Energy Conservation and Clean Energy Programs

Board Workshop

April 25, 2019

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Agenda

- Overview
- Energy Efficiency Programs & Initiatives
- Clean Energy Infrastructure Planning
  - 2016 Clean Energy Plan - CIP Projects Related to Clean Energy
  - 2019 Review of Clean Energy Plan
- Conclusions and Approach to Next Steps

Overview

- Energy Management at ACWD
  - Optimizing Operations for Energy Efficiency
  - Energy Conservation Initiatives
  - Infrastructure Designed for Energy Efficiency
- Approach Based Upon Prior Board Guidance
  - Minimize costs
  - Reduce energy consumption & GHG emissions
  - ACWD Strategic Plan
    - Goal #1: Cost Effectiveness & Value
    - Renewable Energy Initiative

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Overview

- Energy Efficiency and Conservation

- Clean Energy Initiatives

Background

- Overview
  - Provide ‘30,000 Foot View’ of Energy Programs
    - (Acronym Heavy…)
  - Goal:
    - Reduce Energy Use
    - Reduce Carbon Footprint
    - Save $

Background

- Budget
  - Power Budget is Housed in FMD
  - 77 Separate PG&E Accounts

Background

- Budget
  - $3,711,500 FY18-19
  - $73.9M FY18-19 O&M Operating Expense Budget
  - ~ 5% of Total Expense Budget

Background

- Programs
  - PG&E Government Accounts Representative
    - Regular Interaction
    - PDP
    - RES-BCT
    - EBCE
    - LED Lighting Retrofit Project
    - DR- Demand Response
    - APEP
    - Facilities Energy Assessment

Background

- Programs
  - Internal
    - Solar Panels (HQ)
    - Ops Changes
      - TOU (Time of Use)
      - Whitfield Flow-through
      - Well Maint & Sampling
    - Building Systems Controls
    - EV Charging Stations

PDP- Peak Day Pricing

- PG&E Can Declare Up to 15 ‘Event’ Days a Year (May 1– Oct 31)
- Reduce Energy Consumption From 2-6pm on Event Days for a Reduced Rate
- PG&E Installed Equipment to Automate

Bottom Line:

Started in 2010. Through 2018 **~$35,000** Saved **(~$4,500/yr** or **~$300/event**)

RES-BCT

- **R**enewable **E**nergy **S**elf-Generation **B**ill **C**redit **T**ransfer
- Formerly known as AB 2466
- Allows Local Gov’ts that generate excess ‘green’ power to receive credits
- Hydro-Turbines- Power TP1, TP2, & B16
  - Avoided Cost of ~ $38K/mo = ~ $450K/yr
- PG&E req’d equipment:
  - Relays, Power Output Meters, Batteries, etc.

RES-BCT Savings 2018

BOTTOM LINE:

2018 Date Range	Savings	Exported KWH
Jan 1 – Jan 22	$4,395.05	
Jan 22 – Feb 21	$4,313.56	67,174
Feb 22 – Mar 22	$0.00	0
March 22 – April 23	$1,425.64	20,578
April 23 – May 22	$9,386.66	124,189
May 23 – June 21	$14,342.92	182,919
June 21-July 23	$15,325.40	205,529
July 23-Aug 22	$14,646.44	194,487
Aug 22-Sept 23	$13,615.63	185,900
Sept 23 - Oct 23	$13,493.20	176,337
Oct 23 – Nov 25	$11,496.96	156,996
Nov 25 – Dec 23	$8,374.38	118,139
Total	**$110,815.84**	**1,432,248**

EBCE- East Bay Community Energy

- CCA- Community Choice Aggregation
  - aka CCE- Community Choice Energy
- Automatically Enrolled in June 2018
- Provides a 1.5% Discount for Enrolled Accts*
- RES-BCT Accounts Are Not Eligible/Included

- *CPUC Recently Ruled That PG&E Can Add 1.68% to Enrollees

LED Lighting Retrofit Project

- Upgrade Incandescent/ Fluorescent Lighting to LED at 5 District Facilities
  - TP1, TP2, Desal, Blender, HQ
- Qualified For ~$10K in Rebates
- OBF- On-Bill Financing- No Cost ‘Loan’

Bottom Line:

Saves ~$6,800/mo (~$80K/yr) in Energy Costs

* Savings at TP1 & TP2 Will Increase RES-BCT

Facilities Energy Assessment

- PG&E Recently Conducted Assessment of Facilities/Plants
- IML Report (Integrated Measures List)
- Provided Recommendations Based on Findings
  - i.e.; VFD installs, Pump Overhauls, etc.

Facilities Energy Assessment*

		Savings		Estimated			Simple
#	Measure	Peak kW	Annual kWh	Annual Cost Savings	Project Cost	Incentive	Payback
1	LEDs Remaining	5.5	11,440	$ 1,700	$ 17,000	$ -	10.0
2	TP2 Air Compressor	5.2	33,800	$ 5,000	$ 15,000	$ 2,418.00	2.5
3	Line Shaft Pumps	17.8	106,600	$ 21,320	$ 200,000	$ 4,635.00	9.2
4	APEP Pump Overhauls	93.0	699,300	$ 104,895	$ 750,000	$ 48,933.00	6.7
5	Mowry Pump VFDs	76.6	1,078,000	$ 150,920	$ 1,800,000	$ 70,425.00	11.5
6	Peralta-Tyson Pump VFDs	119.3	1,144,000	$ 160,160	$ 1,800,000	$ 77,587.50	10.8
Total		317.4	3,073,140	$ 443,995	$ 4,582,000	$ 203,998.50	9.9

*Note: Preliminary report- Staff still needs to analyze

Bottom Line: Potential to Save Energy, Save Money, and Receive Incentives on Equipment

DR- Demand Response

- In Discussions With DR Aggregator
- Reduce Identified Power Loads During Called 'Event' Days (similar to PDP)

Bottom Line:

Potential To Save ~$10K- $20K/yr (or more)

APEP

- APEP- Advanced Pump Efficiency Program
  - Large Pump Efficiency Program (>30hp)
- Provide Recommendations Based on Pump Performance
  - i.e.; Overhauls, Replacements, Re-sizing, etc.

Bottom Line:

Potential to Save Energy, Save $, and Receive Incentives Rebates on Equip

Internal Operation Changes

- TOU- Time Of Use Pumping
  - Avoid On-Peak Equipment Operation As Much As Possible
- Blender Rate Changes
- Well Sampling Changes

Bottom Line:

Not Yet Quantified- Energy Savings Expected

Internal Operation Changes

- Whitfield Flow Through
- Gravity Flow ~ 10MGD w/o Pumping

Bottom Line:

- 2016 = $39/mg (737 mg total, $28,990 total energy)
- 2017 = $35/mg (576 mg total, $20,100 total energy)
- 2018 = $35/mg (696 mg total, $24360 total energy)

Solar Panels HQ

- Solar Panels Connected
- 16 Years Old- Old Technology, Declining
- Could Be Area For Upgrade
  - New Panels More Efficient
  - May Require Electrical Upgrade

Bottom Line: Produces ~$7,500/yr
(~50,000kWh/yr)

Building Systems Controls

- Updating HVAC and Lighting Systems Controls
- Better Energy Management

Bottom Line: Should Produce Some Savings With More Refined Controls

EV Charging Stations

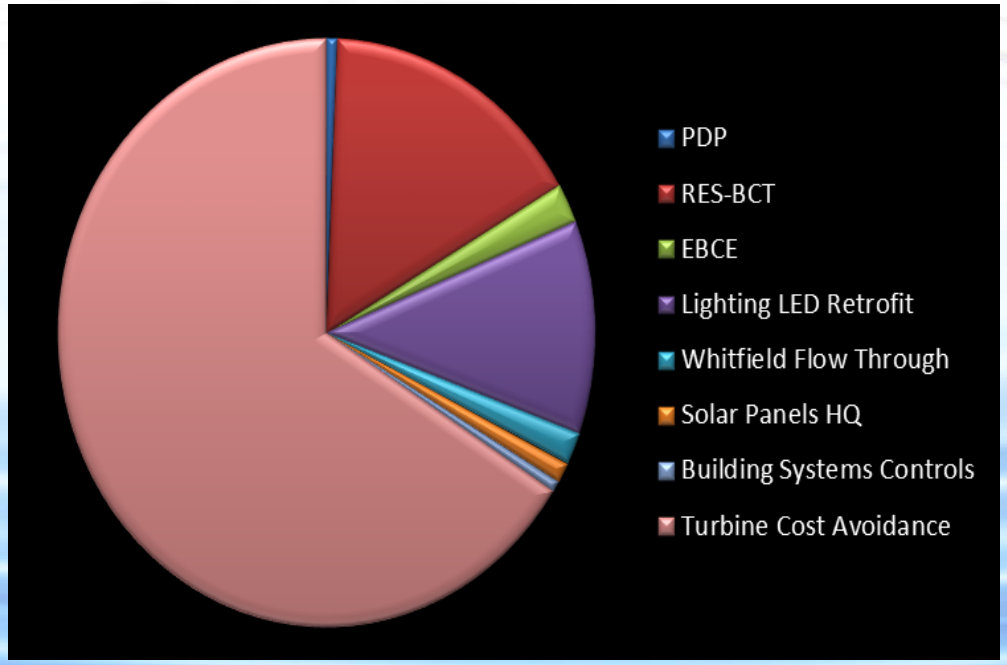
- Continue to Operate EV Stations at HQ
- Net Zero- District Charges Only For Energy Used

Bottom Line: District Does Not Directly Benefit Financially; However District Support of EV Vehicles Demonstrates Environmental Stewardship and Community Partnership

Bottom Bottom Line

PDP	$4,500
RES-BCT	$110,816
EBCE	$15,000
Lighting LED Retrofit	$81,000
Whitfield Flow Through	$12,000
Solar Panels HQ	$7,500
Building Systems Controls	$4,500
Turbine Cost Avoidance	$456,000
Total *	**$691,316**
Current Budget	$3,711,500

*Annual
*Estimated



Questions

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- Overview
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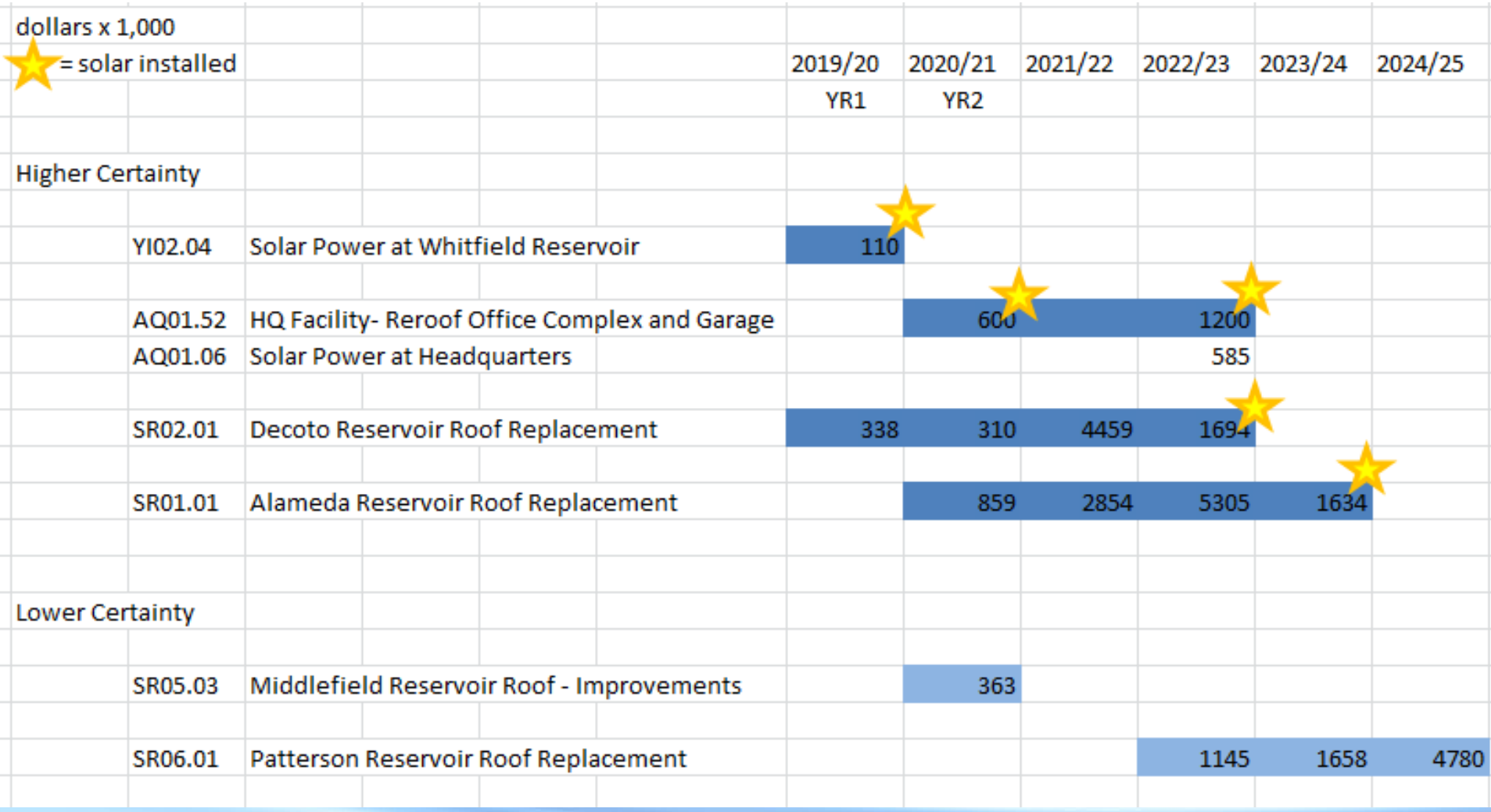
Current Clean Energy Infrastructure Planning

- Solar photovoltaic system at Whitfield Reservoir
  - Starts next FY (FY 2019/20)
- Solar systems incorporated in roof replacement projects
  - Reservoirs
  - Headquarters

Preliminary CIP



dollars x 1,000 = solar installed			2019/20 YR1	2020/21 YR2	2021/22	2022/23	2023/24	2024/25
Higher Certainty								
	YI02.04	Solar Power at Whitfield Reservoir	110					
	AQ01.52	HQ Facility- Reroof Office Complex and Garage		600		1200		
	AQ01.06	Solar Power at Headquarters				585		
	SR02.01	Decoto Reservoir Roof Replacement	338	310	4459	1694		
	SR01.01	Alameda Reservoir Roof Replacement		859	2854	5305	1634	
Lower Certainty								
	SR05.03	Middlefield Reservoir Roof - Improvements		363				
	SR06.01	Patterson Reservoir Roof Replacement				1145	1658	4780

Refresher on 2016 Alternatives Analysis

- Followed similar analyses and Board Presentation in 2012
- Two-Step Process
  - Step 1: Feasibility Evaluation
  - Step 2: Financial Evaluation
- Findings presented to Board in April, 2016
- Basis of projects planned in CIP

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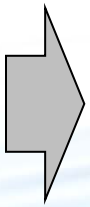
2016 Alternatives Analysis

Alternatives Evaluated*

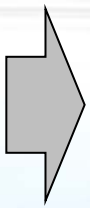
- Wind
- Fuel Cell
- Hydroelectric
- Solar
- Biomass
- Ocean Hydro
- Nuclear
- Geothermal



Step 1

Feasibility Analysis

- Available Sites
- Resource Availability
- Infrastructure Requirements
- Regulatory and Land Use Issues



Step 2

Financial Analysis

- Life Cycle Costs
- Cost Savings
- Funding Sources/Incentives
- Scheduling/Timing with Planned Capital Improvements

*Battery Storage and Floating Solar not analyzed in 2016

2016 Recommendations & Resulting CIP Projects

- Install solar panels at Whitfield Reservoir under a Power Purchase Agreement (PPA).
- Plan solar for reservoirs as their roofs are replaced.
- Solar at Headquarters.
- Continue to evaluate the benefit of including clean energy options in future projects.

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2019 Clean Energy Plan Review

- Genesis
  - CIP Revisions, 2-Yr Budget
  - Nearing start of first major Plan project (Whitfield solar)
  - Request for Board Workshop
- Independent review of staff's 2016 analysis
  - Update assumptions
    - Utility market rates/trends
    - Unit costs for various technologies
  - Confirm financials
    - Incentive programs
    - Lifecycle NPV
  - Review additional technologies
    - Battery storage
    - Floating solar
  - Recommend enhancements to CIP

2019 Clean Energy Plan Review

- Competitive Procurement for Professional Services
- Michael D. Brown Consulting Engineers, LLC
  - 40+ years of related experience, CA local governments and other clients
  - Experience in all forms of renewable energy technology
    - Solar, Battery, Fuel Cell, Wind, Geothermal, Hydro, Biogas, Biomass
    - Commercial, Industrial clients, including Water, Wastewater, Landfills
  - Experience with CA regulations, CA/Federal subsidies, low-cost financing, private partnerships, etc.
  - Recent Projects include:
    - Bay Area Biosolids Coalition (bio-solids conversion) for 20 wastewater utilities, including: USD, DSRSD, Central Marin, Delta Diablo, etc.
    - Renewable Energy Assessments for BART, San Bernardino County; Stockton, CA; Antioch, CA; Hayward, CA; Baja California, Mexico; and U.S. Forestry Service

ACWD Clean Energy Plan Review

April 25, 2019

MDB Engineers

Overview

- 2016 ACWD Clean Energy Plan assessed multiple clean and renewable energy generation alternatives. Recommended on-site renewable power generation opportunities
- District hired MDB Engineers to review Plan and complete financial analysis
- Recommend changes to CIP as appropriate

Methodologies

- Utilized an initial screening process
  - Reviewed available resources (solar, wind, hydro, etc.)
  - Eliminated projects with insufficient resource or other site constraints
  - Projects that pass screening advance to full financial analysis

Methodologies

- Modeled generating system
  - Site-specific electricity data
  - Representative generator and ancillary equipment
  - Output: time and amount of generation
- Financial analysis
  - Value of generated electricity
  - Capital cost, operation and maintenance,
  - Cash flow analysis

Findings

- Technologies advancing to the financial analysis:
  - Solar
  - Wind
  - Hydro
  - Fuel Cell
  - Battery Storage
- Not advancing:
  - Geothermal
  - Biomass
  - Cogeneration

Financial Analysis Methodology

- We use the Life Cycle Net Present Value Method to determine feasibility and rank projects
- This method projects revenues, costs and net financial benefits to the District over the project lifetime, then discounts future benefits to arrive at a single NPV number
- Positive numbers mean that the project is economically attractive as it produces more revenues than it costs

Financial Analysis Methodology

- We looked at three scenarios for each site/technology pair:
  - ACWD owned/financed, pay as you go ("Paygo")
  - ACWD owned/financed using a low cost loan such as that provided to local governments by the California Energy Commission (must meet 20 year simple payback)
  - Project owned/financed by a private company with a power purchase agreement (PPA) with ACWD that is lower cost then continued utility power purchase. This allows Tax Credits to utilized by the project.

IRS Investment Tax Credit

Example

ITEM	AMOUNT
Initial project cost	$1,000,000
Investment Tax Credit	$260,000 (26%)
Accelerated cost recovery	$178,500 (assumes 21% tax rate)
Net project cost to PPA provider	$438,500

Some PPA structures allow the Project to be transferred to host after 6 to 7 years at discounted cost

Wind

				Year 1 Production						
Location	System Capacity (kW)	Capacity Factor	Project Cost	Onsite Use (kWh)	Onsite Value	RES-BCT Gen (kWh)	BES-BCT Value	20 year - NPV (Paygo)	20 year - NPV (CEC debt)	20 year - NPV (PPA) @ $0.23/kWh
Patterson Reservoir	850	23%	$3,953,000	231,000	$53,800	1,489,000	$184,000	$(913,000)	$(584,000)	$(891,000)
Desalination	850	14%	Deemed infeasible in screening stage because of low capacity factor							

- Wind is not financially feasible
  - No Self Generation Incentive Program (SGIP) available due to low on-site demand
  - No Production Tax Credits (PTC) available after 2019 (ITC is currently 12%)
- Implementation challenges:
  - ACWD would have to lead the development activities
  - Typically requires one year of on-site monitoring to confirm wind conditions
  - May require additional environmental study to determine impacts (visual, avian, etc.)

Hydro

Sites Reviewed	Site Notes
Vallecitos	Intermittent flow; assumes pipeline alternative to replace existing channel
Appian Tank	Insufficient and intermittent flow
Avalon Tank	Insufficient and intermittent flow
SF Blender	Low power production
WTP2 to Whitfield	Insufficient head

- Most District identified sites have adequate head for hydropower
- District sites have insufficient/intermittent flow for cost effective power generation
- MDB recommends no further consideration of hydropower at this time

Fuel Cells

- Fuel cells are typically applied to high priority/high value facilities that need uninterruptable power at a premium cost
- Natural gas driven fuel cell electricity is not renewable and may produce higher Green House Gas levels than grid electricity
- Caveats around fuel cell financial analysis
  - Assumes that full demand charge reduction realized
  - At higher assumed natural gas price escalation, project feasibility declines
  - Significant uncertainty regarding natural gas price trends. Some PPA structures require customer to take on natural gas price risk

Fuel Cells

Location	Fuel cell (kW)	Cost	Year 1 Generation (kWh)	Offset Value	15 year - NPV (Debt)	15 year - NPV (PPA)	Est. PPA Price ($/kWh)
Desalination (2% gas escalation)	600	$2,665,000	4,729,000	$672,000	$(843,000)	$71,900	$0.145
Desalination (4% gas escalation)	600	$2,665,000	4,729,000	$672,000	$(1,371,000)	$(563,600)	$0.155
Desalination (8% gas escalation)	600	$2,665,000	4,729,000	$672,000	$(2,735,000)	$(1,516,900)	$0.17
Desalination (200 kW)	200	$1,115,000	1,576,000	$224,000	$(340,000)	$(164,000)	$0.15
PT Well and Blending	200	$1,115,000	1,576,000	$224,000	$(420,000)	$(160,000)	$0.15
Mowry	200	$1,115,000	1,199,000	$180,000	$(638,000)	$(753,000)	$0.15

- Not eligible for CEC loan
- High PPA price needed by Developer to meet financial targets
- Slightly positive NPV in 600 kW PPA scenario w/ 2% natural gas escalation (assume 2 percent PPA escalation)
- At higher natural gas escalation, NPV is negative

Battery Storage

- Lithium ion is predominant battery storage technology
- Recycling rate of lithium ion is low but growing
- Presently, no standalone battery storage application we analyzed has a positive NPV
- This is a technology to re-evaluate periodically
  - Costs declining
  - Utility rate-making may allow energy storage to leverage other value streams
- Can be paired with solar for resiliency and potentially more attractive PPA proposals from competing vendors
- Becoming more widely adopted – projected to increase significantly in 2019

Standalone Battery Storage

- Value proposition is providing demand charge reduction, price arbitrage, and backup power

Location	Avg Demand (kW)	Avg Max Monthly Demand (kW)	Battery system size (kW)	Cost	Demand Charge Reduction	Energy Shift Value	10 year - NPV (Paygo)	10 year - NPV (CEC debt)
PT Well and Blending	217	524	250	$420,000	$9,700	$700	$(391,000)	$(374,000)
Headquarters	131	273	250	$420,000	$28,000	$2,000	$(184,000)	$(167,000)
Whitfield Reservoir/Boosters	94	239	250	$420,000	$22,000	$800	$(265,000)	$(247,000)
WTP#2	17	158	250	$420,000	$19,000	$180	$(301,000)	$(284,000)
Mowry	136	468	250	$420,000	$11,000	$(490)	$(384,000)	$(366,000)

Solar

Location	Available area (sq ft)	System Capacity (kW)	Project Cost (2019 $)	Timing of implementation
Alameda Reservoir	105,000	1,470	$3,940,000	Roof replacement scheduled for FY23/24
Decoto Reservoir	83,000	1,150	$3,400,000	Roof replacement scheduled for FY22/23
Mayhew Reservoir	45,000	650	$2,269,000	Roof replaced recently
Middlefield Reservoir	50,000	700	$2,390,000	Roof replacement scheduled for FY20/21
Patterson Reservoir	84,000	1,150	$3,400,000	Roof replacement scheduled for FY24/25
Whitfield Reservoir (non reservoir area – single axis tracker)	147,000	640	$2,400,000	Included in CIP FY19/20
Whitfield Reservoir (above reservoir area – fixed tilt)	85,000	460	$1,240,000	Option to be combined with above
Desalination	9,000	120	$520,000	Existing roof to be evaluated
Headquarters	81,000	1,210	$3,970,000	Roof replacement scheduled for FY20/21 and FY 22/23 (Phase 1, Phase 2)
Pit T1[1]	440,000	2,200	$9,090,000	Requires additional evaluation
Pit T2[1]	400,000	2,000	$8,340,000	Requires additional evaluation
TOTAL		11,750	$39,720,000	

NOTES: 1 – Pit T1 and T2 are floating solar projects

Solar

Location	Year 1 Production: Onsite Use (kWh)	Onsite Value	RES-BCT Gen (kWh)	BES-BCT Value	20- year NPV (Paygo)	Paygo Payback (Years)	20- year NPV (CEC loan)	20 year - NPV (PPA)	Est. PPA Price ($/kWh)
Alameda Res.	25,100	$4,000	2,189,000	$276,500	$252,000	16.1	$579,000	$742,000	$0.13
Decoto Res.	1,900	$300	1,732,000	$216,400	$(185,000)	17.9	$98,000	$526,000	$0.13
Mayhew Res.	47,900	$7,900	920,300	$114,400	$(460,000)	20.8	N/A	$318,000	$0.13
Middlefield Res.	21,500	$3,000	1,013,000	$126,400	$(486,000)	20.8	N/A	$316,000	$0.13
Patterson Res.[1]	67,500	$19,300	1,653,000	$281,600	$1,388,000	12.0	$1,672,000	$2,128,000	$0.13
Whitfield Res. (non res. area)	232,000	$34,500	999,500	$128,500	$136,000	16.1	$335,000	$351,000	$0.14
Desalination	180,400	$21,400	0	0	$(213,000)	27.3	N/A	$6,000	$0.14
Headquarters	567,100	$98,400	1,251,000	$159,200	$212,000	16.2	$543,000	$836,000	$0.14
Pit T1	0	$-	3,411,000	$418,500	$(3,664,000)	27.2	N/A	$95,000	$0.15
Pit T2	0	$-	3,101,000	$380,800	$(3,411,000)	27.4	N/A	$87,000	$0.15
TOTAL	1,140,200	$188,400	16,272,000	$2,103,000					

NOTES: 1 - Account is on an A6 rate. Assumes PG&E allows continuation of A6.

- PPA rates are representative of market rates. Actual PPA may vary depending on competitiveness of procurement

Solar - Findings

- All solar projects are feasible in a third-party owned PPA scenario
- Most are also feasible with pay as you go or low cost financing through California Energy Commission or similar programs
- Likely economies of scale by aggregating multiple sites into a single procurement
- MDB findings confirmed the District's site selection and differed slightly on the numbers
  - Systems sizes varied slightly
  - Financially, the PPA pathway has higher value

Solar plus Storage

						Solar plus Storage			Solar only		
Site	Avail. area (sq ft)	PV System Cpty (kW)	Battery System Cpty (kW)	Project Cost	Year 1 Production (kWh)	20- year NPV (Paygo)	20- year NPV (CEC loan)	20 year - NPV (PPA)	20- year NPV (Paygo)	20- year NPV (CEC loan)	20 year - NPV (PPA)
Head-quarters	81,000	1,210	250	$4.27M	1,808,000	$(103,000)	$374,000	$792,000	$212,000	$543,000	$836,000
Whitfield	147,000	640	250	$2.70M	1,226,000	$(231,000)	$115,000	$142,000	$136,000	$335,000	$351,000

- NPV is slightly higher for solar only
- Opportunity to include battery as an “add-on option” in the procurement process

Initial Conclusions

- Solar-
  - Consider pros and cons of PPA vs. low cost loan vs. Paygo
  - Significant value possible via PPA, aggregate several solar projects together to reach sufficient scale to attract a large pool of quality bidders
    - At least 3 MW (or better)
      - 5 MW (or better) will attract top level competitors
    - Include Pits T1 and T2 as part of the main package with the Developer tasked with doing much of the leg work to determine feasibility (community outreach, environmental review and site feasibility)
    - Sites should either include Battery Storage or be designed to accommodate it at a later date

Potential Solar Projects

No.	Location	Capacity (kW)	Generation (kWh)	Notes
Implement Near Term				
1	Whitfield Reservoir (non reservoir area)	640	1,232,000	Included in CIP; Include option for battery storage
2	Mayhew Reservoir	650	968,000	Roof replaced recently
3	Desalination	120	180,000	No roof replacement required
4	Headquarters (Phase 1)	800	1,200,000	Roof replacement scheduled for FY20/21; option for battery storage
Implement w/ Roof Replacement				
5	Headquarters (Phase 2)	400	600,000	Roof replacement scheduled for FY22/23; option for battery storage
6	Decoto Reservoir	1150	1,734,000	Roof replacement scheduled for FY22/23
7	Alameda Reservoir	1470	2,214,000	Roof replacement scheduled for FY23/24
If Feasible				
8	Pit T1	2,200	3,411,000	Site Feasibility Assessment Required
9	Pit T2	2,000	3,101,000	Site Feasibility Assessment Required
Possible Future Sites				
10	Patterson Reservoir	1150	1,720,000	Roof replacement scheduled for FY24/25
11	Middlefield Reservoir	700	1,034,000	Roof rehabilitation scheduled for FY20/21

Initial Conclusions

- Wind at Patterson Reservoir
  - Patterson Reservoir has marginal wind speeds for cost effective power production
  - Consider ACWD level of effort required and financial risk since only the low interest loan program appears economic
- Hydro
  - No sites appear worth pursuing at this time
  - Monitor hydro technology, costs and flow rates periodically

Initial Conclusions

- Fuel Cells
  - No sites appear worth pursuing at this time
  - Consider the risks of natural gas pricing over time
  - Demand charge reduction is subject to fuel cell capacity factor
  - PPA method is preferred as CEC loan program does not cover natural gas driven fuel cells and some developers may take the gas pricing risk
- Stand Alone Battery Storage
  - No sites appear worth pursuing at this time
  - We would recommend adding it to the solar procurement as some vendors may offer better terms for the combined system

Renewable Project Potential

Proposed/Existing Projects	Annual kWh
Existing Hydro at WTP #2	1,500,000
Near Term Solar Sites (Whitfield, Mayhew, Desal, HQ Phase 1)	3,600,000
Roof Replacement Solar sites (HQ Phase 2, Decoto, Alameda)	4,500,000
Pit T1 (or Pit T2)	3,000,000
TOTAL Generation Potential	**12,600,000**
Total Annual ACWD usage (w/ Desal scaling up)	16,500,000

- Potential to offset ~75% of generation charges (number could be higher with energy efficiency and additional future solar)
- Distribution and demand charges are not credited, District will still be billed for these services

Agenda

- Overview
- Energy Efficiency Programs & Initiatives
- Clean Energy Infrastructure Planning
  - 2016 Clean Energy Plan - CIP Projects Related to Clean Energy
  - 2019 Review of Clean Energy Plan
- Conclusions and Approach to Next Steps

Overall Conclusions

- Significant energy conservation and cost savings realized from past and current operations and initiatives.
- 2016 Clean Energy Alternatives Evaluation findings remain valid.
- Preliminary CIP meets Strategic Plan objectives for Clean Energy.

Planned Approach

- Implementation Approach
  - Aggregated solar & optional battery under one PPA.
  - No changes to proposed CIP project schedules.
  - Leverage available sites now, implement at HQ and reservoir sites when roofs are replaced.
  - Include in RFP:

    Implement Near Term
    Whitfield
    Mayhew*
    Desalination Facility*
    Headquarters Phase 1*

    Implement w/ Roof Replacement Projects
    Headquarters Phase 2*
    Decoto*
    Alameda*

    *Optional “off ramps” in PPA contract

    If Feasible
    Pits T-1 & T-2* (feasibility eval. reqd.)

  - Potential future sites:
    - Patterson
    - Middlefield

Next Steps

- RFP for Energy Engineer/Procurement Consultant
  - Master plan for mapping generating sites to consuming sites.
  - Develops scopes of work and terms for vendors to propose.
    - Aggregated solar (optional battery) projects under PPA.
  - Assists in PPA procurement process.
  - District representative in implementation of solar projects.
- Procurement process for aggregated solar/battery PPA.
- Continue to monitor Fuel Cell and Battery technologies.
- Evaluate Battery Storage relative to Emergency Response and Business Continuity planning.

Questions & Discussion