# Santa Rosa Veterans Hall Energy & Resilience Upgrades

## Sustainable Solutions Turnkey Program Phase 1 Project

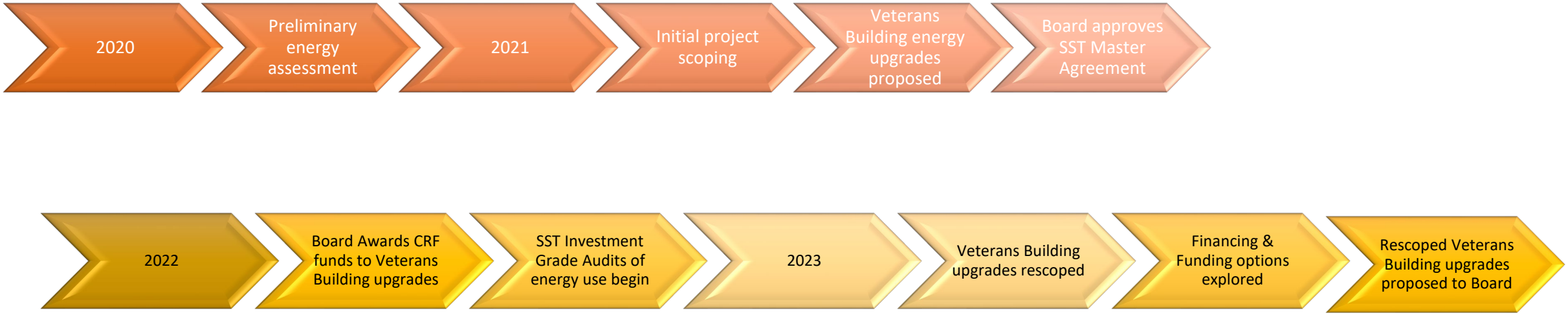
### Sonoma County Public Infrastructure and CAO/Climate Action and Resiliency

# Overview

- Review proposed energy improvements at the Santa Rosa Veterans Building
- Consider proposed funding and financing for the project
- Hold a public Hearing to make determinations and findings related to the project
- Approve the project, and funding and financing, or provide other direction to staff

# Project Background

# Timeline Overview



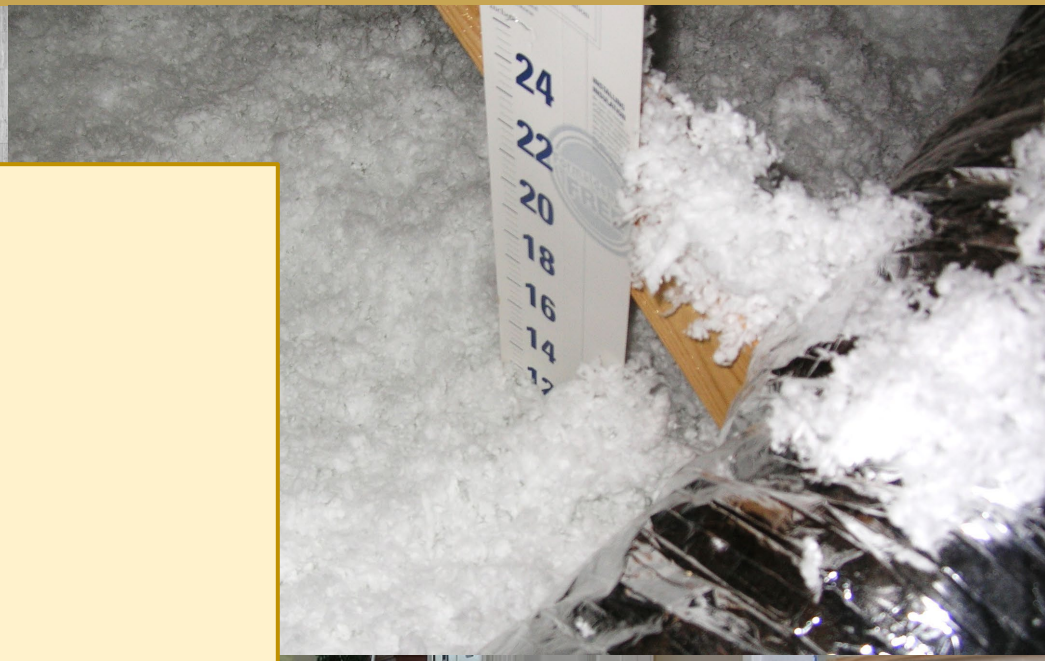
# Sustainable Solutions Turnkey (SST) Program

- PG&E “turnkey offering”
- Helps customers identify, prioritize, fund, and implement energy efficiency, generation, storage, and water conservation measures.
- PG&E’s Turnkey team has been successfully designing, financing, and installing projects for large customers since 2008

***Key Things to Note:***

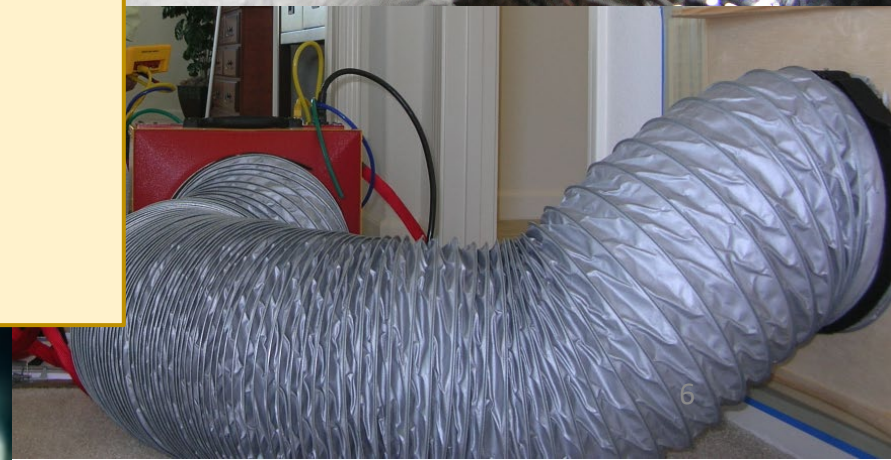
- Project measures go deep/wide: Lighting, HVAC, Controls, PV, Cogen, Batteries, Chargers, etc.
- Project “paybacks” range 3-20 yrs. (government projects often 15-20 yrs. in order to update core systems)
- Projects targeted to be cost-neutral with finance payments pegged to annual cost savings yielded by the project
- All forms of financing utilized: OBF, CEC, Private Finance, Buy-Downs, etc.
- Customers typically see cost, energy, and CO2 savings of 20-40% annually

# Sustainable Solutions Turnkey (SST) Program Users




***Some Examples:***

- DMV HQ (Sac.) ($9M)
- DMV Field Offices (across CA) (6M+)
- CPUC HQ (SF) ($1.6M)
- DSH Hospitals (Coalinga/Metro) ($35+M)
- 7 VA Hospitals (across CA) ($40M+)
- Army Bases (across CA) ($20M+)
- Cities & Counties (dozens in CA) ($40M+)
- Schools & Univ. (across CA) ($20M+)
- NASA (across CA) ($25M+)
- Fed. Bureau of Prisons (Taft) ($10M)
- Sutter Hospitals (across CA) ($10M)



# Project Details

# Santa Rosa Veterans Memorial Building + CMP chiller schedule update

**Comprehensive project to upgrade the infrastructure, reduce the energy/carbon footprint and increase resilience**

***Project Scope:***

- Parking Lot Car Canopy Solar PV – 110 kW
- Battery Energy Storage – 80 kW / 220 kWh
- LED Lighting Retrofit
  - Replace existing fluorescent lights with T8s, add Title 24 Energy Code compliant controls
- HVAC upgrades to Auditorium and 3 offices
  - 80 tons of heat pump cooling & heating for the Auditorium
  - 3 mini split heat pump systems for front offices
- Building Management System (BMS) upgrade
- Update Central Mechanical Plant chiller and thermal storage schedules to avoid peak demand periods

# Changes in Scope of Upgrades

- Parking Lot Car Canopy Solar PV – 110 kW
- Battery Energy Storage – 80 kW / 220 kWh
- LED Lighting Retrofit
  - Replace existing fluorescent lights with T8s, add Title 24 Energy Code compliant controls
- HVAC upgrades to Auditorium and 3 offices
  - 80 tons of heat pump cooling & heating for the Auditorium
  - 3 mini split heat pump systems for front offices
- Building Management System (BMS) upgrade
- Update Central Mechanical Plant chiller and thermal storage schedules to avoid peak demand periods

# Project Benefits

***Key Things to Note:***

- Improves resiliency of an important community center & creates a conditioned space for events
- Improves lighting throughout the building space
- Reduces site carbon emissions through electrification
- Eligible for over $588,000 of grants and incentives
- Replaces an out-of-date building controls systems
- Implements existing demand reduction capabilities at the CMP, providing a quick return on investment

***California Government Code 4217 Compliant***

- ✓ Anticipated cost of energy will be less than if the County does ***not*** proceed with the proposed project
- ✓ Project provides significant verifiable savings
- ✓ Using projected utility escalation rates paired with incentives and rebates, marginal project costs & staff time are covered by savings

# Alignment with County Strategic Plan

## Climate Action and Resiliency Pillar

- **Goal 3**: Make all County facilities carbon free, zero waste, and resilient
  - **Objective 3.1**: Design or retrofit County facilities to be carbon neutral, zero waste, and incorporate resilient construction techniques and materials.
  - **Objective 3.3**: Invest in County owned facilities, establishing carbon eliminating microgrid technology and improving energy grid resilience to reduce the impact of power loss during power shutdowns and natural disasters (floors, fires, earthquakes), prioritizing critical infrastructure such as command and communications facilities.

## Resilient Infrastructure Pillar

- **Goal 2**: Invest in capital systems to ensure continuity of operations and disaster response.
  - **Objective 2.2**: Invest in electric power resiliency projects at County facilities, including Veteran's Buildings, used for evacuation sites, warming/cooling centers, or as alternate work facilities for delivery of critical services.

# Project Cost & Funding

# Project Costs

| | |
|---|---|
| • Comprehensive LED lighting retrofit | $57,667 |
| • Carport Solar Photovoltaic (PV) Array 110.7 kW | $494,571 |
| • HVAC replacement and decarbonization/electrification | $522,359 |
| • Battery Energy Storage System (BESS) & Microgrid | $298,239 |
| • Building Management System (BMS) upgrade | $231,260 |
| • Analyze and align CMP time of energy use | incl. in SST IGA |
| • Monitor, verify, and adjust for optimization | $45,000 |
| • Permits, licenses, sub risk, and contingencies | $267,411 |
| • Contractor labor and management | $592,503 |
| • Contractor overhead | $320,321 |
| • Contractor profit | $123,201 |
| • SST Program fee | $290,753 |
| ***Subtotal = SST Costs*** | ***$3,243,290*** |
| • SPI staff oversight and contingencies | $303,430 |
| ***Subtotal = SST + SPI Costs*** | ***$3,546,720*** |

# Project Funding & Gaps

| | |
|---|---|
| • Climate Resilience Fund award (February 1, 2022) | ($1,771,230) |
| • Self-Generation Incentive Program (SGIP)[1] related to the BESS | ($122,400) |
| • Inflation Reduction Act (IRA) Local Government Investment Tax Credit Direct Pay Option[2] | ($466,010) |
| *Subtotal = Awards + Incentives* | *($2,359,640)* |
| ***Net Project Cost w/o financing*** | ***$1,187,080*** |
| ***Additional funds needed for initial award*** | ***$1,775,460*** |

(1) With prior Board approval in June of 2020, Energy and Sustainability staff applied for and secured SGIP incentive funds through an administered lottery process. Incentive funds are reserved for the Santa Rosa Veteran's location for up to $170,000 towards the cost of a 210 kWh capacity battery energy storage system located on-site.

(2) Program guidelines for the Inflation Reduction Act (IRA) Local Government Investment Tax Credit Direct Pay Option have not been finalized and may require a discount of up to 15% where the qualifying project is financed.

# Project Scope & Cost Changes

Project costs have increased since the original scoping:

| | |
|---|---|
| • Original project cost excluding staff costs and incentives | $1,771,230 |
| • Installation cost increase | $1,472,060 |
| • The SST installation cost (based on bids) | $3,243,290 |
| • Staff oversight and management cost | $303,430 |
| • **Current project cost** | **$3,546,720** |
| • *Value of incentives* | *$588,410* |

Cost increases to the project from the original scoping are due primarily to:

- Changes in equipment and addition of SPI oversight and contingency costs;
- Refinement in cost estimates from preliminary energy assessment to investment grade audit; and
- Construction and materials cost increases from 2020/21 to 2023.

# Funding Options

- Finance through SST with  a Tax-exempt Equipment Lease Purchase
  - Project costs $3,546,720
  - Less CRF award -$1,771,230
  - Project cost to be financed $1,775,460
  - Estimated capitalized Interest (financed) $81,600
  - Estimated finance charges (@4.54%) $1,008,134
  - **Total cost if financed** **$4,636,454**
- Finance through another lender
- Fund with General Fund Contingencies
- Fund from Deferred Maintenance Fund

# Projected Overall Return

- Project Cost is **$3,546,720**
- Project cost if financed is **$4,636,454**
- Incentives applied after completion save **$588,410**
- Projected annual savings from CMP load rescheduling is **$125,000**
- Total Projected Value of Energy Savings and Incentives: **$5,580,955**
- On a net metering basis, the new solar PV will **generate all needed electricity** at Santa Rosa Veterans Building
- Project reduces over **800,000 lbs of lifetime C02 emissions reduction**

# Using SST
# &
# Government Code 4217

# Government Code 4217

- Provides a streamlined path to contracting and financing
- Requires specific findings to use the streamlining
  - The total cost is less than the total savings (4217.12)
  - The project is in the best interests of the County (4217.12)
  - The lease payments can be made from the savings (4217.13)

Note: The estimated interest rate is 4.54% but the financing isn't locked until the contract is executed, analyses were also run at a higher rate of 6% to verify findings can still be made.

# GC 4217.12 – Contracting

GC 4217.12 requires a finding: That the County cost of the proposed energy and conservation services and measures is less than the anticipated costs for energy that otherwise will be consumed by the County at the Building, and that the terms of the Contract are in the best interests of the County.

- Total cost with financing $4,636,454
- Expected operation & maintenance $305,822
- All project costs $4,942,276
- Estimated savings, including incentives $5,511,054

*Note: total cost at 6% is $5,358,712 and still supports the required finding.*

# GC 4217.13 – Financing

GC 4217.13 requires the finding: That funds for the repayment of the financing and/or the cost of design, construction, and operation of the energy conservation facility, are projected to be available from funding that otherwise would have been used for purchase of energy in the absence of the energy conservation facility.

- Estimated annual TELP lease payments $143,261
- Estimated annual savings $177,822 - $268,832

*Notes on Savings: Incentives were spread over multiple years. Savings increase as energy prices increase. Energy price escalation rate of 5% used, which is less than the average increase of 8.25%. The lease payment at a financing rate of 6% is $161,910 and still supports the required finding.*

# Alternative Scenarios

# Assessing Alternatives

- Efficiencies in project implementation and management mean the project elements are more costly if implemented individually.
- Due to building code requirements and other constraints, only certain equipment groupings are viable.
- All alternative scenarios were evaluated at a financing interest rate of 4.54% and at a cap of 6%; all other parameters remain the same.

# Alterntaive Package #1:
# Solar, Battery Storage, and LED Lighting

| | |
|---|---|
| • Comprehensive LED lighting retrofit | |
| • Carport Solar Photovoltaic (PV) Array 110.7 kW | |
| • Battery Energy Storage System (BESS) & Microgrid | |
| • Project installation costs | $2,203,097 |
| • Project costs if financed at 4.54% | $3,020,157 |
| • Estimated annual lease payment | $107,508 |
| • CRF award | $870,000 |
| • Incentives reimbursed after completion | $588,410 |
| • Total savings | $3,612,480 |
| • Estimated annual savings | $107,510 to $122,212 |

# Alterntaive Package #2 + 3:
# Heating & Cooling + Building Mgmt + CMP sched.

| | |
|---|---|
| • Heating & Cooling replacement | |
| • Building Management System | |
| • CMP energy scheduling optimization | |
| • Project installation costs | $1,553,388 |
| • Project costs if financed at 4.54% | $1,953,017 |
| • Estimated annual lease payment | $56,218 |
| • CRF award | $901,230 |
| • Incentives reimbursed after completion | none |
| • Total savings | $2,328,674 |
| • Estimated annual savings | $70,969 to $179,336 |

# Project Contacts

**County of Sonoma**

Barbara Lee, Climate Action and Resiliency Director

Barbara.Lee@sonoma-county.org

Johannes Hoevertsz, Sonoma County Public Infrastructure Director

johannes.hoevertsz@sonoma-county.org

Christine Condon, Climate Action and Resiliency Energy and Sustainability Analyst

Christine.Condon@sonoma-county.org

**Pacific Gas and Electric (PG&E)**

David Carter, Sustainable Solutions Turnkey Program

d6c4@pge.com

**Willdan Performance Engineering (Willdan Group)**

Eddie Sladek, Project Development Engineer

esladek@willdan.com

Stephen Gribble , Project Development Engineer

sgribble@willdan.com

# Supporting Information

# Project Overview

| | | | | COST, PROJECTED SAVINGS & INCENTIVES | | | | | | | | | ENERGY & EMISSIONS REDUCTION | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | SCOPE # | ENERGY CONSERVATION | SCOPE OF WORK SUMMARY | TURNKEY COST | UTILITY SAVINGS | O&M SAVINGS | TOTAL SAVINGS | GRANTS & INCENTIVES | SIMPLE PAYBACK (YEARS) | RESILIENCY / EMERGENCY PREPAREDNESS | MICROGRID | EUL | Annual kWh savings / generation | Annual Natural Gas Savings, therms | Annual C02e saving annual, lbs | Lifetime CO2e savings, lbs |
| *Scope of Work* | *1.1* | **LED Lighting Retrofit** | Comprehensive type B LED lighting replacement | **$224,870** | **$6,730** | **$415** | **$7,145** | **$0** | **+20 yrs** | | | **20** | **22,430** | **0** | **1,530** | **30,600** |
| | *3.2* | **HVAC Replacement** | Replace hot water boiler serving auditorium with electric heat pump. Add three mini splits to front offices. | **$1,023,800** | **($7,410)** | **($1,800)** | **($9,210)** | **$0** | **NP** | **X** | | **20** | **(24,710)** | **1,770** | **22,120** | **442,400** |
| | *4.2* | **Car Canopy Solar** | Install 110 kW car canopy PV array, North lot | **$974,790** | **$39,010** | **($2,210)** | **$36,800** | **$292,440** | **18.5** | **X** | | **35** | **165,990** | **0** | **11,290** | **395,150** |
| | *5* | **BESS** | Install 80 kW BESS | **$578,570** | **$4,260** | **($2,700)** | **$1,560** | **$295,970** | **+20 yrs** | **X** | **X** | **20** | **(5,790)** | **0** | **(390)** | **(7,800)** |
| | *7* | **BMS** | Bring all building systems into one remotely controllable front end | **$396,260** | **$0** | **$0** | **$0** | **$0** | **NP** | **X** | **X** | **25** | **0** | **0** | **0** | **0** |
| | *9* | **CMP Chiller Schedule Update** | Provide CMP chiller schedule. Provide 3 years of quarterly M&V to confirm savings. Only capturing 1/2 of the utility savings. | **$45,000** | **$62,500** | **$0** | **$62,500** | **$0** | **0.7** | | | **20** | **0** | **0** | **0** | **0** |
| | - | **IGA** | Phase 1 investment grade audit | **$2,750** | - | - | - | - | - | - | - | - | - | - | - | - |
| | | | ***Total*** | **$3,246,040** | **$105,090** | **($6,295)** | **$98,795** | **$518,510** | **+20 yrs** | | | | **157,920** | **1,770** | **34,550** | **860,350** |

# Equipment Expected Useful Life (EUL)

| | SCOPE # | ENERGY CONSERVATION MEASURE | EUL | Scope | Source | Reasoning |
|---|---|---|---|---|---|---|
| *Scope of Work* | *1.1* | **LED Lighting Retrofit** | 20 | LED retrofit | Manufacture's L70 rating is generally >= 50,000 hours for LED T8 tubes, including the product selected for this project. | All spaces based on 2019 data (with exception of the 3 offices), run less than 1800 hours per year. L70 rating on the LED tubes is more than 20 years of use. |
| | *3.2* | **HVAC Replacement** | 20 | New heat pump and three DX split systems | ASHRAE Service Life and Maintenance Cost Database. Database tracking 344 buildings and equipment. | Generally we advise facilities to start thinking about replacing packaged HVAC equipment around 15 years and older. This allows time to replace at or around 20 years. The ASHRAE database shows DX split systems, currently in service (i.e. still working), at a median age of 19 years. Projected median EUL to exceed 20 years. The proposed heat pump does not have it's own category in the ASHRAE database, but is similar to a Packaged DX unit and shows a median age of 22 years at time of replacement. |
| | *4.2* | **Car Canopy Solar** | 35 | Solar PV system | National Renewable Energy Laboratory (NREL) states a 25 to 35 year useful life and Department of Energy (DOE) states a 30 to 35 year range. | Two government agencies support the 35 year EUL. The inverter will likely need to be replaced during this time frame and is accounted for in the cash flow. |
| | *5* | **BESS** | 20 | Battery energy storage system | Battery manufacture designs and tests batteries for ~15 years of cycles at a ~95% battery discharge. | The battery was not modeled to be discharged fully every day for SRVH. The battery reserves capacity for grid outages to provide resiliency. The reserved capacity greatly lowers the utilization of the battery and the strain on the system. Thus, it would be reasonable to expect the battery to last longer than 15 years. The integrated thermal management system, filters, and UPS battery will all need to be maintained. |
| | *7* | **BMS** | 25 | Building management system | ASHRAE Service Life and Maintenance Cost Database. Database tracking 344 buildings and equipment. | Median age of DDC systems when replaced is 25 years per ASHRAE database. |

| Scope | Source / Note |
|---|---|
| 3.2 | http://weblegacy.ashrae.org/publicdatabase/default.asp |
| 4.2 | https://www.nrel.gov/analysis/tech-footprint.html |
| 4.2 | https://www.energy.gov/eere/solar/end-life-management-solar-photovoltaics |
| 7 | http://weblegacy.ashrae.org/publicdatabase/default.asp |
| All | EUL depends on the systems being properly maintained and used as expected. EULs often exceed warranties provided by manufactures. |

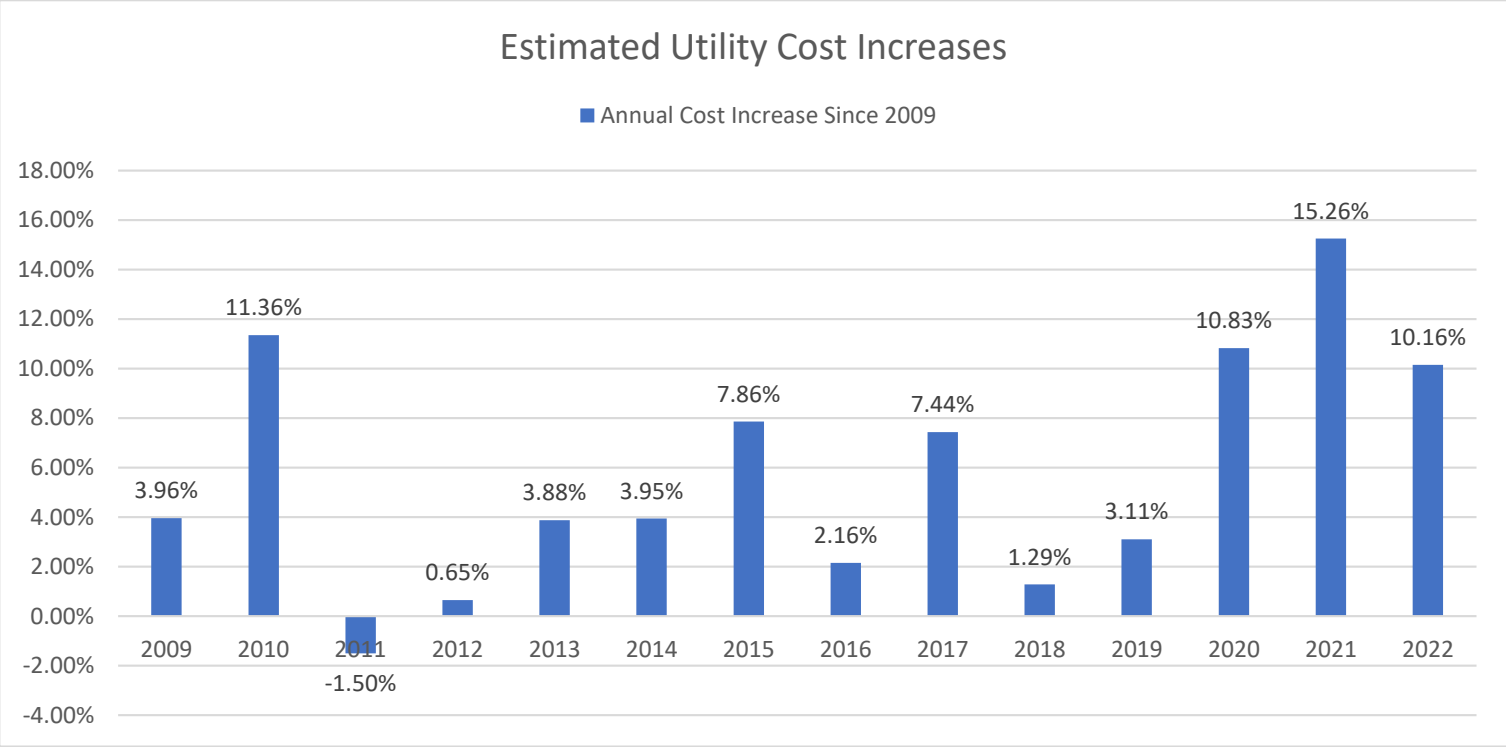
# Illustrative Cashflow Overview
# SST Phase 1-SRVH & CMP

| Financing Assumptions | |
|---|---|
| Total Project Cost including IGA | $3,246,040 |
| County Contribution | $1,467,800 |
| Financing IDC, related to construction schedule | $81,600 |
| Total Financed with TELP or Bond | $1,859,840 |
| Financing Term, years | 20 |
| Indicative Financing Interest Rate | 4.54% |
| Utility Escalation | 5.00% |
| Solar Degradation | 0.50% |
| Solar ITC credit | 25.50% |
| BESS ITC credit | 25.50% |
| NEM 3.0 Reduction @ 20 years | 30.00% |
| O&M Escalation Rate | 3.00% |

**Sonoma County - Indicative Financial Proforma w/ 20-Year Tax Exempt Lease Purchase**

| Year | Energy Savings | SGIP Incentive | ITC | Incentives (SGIP & ITC) | Total Yearly Savings | Principle Payment | Interest Payment | Lease Payments | O & M Cost (Solar, EV, etc.) | Total Yearly Program Costs | Yearly Net Savings |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year 1 | $110,128 | $61,200 | $396,110 | $457,310 | $567,438 | $59,037 | $84,437 | $143,473 | $6,484 | $149,957 | $417,481 |
| Year 2 | $115,408 | $20,400 | | $20,400 | $135,808 | $61,717 | $81,756 | $143,473 | $6,678 | $150,152 | -$14,343 |
| Year 3 | $120,943 | $20,400 | | $20,400 | $141,343 | $64,519 | $78,955 | $143,473 | $6,879 | $150,352 | -$9,009 |
| Year 4 | $126,743 | $20,400 | | $20,400 | $147,143 | $67,448 | $76,025 | $143,473 | $7,085 | $150,558 | -$3,416 |
| Year 5 | $132,822 | | | | $132,822 | $70,510 | $72,963 | $143,473 | $8,457 | $151,930 | -$19,108 |
| Year 6 | $139,194 | | | | $139,194 | $73,711 | $69,762 | $143,473 | $7,517 | $150,990 | -$11,796 |
| Year 7 | $145,871 | | | | $145,871 | $77,058 | $66,416 | $143,473 | $7,742 | $151,215 | -$5,344 |
| Year 8 | $152,871 | | | | $152,871 | $80,556 | $62,917 | $143,473 | $7,974 | $151,448 | $1,423 |
| Year 9 | $160,206 | | | | $160,206 | $84,213 | $59,260 | $143,473 | $8,214 | $151,687 | $8,520 |
| Year 10 | $167,895 | | | | $167,895 | $88,037 | $55,437 | $143,473 | $9,804 | $153,277 | $14,618 |
| Year 11 | $175,954 | | | | $175,954 | $92,034 | $51,440 | $143,473 | $8,714 | $152,187 | $23,767 |
| Year 12 | $184,401 | | | | $184,401 | $96,212 | $47,261 | $143,473 | $8,975 | $152,448 | $31,952 |
| Year 13 | $193,254 | | | | $193,254 | $100,580 | $42,893 | $143,473 | $9,244 | $152,718 | $40,536 |
| Year 14 | $202,533 | | | | $202,533 | $105,146 | $38,327 | $143,473 | $9,522 | $152,995 | $49,538 |
| Year 15 | $212,259 | | | | $212,259 | $109,920 | $33,553 | $143,473 | $11,365 | $154,839 | $57,420 |
| Year 16 | $222,453 | | | | $222,453 | $114,910 | $28,563 | $143,473 | $10,102 | $153,575 | $68,878 |
| Year 17 | $233,138 | | | | $233,138 | $120,127 | $23,346 | $143,473 | $10,405 | $153,878 | $79,260 |
| Year 18 | $244,338 | | | | $244,338 | $125,581 | $17,892 | $143,473 | $61,790 | $205,263 | $39,075 |
| Year 19 | $256,077 | | | | $256,077 | $131,282 | $12,191 | $143,473 | $11,038 | $154,512 | $101,566 |
| Year 20 | $268,382 | | | | $268,382 | $137,243 | $6,231 | $143,473 | $11,369 | $154,843 | $113,539 |
| Year 25 | $81,990 | | | | $81,990 | | | | $4,627 | $4,627 | $77,363 |
| Year 30 | $102,052 | | | | $102,052 | | | | $5,364 | $5,364 | $96,688 |
| Year 35 | $127,024 | | | | $127,024 | | | | $6,219 | $6,219 | $120,805 |
| **Total** | **$4,992,545** | **$122,400** | **$396,110** | **$518,510** | **$5,511,055** | **$1,859,840** | **$1,009,626** | **$2,869,466** | **$305,822** | **$3,175,289** | **$2,335,766** |

# Indicative Escalation Rate 2009-2022




- Estimates Rate Increases – Actual account increases may vary based on tariff and usage
- B20 rates have averaged an increase of 8.25% per year from 2009 to 2022

Source: Utility Dive / PG&E Historical Tariff Data
Notes: The escalation rate analysis is based on historical PG&E tariff data and provided by PG&E to support utility rate escalation rate projections in accordance with GC 4217.15