2030 Zero Carbon Plan

Progress Report | September 2024

2023 accomplishments & 2024 priorities

SMUD®

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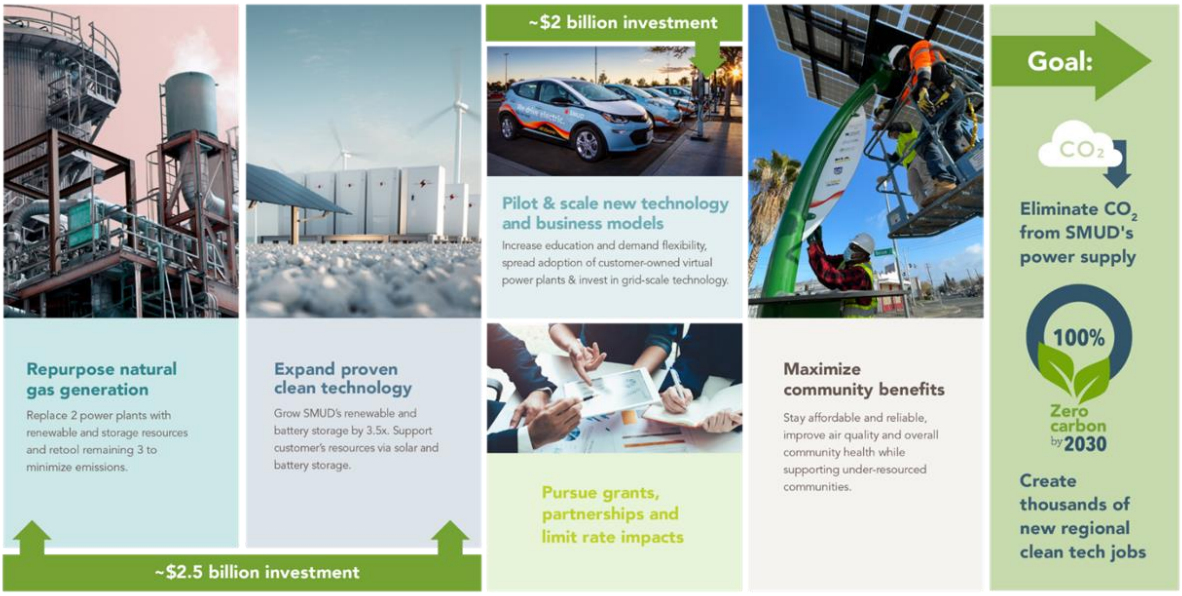
Introduction

It's been 3 years since the 2030 Zero Carbon Plan (ZCP) was approved by the Board in April 2021, and we've made substantial progress towards our goals. We've been focused on identifying new renewables and energy storage resources to transition away from natural gas generation and new technologies like carbon capture and sequestration, green hydrogen and emerging long-duration energy storage (LDES) technologies. We've also made progress on new customer programs and electrification growth in the region with a focus on equity in our offerings to ensure all communities are moving along to a cleaner tomorrow. Our ZCP, which focuses on the pillars outlined in the graphic below, is an ambitious plan with flexibility to work within the guardrails of affordability and reliability.



This report reviews our high-level 2023 accomplishments and the upcoming priorities for 2024 and beyond. It was presented in 2 separate Energy Resources and Customer Services Committee meetings: the Utility Scale Update was presented on May 14, 2024, and the Customer Programs Update was presented on September 17, 2024. The presentation decks that accompany this report are available at:
Utility Scale Presentation - May 14, 2024 and Customer Programs & Initiatives Presentation - Sept. 18, 2024.

2030 ZCP filed with the California Energy Commission

SMUD's 2030 ZCP was filed with the California Energy Commission (CEC) in September 2022 as our new Integrated Resource Plan (IRP). The administrative regulatory filing met our obligation under SB350 (2015), which requires SMUD and other utilities to file a Board-adopted IRP at least every 5 years. The filing places our ZCP IRP on the regulatory stage for the CEC to use in various planning and study efforts and allows visibility into the industry. CEC declared on August 14, 2024, that our IRP meets SB350 filing requirements and completes our obligation for another 5 years starting in 2022.

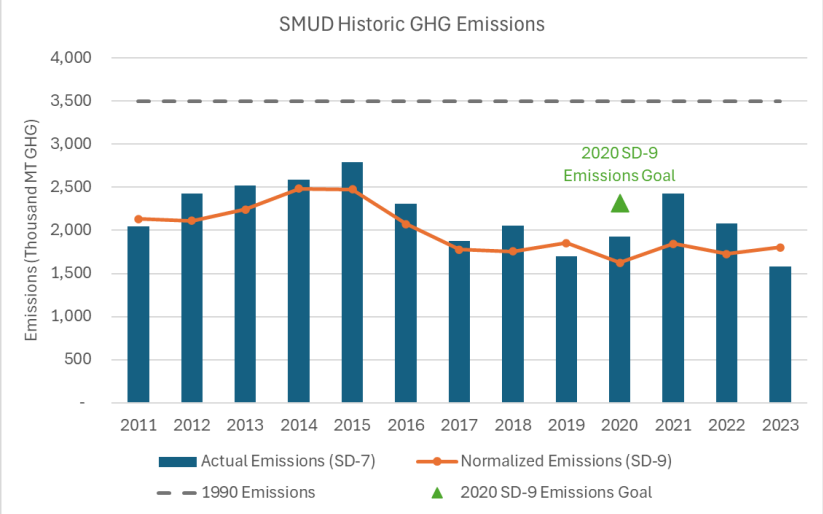
SMUD's greenhouse gas emissions

SMUD's Strategic Direction 9 Resource Planning (SD9) contains our goals for reducing greenhouse gas (GHG) emissions in our energy supply, in addition to other resource planning directives[1].

As described in our latest SD9 Board Monitoring report[2], actual GHG emissions to serve load are reported in SD9[3] but also include "normalized" GHG emissions to account for unpredictable weather, hydro and load conditions that occurred in the year that could not be reasonably planned for. Normalization allows us to answer the question: "If average planning conditions had occurred, what would our emissions have been?"

The graph below reports our actual and normalized GHG emissions as reported in SD9 between 2014-2023. As illustrated in the graph below, our normalized and non-normalized emissions have trended downwards over this period. We've also made substantial reductions relative to our 1990 GHG emissions of 3.5 million metric tons and were well below our 2020 SD9 goal of 2.318 million metric tons. Our 2023 actual GHG emissions were 24% lower than 2022, driven primarily by increased generation from the Upper American River Project (UARP) hydro fleet due to increased rain and snow in the western United States, new delivery of geothermal energy and targeted purchases of high-quality renewable energy credits equivalent to approximately 4.5% of retail sales.

[1] SMUD's current Strategic Direction 9 language: https://www.smud.org/-/media/Documents/Corporate/About-Us/Company-Information/Strategic-Direction/SD-9.ashx
[2] SMUD's most recent SD9 Board Monitoring report: https://www.smud.org/-/media/Documents/Corporate/About-Us/Board-Meetings-and-Agendas/2024/Sept/Policy-Info-Packet---Sep-11-2024.ashx
[3] SMUD's Strategic Direction 7 (SD7) Environmental Leadership also reports actual emissions consistent with those in SD9. The most recent SD7 report can be found here: https://www.smud.org/-/media/Documents/Corporate/About-Us/Board-Meetings-and-Agendas/2024/Sept/Policy-Info-Packet---Sep-11-2024.ashx



Since 2010, we've added over 1,000 MW of new carbon-free renewable energy to our energy supply. The table below summarizes the renewable resource additions that we've added to our energy supply that support the downward trend on emissions and the approximate annual GHG emissions reduction impact these clean resources have.

Renewable resource additions 2010-2024

Resource type	MW	Equivalent annual GHG emissions reductions (MT)	Equivalent light duty vehicles removed from road
Wind	463	659,134	142,362
Solar	442	407,367	87,984
Geothermal	151	441,908	95,445
Biogas/Biomass	19	47,541	10,268
Hydro	10	15,303	3,305
Total	**1,086**	**1,571,253**	**339,363**

**Approximate GHG reductions based on SMUD's thermal fleet average carbon intensity factor of 0.39 MTGHG/MWh.*

We expect our GHG footprint to continue to trend down in a significant manner on our way to zero carbon in 2030, but we have much more work to do. As detailed in our ZCP, we're focused on eliminating GHG emissions by transitioning away from our natural gas plants, expanding proven clean technology and exploring new and emerging technology and business models to achieve our very aggressive goals.

The following utility scale section details our clean energy developments focused on reducing our energy supply GHG emissions on our way to 2030 Zero Carbon.

Utility scale

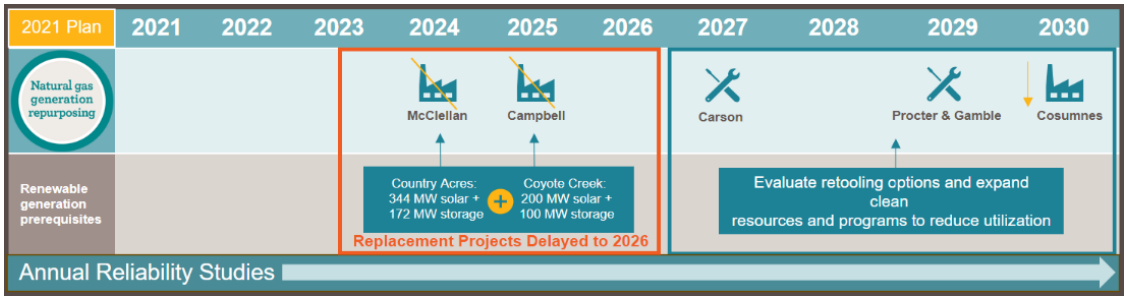
Natural gas generation repurposing plan update

Our gas power plants provide low-cost, reliable energy and are our main source of GHG emissions. However, we must find replacement carbon-free resources to transition away from fossil fueled generation. The natural gas generation repurposing part of the ZCP is focused on reducing and eliminating GHG emissions at SMUD's natural gas plants while maintaining reliable service and affordable electricity for customers.

The ZCP identified McClellan and Campbell natural gas plants as the first 2 plants to be replaced as part of our thermal transition by 2024 and 2025, respectively. However additional reliability studies were required to ensure a reliable transition with planned renewable and storage projects.

Follow-up reliability studies performed after the Board adoption of our ZCP identified 2 local solar and storage projects to replace these 2 plants. The Country Acres and Coyote Creek solar and storage projects were identified as projects that could reliably replace and begin the transition of McClellan and Campbell[4]. At the time of the reliability study, these 2 solar and storage projects were expected to be online in 2024 and 2025, respectively. However, over the last 3 years, several factors have slowed development of new renewable and storage resources across the industry. One of the key factors impacting project development timelines is the constraint on supply chain for materials and services needed to develop these projects brought on by the pandemic.

Original thermal transition schedule



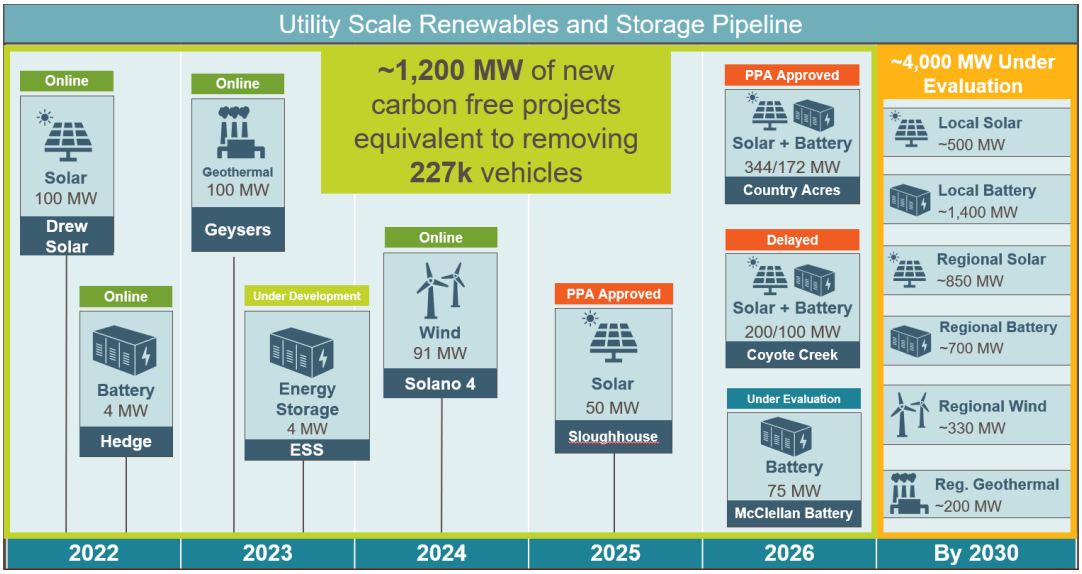
Today, we expect Country Acres and Coyote Creek to come online in late 2026. Given the delays to requisite replacement resources for McClellan and Campbell, the transition of these natural gas plants is also delayed, and new reliability studies are needed. SMUD will work on these studies between now and the end of 2024. An updated thermal transition schedule for McClellan and Campbell will be shared in 2025.

[4] March 16, 2022 Zero Carbon Plan Board Update: Presentation for Agenda Item 2 - Board Energy Resources & Customer Services Committee Meeting and Special Board of Directors Meeting - March 16, 2022 (smud.org)

Proven clean technologies

Renewable & storage projects update

SMUD continues to add new renewables and storage resources needed to achieve our 2030 Zero Carbon goal. Since the SMUD Board adopted our plan, we've added ~300 MW of new renewables and storage and expect an additional ~900 MW to come online by the end of 2026. By the end of 2026, these resources are estimated to reduce about 1 million metric tons per year – the equivalent of removing about 227,000 gasoline cars from the road. To meet our ZCP 2030 goal, we continue to pursue proven clean technologies, such as wind, geothermal, solar and energy storage. In 2023, we added 100 MW of geothermal to our portfolio, resulting in an annual portfolio emission reduction of 193,000 MT CO_2e. In 2024, we completed the Solano 4 project (project details can be found below). Since the adoption of the ZCP in 2021, we've added proven clean technology projects totaling 286 MW of generation and 4 MW of storage. An additional 872 MW of generation and 351 MW of storage are in various stages of planning or development with online dates prior to 2030.



Looking forward, we continue to identify possible new renewable and storage resources. We're evaluating ~4,000 MW of new projects in this area, including about 500 MW of local solar, 1,400 MW of local storage and nearly 2,100 MW of regional (i.e. outside SMUD service area) wind, solar, geothermal and battery storage. Beyond this, we're in active discussions with developers for additional resources to evaluate to continue packing the development pipeline. This is important since not every proposed project is successful, and we only want to move forward with projects that meet our development guidelines.

From a planning standpoint, we've performed significant analysis and outreach, numerous studies and a competitive solicitation. However, there is still much work to do between now and the middle to end of the decade. Specifically, more analysis needs to be done around firming up our resource plan, siting of local utility solar and storage, interconnection studies and several different delivery options of non-local renewables and what that means from a transmission study analysis and market rules. We'll also study low hydro impacts in conjunction with the reliability studies and determine what that might mean from an energy supply standpoint between now and the end of the decade.

Below you'll find a description of projects we've either brought online recently or that are under active development.

Hedge

Commercial operation of the Hedge Lithium-Ion Battery Energy Storage System (BESS) began in January 2023. The system will provide 4 MW of electricity and 8 MW-hours of storage that can be tapped when other energy resources are strained – enough to power 800 homes for 2 hours with clean, renewable energy.

Calpine

January 2023 marked the beginning of the 10-year Power Purchase Agreement (PPA) of energy from Calpine's operations at The Geysers, which adds 100 MWs of geothermal energy to SMUD's portfolio – enough to power about 100,000 homes for a year. Located north of San Francisco, The Geysers is the single largest geothermal electric operation in the world.

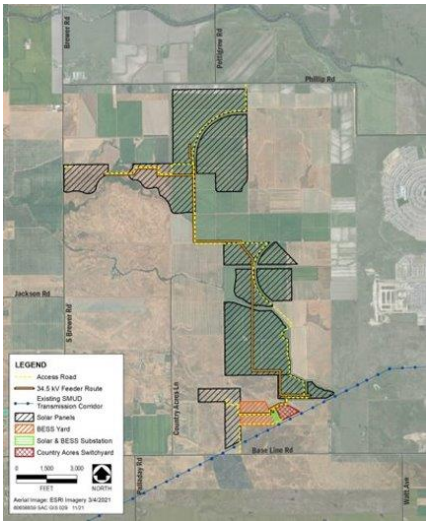
Solano 4

The Engineering, Procurement, and Construction contract for Solano 4 was awarded to Vestas in 2022. The project scope included decommissioning Solano 1 by removing 23 wind turbines (0.66 MW each or 15 MW total). The project scope also included the installation of 19 wind turbines (9 in Solano 4 East and 10 in Solano 4 West). Each turbine can produce 4.5 MWs for a project total of 85.5 MW. The switch to more

efficient wind turbines will remove over 70,000 Metric Tons of CO2 emissions per year and generate enough electricity to power 33,000 homes.

Construction on the new turbines started in April 2023 and was completed in May 2024. Upon the completion of Solano 4, SMUD Solano Assets (Solano 2, 3 & 4) have a total installed capacity of 300 MW.

Country Acres



The Country Acres project is located in unincorporated western Placer County, just west of Roseville and north of Baseline Rd, adjacent to SMUD's existing Transmission Corridor. The project will build 344 MW of solar and 172 MW of 4-hour battery energy storage on 725 acres. This project will be SMUD's largest solar and battery storage project to date and will connect to SMUD's existing 230 kV transmission.

The SMUD Board approved the Final Environmental Impact Report (EIR) for the Country Acres Project on April 20, 2023. The Placer Planning Commission and Placer Conservation Authority approved the Project and Mitigation Agreement on Jan. 11 and 17, 2024. On Feb. 20, 2024, the Placer County Board of Supervisors unanimously supported the project with a 5-0 vote while thanking SMUD for being forthright and transparent throughout the 3 years of project development, and for creating a "win-win" project for Placer County.

An important component of the project was inclusion of SMUD's Principles for Development, which include obligations for the developer to meet SMUD's key objectives, including:

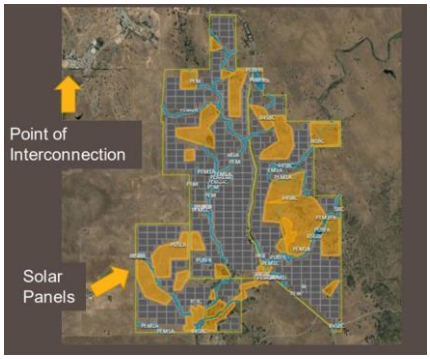
- Minimizing impacts to sensitive biological, cultural and tribal resources.
- Inclusion of agricultural practices such as sheep grazing and pollinator habitat, Minimizing ground disturbance.
- Incorporation of sustainable life cycle management for construction and operation materials and wastes.
- Engagement with local workforce and addressing workforce disparity gaps for historically underserved communities.
- Sourcing materials from companies with a human rights policy and statement of supply chain ethics commitment as part of the development, construction and operation of the project.

The project will also include a 10-acre agrivoltaics pilot site operated in partnership with UC Davis, the largest of its kind on the west coast. The innovative pilot project intends to demonstrate the ability to effectively grow crops, berries and vines, as well as citrus and nut trees underneath the solar panels. The solar panels will act as a canopy and provide shade to the crops, reducing water evaporation from the soil, as well as providing shelter from extreme weather events, leading to improved agricultural yields and quality. By utilizing the same land for solar energy production as well as agriculture, the Country Acres project will make efficient use of available space for solar projects, while reducing crop water consumption and reducing competition for limited agricultural land.

The Country Acres project is estimated to contribute more than $41 million in direct and indirect value to the Placer County economy – supporting more than 360 jobs in Placer County during the construction phase. Once operational, it's expected to contribute $3.7 million to the Placer economy annually and support an additional ~40 local jobs annually.

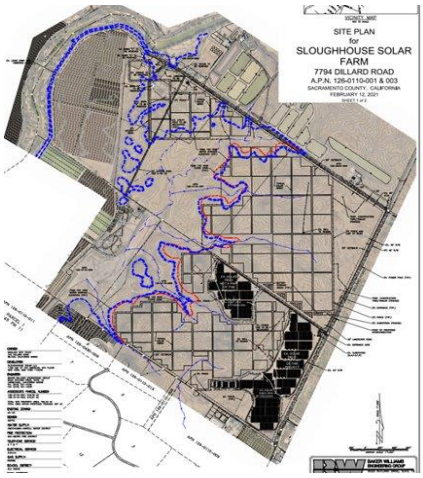
Coyote Creek

SMUD is in contract with DE Shaw for the procurement of energy for the Coyote Creek project. As the developer, DE Shaw is currently in the environmental review process. The scope of the Coyote Creek project includes 200 MW Solar coupled with 100 MW x 4hr BESS. The project is located on the Barton Ranch in unincorporated Sacramento County and connects to SMUD's 230 kV Transmission line. It's forecasted to be complete in Q2 2027.



Sloughhouse

SMUD is in contract with the developer, DE Shaw, for the procurement of energy for the Sloughhouse project. The scope of the project is a 50 MW solar installation, interconnected to SMUD's 69kV system, and located at Dillard Road in the Cosumnes community. Construction began the Summer of 2024, and the project is expected to come online in 2025.



McClellan BESS

SMUD is developing the McClellan Battery Storage Project. This project is a 75 MW lithium-ion battery storage system that is about 300 MWh of 4 hours of storage. This is expected to come online in 2027. The SMUD project team is evaluating interconnection and ownership options. The project site is located on previously disturbed land. The CEQA process has started, and we are collecting and developing the CEQA documentation. The Board Notice of Determination is expected in Q1 2025.

New technology

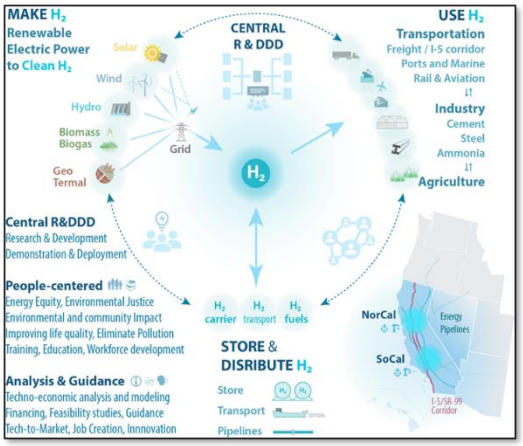
Grid scale technologies research

Significant progress has been made on the research plan presented to the Board 2 years ago. We've researched every area identified in the plan, including carbon capture, LDES and alternative clean fuels (hydrogen). These resources hold the potential to completely decarbonize our energy supply. We have gathered and analyzed information, made decisions and pivots and identified areas for deeper focus.

Alternative clean fuels (hydrogen)

Hydrogen is a crucial new technology option that supports our 2030 ZCP. It will allow us to expand our dispatchable renewable energy resources for the last 10% of our portfolio. The Department of Energy's (DOE) focus on hydrogen at the national level and California's statewide commitment through the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES) Hub opens doors to innovation, job training and development opportunities in the green energy sectors and, more importantly, in our region and service territory. The DOE regional Clean Hydrogen Hubs (H2Hubs) program has committed $7 billion to establish 8-10 regional hubs. SMUD staff worked with ARCHES on developing and submitting 2 concepts to the DOE for consideration as part of the April 7 application process.

SMUD's concepts have been selected as alternatives in the application. SMUD staff will continue to work on bolstering the concept papers with additional engineering and technical assessments to ensure the projects are "shovel-ready" for future funding consideration through ARCHES or other funding opportunities.



- **Concept 1**:
  Electrolytic hydrogen production to support power, transportation and industrial applications possibly at Consumes Power Plant or Procter & Gamble Power Plant
- **Concept 2**:
  Thermochemical conversion of biomass to hydrogen to support power, transportation and industrial applications

LDES

We are very excited about a couple of projects in the long-duration energy space. Our ZCP includes a significant commitment to energy storage and exploring other technologies other than lithium-ion batteries.

Agreement with ESS, Inc.

In the Fall of 2022, the Board of Directors authorized SMUD to enter a multi-year strategic collaboration with ESS, Inc. aiming to speed up the adoption of LDES in our service area. The partnership with ESS Inc., a leading manufacturer of long-duration iron flow batteries for utility-scale energy storage applications, could allow us to deploy up to 200 MW of LDES to our grid and accelerate our decarbonization efforts.

The agreement calls for ESS to deliver a mix of its Energy Warehouse™ and Energy Center™ LDES solutions for integration with our grid. Phase 1 pilot targets demonstrating up to 4 MW/24 MWh at our Hedge facility with 2 separate installations. The first is a 0.5 MW demonstration of 6 Energy Warehouses (each rated at 75kW/400kWh) at Hedge. The 450kW / 2400 kWh demonstration storage system was deployed in September 2023 and is undergoing operational

testing. For the second installation, design is underway for an approximately 3.6 MW / 29 MWh (8-hour duration) storage system, which has been awarded a $10 million grant from the CEC.

Carbon capture – post-combustion

In 2023, Calpine Corporation contacted SMUD for support of their DOE grant application that could provide federal grant funding to develop their Sutter Decarbonization Project, which proposes to retrofit the existing Sutter Energy Center natural gas plant located in Sutter County with carbon capture and sequestration (CCS) technology. The project has the potential to generate up to 440 MW of clean energy and sequester up to 1.7 million metric tons of GHG per year with an estimated online date in 2027.

In early 2023, SMUD discussed the opportunity to support Calpine's grant application with the SMUD Board in 2 committee meetings and held a public workshop to further explore the opportunity with the public at SMUD offices. In May 2023, SMUD's Board voted for SMUD to support Calpine's grant application. In late 2023, the DOE awarded Calpine a grant of up to $270 million for their project, along with 2 other awards for similar CCS projects located in other states[5]. SMUD's interest in the project is as an offtake of clean energy under a PPA. SMUD expects to discuss the PPA opportunity with the SMUD Board and public in early 2025.

Customer programs & initiatives

Program portfolios

The customer programs and initiatives and related components of the ZCP are grouped into portfolios with generally common objectives, goals or metrics. These include:

Building electrification & energy efficiency: This portfolio of programs encourages customers to reduce local carbon emissions in homes and businesses through beneficial electrification by converting end use equipment and appliances from gas to efficient electric systems, as well as reduction of overall energy use. Carbon reductions from the programs and initiatives in this portfolio are converted to an equivalent all-electric homes metric in the ZCP.

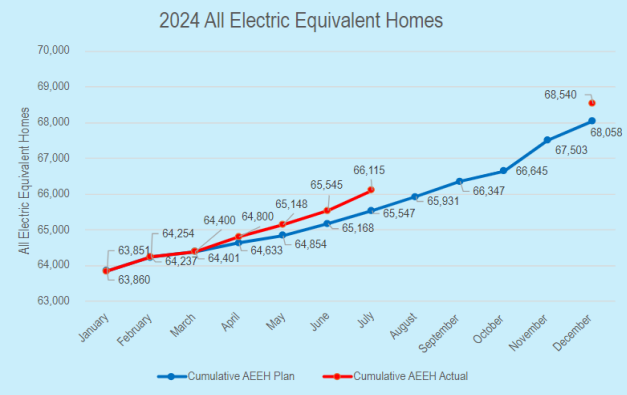
[5] Department of Energy Carbon Capture Demonstration Projects Selections: Carbon Capture Demonstration Projects Selections for Award Negotiations | Department of Energy

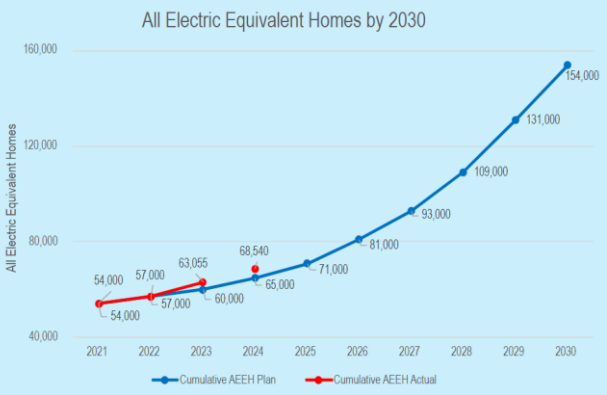
Transportation electrification: This group of programs and initiatives is focused on supporting the growth and adoption of electric vehicles (EVs) and related charging infrastructure systems in homes and businesses, as well as the development of mechanisms to ensure the mitigation of grid impacts through rates or charging management initiatives. The primary metric currently utilized for this portfolio in the ZCP is the number of equivalent light duty EVs in our service territory.

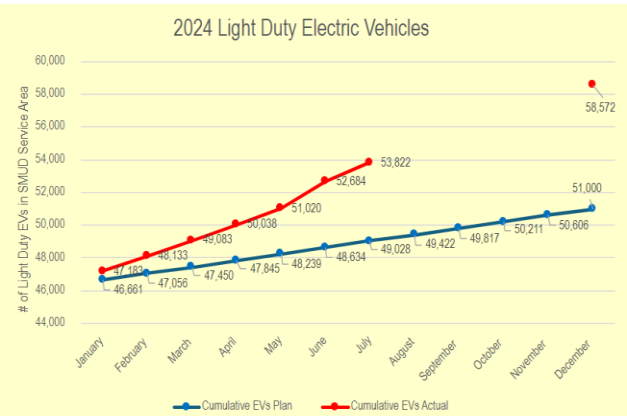
Distributed energy resources (DERs): The focus of this portfolio is the implementation of customer programs, technologies and systems that provide resources and load flexibility options that can replace traditional thermal generation assets needed to manage loads by reducing loads during periods of high demand or shifting and storing excess energy for use when needed. The primary metric for this portfolio is available MW of DERs.

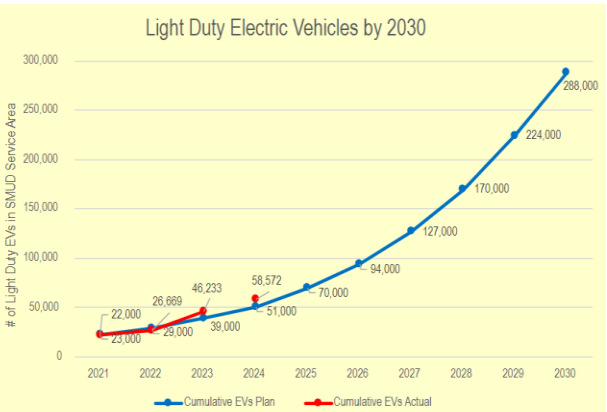
Green pricing: The primary goal of this portfolio of programs is to give customers the ability to opt in and select a level of renewable and/or carbon-free electricity that meets their individual or corporate objectives. Customers that enroll and participate in the Voluntary Renewable Electricity Program (VREP) options pay for their own portion of this renewable power above and beyond what SMUD provides through our retail rates.

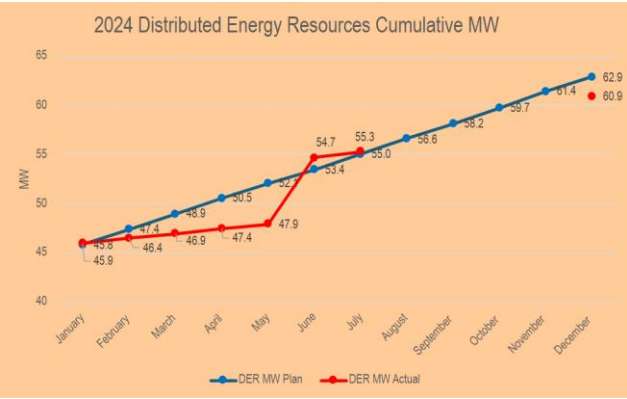
The charts below represent the high-level goals and progress to date for each of these portfolios. The charts on the right provide the annual goals through 2030, while the charts on the left provide the planned monthly targets for 2024. As the charts indicate, we are making steady progress toward our goals, however as also evident, the goals in each show steeper growth in the latter years.

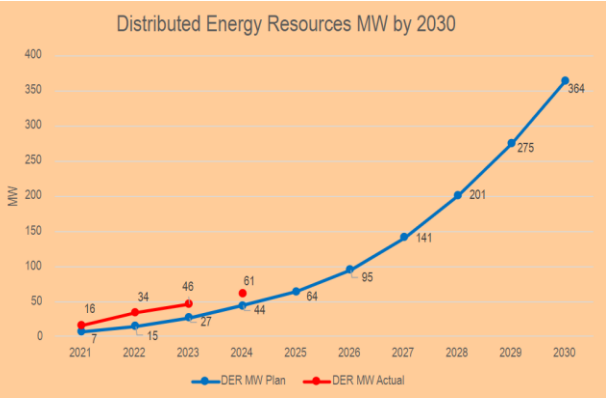

2024 All Electric Equivalent Homes
All Electric Equivalent Homes
70,000
69,000
68,000
67,000
66,000
65,000
64,000
63,000
January
February
March
April
May
June
July
August
September
October
November
December
63,860
63,851
64,237
64,254
64,401
64,400
64,633
64,800
64,854
65,148
65,168
65,545
65,547
66,115
65,931
66,347
66,645
67,503
68,058
68,540
Cumulative AEEH Plan
Cumulative AEEH Actual


All Electric Equivalent Homes by 2030
All Electric Equivalent Homes
160,000
120,000
80,000
40,000
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
54,000
57,000
63,055
68,540
54,000
57,000
60,000
65,000
71,000
81,000
93,000
109,000
131,000
154,000
Cumulative AEEH Plan
Cumulative AEEH Actual


2024 Light Duty Electric Vehicles
# of Light Duty EVs in SMUD Service Area
60,000
58,000
56,000
54,000
52,000
50,000
48,000
46,000
44,000
January
February
March
April
May
June
July
August
September
October
November
December
46,661
47,183
47,056
48,133
47,450
49,083
47,845
50,038
48,239
51,020
48,634
53,822
49,028
52,684
49,422
58,572
49,817
51,000
50,211
50,606
Cumulative EVs Plan
Cumulative EVs Actual


Light Duty Electric Vehicles by 2030
# of Light Duty EVs in SMUD Service Area
300,000
250,000
200,000
150,000
100,000
50,000
0
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
22,000
23,000
26,669
29,000
46,233
39,000
58,572
51,000
70,000
94,000
127,000
170,000
224,000
288,000
Cumulative EVs Plan
Cumulative EVs Actual


2024 Distributed Energy Resources Cumulative MW
MW
65
60
55
50
45
40
January
February
March
April
May
June
July
August
September
October
November
December
45.9
45.8
46.4
47.4
46.9
48.9
47.4
50.5
47.9
54.7
53.4
55.3
55.0
56.6
58.2
59.7
61.4
62.9
60.9
DER MW Plan
DER MW Actual


Distributed Energy Resources MW by 2030
MW
400
350
300
250
200
150
100
50
0
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
16
7
34
15
46
27
61
44
64
95
141
201
275
364
DER MW Plan
DER MW Actual


2024 Green Pricing GWh
GWh Sold
1,000
800
600
400
200
0
January
February
March
April
May
June
July
August
September
October
November
December
55
58
116
112
170
172
241
238
315
303
401
392
488
489
571
645
708
772
822
822
GP GWh Plan
GP GWh Actual


Green Pricing GWh by 2030
GWh Sold
1250
1150
1050
950
850
750
2022
2023
2024
2025
2026
2027
2028
2029
2030
838
823
823
822
863
929
990
1064
1140
1224
GP GWh Plan
GP GWh Actual

A more detailed explanation and breakdown for each of these portfolios of programs is provided in the sections to follow.

Our Zero Carbon goal is a bold one. To reach it, SMUD must engage our customers to come alongside us in the journey. Our progress reflects the organization's focus on aligning with our customers – from resource planning to program development to marketing, outreach and community engagement work and everything in between. This alignment and focus include delivering on our goals in a way that brings all communities along.

We've set a bold goal for 2024 of getting 50,000 new customers to join the charge by the end of this year, and we're well on our way. Our new "Clean Power Promise" campaign launched this summer, to celebrate our customers' actions and generate excitement for others to take action through programs, rebates, tips and "Joining the Charge" to support a clean energy future. Simultaneously, we're reinforcing our commitment to world-class safety, reliability and low rates. This is a fully integrated, multi-channel campaign, which means it's supported by target marketing for our various customer segments and is carried through to our outreach and events – from ride and drives across many communities during the year, to our outreach in schools to our Community Impact Plan (CIP) work through neighborhood walks and other outreach activities. Our Board Members do a great job of spreading the word and getting our customers and others engaged.

Current & projected key metrics & milestones by portfolio

The information in the following sections provides data for some of the key metrics and goals associated with the programs and initiatives in each of the portfolios described above.

Building electrification & energy efficiency

We are on track to meet the "cumulative equivalent all-electric homes[6]" targets. In 2023, we completed building electrification installations equivalent to more than 5,000 all-electric homes, bringing the total in our service territory to more than 63,000. For 2024, we expect to complete projects that will add approximately another 5,000, which will meet or exceed our current planned trajectory.

[6] "Equivalent All Electric Home" does not require an individual home to be all electric. This metric considers the impact of electrifying individual devices and the aggregated impact at the community level. This metric is the combination of commercial and residential measures across all programs and customer segments.

	2023 Final	2024 Goal	2024 Actual (July)	2024 Forecast
Heat pump HVAC conversions	2,914	3,805	2,493	4,280
Heat pump water heater conversions	940	1,583	1,457	2,008
Induction cooktop conversions	392	410	194	349
All electric new construction (smart homes)				
Single-family homes	562	450	218	686
Multifamily units	1,363	850	517	1,072
Multifamily units retrofitted	1,113	660	363	1,223
Income qualified home electrification retrofits	791	882	496	882
Commercial retrofit and new construction projects	324	330	156	417
All electric equivalent homes (cumulative)	63,055	68,058	66,115	68,540

Initiatives in progress this year include the expansion of our Home Electricity Reports program to more than 155,000 customers with a more direct focus on supporting the ZCP goals for carbon reduction.

Significant additions to the building energy efficiency and electrification portfolio were included in the 2023 program plans to expand the availability and reach of these programs to underserved, low- and moderate-income customers through the CIP. More detailed information and description of the CIP is provided in the following section.

While we expect to remain on track this year, we must scale up our program goals significantly over the next few years and do so in a cost-effective manner. For building electrification, we have seen significant increase in interest for residential heat pump water heater and HVAC conversions through our incentives, and external funding sources are proving to help augment adoption efforts. The SMUD Contractor Network is critical to the success of our residential electrification programs and continues to increase participation among our local contractor community. Currently, 340 contractors are actively participating and connecting our customers

to incentives and rebates to help them electrify their homes. Some of the tailwinds that we expect to help in this regard are the Technology and Equipment for Clean Heating (TECH) California statewide incentive program, as well as the Energy Security and Climate Change provisions of the Inflation Reduction Act (IRA). Staff will continue to closely monitor these programs to determine how best to update and adapt our programs as we've seen that the TECH Heat Pump HVAC and Water Heater Program incentives have already led to increased market demand for these products. The allocation of IRA funding through the CEC's Equitable Building Decarbonization Program will likely be available in early 2025, which will benefit low- and moderate-income customers. Given the significant influx of additional incentives, we'll monitor and adjust residential programs for administrative and programmatic changes. Additional tailwinds for building electrification include increased focus on adoption of clean technologies in local and statewide building codes and standards, providing opportunity to reevaluate program offerings. In support of commercial customers, we've revised our electrification incentives offerings to address equipment, design and infrastructure costs to better support building decarbonization efforts and have seen a very strong interest across all our programs.

An additional and complimentary effort that was launched in 2023 is the new, statewide residential all-electric new construction program, CalEHP, funded through the CEC. The program is very similar to our own Smart Homes program and provides incentives for electrification measures to builders and developers of market rate projects. The program is beginning to see active enrollments for 2024 and is expected to offset the Smart Homes program participation for several upcoming years.

Community Impact Plan

The CIP is a set of significant initiatives that provide a roadmap of how we ensure no community is left behind in the ZCP and is a key component in our ability to bring customers along on our journey.

The plan underscores SMUD's commitment to making meaningful investments in under-resourced communities to ensure their participation in a clean energy future. The CIP is comprised of 3 core areas: affordability, equitable access and community engagement. The CIP was initially launched in 2022 and has been significantly expanded for 2024 with targeted investments, outreach and engagement in our under-resourced communities.

Accomplishments for 2023 include collaboration with community partners to achieve the following results in our Neighborhood Electrification Program:

- More than 25,000 households with education on ways to save, zero carbon messaging and program offerings via email, direct mail, post cards, in person and door tags.
- Participated in 6 community events within the targeted neighborhoods to build trust and deliver the message to residence in the community.
- Conducted 171 in-home energy assessments and more in the pipeline.
- Completed 88 full home electrifications with more in the pipeline.

In addition to our residential work, we expanded our relationships with Property Business Improvement Districts, chambers of commerce and community-based organizations to ensure commercial customers have access to affordable, equitable clean energy programs. SMUD's Business District Electrification program is intended to address systemic gaps in economic vitality in prioritized under-resourced communities. Initial outreach with trusted community and business partners uncovered the unfortunate reality of cash-strapped commercial customers who lack financial means to prioritize and participate in electrification programs. The cost of investing in electrification represents an immense obstacle for small businesses in our under-resourced communities. Our incentives will allow commercial customers to participate in electrification programs and will ensure the benefits of the ZCP are equitably distributed across our most vulnerable, high-priority communities. Without the incentives provided through our CIP programs, it's unlikely that any commercial customers in our high-priority communities would participate.

Our Business District Electrification program includes:

- Information and education on SMUD's programs and services and the ZCP.
- No-cost energy assessments to interested under-resourced commercial customers in prioritized under-resourced neighborhoods.
- Customized "energy bundle" recommendations including a combination of lighting, energy efficiency, building electrification and/or EV charging.
- Up to 100% funding of approved energy bundle recommendations.

To date, we've completed 3 outreach campaigns along Del Paso Boulevard, Stockton Boulevard and Tower District business corridors and have committed over $2.1 million in funding to support infrastructure, building, kitchen and transportation electrification projects. Additionally, we've been able to secure up to $2 million annually in state funds to offset transportation electrification costs for these projects, allowing us to install electric vehicle supply equipment (EVSE) in charging deserts.

The CIP will allow targeted investments in community partnerships to train at least 3,000 people with regional resilience and clean-energy skill sets and facilitate the employment of at least 1,000 people into high-paying jobs. Success depends highly on a close-knit regional network of partnerships in community, education and training and employment. Through expansive

partnership collaboration, SMUD will create a regional end-to-end green jobs pipeline, from community career awareness to education and training to high-paying jobs. The plan identifies ongoing workforce development needs that create more equitable career solutions for under-resourced communities; develop relationships with regional employers to inform training and boost career opportunities; expand and diversify the pool of qualified competitive candidates for jobs within SMUD and the region; identify and develop regional talent to execute on the clean energy vision; and ensure the availability and readiness of qualified candidates for critical clean energy roles.

Our regional workforce partnerships include:
Solar training & electrification

- Partnership with Grid Alternatives.
- Entry-level solar training plus electrification (storage, EVSE, electric appliances).
- 5 weeks, 40 hours/week, and includes wrap around services, stipends.
- In 2023, 69 people were trained through this program. One cohort of trainees was designated solely for women.

Electrician assistant

- Collaboration with Northern California Construction Training, Inc.
- Basic electrical skills for entry level electrical helper positions, supports IBEW apprenticeships.
- 6 weeks, 40 hours/week, includes stipends, soft skills.
- In 2023, there were 72 people trained through this program. At least 24 of those participants found careers with IBEW or in the trades after graduation.

Construction

- New construction electrification class at Consumnes River College, that preps participants for entry-level construction jobs, provides credit towards construction management certificate.
- 2 courses per year, evening classes, stipend, tools and access to tool library.

Battery storage & manufacturing

- Battery system assembly, operations and maintenance brought to Sacramento as a result of SMUD's strategic partnership with ESS for LDES.
- Includes establishing a Center of Excellence to support training up a local advanced energy storage industry workforce.
- Partnership with the California Mobility Center with a commitment to train 314 people in manufacturing basics, with 114 of those continuing with on-the-job training and employment opportunities with a local battery manufacturer.

Transportation electrification

By the end of 2023, there were approximately 46,200 light duty EVs in operation in the SMUD territory, according to data from the Electric Power Research Institute (EPRI). In 2024, the ZCP goal is 51,000, which we exceeded mid-year. The ZCP targets growth to approximately 288,000 light duty EVs in operation[7] by 2030, which is more than a 500% increase from where we ended in 2023.

	2023 Final	2024 Goal	2024 Actual (July)	2024 Forecast
Charge@Home • Charger rebates • Circuit installations	 3,558 1,215	 1,000 500	 2,008 892	 2,558 1,392
Commercial EV chargers • L1/L2 chargers • DCFC	 368 33	 400 45	 182 31	 600 45
Residential EV rate participants (cumulative)	23,329	34,680	26,951	29,276
Low income EVSE installations • Chargers installed • Circuits installed	 145 384	 200 350	 144 187	 200 350
eFuel Services program • Advisor reports • Projects	 21 2	 25 6	 8 0	 25 3
Managed Charging pilot participants (cumulative)	965	1,000	1,159	1,200
# of light duty EVs in service territory (cumulative)	46,233	51,000	53,822	58,572

Transportation electrification is seeing significant local and national attention. As a major element of the Inflation Reduction Act, it is expected to receive substantial support through grants. These elements, combined with increasing interest from customers and proliferation of vehicles and options, will drive demand and market penetration of EVs and electric transportation options over the coming years.

[7] Note: “in operation” means new vehicles, used vehicles and vehicles that were sold - and is the EPRI term for the true number of EVs in our service territory.

The challenge we face is to ensure that the electric infrastructure and charging options available to customers don't become barriers to adoption. To that end, our focus this year and looking ahead will be to increase our efforts to educate and inform customers about vehicles and charging options, while also expanding our managed charging pilots this year and next. We'll garner the learnings and outcomes from these pilots to develop a full-scale program that seeks to maximize customer utility and benefit while minimizing grid and infrastructure impacts.

In 2024, we're continuing to encourage customers to contact SMUD first early in the lease/purchase decision process through our multilevel marketing campaign. We established a dedicated team in the contact center to answer customers' questions and provide information on charging and vehicles. Staff was also trained to provide charging information and emphasize the benefits of off-peak charging and right-sizing charging solutions, which in many cases result in customers becoming aware that they may not even need a level 2 charger at home and can avoid a panel upgrade.

Our current managed charging pilot was extended and includes continued participation of eligible residential vehicles from Ford, GM and BMW with enrollment via the Open Vehicle Grid Integration Platform (OVGIP), and Tesla drivers with Optiwatt, utilizing vehicle telematics as the means to communicate with and optimize charging parameters.

In the residential space, we expanded our contractor network and contractor education for EV charger installations. As a result, our Charge@Home program well exceeded its goal and provided chargers and circuit installation support for several thousand households. Our SMUD Energy Store was updated to allow for instant rebates and a home charger turnkey installation process through our partner Qmerit. Customers can select and purchase a qualifying charger and provide information to receive a quote and contractor offer to install the charger in the same transaction.

Another initiative underway is the ChargeReady or Reliable, Equitable and Accessible Charging for multifamily housing (REACH) grant project. SMUD received a grant from the CEC in 2022 to develop a technical and business model to inform future deployments of EVSE at multifamily properties. Project partners include Mutual Housing and the Sacramento Metropolitan Air Quality Management District (SMAQMD). REACH will utilize SMUD's eFuel program for design, construction and installation of more than 100 Level 2 charging handles in multifamily sites in underserved communities across our service territory. The project team is currently evaluating the sites, with construction estimated to start in 2024 and a goal to be completed by mid-2025. Part of the project scope includes a Community Engagement Plan to survey residents' knowledge and interest in EVs, as well as provide education and outreach. Beginning in Q3 2024, planning will launch for a major expansion of the program through REACH 2.0, which will install 200-300 chargers at additional multifamily housing locations in SB 535 designated disadvantaged communities.

In 2023, SMUD was awarded $2.8 million from the CEC's Fast and Available Charging for All Californians (FAST) grant program to support EV charging infrastructure for high mileage on-demand transportation services, car sharing enterprises, or car rental agencies, and the public. SMUD will deploy public 150+kW fast chargers at the Sacramento International Airport, Sacramento Valley Amtrak Station and California State University, Sacramento. These stations will offer public charging at an affordable rate for all users ($0.25/kWh), in addition to further discounts for ride-share drivers, ensuring access to public charging at rates comparable to home charging. Chargers will be in areas where ride-share drivers already wait and queue for fares, reducing trips. The rapid chargers will be high-powered and conveniently located in free public lots, requiring no additional access fees. As part of the grant program, SMUD will provide workforce development and training opportunities to educate the local workforce in the service and maintenance of EV infrastructure. Implementation is currently underway and expected to be completed by the end of 2025.

Load flexibility

In 2024, we anticipate adding another 15 MWs through the expansion and launch of additional elements in our Virtual Power Plant (VPP) programs, as well as incremental addition from ongoing programs. By 2030, our net additional load flexibility resource is projected to jump to more than 360 MWs, which is a significant 7-fold increase from where we are today. Most of this increase is planned to come from our VPP programs to manage customer-sited AC load, battery storage and EV charging. This value is the ZCP Base Case MW Capacity and is the baseline level of DER adoption sized to fill the resource gap needed to reach our ZCP goal.

	2023 Final	2024 Goal	2024 Actual (July)	2024 Forecast
My Energy Optimizer Partner (smart thermostats enrolled)	23,802	38,435	26,926	30,000
My Energy Optimizer Starter (TOD-optimized batteries)	326	506	553	600
My Energy Optimizer Partner+ (batteries enrolled in VPP)	80	580	107	208
Peak Conserve or NextGen ACLM (enrollments)	1,338	6,500	1,542	1,700
Commercial PowerDirect (MWs enrolled)	21.2	22.7	27.5	29.8
Total MW	45.8	62.9	55.3	60.9

Note: All figures are cumulative.

Within the **My Energy Optimizer** (MEO) suite of offerings, 2023 saw a very successful growth in our smart thermostat Partner program. We exceeded the goal by over 10,000 enrollments. The smart thermostat offering provides an enrollment incentive and an annual bonus to customers who agree to have their qualifying smart thermostat control their air conditioner usage during periods of high demand. The SMUD Energy Store included a popular offering that coupled enrollment with purchase of a qualifying smart thermostat. The program also includes a **Critical Peak Pricing** (CPP) secondary offer. CPP offers a discount of $0.02 per kWh during non-event periods from June 1 to Sept. 30. During CPP peak events, an additional charge of $0.5 per kWh is added to the applicable time period's price.

While we continued to see growth in the participation and enrollment of smart thermostats in the MEO program this year, the rate of growth has slowed somewhat, and we'll end the year below the planned goal for participation.

Implementation of demand response and load management events this year includes additional use cases across different hours of the day and with staggered events to continue to test and optimize program performance and customer experience.

The **PowerDirect** automated demand response commercial offering currently provides $10/kW in monthly capacity payments, for load reduction during peak events. Participants may also qualify for up to $175/kW of incentives to offset technology and equipment costs. This technology automatically scales back energy use for the selected equipment by the customer when demand for electricity is at its peak. This year saw significant success in attracting and enrolling several new and large commercial and industrial customers on the program.

My Energy Optimizer Partner+ (MEOP+): This customer offering provides upfront incentives for a home battery system for year-round control of a resident's battery system. The battery will continue to be available for customer use and back-up power needs in the event of an outage. Customers in the Partner+ level also receive ongoing performance payments in addition to the upfront incentive. For this incentive level, customers must own and have installed a Tesla Powerwall (expansion to other manufacturers is in development). To boost residential battery adoption, the MEOP+ program launched a significant expansion effort in June 2024. The expansion included doubling of incentives per battery from $2,500 to $5,000 with a maximum upfront incentive of up to 2 batteries per customer, additional customer and contractor outreach and an expanded marketing effort targeted to customers with existing solar systems.

Peak Conserve: This residential customer offering provides a $50 sign-up bonus and up to a $25 annual bonus to customers for the installation of a 2-way communicating "cycling" device on their home's central air conditioner to allow for cycling of their air conditioning compressor during periods of summer high demand. The devices utilize SMUD's mesh meter network to communicate with the controller, negating the need for additional communication systems or for the customer to have WiFi to participate. The program launched in summer of 2023 with a goal of installing about 4,500 devices per year. In 2024, this program was incorporated as a component of the GRIP grant from the DOE and we're retooling our implementation and marketing and outreach plan to align with the goals of the grant with a focus on providing clean energy benefits to disadvantaged communities.

Green pricing

In 2023 SMUD delivered 825 GWhs to more than 63,000 participants and successfully completed the internal and external audits without error or correction. We also developed and launched the Residential SolarShares program, which is designed to offer low- and moderate-income customers an innovative solar option.

All SMUD customers benefit from this arrangement through the Retail Sales Exclusions associated with qualifying sales and it reduces carbon emissions from our power supply mix.

In response to Renewable Energy Credit cost increases over the last 2 years, staff are beginning the process of adjusting the Renewable Energy Credit (REC) purchases used to

supply **Greenergy** and alter product mixes to avoid significant product price increases associated with current high REC costs where possible. As a result, the GWh goal for 2024 is expected to remain flat year to year. Communications with customer participants have commenced and will continue through 2024, to inform participants that their product mix will change as of January 2025. The Greenergy program will incorporate to reduce costs, and while this supply does not directly contribute to our ZCP goals, it will provide the best customer experience and retention for our customers as a bridge solution while we reset renewable supply in future years to more local resources as they become available and more cost effective.

	2023 Final	2024 Goal	2024 Actual (July)	2024 Forecast
Residential Greenergy customers	61,520	61,520	63,291	61,520
Commercial Greenergy customers	1,489	1,489	1,544	1,489

Neighborhood SolarShares
• Enrolled premises (Cum.)
  • Single family
  • Multifamily
  • Accessory dwelling units
	
	58
	843
	146
		
		104
		1510
		262
			
			67
			975
			169
				
				93
				1349
				234

Commercial SolarShares • Customers • Accounts	 30 410	 30 410	 30 443	 30 445
Total gross GWh sales	823	822	489	822

Our **Neighborhood SolarShares** program provides a community solar Title-24 compliance option for builders, developers and owners constructing new residential single family or multifamily housing units continues to provide an effective solar option and is particularly popular for multifamily and accessory dwelling unit projects. Staff is closely tracking new home project reservations against available generator supply. We expect this program to be fully subscribed and closed to new reservations by the end of 2025.

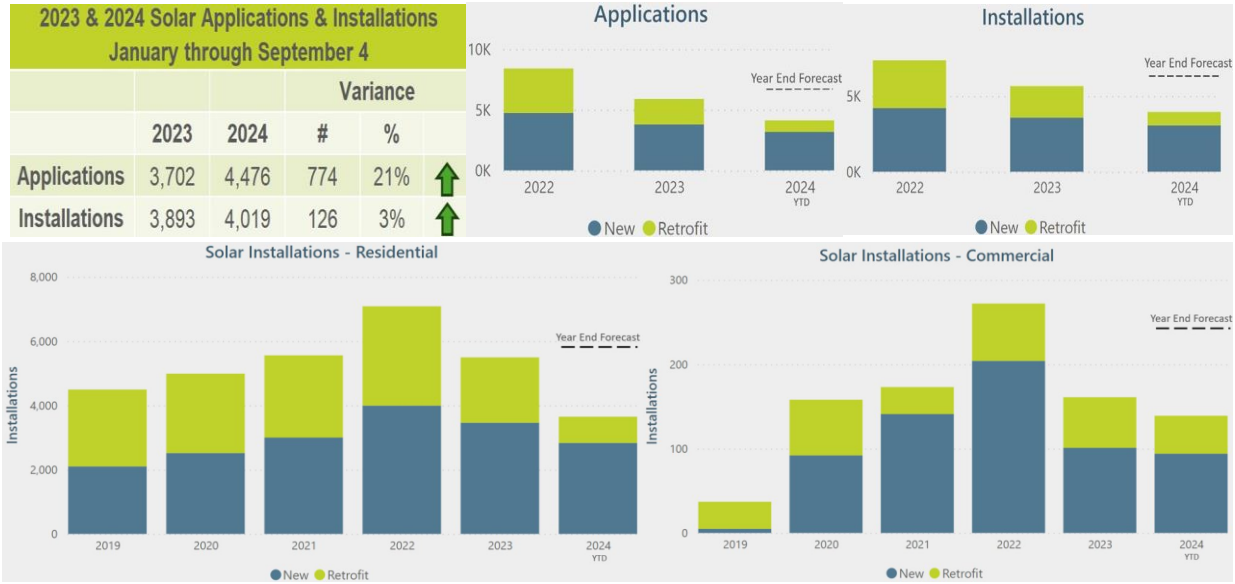
Our **[Large] Commercial SolarShares** program is fully subscribed and closed to new enrollments but continues to maintain and support our existing customer contracts and accounts.

To complement our Neighborhood SolarShares program, staff launched the Residential **SolarShares** program to offer a low cost, easy to use, community solar option that doesn't require roof space, home ownership or solar access, which will be targeted to low- and moderate-income customers. This program was launched at the end of 2023 and is currently supplied by 10MW of Rancho Seco II solar. Staff is actively engaged in the development of a marketing plan and enrollment strategies targeted to reach our low- and moderate-income market and customers that would most benefit from participating in this program.

In an effort to extend the **Residential SolarShares** program to more participants, SMUD has applied for multiple grants to fund solar projects at high schools located in under-resourced communities. In addition to supplying the Residential SolarShares program with more community solar supply, these projects will include resiliency centers that include stationary storage, vehicle to grid and microgrid abilities in addition to solar. The technology suite will be used to stabilize grid functions, and in the event of an emergency where SMUD's grid is not available, these high schools will become gathering centers for residents and operations centers for first responder and emergency personnel.

Finally, we're also working to develop the long-term goals and program strategies that can most effectively support and complement the goals of our ZCP on our path to 2030 and beyond. This will allow us to leverage resources to grow the programs, making a quantifiable and positive contribution to the ZCP.

Behind the Meter Solar



These tables visualize the progress we've made with **Behind the Meter Solar** applications and installations. In 2023, we added approximately 35 MWs of solar (26 MWs residential + 9 MWs

commercial). The tables also show the breakdown between new construction and retrofit for both commercial and residential and the growth each year.

On March 1, 2022, SMUD launched **Virtual Solar**, which provides an opportunity for customers living in qualified, low-income multifamily properties to benefit from solar energy. SMUD continues supporting inquiries about the offering from solar contractors, energy consultants and affordable housing developers. Applications received since the launch represent over 2 MW of solar production benefiting over 1000 customer accounts.

In late 2022, SMUD received the first Virtual Solar application for a 50-unit, 57.65 kW installation – this project has been completed and will qualify for SEED benefits worth approximately $30,000. **Virtual Solar SEED Benefits** provide additional incentives for Virtual Solar property owners who use a SEED-qualified solar or electrical contractor to complete the installation, including the opportunity to receive a Solar SEED incentive that pays property owners $0.60 per watt of installed solar, up to $500,000 upon project completion.

Partnerships & grants

Grants and partnerships are key to SMUD attaining our goal of Zero Carbon. In 2023, SMUD continued executing our grant strategy and focused on grant capture and partnership efforts.

In 2023, we successfully obtained grants, as mentioned previously, that not only benefited SMUD, but also brought additional funds for our community through partnerships and support to community members in grant applications. SMUD helped secure $59 million in funding of which $58 million directly benefitted SMUD customers and $1.3 million went to SMUD partners helping to accelerate emerging technologies.