Coachella Valley Mosquito Vector Control District

Investment Grade Audit

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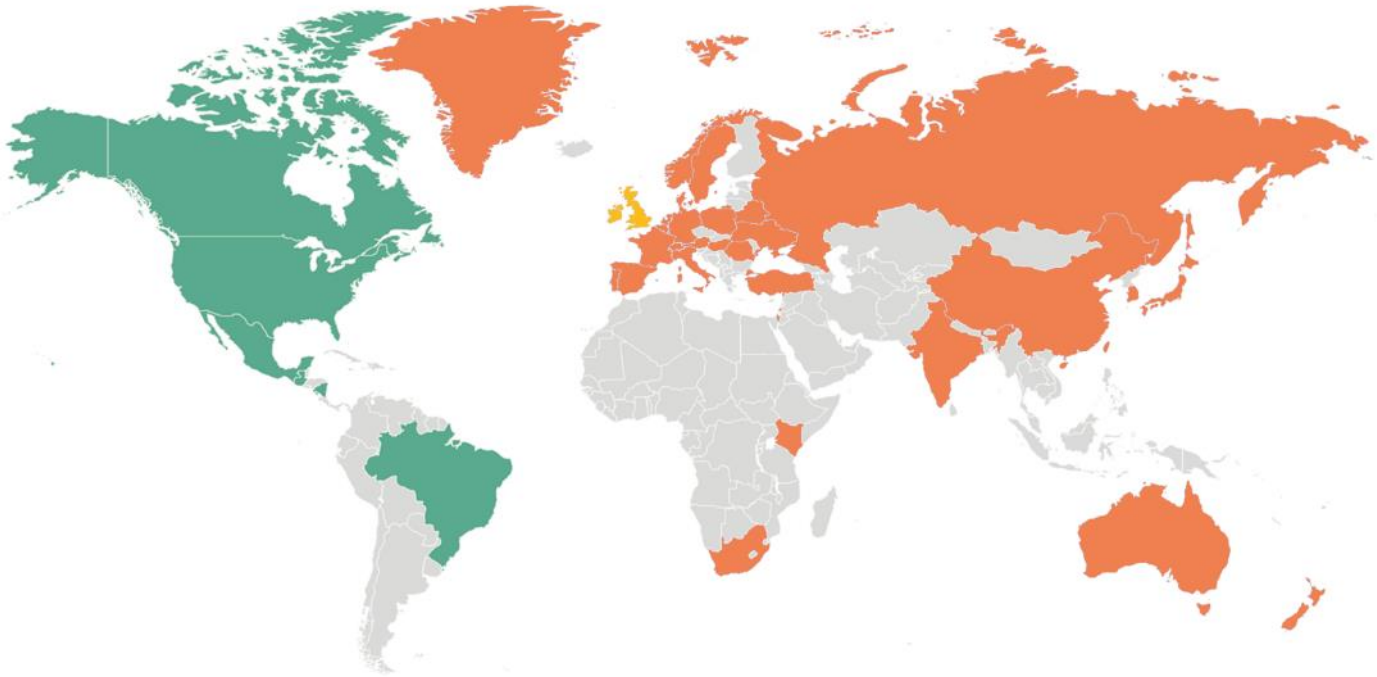
We collaborate with commercial, industrial and public organizations with a large or critical need for energy around the world



Number of client sites

2,301 Americas

1,714 UK&I

2,055 International

NAESCO
National Association of Energy Service Companies

U.S. DEPARTMENT OF ENERGY

9K+

solar PV systems installed in the US

20K+

energy efficiency upgrades completed in the US

4k

commercial EV chargers installed, including 350+ DC Chargers

1,100

assets managed including solar, storage, fuel cells and CHP

Centrica is the Leading Sustainable Energy Solutions Integrator (EPC) in North America

$33b

Group revenue in 2022

6K+

customer sites proudly supported around the world

A Roadmap for Success

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Discovery (PFA)

Site Walk
- ASHRAE Level 1 Energy Audit
- Identify all energy efficiency measures, needs for energy and locations for energy production
- Verify main meter and specifications

Discovery Meeting
- Collaborate on needs and goals
- Identify priorities and sites
- Review energy usage profile

Development (IGA)

Preliminary Feasibility Assessment
- Present indicative design, budgetary savings and cash flow analysis
- Collaboration on project scope to be evaluated in IGA
- Board Resolution/LOI to move to IGA

Investment Grade Audit
- ASHRAE Level 3 Energy Audit
- Comprehensive field audit & data gathering
- Detailed savings and firm costs
- Measurement & Verification Methodology
- Detailed Report

Scope Review
- Firm up scope in Toggling Session
- Determine M&V and Other Service Needs

Project Approval & Financing
- Execute contract for SOW and services
- Facilitate Financing

Implementation

Design & Engineering
- Develop specifications and design drawings
- Permitting and approvals

Construction
- Site preparation and safety plans
- Implementation of all agreed upon measures
- Inspections and commissioning

Completion
- Customer acceptance
- Training
- As-built package
- Warranty registration

Measurement & Verification
- Validation of calculated savings
- Proactive monitoring
- Annual true-up reporting

Equipment O&M Services
- Preventative Maintenance
- Non-scheduled Services

On-going Support Services

Condition Assessment

The IGA site walk revealed the following site conditions:

- Various areas throughout facility utilize linear fluorescent and HID lighting
- Current HVAC Building Management System (BMS) is not fully integrated into entire site and difficult to service with current provider
- Old HVAC Equipment reaching end of life (24 years old on average)
- Need for EV charging stations for fleet electrification (secured commitment from IID if done now)
- Opportunity for on site solar production to offset grid usage and electric vehicle charging
- Existing solar has degraded to the point of failure and is in need of replacement

Condition Assessment

Existing thermostats to be replaced with networkable thermostats connected to BMS

Exterior carport fluorescent lighting to be replaced with LED lighting and brought up to code

Solar PV inverters which are not functioning properly connected to 2009 system

Interior fluorescent lighting to be replaced with LEDs

24 year old HVAC package unit in need of replacement

Pathway to Maximum Efficiency

LED Lighting

- Replace linear fluorescent and HID technology with efficient, long-lasting LED retrofit kits and fixtures
- Install lighting controls to comply with CA Title 24 Energy Code

HVAC Building Management System (BMS) Upgrade

- Remove old Johnson Control system with a new open-source BMS for client's ease of use
- Integrate other areas not on the BMS system with new controls and have access to those control points through the new HVAC BMS

HVAC Unit Replacement

- Replace 8 aging HVAC equipment with higher efficiency in kind systems

Solar Replacement (PV)

- Replace existing solar photovoltaic arrays built in 2009 w/ a new system in its entirety

New Solar Photovoltaics (PV)

- Install flush-mount PV arrays on existing shade structures and roofs to offset usage from the Laboratory meter

EV Charge Stations

- Install 4 Dual-Port charging stations (8 ports total) for first phase of fleet electrification
- Main service, switchgear, and infrastructure upgrade to ensure electric fleet expansion readiness

Lighting Upgrade

Recommended Solution

Replace fluorescent and HID lighting with high efficiency LED technology and controls as required by Title 24.

Cost Considerations

LED lighting has a longer lifespan as well as uses less energy than fluorescent and HID lights. This FIM delivers savings by lowering energy usage and reducing replacement costs over the lifetime of the product.

HVAC Upgrade

Recommended Solution

Replace 8 HVAC units across the facility with high efficiency units

Cost Considerations

This FIM will generate savings by replacing older end of life HVAC units with high efficiency units. These higher efficiency units will use less energy to generate the same space temperatures.

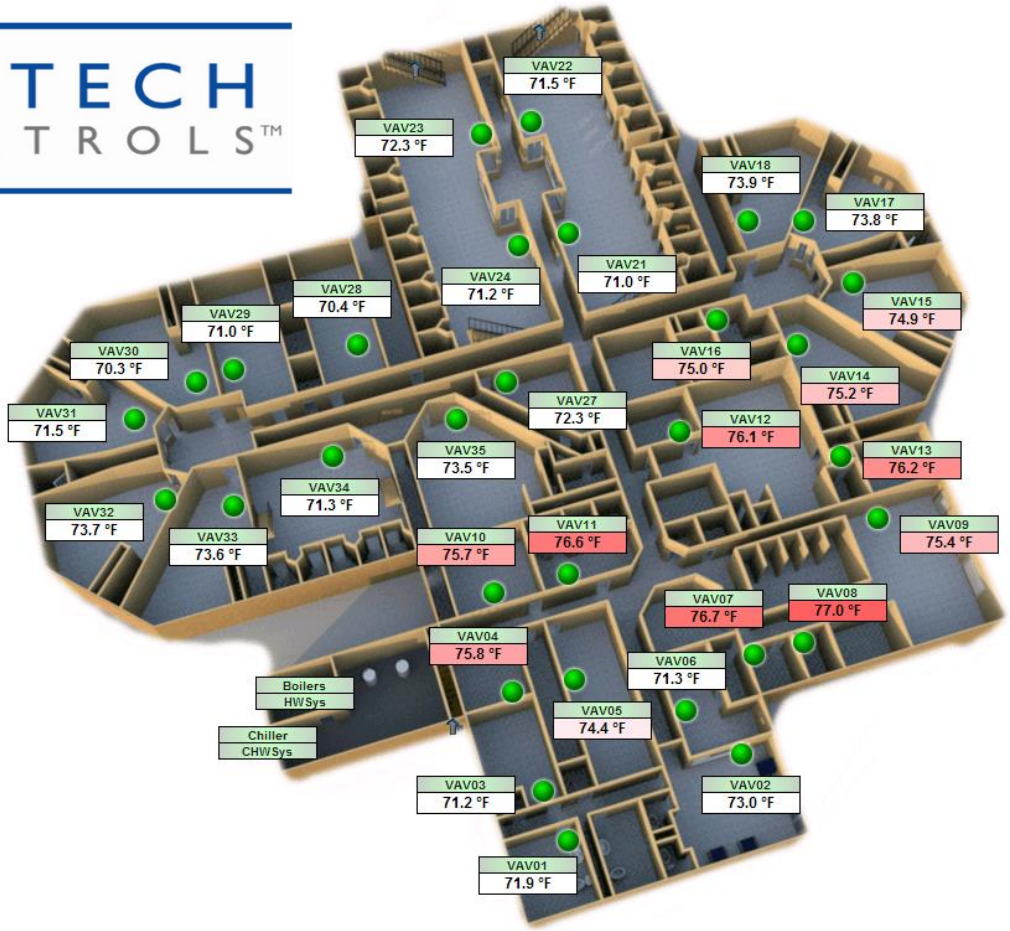
BMS Upgrade

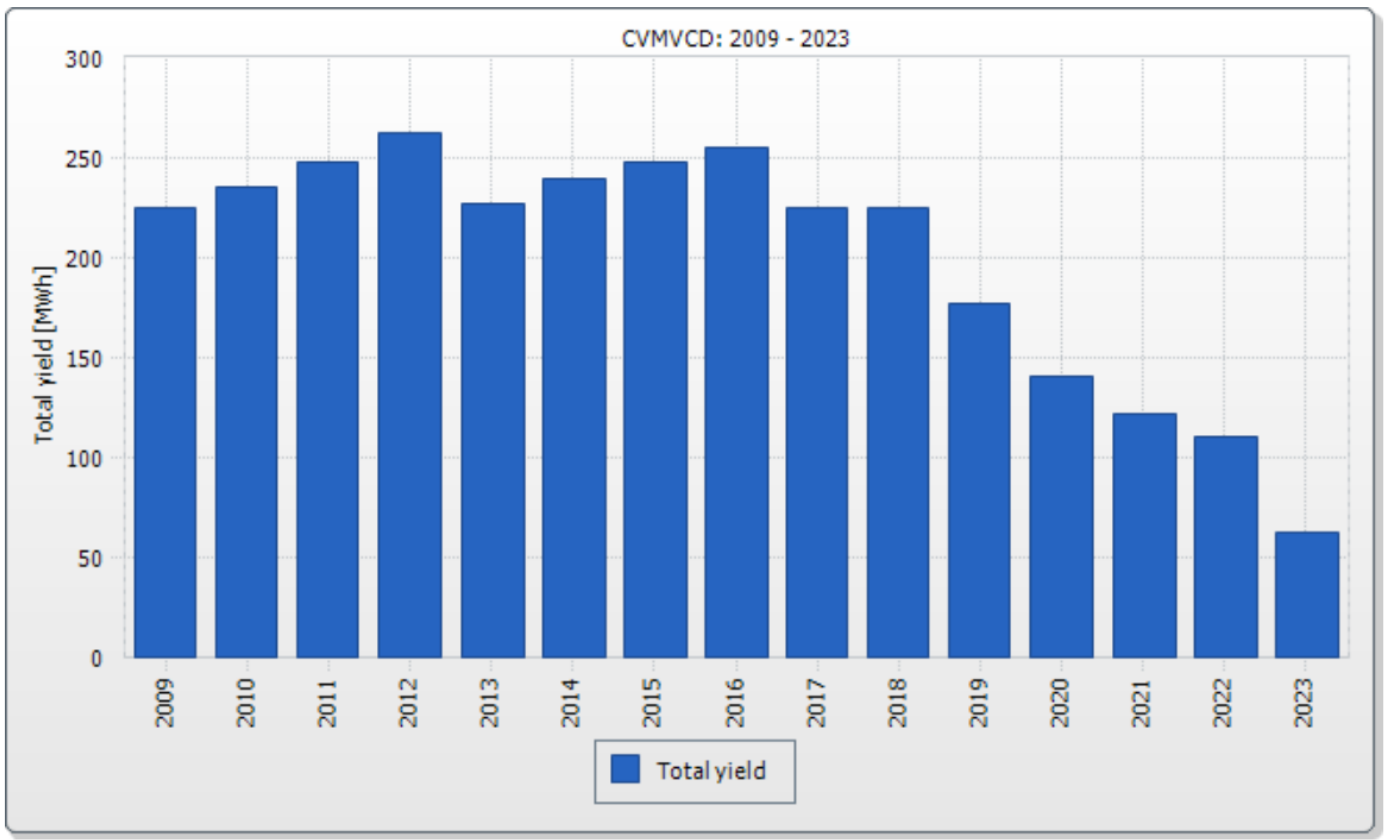
Recommended Solution

Replace existing Johnson controls BMS with Distech Controls system and integrate HVAC for site wide temperature controls.

Cost Considerations

BMS savings come from better control over space temperatures and setpoints as well as better control over equipment use. This FIM's savings come from controlled space temperature setpoints and schedules, reducing unwanted HVAC waste. The other piece of savings come from VFD controls which put fans into a partial loading condition to reduce power consumption when there is lower demand for HVAC.





Current Solar PV Operation (2009 install)

Current Problems

- Existing Solar PV system only producing a fraction of expected production
- Failing inverters
- Electrical work not up to code
- Underground conductors not rated for the application

- Existing PV System Size (kW AC): 126
- Annual Production of 2009 PV (kWh): 64,000

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Solar Photovoltaics Existing System Replacement

Features and benefits

Install approx. **120 kW-AC** flush mounted solar PV arrays over existing carport

Fully replace all solar PV component (inverters, wire, panels, conduit)

All panels will be recycled through a certified company and waste disposed of properly

- Overall PV System Size (kW AC): 120
- Expected Annual Production (kWh): 255,000
- Gain in production (kWh): 191,000
- Expected Annual Electric Offset:
  - 100% (from baseline of Office Meter)

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Solar Photovoltaics New System

Features and benefits

Install approx. **272 kW-AC** flush mounted solar PV arrays over existing carport/ shade structures and building roofs.

- Overall PV System Size (kW AC): 272
- Expected Annual Production (kWh): 464,000
- Expected Annual Electric Offset:
  - 100% (from baseline of Laboratory Meter)
  - 75% (EV usage)

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Electric Vehicle (EV) Charger Details

Recommended Solution- Phase 1

4 - Level 2 Dual-Port “Fleet” EV Chargers
19 kW AC input power
Proposed infrastructure will accommodate expansion to 30 charging ports

Cost Considerations

Cost savings come from the difference in avoided cost of fuel and increased cost of electricity. The fueling cost per mile is considerably less with electric charging compared to gasoline. This means that every mile driven is saving the district money.

Utility Considerations

Each charger shall require up to 80A at 208V. Plan service upgrade accordingly.
IID Has confirmed that the capacity required for this utility upgrade is available. There is not an indefinite availability and they requested project confirmation to hold the capacity for the upgrade.

EV Charger Conclusions and Recommendations

Increase grid consumption for EV will be 75% offset by proposed 272 kW-AC solar PV array
Utility upgrade will ensure future readiness for full fleet electrification of CVMVCD’s 59 vehicles
Fuel savings from EV’s will help to pay for charge stations and utility upgrade

Electric Vehicle (EV) Charger Savings

CVMVCD Information

From CVMVCD we received a lot of help and information developing the savings for this FIM. Key among that information was the average vehicle milage and fleet composition. From CVMVCD information we received the following:
-Average milage of 4,345 per vehicle
-59 fleet vehicles

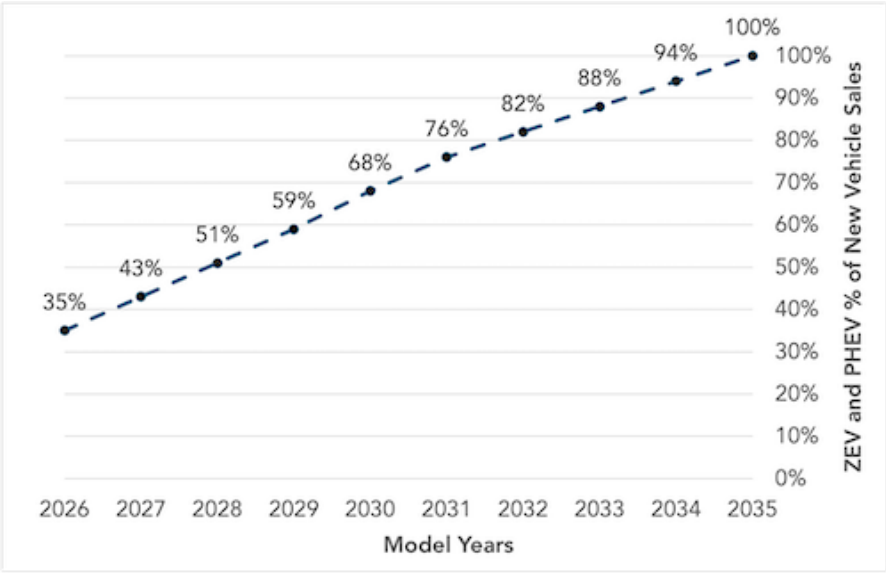
Savings Methodology

To develop a methodology for savings we used the difference between the increased cost of electricity and avoided cost of gasoline. To determine an annual savings, we needed to determine a fleet changeover schedule. Based on conversations with CVMVCD staff and the fleet inventory we arrived at the following fleet changeover schedule.

Results

As the district replaces more fleet vehicles with EV's the savings from use will increase. We have modeled replacement on 2 factors, age of fleet vehicles and expected percentage of new EV sales from CARB. This projects a full fleet changeover by 2040 with 35 EV's in the fleet by 2030.

Year	Number of EV's purchased
2024	0
2025	0
2026	0
2027	4
2028	9
2029	8
2030	14
2031	1
2032	
2033	1
2034	
2035	
2036	1
2037	4
2038	8
2039	7
2040	2



https://ww2.arb.ca.gov/our-work/programs/advanced-clean-cars-program/advanced-clean-cars-ii

FIM Cost Breakdown

FIM Name	kWh Savings (kWh/yr)	Cost Savings ($/yr)	Maintenance Savings ($/yr)	Tax Incentives	Green House Gas Reduction (Ton-CO2/yr)	FIM Cost
LED Lighting	82,500	$13,519	$3,209		39 Tons	$212,804
HVAC Upgrade	6,300	$1,502	$4,000		4 Tons	$305,461
BMS Upgrade	31,600	$6,194			18 Tons	$179,092
EV Charger + Utility Upgrade	-109,000	Calculated by vehicle purchases				$1,340,682
New Solar PV System	464,000	$58,445		$493,274	220 Tons	$1,450,803
Existing Solar PV Replacement	191,000	$19,260		$186,918	91 Tons	$658,180
Total	666,400	$98,920	$7,209	$680,192	372 Tons	$4,147,022

The two scope adjustments discussed during the Ad Hoc Building Committee meeting we as follows
-Complete utility upgrade for EV charging and stop infrastructure at switchgear ROM price difference of $700,000
-Complete Utility upgrade and infrastructure up to stub up for EV chargers ROM price difference of $70,000
(These are ROM price numbers and will be finalized after scope determination and re-quote from subcontractor)

Annual Services Options

M&V Costing and Scope

Measurement and Verification (M&V) is a service where Centrica will guarantee savings on the project and then measure the savings each year of the M&V term. If the guaranteed savings are not met, then the District will be compensated.

Scope of M&V

Lighting: 1st year power measurement
HVAC: 1st year efficiency documentation
BMS: 10-year Fan VFD savings analysis
Solar: 10-year production monitoring
EV Charging: Stipulated (savings based on use which cannot be guaranteed)

Cost of M&V

Year 1: $14,211
Year 2-10: $6,583 with 3% annual escalation

O&M

The Operations and Maintenance (O&M) service is a service contract set for the duration of the M&V contract. To guarantee savings, Centrica requires an O&M contract to service the equipment and ensure it is operating correctly. Services are offered for 2 of the proposed FIMs.

Solar

The solar O&M contract provides 2 annual panel cleanings as well as inverter maintenance and servicing.
Cost: $34,080 (with 4% annual escalation or labor index increase, whichever is greater)

BMS

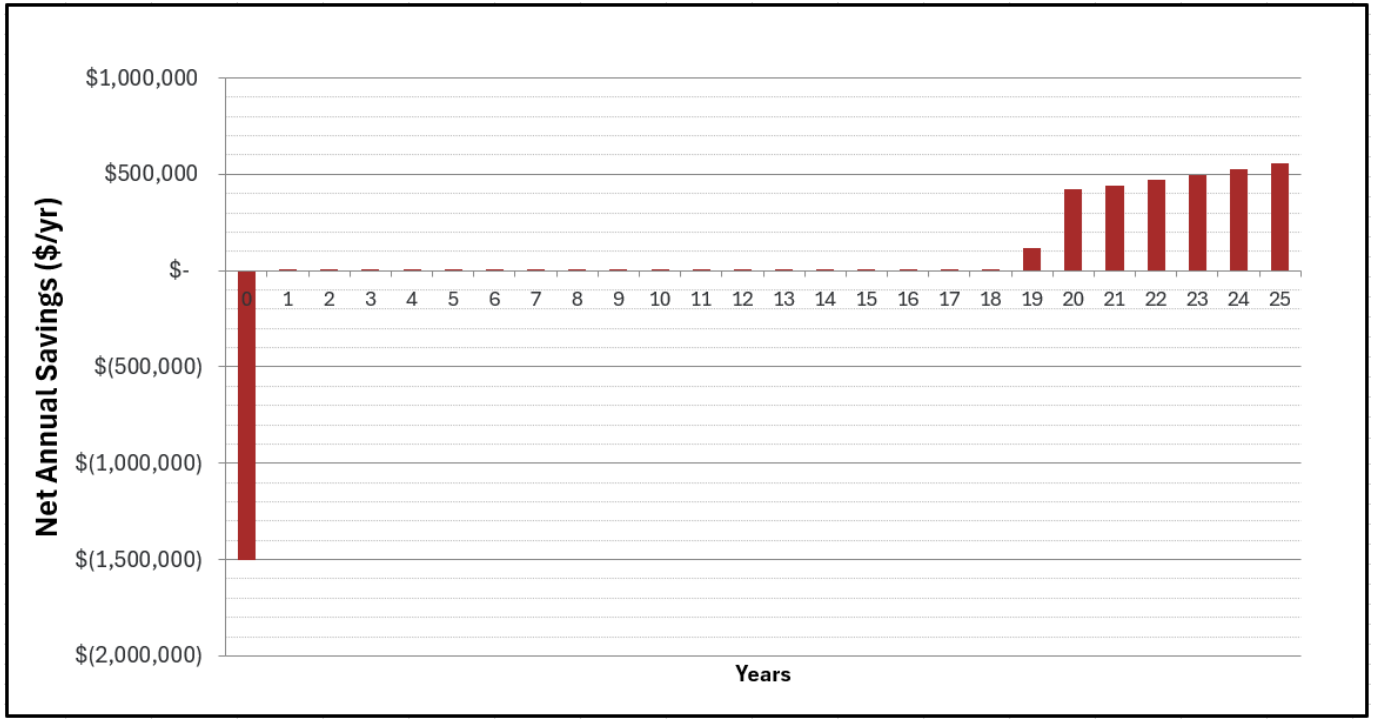
The BMS O&M contract provides 2 annual site visits for servicing and data backups, as well as 10 hours of included customer support.
Cost: $6,400 (with 4% annual escalation or labor index increase, whichever is greater)

Financed Project Financials

The following financials include a financed cashflow of the full turn-key installation of LED lighting, HVAC replacements, BMS controls, EV fuel savings, and solar PV as well as M&V and O&M for a 10 year Service Contract

Project Investment	$4,147,022
Indicative Interest Rate	4.65%
District Contribution	$1,500,000
Year 1 Cost Savings (Utility + Maintenance)	$106,129
Annual Service Cost (Year 1)	$54,691
Investment Tax Credit (IRA)	$680,192
25 Year Cumulative Cashflow	$1,481,000

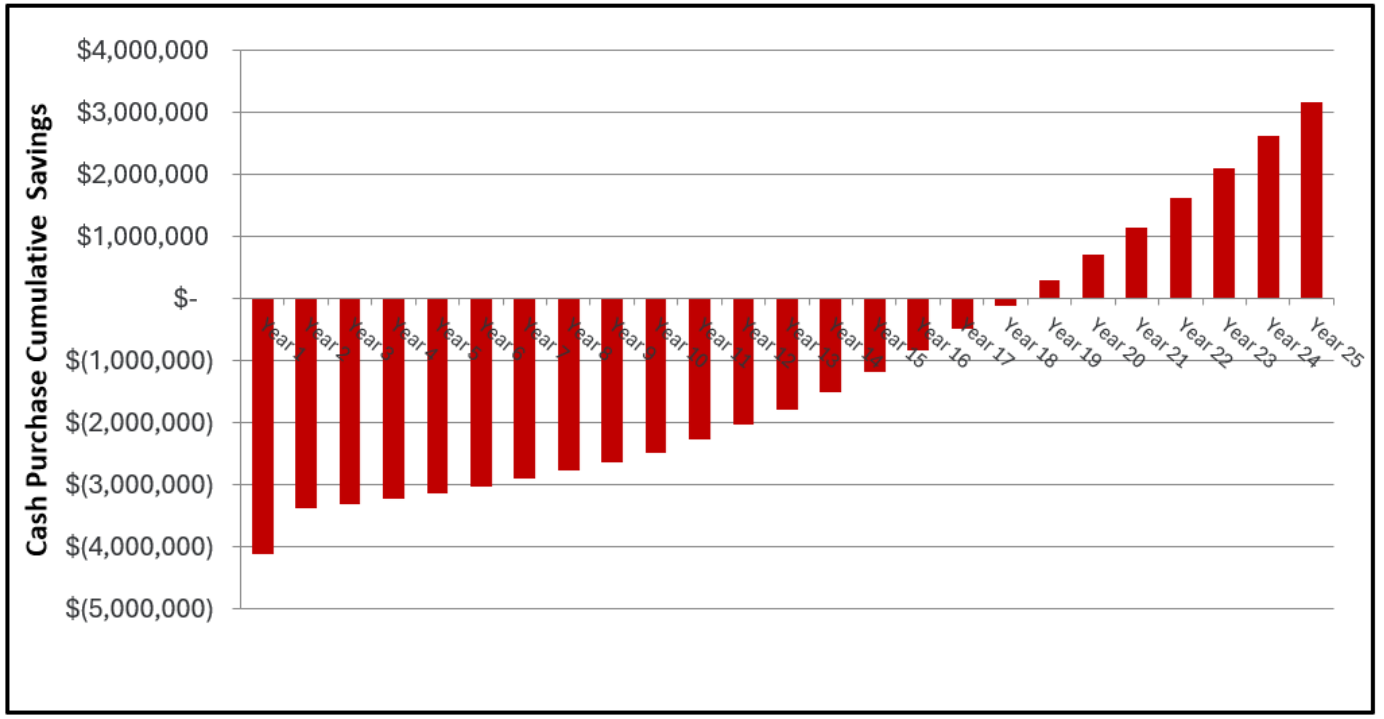
Budget Neutral Loan with Initial Project Investment



Cash Purchase Project Financials

The following financials include a cash purchase cashflow of the full turn-key installation of LED lighting, HVAC replacements, BMS controls, EV fuel savings, and solar PV as well as M&V and O&M for a 10 year Service Contract

Project Investment	$4,147,022
Year 1 Cost Savings (Utility + Maintenance)	$106,129
Annual Service Cost (Year 1)	$54,691
Investment Tax Credit (IRA)	$680,192
25 Year Cumulative Cashflow	$3,165,714



Battery Energy Storage Considerations

Battery Energy Storage Systems (BESS) may be implemented to accomplish various goals. The following applications are considered for the District:

Resiliency
BESS stores excess solar PV generation or grid energy to power building in the event of grid outage. BESS enables solar PV to generate in event of grid outage.
Demand Shaving and TOU Arbitrage may be used in conjunction w/ Resiliency application by upsizing BESS and reserving storage capacity.

Solar Storage Savings
The main savings for BESS would come from excess solar PV generation that is stored in the battery and discharged during the night to reduce grid usage. This comes out to about $0.06 / kWh. Assuming maximum utilization of this method the savings would be as follows:
-2 hour battery: $17,600
-4 hour battery: $35,200

Other Considerations for Battery Design

Demand Shaving
BESS stores excess solar PV generation or grid energy to decrease peak demand charges. The current rate structure for the laboratory building does not have demand charges. After solar installation there will be some demand charges during billing.
-Expected annual demand charges: ~$9,000
-75% demand savings: $6,750

Time of Use (TOU) Arbitrage
BESS stores excess solar PV generation or grid energy to decrease peak electric charges. IID does not do TOU metering so there will be no savings associated with arbitrage.

Savings Estimate
Centrica estimates avoided costs from Demand Savings and TOU Arbitrage to be 75% of the remaining energy and demand costs (post solar PV implementation).
-Estimated BESS Demand Savings: $6,750
-2 hour battery: $17,600
-4 hour battery: $35,200

Battery Energy Storage Consideration

Battery Back-up Investigation

During the IGA Centrica was asked to investigate the feasibility of a Battery Energy Storage System (BESS). We were asked to determine the size and cost of a BESS system for the laboratory. Based on the current usage profile, we developed 2 solutions. Those were a 2-hour and a 4-hour solution with no loss in facility functionality. The following are the preliminary cost estimates for these 2 solutions.

2 Hour BESS cost: $775,000 – simple payback of 33 years

4 Hour BESS cost: $1,195,000 – simple payback of 29 years

When designing a battery system, we look for a simple payback less than 13 years because that is the average lifespan of a battery cell. Even with the most aggressive savings model which sacrifices some of the emergency backup capability, the payback is far outside the range where it is financially viable.

Thank you!

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