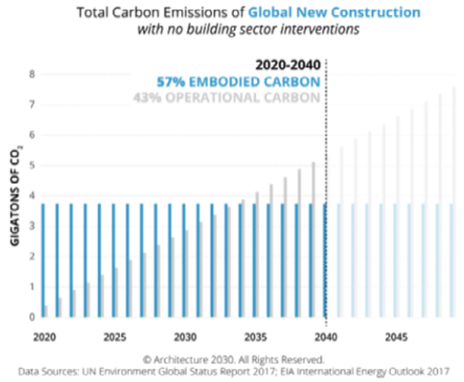
The figure below (developed by Mithun) illustrates the typical embodied carbon hotspots, which will be the focus of the County's strategic approach. In a study carried out by by the London Energy Transformation Initiative (LETI), a typical office building's emissions were attributed as shown in the pie chart below. At 65% (Superstructure + Substructure), this further highlights the importance of understanding, quantifying, and tackling the emissions related to structural materials, whose production stage can be extremely carbon intensive.





Source: Mithun

Time Value of Carbon

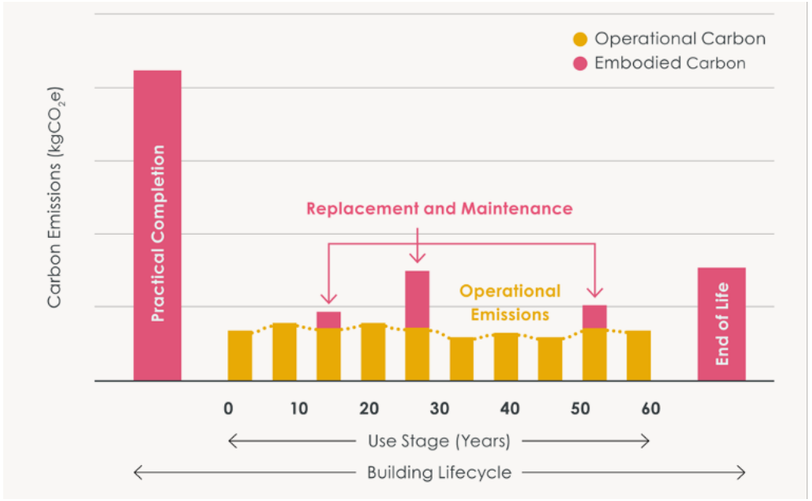


As building operational carbon is eliminated through various measures, including clean grid-supplied energy and efficient operation of existing buildings, embodied carbon share will become more critical in the decarbonization path.

According to Architecture 2030, almost half of the carbon emitted by new construction by 2050 will be embodied. As embodied carbon emissions occur before a building is even occupied, these are locked in at the start. Given the limited carbon budget that remains to avoid catastrophic climate change (per the IPCC 2018 report), decarbonizing the whole-life cycle of the building and construction industry is one of the most effective strategies to avoid the worst effects of a changing climate.

The following diagram by LETI puts a building's whole-life carbon – which encompasses both embodied and operational – into perspective over the typical 60-year lifecycle. As we investigate the next 20 years – a critical timeframe for curbing emissions – it becomes alarmingly apparent how our focus should turn to carbon that is emitted before we even turn on the light switch of our offices, libraries, fire stations and community centers.

As the County continues to evaluate the possible approaches to embodied carbon accounting and reduction, it will establish itself as a leader in transitioning to a zero carbon future. Rising to this ambitious challenge will better prepare the County of San Diego to face regulatory pressures that are in the horizon as the industry catches on to the emerging need of addressing embodied carbon.



Accomplishments

In January 2020 CoSD's Energy & Sustainability Division commissioned a study to evaluate the potential to reduce embodied carbon from an active capital project, in design at the time the study began, and then to determine the feasibility of including embodied carbon requirements in the County's Request for Proposal (RFP) process. The study evaluated embodied carbon policies that have been implemented by other municipalities or are recommended by leading industry organizations. The policies were analyzed and rated across environmental, financial and project schedule impact as illustrated in graphic below.

#	Strategy	Details	Carbon Reduction	Hard Costs	Soft Costs	Schedule Impact
1	Building Embodied Carbon Disclosure	Require new building projects to calculate and report life-cycle carbon emissions				
2	Building Embodied Carbon Limits	Set maximum embodied carbon limits for the structure and enclosure of new buildings				
3	Low Carbon Concrete	Set performance-based embodied carbon limits for concrete (applicable to buildings as well as infrastructure)				
4	Material Carbon Disclosure & Limits	Set carbon limits for key materials (applicable to buildings as well as infrastructure)				
5	Low Carbon Construction Sites	Reduce use of internal combustion engines in construction sites				
6	Recycled Aggregate Requirement	Set minimum level of recycled or reused aggregates and soils used on projects				
7	Low Carbon Asphalt Procurement	Require asphalt suppliers to document and report asphalt carbon intensity with EPDs				
8	Require Use of Certified Wood Products	Require use of certified wood products that have been demonstrated to have a lower embodied carbon footprint				
9	Circular Materials Purchasing Strategy	Define procurement in a manner that ensures the market will deliver a circulation solution in response				
10	Salvaged, Reused or Recycled Material Minimums	Set minimum requirement for the use of salvaged, reused or recycled materials				

The findings of this initial study were to implement the following:

1. **Implement Material Carbon Disclosure & Limits for Concrete & Steel**

2. **Publicize Embodied Carbon Disclosure & Limits for Building Structure & Enclosure**

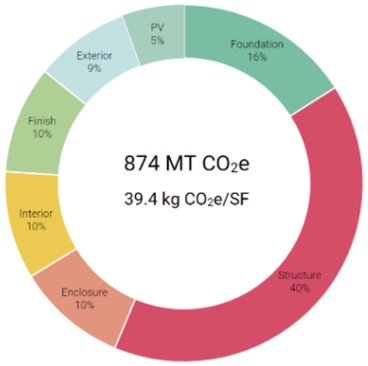
Project Highlights

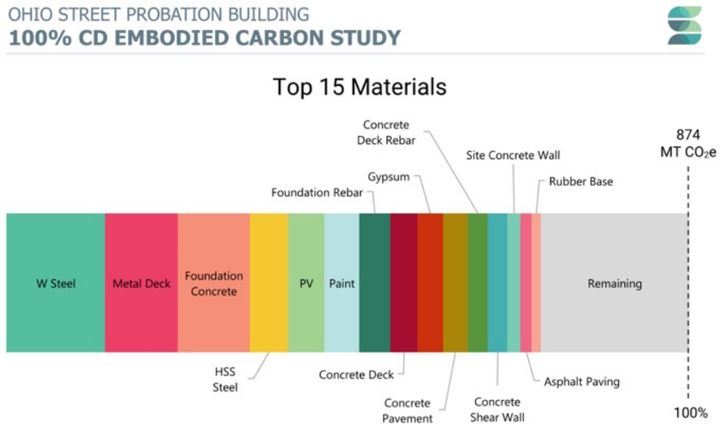
OHIO STREET PROBATION CENTER

The Ohio Street Probation Center is a 22,000 sf, 2-story office building located in central San Diego. The County analyzed the life-cycle embodied carbon of the project to determine the impacts associated with business-as-usual construction practices. The study identified a scenario with the potential to reduce embodied carbon by 25.7% from the baseline through concrete and steel material optimization. In the next phase the County is gathering information from the contractors to evaluate if there would have been cost or schedule impacts to pursue the lower carbon scenario.

Next Steps:

- Update RFP for new construction to include Embodied Carbon Reduction and Disclosure requirements.
- Consider building re-use where possible.





Water Efficiency

In general, the water energy intensity (amount of electricity needed per gallon of water used) is twice as high in Southern California than the rest of the state due to fewer local fresh water resources.

—2018 SD County Climate Action Plan

The County has a longstanding track record for water savings. The County recognized the need to address decreased water supply security associated with reduced snowpack in the Sierra Nevada & Rocky Mountain Ranges and has implemented various water saving programs in existing facilities as well as new construction.

During the prior drought of 2014-2015, the County implemented an aggressive drought response plan at the direction of the Board of Supervisors. A series of projects to reduce water use were implemented resulting is significant immediate and long-term savings for County Operations.

ESD is in the process of developing a new long-term Water Efficiency Plan for County operations. Prior efforts have largely removed “low hanging fruit” like landscape conversions and irrigation retrofits, and the new plan is intended to define more aggressive options like water reuse.

Water-related energy use consumes

19% of the state’s electricity + **30%** of its natural gas + **88** billion gallons of diesel fuel every year

Source: California’s Water-Energy Relationship, CEC, 2005

Synergies with Other County Programs

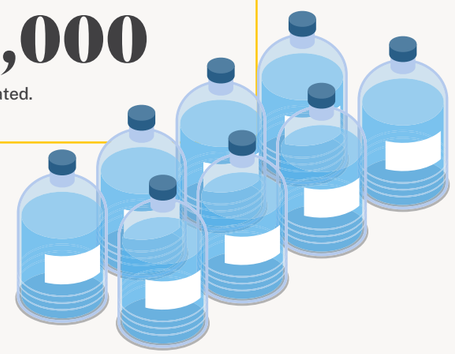
2018 SD County Climate Action Plan
Measure W-1.3: Reduce Potable Water Consumption at County Facilities

- 15% below 2014 levels by 2020
- 20% below 2014 levels by 2030

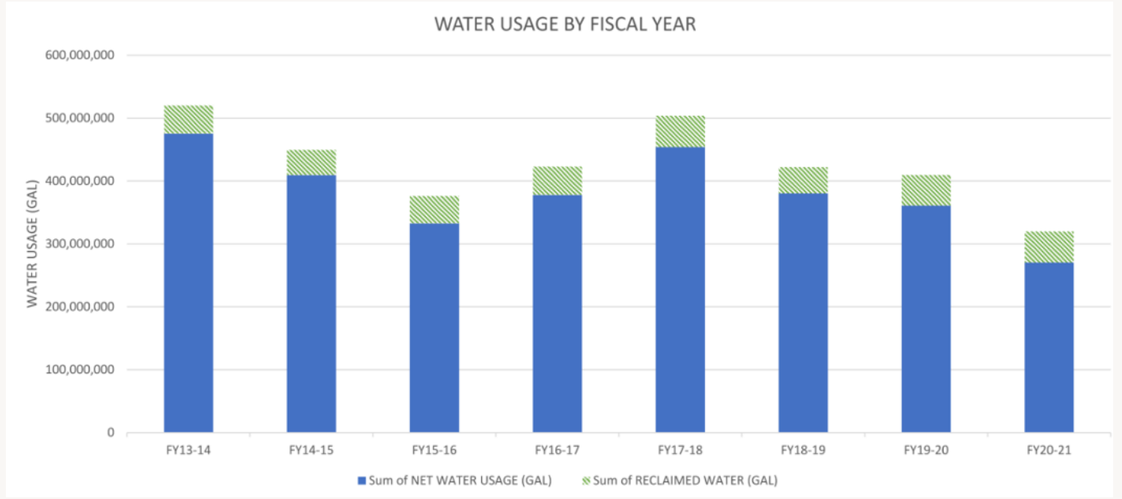
Accomplishments

Following the issuance of Governor Brown’s Executive Order requiring reductions in potable urban water usage on April 1, 2015, and additional regulations imposed by State Water Resources Control Board, County staff immediately reduced irrigation practices and recreational water operations and developed a coordinated suite of conservation projects called the Drought Response Action Plan (DRAP). These projects included: plumbing fixture retrofits; landscaping and irrigation conversions; central plant water treatment; and use of reclaimed water. Total water savings from completion of the entire DRAP was estimated at nearly 60,000,000 gallons per year.

60,000,000
gallons per year saved, estimated.



The County is well ahead of the water reduction target identified in the 2018 CAP. Some of the reductions in FY 20-21 are from COVID impacts due to reduced on-site staffing. Teleworking plans will keep much of these reductions in place even as the County grows. The new Water Efficiency Plan will help ensure these savings are maintained and strengthened over time as we continue to experience drought as a normal way of life in southern California.

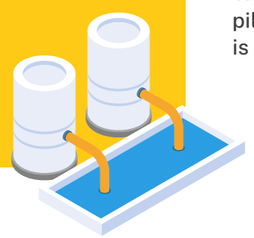


Water Reduction Strategies Implemented:

- Low-flow fixtures
- Xeri-Scaping at New Construction & Existing Buildings
- Irrigation Controllers
- Water Submeters reporting to BAS and Dashboard
- Central Plant water savings

Next Steps:

Develop Water Efficiency Plan for County Facilities



The County has recognized that reduction alone will not solve the water crisis facing this region and is taking their water efforts to the next level. They are actively developing a Water Efficiency Plan for County Owned and Occupied facilities that will address water recycling. The Plan will evaluate new technologies and identify pilot projects. Another key factor that will be considered is policy changes and designer and occupant education.

Project Highlights

HAZARD WAY FACILITY

Water Reduction:

171,360

Gallons/Year (51% Reduction)

WATER CONSERVATION PROJECT

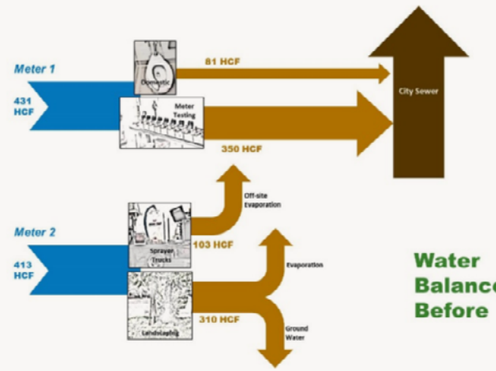
MEASURES 1 & 3 IMPLEMENTED: 2015

In 2015 the County reviewed the water consumption of the Hazard Way facility which is comprised of three buildings and houses a water and gas meter testing laboratory with a yearly water usage of approximately 260,000 gallons. Another high-water consumption occupant is the AWM Pest Detection Program (PDP) which utilizes truck-mounted water tanks for offsite spraying, which consumed roughly 76,000 gallons of water per year. The study identified three water reduction strategies that would result in 69% water savings.

Strategies:

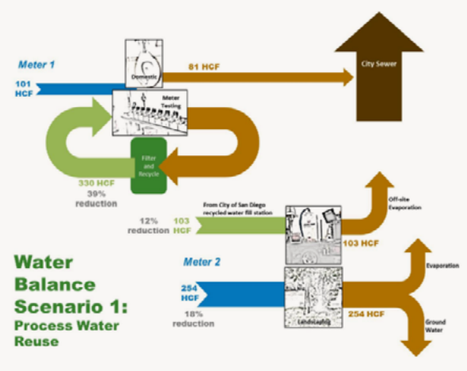
- Measure 1: Install testing laboratory benches with water recirculation – 39% reduction (implemented)
- Measure 2: Refill PDP truck water tanks at City recycled water station -18% reduction
- Measure 3: Reduce irrigation time – 12% reduction (implemented)

Before:
844 HCF (Hundred Cubic Feet) Water



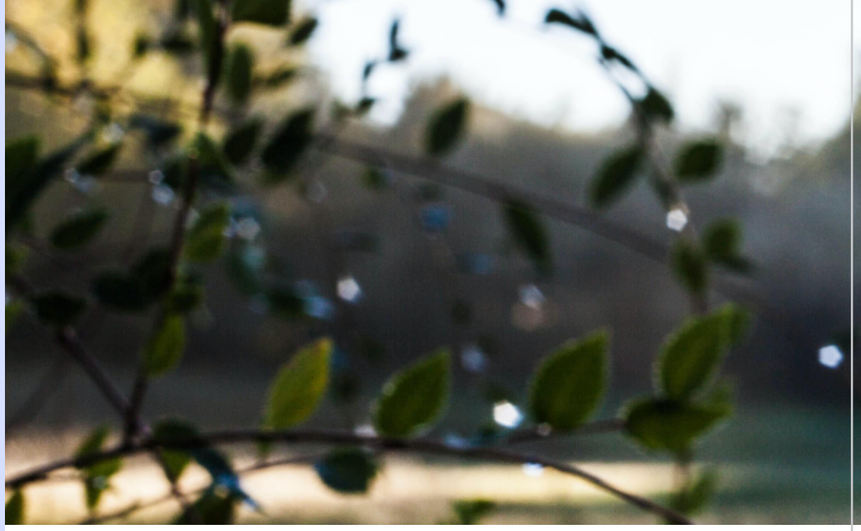
Water Balance Before

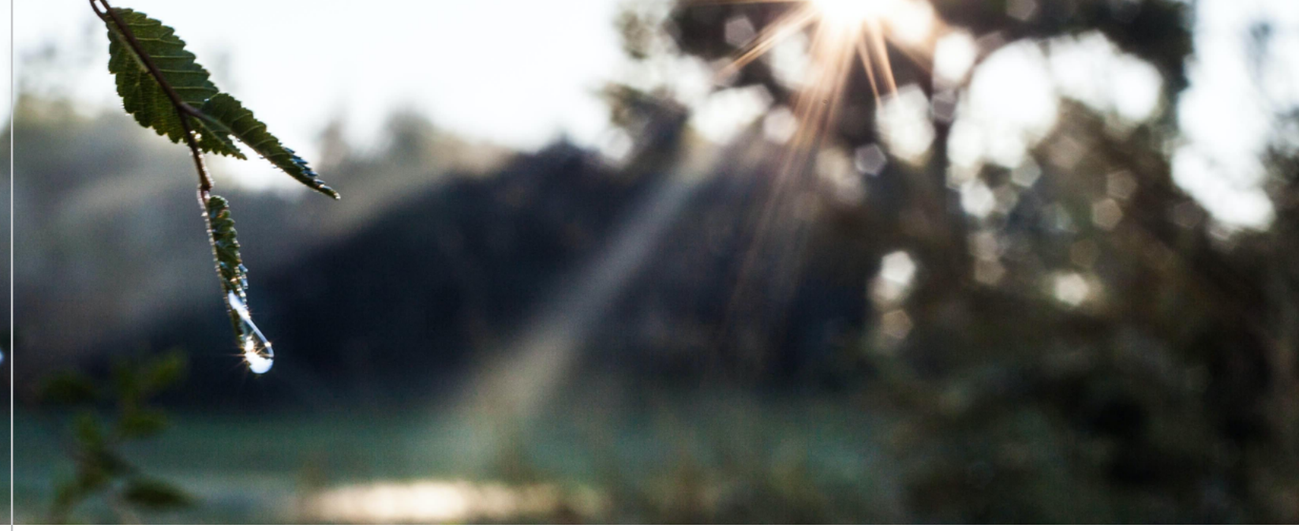
After:
355 HCF



Water Balance Scenario 1: Process Water Reuse

VII. Progress Reporting





Summarize Next Steps:

- Annual GHG Reporting
- Operational GHG Verification every 3 years
- Annual ZCPP Progress Report to monitor progress & adjust as necessary
  - Confirm progress of each active measure by year
  - Confirm applicability of future planned measures
  - Replace generic assumptions for future years with real proposed projects if known
  - Adjust individual projects within each measure if needed
  - Account for new technology available, changes in hiring or construction, legislation, etc.
- ZCPP Update – detailed refresh of the ZCPP when determined to be necessary.

Process for Tracking by Measure:

Each carbon reduction project that is implemented will be entered into a tracking tool that will be used for each annual update of the Zero Carbon Portfolio Plan (ZCPP).

- Responsible Party: ESD
- Tracking Tool = Measure-specific Spreadsheet
  - Information for each project
  - Facility name & address
  - SDGE account #
  - Source of electricity: SDG&E, Direct Access, or CCA
  - Project Description
  - Start date of project
  - Completion date of project
  - Estimated savings (electricity/therms)
  - Verified savings, if available

Future Updates:

Templates have been developed in order to streamline the yearly tracking and reporting process. Each Update Report will include:

- Current Fiscal Year Projects Planned per Measure
- Accomplishments/Status of Current Fiscal Year Projects and overall GHG reductions
- Next Fiscal Year Projects Planned

EXAMPLE FY 21-22 PLAN

Following are the proposed projects for this fiscal year by measure:

Measure 1: Green Energy Supply

Targeted percent renewable by electricity provider:

1. Calpine: 40%
2. CEA: 53%
3. SDCP: 53%
4. SDG&E: 42%

Measure 2: Building Electrification

No electrification projects are planned to be completed during FY 21-22.

Electrification Feasibility Studies are being analyzed to identify projects for implementation in upcoming fiscal years.

Measure 3: Energy Efficiency Projects

Site Name	Project Description	Estimated kWh Saved	Estimated therms Saved
Valley Center Library	HVAC replacement	21,000	
Hazard Way Bldgs	Energy Projects	59,000	
Spring Valley Gym/ Teen Ctr	Lighting upgrade	17,000	
Julian Library	Lighting upgrade	21,000	
Alpine Sheriff	Lighting upgrade	26,000	
ASTREA	Lighting upgrade	140,000	
El Cajon FRC	Lighting upgrade	8,000	
Law Library downtown	Lighting upgrade	145,000	
NCRC	Lighting upgrade (multi-year project)	675,000	
LCDRF	MMIP (multi-year project)	830,000	

Measure 4: Proactive Energy Management

Site Name	Project Description	Estimated kWh Saved	Estimated therms Saved
El Cajon FRC	RCx	155,000	
Law Library Downtown	RCx	100,000	4,000
NCRC	RCx (multi-year project)	490,000	19,000
North Central HHSA Ruffin Rd	RCx	66,000	1,300
Juvenile Probation Center	RCx	345,000	12,000

Measure 5: ZNE Buildings

No new ZNE projects are planned to be completed during FY 21-22

The following new ZNE projects are in construction during FY 21-22:

* Ohio Street Probation
* JJC Phase 1 (Not currently sized to ZNE)
* Lakeside Library

The following new ZNE projects are in design during FY 21-22:

* East Otay Mesa Fire Station
* SE LiveWell
* JJC Phase 2

RFP Phase

* San Diego Central Animal Shelter
* Ramona Livewell Center

Measure 6: Renewables

No new renewable energy projects are planned to be completed during FY 21-22

APPENDIX A Business-as-usual

A summary of the expected major new construction projects included in the BAU is listed below. This list is subject to change.

Fiscal Year	Project Name	Project Description
FY 21-22	JJC Phase 1	Replace existing facilities with new
FY 22-23	Ohio Street Probation Center	Replace existing facility with new
FY 22-23	Lakeside Library	Replace existing facility with new
FY 22-23	Southeastern Livewell Center	Replace existing facility with new
FY 22-23	East Otay Mesa Fire Station #38	Replace existing facility with new
FY 22-23	Bonsall Community Park	New facility
FY 22-23	East County Crisis Stabilization Unit (CSU)	New facility
FY 22-23	Casa De Oro Library	Replace existing facility with new
FY 22-23	El Cajon Branch Library	Replace existing facility with new
FY 23-24	JJC Phase 2	New facility
FY 23-24	Ramona Livewell Center	New facility
FY 23-24	Central Animal Shelter	Replace existing facility with new
FY 23-24	Ramona Sheriff Station	New facility

FY 23-24	Project Name	Project Description
FY 23-24	Santee Library	Replace existing facility with new
FY 23-24	Aqua Caliente County Park - Staff Housing	New facility
FY 24-25	Health Services Complex	Replace existing facility with new
FY 24-25	Intermountain Fire Station 85	Replace existing facility with new
FY 24-25	East Otay Mesa Sheriff Station	New facility
FY 24-25	San Marcos Library	Replace existing facility with new
FY 24-25	Jacumba Fire Station #43	Replace existing facility with new
FY 25-26	I-15 and SR-76 Sheriff Station	New facility
FY 25-26	Santee Public Safety Center	New facility
FY 25-26	North Coastal Sheriff Station	Replace existing facility with new
FY 25-26	Third Avenue Mental Health Inpatient Facility (Central Region Hub)	New facility
FY 25-26	Sheriff's Quartermaster & Regional Training Facility	New facility
FY 26-27	La Mesa Library	Replace existing facility with new

APPENDIX B Measure 1 – Green Energy Supply

Planned purchase of renewable by electricity supplier.

See Measure 1 Section for further description of how emission factors are estimated.

Fiscal Year	SDG&E	DADirect Access (Calpine)	CCA1 San Diego Community Power (SDCP)	CCA2 Clean Energy Alliance (CEA)
FY 21-22	40%	35%	50%	50%
FY 22-23	42%	43%	53%	53%
FY 23-24	45%	46%	56%	56%
FY 24-25	47%	49%	59%	59%
FY 25-26	50%	52%	62%	62%
FY 26-27	52%	55%	67%	67%
FY 27-28	55%	61%	73%	73%
FY 28-29	57%	68%	80%	80%
FY 29-30	60%	81%	89%	89%
FY 30-31	62%	100%	100%	100%

APPENDIX C Measure 2 – Building Electrification

List of Proposed Projects (Baseline Plan)

Fiscal Year	Facility	Electrification Scope
FY 24-25	South Bay Regional Center	Partial Facility: DHW Boilers + Laundry
FY 24-25	North County Animal Shelter	Partial Facility: 8 Gas/electric packaged units
FY 24-25	San Marcos RMS Div II HQ	Partial Facility: 19 Gas/electric packaged units
FY 24-25	HHSA North Central Regional Center	All gas HVAC + DHW + equipment
FY 24-25	Encinitas Sheriff Station	All gas HVAC + DHW + equipment
FY 24-25	Fallbrook Park & Community Ctr	Partial Facility: 8 Gas/electric packaged units + Kitchen
FY 24-25	County Off San Marcos 141 Carmel St.	All gas HVAC + DHW + equipment
FY 24-25	Lakeside Community Center	Partial Facility: DHW
FY 24-25	County Off San Marcos 151 Carmel St	All gas HVAC + DHW + equipment
FY 24-25	East Mesa Reg Firing Range	All gas HVAC + DHW + equipment
FY 24-25	Gillespie Field Airport	Partial Facility: DHW (Maintenance Hangar)
FY 25-26	County Operations Center	Partial Facilities: NW Tower DHW, SW Tower DHW
FY 25-26	Las Colinas Detention & Reentry Fac	All gas HVAC + DHW + equipment

List of Proposed Projects (Baseline Plan)

Fiscal Year	Facility	Electrification Scope
FY 25-26	Fallbrook Park & Community Ctr	Partial Facility: 9 Gas/electric packaged units
FY 25-26	McClellan Palomar Airport	All gas HVAC + DHW + equipment
FY 25-26	Spring Vly Library/Gym/Teen Ctr	Partial Facility: 1 Gas/electric packaged unit
FY 25-26	Lakeside Community Center	Partial Facility: 6 Split HVAC units
FY 25-26	Gillespie Field Airport	Partial Facility: DHW (Terminal)
FY 26-27	San Marcos RMS Div II HQ	Partial Facility: DHW
FY 26-27	Lakeside Community Center	Partial Facility: 8 Gas/electric packaged units
FY 27-28	County Operations Center	Partial Facilities: SE Tower DHW, NE Tower DHW
FY 27-28	El Cajon Family Resource Ctr	All gas HVAC + DHW + equipment
FY 28-29	Fallbrook Park & Community Ctr	Partial Facility: DHW
FY 29-30	County Operations Center	Medical Examiner: all equipment
FY 29-30	Edgemoor Skilled Nursing Facility	All gas HVAC + DHW + equipment
FY 29-30	Polinsky Children's Center	Partial Facility: Portion of HVAC + DHW

APPENDIX C: Measure 2 – Building Electrification
(continued)

List of Proposed Projects (Baseline Plan)

Fiscal Year	Facility	Electrification Scope
FY 29-30	Polinsky Children's Center	Partial Facility: Portion of HVAC + DHW
FY 29-30	Law Library	All gas HVAC + DHW + equipment
FY 29-30	Spring Vly Library/Gym/Teen Ctr	Partial Facility: 2 Gas/electric packaged units
FY 30-31	County Operations Center	Partial Facilities: NW, SE, NE & SW Boilers
FY 30-31	North County Regional Center	All gas HVAC + DHW + equipment
FY 30-31	South Bay Regional Center	Partial Facility: HHW Boilers + Kitchen
FY 30-31	San Diego Central Jail	All gas HVAC + DHW + equipment
FY 30-31	San Diego County Psychiatric Hospital	All gas HVAC + DHW + equipment
FY 30-31	North County Animal Shelter	Partial Facility: HVAC
FY 30-31	Rancho San Diego Library	All gas HVAC + DHW + equipment
FY 30-31	Spring Vly Library/Gym/Teen Ctr	Partial Facility: 1 Gas/electric packaged unit
FY 30-31	Gillespie Field Airport	Partial Facility: 1 Gas/electric packaged unit

APPENDIX D Measure 3 – Energy Efficiency Projects

List of Proposed Projects

Fiscal Year	Project Name	Project Description
FY 21-22	Valley Center Library	Upgrade MM HVAC replacement project
FY 21-22	Hazard Way Buildings	Lighting projects
FY 21-22	Spring Valley Gym/Teen Ctr	Portfolio audit measures – lighting project
FY 21-22	Julian Library	Portfolio audit measures – lighting project
FY 21-22	Alpine Sheriff Station	Portfolio audit measures – lighting project
FY 21-22	ASTREA	Portfolio audit measures – lighting project
FY 21-22	El Cajon FRC	Portfolio audit measures – lighting project
FY 21-22	Law Library (downtown)	MMIP – Lighting project
FY 21-22	NCRC	MMIP – Lighting project
FY 21-22	LCDRF	MMIP
FY 22-23	Lakeside Community Center	Portfolio audit measures – lighting project
FY 22-23	Borrego Valley Airport	Portfolio audit measures – lighting project

List of Proposed Projects

Fiscal Year	Project Name	Project Description
FY 22-23	Gillespie Field Airport	Portfolio audit measures – lighting project
FY 22-23	Palomar Airport	Portfolio audit measures – lighting project
FY 22-23	Ramona Airport	Portfolio audit measures – lighting project
FY 22-23	COC Buildings 201,202,203,204 Office Towers	Lighting retrofit projects
FY 22-23	North Coastal Sheriff	MMIP – Lighting project
FY 22-23	Valley Center Library	MMIP – Lighting project
FY 22-23	Sheriff HQ	MMIP
FY 22-23	Fallbrook Community Center	LED lighting upgrade
FY 22-23	Hall of Justice	Major system replacements
FY 23-24	Polinsky Children's Center	LED lighting upgrade
FY 23-24	County Administration Center	Major systems renovation project (phased over FY's 21-24

APPENDIX E Measure 4 – Proactive Energy Management

List of Proposed Projects

Fiscal Year	Project Name	Project Description
FY 21-22	El Cajon FRC	RCx Project
FY 21-22	Juvenile Probation Center	RCx Project
FY 21-22	Law Library (downtown)	RCx Project
FY 21-22	NCRC	RCx Project
FY 21-22	North Central HHSA Ruffin Rd.	RCx Project
FY 22-23	Borrego Valley Airport	RCx Project
FY 22-23	Palomar Airport	RCx Project
FY 22-23	EMDF Campus	RCx Project
FY 22-23	East Mesa Campus (Phase 1 CPC, Phase 2 EMR)	RCx Project
FY 25-26	Lakeside Community Center	RCx Project

APPENDIX F Measure 5 – ZNE Buildings

List of Proposed Projects

Fiscal Year	Project Name	Project Description
FY 21-22	JJC Phase 1	Replace existing facilities with new
FY 22-23	Ohio Street Probation Center	Replace existing facility with new
FY 22-23	Lakeside Library	Replace existing facility with new
FY 22-23	Southeastern Livewell Center	Replace existing facility with new
FY 22-23	East Otay Mesa Fire Station #38	Replace existing facility with new
FY 22-23	Bonsall Community Park	New facility
FY 22-23	East County Crisis Stabilization Unit (CSU)	New facility
FY 22-23	Casa De Oro Library	Replace existing facility with new
FY 22-23	El Cajon Branch Library	Replace existing facility with new
FY 23-24	JJC Phase 2	New facility
FY 23-24	Ramona Livewell Center	New facility
FY 23-24	Central Animal Shelter	Replace existing facility with new
FY 23-24	Ramona Sheriff Station	New facility

List of Proposed Projects

Fiscal Year	Project Name	Project Description
FY 23-24	Santee Library	Replace existing facility with new
FY 23-24	Aqua Caliente County Park - Staff Housing	New facility
FY 24-25	Health Services Complex	Replace existing facility with new
FY 24-25	Intermountain Fire Station 85	Replace existing facility with new
FY 24-25	East Otay Mesa Sheriff Station	New facility
FY 24-25	San Marcos Library	Replace existing facility with new
FY 24-25	Jacumba Fire Station #43	Replace existing facility with new
FY 25-26	I-15 and SR-76 Sheriff Station	New facility
FY 25-26	Santee Public Safety Center	New facility
FY 25-26	North Coastal Sheriff Station	Replace existing facility with new
FY 25-26	Third Avenue Mental Health Inpatient Facility (Central Region Hub)	New facility
FY 25-26	Sheriff's Quartermaster & Regional Training Facility	New facility
FY 26-27	La Mesa Library	Replace existing facility with new

APPENDIX G Measure 6 – Renewable Energy

List of Proposed Projects

Fiscal Year	Project Name	Project Description	Electricity Delta (kWh/yr)
FY 22-23	McClellan-Palomar Airport	PPA	231 kW DC
FY 22-23	Gillespie Airport	PPA	122 kW DC
FY 22-23	San Marcos Offices	PPA	337 kW DC
FY 24-25	Fallbrook Library	PPA - replace green roof with PV & add parking lot PV	233 kW DC
FY 24-25	Las Colinas	PPA	700 kW DC
FY 25-26	COC Parking Structure A	Purchase existing hosted system	425 kW DC

APPENDIX H **Terminology**

BAS – Building Automation System

BAU – Business as Usual

CCA – Community Choice Aggregation

CCE – Community Choice Energy

CINA - Capital Improvement Needs Assessment

CoSD – County of San Diego

COVID – Coronavirus Disease

DGS – Department Of General Services

EEM – Energy Efficiency Measure

ESD – Energy & Sustainability Division

GHG – Greenhouse Gas

IPCC – Intergovernmental Panel on Climate Change

kW – kilowatt

kWh – kilowatt-hour

MBCx – Monitoring-Based Commissioning

MMIP – Major Maintenance Improvement Plan

M&V – Measurement and Verification

PPA – Power Purchase Agreement

PV – Photovoltaic System

RCx – Retro-Commissioning

RPS – Renewable Portfolio Standard (e.g. for utility grid composition)

SDG&E – San Diego Gas & Electric

ZNE – Zero Net Energy

ZPP – Zero Energy Portfolio Plan

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