Office of Energy Strategy
2024 End of Year Report

Table of Contents

Section I: Office of Energy Strategy

Office of Energy Strategy Background

In 2024, San Antonio Water System spent approximately $47 million or 9 percent of its annual operating budget on energy, making it the fourth largest use of funds behind debt service, salaries and wages, and water procurement. In the last 10 years, SAWS' total cost of energy has increased 65 percent, primarily due to increased consumption that has grown 4.8% annually. Strategically managing energy consumption will be key in reducing the impact of future energy cost increases.

An ongoing commitment to energy management has emphasized the need for planning and developing committed goals for energy reduction. As a result, SAWS has adopted its first Energy Strategy Master Plan. This plan will solidify SAWS efforts by identifying energy savings measures and committing resources towards achieving energy savings goals.

The Office of Energy Strategy (OES) is responsible for paying utility bills, developing utility budget forecasts, serving as CPSE liaisons, and identifying and implementing energy savings reduction efforts. Currently, the OES consists of five staff members reporting to a Senior Vice President as highlighted below.

Name	Title	Department
Jaime Castillo	Senior Vice President	Ops Support/Chief of Staff
Chris Wilcut	Director	District Cooling/OES
Brandon Leister	Energy Manager	Office of Energy Strategy
Stephen Turner	Resource Analyst Coord.	Office of Energy Strategy
Alfred Rocha	Sr. Resource Analyst	Office of Energy Strategy
Chantay Griffin	Administrative Assistant	Office of Energy Strategy

2024 OES Highlights

- In total, 2024 energy saving efforts produced $834,552 in verified utility bill savings for SAWS. The primary drivers of these savings included Strategic Energy Management, District Cooling System Upgrades and Optimization, and Utility Tariff Analysis (see section III). The reason that the utility budget continues to increase despite these savings is that SAWS is relying on more energy intensive water sources than in years past due to drought and Edwards permit issues.
- CPS Energy's Demand Response program is a voluntary load curtailment program designed to reduce CPS Energy's peak load growth by incentivizing customers to shed electrical loads during peak winter and summer days. Last year, SAWS participated in both the summer and winter demand programs and reduced demand by more than 7.8 MW resulting in $747,478 in incentives.
- One of CPS Energy's programs under the umbrella of STEP includes the Commercial Solutions Program. This program incentivizes commercial customers to implement projects aimed at reducing energy consumption. Since 2018, SAWS has received $969,521 in rebate incentives.
- SAWS' Office of Energy Strategy is committed to reducing energy intensity by implementing energy conservation measures identified within SAWS' water, wastewater and district cooling systems. In 2024, these measures provided significant energy savings for the wastewater and district cooling systems, reducing energy intensity by 8.0 percent and 5.7 percent, respectively. Despite these savings, water operations increased by 12.2 percent because of the persistent drought leading to strict usage restrictions on the Edwards Aquifer water source. This led SAWS to use more energy intensive water sources to meet demand.
- Between energy conservation projects and demand response, 2024 OES efforts resulted in $1,582,030 back to SAWS.

Section II: Utility Data

2024 Energy Intensity Performance

As outlined in the 2023 Energy Strategy Master Plan, SAWS has committed to decreasing the energy intensity of its operations by 10 percent by 2028. The plan provides recommendations on potential projects and process modifications for SAWS to consider in order to achieve this goal.

The first step in reducing energy intensity is to pursue low-cost and no-cost energy conservation measures identified within SAWS' water and wastewater systems. District cooling on the other hand is in the process of implementing capital retrofit projects. In 2024, these measures provided significant energy savings for the wastewater and district cooling systems, reducing energy intensity by 8.0 percent and 5.7 percent respectively.

Energy intensity of water operations increased by 10.2 percent in 2024 from the baseline energy intensity in 2021-2022. The year was challenging due to persistent drought conditions which triggered the Edwards Aquifer pumping restrictions. This caused SAWS to rely on energy intensive water sources to meet customer demand.

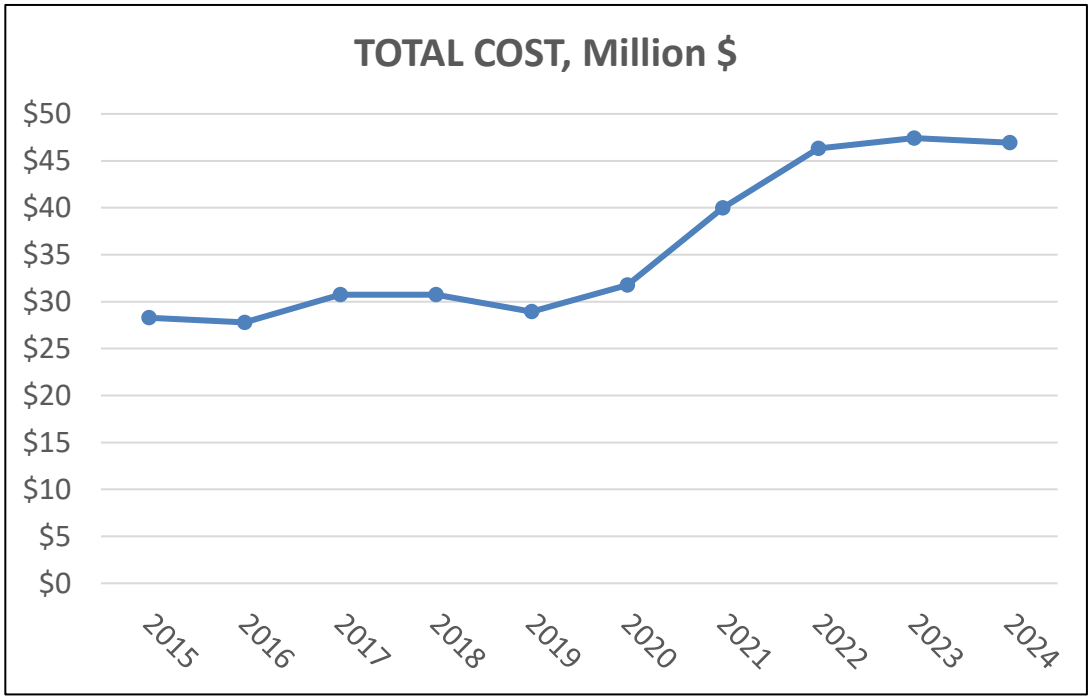
Additionally, the Edwards Aquifer level dropped from 648 feet to 626 feet causing the water to be pumped a longer distance to reach the surface, using more energy.

Operation	EI METRIC	EI BASELINE	2024 EI	PERCENTAGE CHANGE
WATER	KWH / MG	3,502	3,932	12.2%
WASTEWATER	KWH / FLOW MG	1,762	1,620	-8.0%
DISTRICT COOLING	KWH / 1000 TON-HRS	1,022	964	-5.7%
BUILDINGS	KWH / SQUARE FT.	14	14	-0%
TOTAL		**2,893**	**3,188**	**10.2%**

Costs by Year 2015-2024

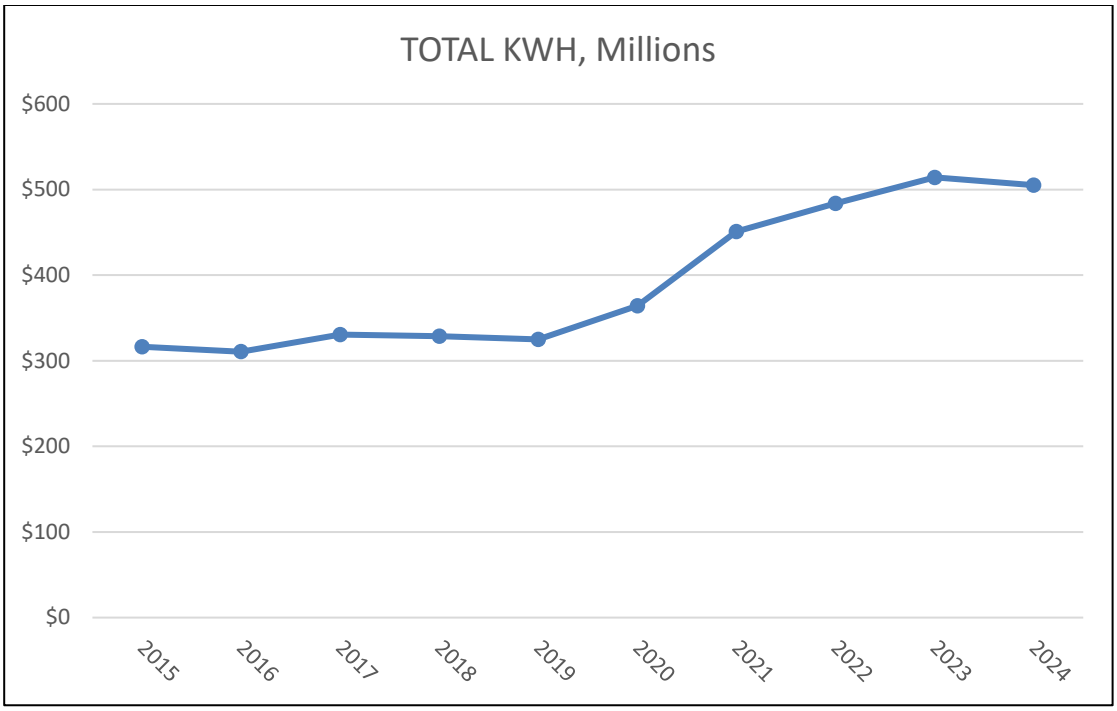
From 2015 to 2024, utility costs increased 65 percent overall or 5.2 percent compounded annually. Of this annual growth rate, 4.8 percentage point growth was related to consumption increases, while price increases attributed to the remaining 0.4 percent point growth.

Costs were relatively stable until 2020 when the Vista Ridge water supply project came online. This project utilizes non-Edwards Aquifer water sources requiring more energy to deliver water from the Carrizo/Simboro Aquifer in Burleson County.



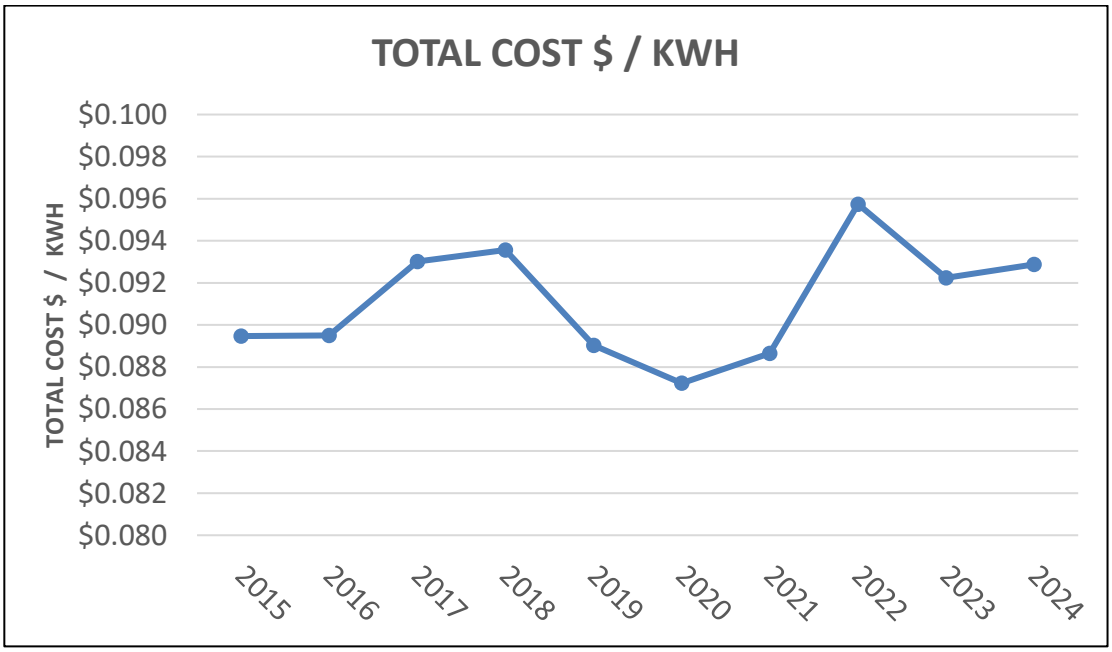
kWh by Year 2015-2024

Kilowatt hours increased 60 percent from 2015 to 2024, or 4.8 percent compounded annually. Increases were relatively flat until 2020 when additional water supplies from the Vista Ridge project came online. In 2022 through 2024, kilowatt hours (kWh) increased due to extreme temperatures and lower than average annual rainfall (64 percent, 38 percent, and 28 percent respectively). This weather caused more water to be pumped from more energy intensive water sources to meet customer demand, thus increasing electric consumption.



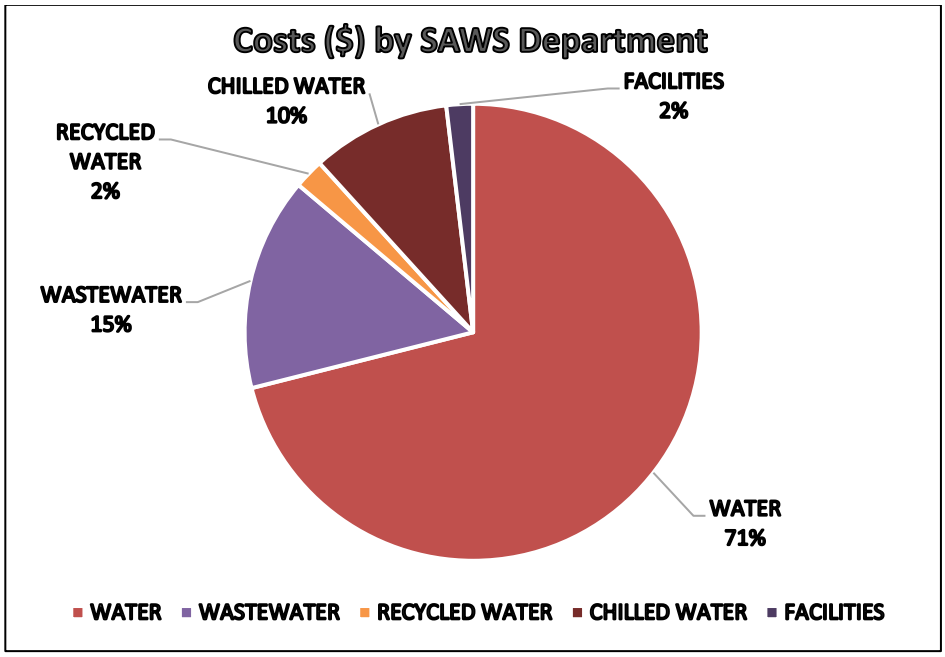
Cost per kWh 2015-2024

SAWS' total energy costs have risen through the years, and it is expected that SAWS' four electrical providers will have rate increases in the near future. The metric used to track energy costs is $/kWh. Essentially, this is the blended cost SAWS pays for a single unit of energy. One of the biggest influences on costs per kWh are fuel adjustment and regulatory charges which can impact the cost per kwh as shown in the chart below:



2024 Costs by SAWS Department

Water production makes up over 71 percent of utility costs at SAWS. Wastewater and Chilled water comprise most of the remaining 28 percent as illustrated in the chart below:



2024 Costs by Utility Provider

SAWS receives its electricity from four different electrical providers. CPS Energy is the largest provider at 78 percent of total costs. Guadalupe Valley Electrical Cooperative, Bluebonnet Electrical Cooperative Utility and New Braunfels Utilities make up the remaining 22 percent. The annual cost breakdown of the four utilities is shown below:

UTILITY PROVIDER	PERCENT OF TOTAL	TOTAL COST $
CPS	77.8	$36,508,644
GVEC	7.4	$3,455,035
BLUEBONNET	14.8	$6,961,676
NEW BRAUNFELS UTILITY	0.003	$1,234
TOTAL	**100**	**$46,926,589**

Energy Use by Water Source 2024

SAWS has a diverse water portfolio, including sources outside of San Antonio's extraterritorial jurisdiction. SAWS' oldest and main water source remains the Edwards Aquifer, which still accounts for 61 percent of SAWS' total water production. The chart below represents SAWS' annual energy consumption by water source:

WATER SOURCE	TOTAL (kWh)	PERCENT OF TOTAL
EDWARDS	147,215,423	42.7
VISTA RIDGE	130,732,491	37.9
ASR PRODUCTION	30,245,541	8.8
DESALINATION	23,916,427	6.9
REGIONAL CARRIZO	4,852,105	1.4
LOCAL CARRIZO	4,428,608	1.3
TRINITY	3,480,084	1.0
LOCAL CARRIZO	4,428,608	1.3
TOTAL	**344,870,679**	**100**

Section III: 2024 Energy Projects

Strategic Energy Management (SEM) Summary

Location	2024 Energy Savings (kWh)	2024 Cost Savings ($)
Medio Creek WRC	1,745,338	$157,080
Clouse WRC	1,379,959	$124,196
Leon Creek WRC	-271,727	-$24,455
2024 TOTALS	**2,853,570**	**$256,821**
LIFETIME SAVINGS (June 2022-Dec 2024)	**8,765,697**	**$788,102**

Background

In order to serve the community, SAWS' operations consume significant amounts of electricity as water distribution and wastewater treatment are inherently energy intensive. Reducing energy consumption would result in significant cost savings and a reduction in SAWS' carbon footprint.

Project Description

Traditionally, there are two types of energy conservation measures: Retrofit type projects (replacing existing equipment with new equipment) and behavioral/operational modifications. Due to the magnitude and complexity of SAWS operations, behavioral type projects present a more attractive opportunity because they require far less capital and yield more immediate savings resulting and a better return on investment.

In 2021, SAWS partnered with Cascade Energy to begin a Strategic Energy Management project that focused on optimizing existing equipment by making behavioral and operational modifications. This project began by establishing energy teams comprised of key water/wastewater staff and operators. These energy teams attended training sessions focused on energy education and ways to save energy within their specific operations. In 2024, wastewater continued to see savings but at a less accelerated pace compared to 2023. Overall, strategic energy conservation measures resulted in more than $250,000 in cost savings (highlighted above).

Notes

Energy consumption and cost savings are verified by a software platform called Gazebo. Gazebo models take water/wastewater data and combine it with weather information and energy data. These models highlight assumed energy consumption based on specific variables vs. actual energy consumption, and the delta between the two is energy savings.

2024 District Cooling Upgrades and Optimization

Background

SAWS operates four chilled water plants across two separate district chilled water systems, downtown and Port San Antonio. The downtown chilled water system supplies about 22,000 tons of cooling capacity to critical facilities including the Convention Center, Alamodome, and Grand Hyatt Hotel to name a few. The Port San Antonio chilled water system supplies about 7,000 tons of cooling capacity to Boeing, Standard Aero, Chromalloy, Port San Antonio, and the U.S. Air Force.

Project Description

In 2024, district cooling continued its implementation of energy efficiency projects, including adding high-efficiency chillers, variable frequency drives (VFD), and Delta T correction. The high-efficiency chillers replaced 20+ year old single-speed chillers, and the variable frequency drives were added to chilled water and condenser pump motors. The Delta T correction was made by focusing on the efficient use of chilled water by SAWS customers.

These projects resulted in an operational efficiency of 0.96kWh/ton-hr in 2024 vs the pre-projects baseline of 1.09kWh/ton-hr (2021). At the 45million ton-hrs of chilled water a year produced by SAWS, this equates to annual savings of roughly $450,000.

Notes

Since utilities costs are a direct pass through to chilled water customers, SAWS passes these energy savings on to customers through their monthly bills.

2024 Utility Tariff Analysis and Adjustment Project

Account Location	Description	2024 Cost Savings ($)
ASR Plant/East Pumps	PL to ELP	$67,759
West Tops Pumps	LLP to PL	$17,883
H&C Downtown-Chill H2O	ELP to SLP	$17,563
Artesia – ASR	LLP to PL	$12,934
Sunset Tank	PL to LLP	$9,239
East Side Service Center	PL to LLP	$4,405
Basin Pump Station	ELP to LLP	$3,986
Cagnon Pump Station	LLP to PL	$3,231
Stevens Pkwy Pump Station	LLP to PL	$637
SE Booster Station	PL to LLP	$617
Seale Pump Station	LLP to ELP	-$3,524
Sutton Pump Station	PL to LLP	-$6,999
2024 TOTALS		**$127,731**
LIFETIME SAVINGS		**$1,906,726**

Background

San Antonio Water System utilizes four different CPS Energy utility tariff structures: General Service (PL), Large Lighting and Power Service (LLP), Extra Large Power Service (ELP) and Super Large Power Service (SLP) rate. Each tariff has its own unique billing structure and minimum term of service. The SLP rate has a five-year minimum term, the ELP and LLP rates have a one-year minimum term, and the PL rate has no minimum term. SAWS has several utility accounts in each of the four tariff categories and can request a change in tariff if potential cost savings can be verified.

Project Description

Due to the nature of SAWS operations, utility accounts and energy consumption do not always remain consistent for long periods of time. Therefore, what may have been the most cost-effective utility tariff for an account one year, may not be the most cost-effective tariff the next. Being aware of these changes in energy consumption, and the ability to request a new tariff, presents SAWS with a significant opportunity for utility cost savings.

To identify cost savings opportunities, the Office of Energy Strategy performs a monthly analysis to calculate the "would be" utility costs of each of the four tariff structures for all of SAWS' nearly 600 CPS Energy utility accounts. This analysis highlights specific accounts where SAWS would be saving money by being in a different tariff than the one currently utilized. Once accounts are identified, OES meets with applicable SAWS staff to understand the account's operational consumption, peak demand, seasonality, outliers, and maintenance/construction schedules. These meetings help provide the needed assurance that the existing operations will remain consistent and warrant a tariff change. This is a critical step because it helps avoid a scenario where SAWS requests a rate change based on a previous month's utility data and ends up losing revenues due to significant operational changes down the line. Ultimately this step verifies the proposed tariff change is appropriate and cost effective.

Notes

Cost savings opportunities are identified by taking several months of previous energy consumption data for each account and calculating what the bill would look like in each of the four tariff categories. If the calculated bill with the lowest total is from a different tariff than is currently utilized, then a cost savings opportunity is present.

Making a rate change request only makes sense when a pattern has been established, so only accounts with cost savings over several months are considered. Cost savings are quantified by subtracting the new tariff costs (i.e. the new request) from the costs under the previous tariff.

Per CPS Energy's request, SAWS provides several months of cost savings to verify why a tariff change request is being presented. The timeframes provided to CPS range from 10 to 16 months of identified cost savings. The figures in the 2024 cost savings column of the summary table are real dollars saved by SAWS in 2024.

CPS Energy 2024 Demand Response Program Summary

Location	Winter	Summer	Bonus	Total DR
Chilled Water Plant	$14,922	$222,801	$22,500	$260,233
Micron PS	$11,332	$113,229	$5,888	$130,449
34th St PS	$15,810	$38,669	$3,375	$57,854
Basin PS	$11,347	$23,122	$15,000	$49,469
Marbach PS	$19,843	$31,979	$1,875	$53,697
Clouse WRC	$10,584	$29,943	$3,375	$42,902
Seale PS	$11,664	$24,338	$3,938	$39,940
Pinn Recycle	$2,457	$21,972	$3,375	$27,805
Golden PS	$6,903	$17,990	$1,388	$26,281
Leon Creek WRC	$3,833	$16,342	$2,625	$22,800
Pearsall Recycle	$1,853	$14,968	$1,875	$18,696
TRP PS	$3,567	$5,970	$375	$9,912
Medio Creek WRC	$0	$1,600	$1,688	$3,288
Leon Creek WRC	$659	$1,566	$938	$3,163
	$114,776	**$564,489**	**$68,213**	**$747,478**

Background

CPS Energy's Demand Response program is a voluntary load curtailment program for its commercial and industrial customers. The program is designed to reduce CPS Energy's peak load growth by incentivizing customers to shed electrical loads on peak summer days.

Project Description

CPS Energy's Demand Response program now provides both a winter and summer option which run January through March and from June through September respectively. During this time, CPS Energy can call a demand response event any weekday.

In 2024, SAWS enrolled in the winter demand option, the summer demand option and a bonus hours option. SAWS' average demand reduction for the summer option was 7.8 MW which is enough electricity to power roughly 2,000 Texas homes on a hot summer day.

Electrical demand at Production, Treatment and Recycle locations was reduced by strategically shutting off pumps and motors when possible. At the Central chilled water plant, demand was reduced by utilizing thermal energy storage.

Special thank you to all Production, Treatment, Recycle and DCS staff who made this possible.

Pump Station Optimization Project

Background

In August of 2024, the Energy Strategy team worked with Production and Cascade Energy, our SEM contractor to perform an audit of the eight highest energy consuming primary and secondary pump stations. In spring of 2023, SAWS piloted an energy efficiency mode at the Mission Primary Pump Station which resulted in a 10% energy reduction, saving approximately $75,000 in annual electricity bills.

Project Description

Most SAWS pump stations have an array of well and high-service pumps and there are several different pumping combinations. Rather than giving all pumps equal run times, the proposed "energy efficiency mode" prioritizes use of the most energy efficient pumps.

Signature Automation was contracted to provide updated SCADA screens, programming, testing, and commissioning for the SAWS Energy Optimization project. This task includes modifying the screens for the Southeast Booster, Pinn Recycle Booster, Maltsberger Pump Station, Naco Pump Station and incorporating efficiency controls at each location. Signature Automation will utilize the existing control system as the basis for modifying the control system. This task includes database development, HMI configuration, programming, and alarm configuration as necessary to implement efficiency modes at each location.

Notes

Project completion date is mid-2025 with energy saving measured and verified by the end of 2025.

CPSE Incentive Rebates Summary 2018 – 2024

Project	Program Year	Rebate Amount ($)
Central CHW Plant VFDs	2024	$229,678.30
GRAND TOTALS 2018-2024		**$969,521.77**

Background

In 2009, CPS Energy launched its first energy efficiency and conservation plan known as the "Save for Tomorrow Energy Plan," or STEP. The plan established a goal of saving 771 MW of energy by 2020. Through community participation and shared commitment, this goal was met ahead of time. In June 2022, the City of San Antonio authorized a new initiative titled the "Sustainable Tomorrow Energy Plan," which established a goal of reducing community demand by 410 MW by 2027.

Project Description

One of CPS Energy's programs under the umbrella of STEP includes the Commercial Solutions Program. This program incentivizes commercial customers who implement projects aimed at reducing energy consumption. CPS Energy helps customers identify energy conservation measures and then pays the customers up to $0.05/kWh and $325/kW, depending on the project type. Some common projects include lighting, variable frequency drives, chillers, refrigeration and more.

Many of SAWS' construction projects inherently save energy because outdated infrastructure is being replaced with newer and more efficient equipment. When a qualifying project is identified, the Office of Energy Strategy staff works closely with CPS Energy's program administration team, CLEAResult, to maximize the rebate potential. Moving forward, staff expects to capture rebates on a more regular basis.

Section IV: Fleet Electrification

Background

In 2023, SAWS made an operational shift toward a phased fleet electrification strategy to meet our sustainability goals to reduce carbon emissions while meeting the needs of our user groups. By transitioning to electric vehicles (EVs), SAWS will play a large role in helping the City of San Antonio meet its Climate Action Plan goals. EVs produce zero tailpipe emissions, which reduces the release of harmful pollutants into the atmosphere during both idling and general operation.

Project Description

In 2024, SAWS made significant progress toward the expansion of electric vehicles and planning of electric vehicle infrastructure by implementing the following:

- Added 20 light duty electric vehicles to the fleet.
    - 2 Ford E-Transit Vans
    - 9 Chevrolet Bolt Sedans
    - 9 Ford F-150 Lightnings
- Implemented 13 Level 2 charging stations at the Northeast Operations Center in November 2024. Fleet acquired three more Ford F-150 Lightnings to be based at the new facility, which will bring the total EV count to 23 during the first quarter of 2025.
- Development of the Headquarters (HQ) electric vehicle charging station Capital Improvement Project (CIP), currently at 100% design and estimated to go to the board in the first quarter of 2025. The project involves necessary electrical infrastructure upgrades through CPSE, including two transformers and switchboards. Upon completion, this project will provide fifty (50) Level 2 charging stations, with the capacity to expand to 100 in the future. The project is estimated to be completed in the third quarter of 2026, with an estimated construction cost of $2.7 M.
- The inclusion of six Level 2 charging stations as part of the Leon Creek facilities improvement project. The project will include electrical infrastructure upgrades through CPSE, with an estimated implementation during the first quarter of 2026.
- An electrical infrastructure assessment of five SAWS service centers was completed in the first quarter of 2025 through our SAWS Engineering department. The assessment will assist SAWS in the future acquisition of electric vehicles and charging station infrastructure.

Notes

Implementing light duty electric vehicles has proven to be successful in decreasing operational and maintenance costs, while meeting the needs of our user groups. SAWS will continue to monitor electric vehicle market conditions moving forward and will adjust planning efforts accordingly. It is expected that SAWS and CPSE will continue to work closely to plan for needed charging infrastructure.

Section V: Energy Strategy Master Plan

In 2023, SAWS developed its first ever Energy Strategy Master Plan. In 2024, SAWS spent approximately $47 million or 9 percent of its annual operating budget on energy, making it the fourth largest use of funds behind debt service, salaries and wages, and water procurement. Every year, SAWS' cost of energy is rising due to rate increases and changes in fuel adjustment charges. Strategically managing energy consumption will be key in reducing the impact of future energy cost increases.

In addition to reducing utility expenditures, this plan will be key in supporting the City of San Antonio's sustainability goals. In October 2019, the city adopted the San Antonio Climate Action and Adaption Plan. The plan set a goal for San Antonio to achieve carbon neutrality by 2050. Energy use is responsible for 48 percent of San Antonio's greenhouse gas emissions and since SAWS is one of the largest energy consumers in the city, this plan can have a real impact on San Antonio's carbon neutrality goal.

SAWS is a national leader in water conservation. Drawing on SAWS' successful history with water conservation, developing this Energy Strategy Master Plan can guide future energy conservation to achieve SAWS' operating cost, energy and emissions reduction goals without compromising water quality or water conservation. This plan establishes an initial commitment for SAWS to reduce its energy intensity (kWh/unit) by 10 percent by 2028.

In 2024, overall energy intensity increased by 10.2 percent (as referenced on page 4) due to an increased reliance on energy intensive water sources. OES will continue to track and record opportunities to improve SEM's and projects as the master plan is a living document that will be updated every three years. Reaching this goal will require the support of SAWS' Board, Executive Team and staff.

Current progress towards the master plan's 10 percent reduction goal is highlighted below. Despite significant reductions in wastewater and chilled water, overall energy intensity has increased since water makes up the large majority of SAWS' energy consumption.

Operation	EI METRIC	EI BASELINE	2024 EI	PERCENTAGE CHANGE
WATER	KWH / MG	3,502	3,932	12.2%
WASTEWATER	KWH / FLOW MG	1,762	1,620	-8.0%
DISTRICT COOLING	KWH / 1000 TON-HRS	1,022	964	-5.7%
BUILDINGS	KWH / SQUARE FT.	14	14	-0%
TOTAL		**2,893**	**3,188**	**10.2%**

Section VI: Next Steps

The Office of Energy Strategy is committed to making energy efficiency a sustainable practice within SAWS. The areas below highlight key areas of focus moving forward:

Strategic Energy Management

OES staff and energy teams will continue to identify and implement low- and no-cost energy conservation measures associated with the strategic energy management project.

Renewable/Alternative Energy

SAWS will continue to explore renewable and alternative energy projects to reduce energy costs and promote San Antonio's efforts towards carbon neutrality. Potential projects include solar and hydropower energy generation.

Thermal Energy Storage

Today, SAWS' district cooling system utilizes thermal energy storage to reduce peak energy demand during the day. SAWS will continue to work with CPS Energy to expand this technology to existing and future chilled water plants.

Engineering and Finance

In 2024 and beyond, OES will work closely with SAWS' Engineering and Finance departments. Engineering will be critical in implementing efficiency projects and Finance will play a key role in how projects are selected and ultimately funded.

Water/Energy Nexus

Moving forward, SAWS will continue to work closely with CPS Energy to maximize the ever-evolving water/energy nexus. Relevant projects already underway include demand response, thermal energy storage, renewable energy opportunities, generators for distributed energy resources, and EV fleet planning.