Yolo County Debt Committee
Item #5 – Energy Savings Project
November 12, 2019

Background:

Project:	Energy Savings Project[1]
Proposed Financing Mechanism:	Equipment Lease Purchase Financing
Requesting Department/Agency:	General Services Department
Time Duration:	15 years
Debt Amount Requested:	Up to $16.9 million
Reason before Debt Committee:	1. Amount of debt or obligation exceeds $500,000 2. Annual debt service of obligation may exceed $150,000 3. Borrowing, debt or obligation may result in significant change in County fiscal health

Purpose / Project:

Trane performed a wide ranging energy analysis of facility improvement measures to existing systems on site across County facilities and recommended two projects ("Base") and ("Energy Storage") which when combined are the "Base + Energy Storage" Projects. The projects are briefly summarized below but have significant detail in the Investment Grade Audit (Attachment D).

Base Project ($10.4 million)

- Mechanical Solutions – 266 unit replacements at 27 buildings
- Lighting Solutions – 10,000+ interior and exterior LED fixture upgrades at 34 buildings
- Transformer Solutions – 29 transformer unit upgrades at 8 buildings
- Water Solutions – 576 Domestic plumbing fixtures retrofit at 21 buildings

Energy Storage Project ($6.5 million)

- Installation of 3 Battery energy storage systems at 3 locations

Base + Energy Storage Project ($16.9 million)

The initial facilities analysis began in calendar year 2018 through a preliminary audit from Trane and after the preliminary results, the Board of Supervisors at its June 4, 2019 meeting gave Trane authorization to perform the Investment Grade Audit. Should the county not proceed with projects with Trane, the County will owe Trane $910,000 for the performance of the investment grade audit.

Staff Analysis:

Prior to the issuance of debt, the Debt Committee is required to convene to review the merits of the respective projects and make a recommendation of whether to proceed with the projects to the full Board of Supervisors. Due to the complexity of the projects, the Chief Financial Officer requested analysis to be performed by Government Financial Strategies (GFS), as County Financial advisor, on the projects. GFS recommended analysis also be performed by an energy advisors and in conjunction with GFS, ARC Alternatives (ARC) reviewed the energy components of the project. Their respective analyses are contained in Attachments B & C.

For simplicity, the two separate projects ("Base") and ("Energy") projects are separated in the below summary of analysis for the Debt Committee.

Base Project

As described above, the base project involves mechanical, electric, water, and lighting improvements in 34 County Facilities. Included with the Investment Grade Audit, Trane provided a pro-forma demonstrating a 20 year projection of the energy project. The project had a variety of key assumptions below:

Assumption	**Factor**
Discount Rate	6.00%
Inflation Rate	3.00%
Escalation Rate (Electricity)	4.00%
Escalation Rate (Gas & Water)	1.00%
Years of Analysis	20
Capital Cost	$10,385,378
Rebates	$0
Interest Rate	2.50%
Financing Term (Years)	15.0
Financed Amount	$10,385,378
Annual Debt Service	$838,790
Estimated Net Benefit (20 year)	$13,462,883

The estimated net benefit is based on taking a picture of status quo operations and using the assumptions above in order to project energy consumption over the time period of the projection. Then the projection calculates an estimate of the savings that would be achieved in various categories including savings on electric utility, gas, water, additional solar credits, unclaimed RESBCT credits, avoided operational expenses, and avoided lifecycle capital renewal.

The Governmental Financial Strategies review along with review by the County of Yolo Department of Financial Services questioned a number of the assumptions.

- Period of Projection – Based on review of the information the majority of the equipment has a useful life of 15 years by the American Society of Heating Refrigeration and Air Conditioning Engineers (ASHRAE). Thus, the belief of GFS and County staff is the pro-forma and net benefit cited should be based on 15 years rather than 20. This reduces the estimated net benefit by $7,598,055. In addition, the Debt policy adopted by the County would limit the County to borrow beyond the useful life of 15 years and thus it is appropriate to limit the analysis to that term. In addition, ARC noted that both the California Energy Commission (CEC) and California Public Utility Commission (CPUC) also have a standard of 15 years for these types of equipment.
- Unclaimed RESBCT Credit – The RESBCT Credit from the Department of Financial Services perspective from reading the IGA is that the credit is obtained primarily from the existing Solar installations and is derived from re-allocation of the credit rather than new generation. Thus, it appears inappropriate to characterize that this is a net benefit from the debt associated with the new project. DFS recommends removing this amount total $1,593,938 for 15 years or $2,370,426 for 20 years in the pro-forma.
- Maintenance & Lifecycle Capital Replacement – A significant amount of the benefit is from factors that could be considered capital avoidance which means the County will need to spend less on either in personnel, equipment, or contracted services on both the maintenance and

capital over the term of the equipment. These savings in the pro-forma are $4,034,000 in avoided lifecycle capital costs in the pro-forma and an additional $2,660,167 in avoided maintenance costs over the twenty year term.

Based on comments above, staff are seeking authorization before coming back to the full Board to make certain adjustments to demonstrate the savings more similarly to the table below representing a fifteen-year time horizon.

Trane Cumulative Net Annual Benefit (20 Year)	$13,462,883
Less:	
Years 16-20	$(7,598,055)
RESBCT Credits not attribute to project	$(1,593,938)
Revised project benefit:	**$4,270,890**
Cost Avoidance Required to derive Benefit(A)	
Capital Lifecycle replacement	$4,034,000
Maintenance savings	$1,841,292
Total Cost Avoidance required	**$5,875,292**
Increase in cost to County if Cost Avoidance not achieved	**$1,604,402**

Note (A): Capital avoidance savings are required to make the Base project result in a net benefit over the course of the 15 year financing. If these costs don't materialize due to the resources that otherwise would have performed these services simply being re-allocated rather than reduced, the project will result in a cost increase to the County rather than purported savings. This is important to note as the ARC Alternatives analysis noted only the County can assess the validity of the ability to reduce expenditures to achieve the cost avoidance cited in the pro-forma.

One of the additional assumptions cited by Governmental Financial Strategies in the analysis was the energy escalation factor for Electricity. This factor at 4% was deemed reasonable based on the analysis by the UC Davis Western Colling Efficiency Center Energy Institute analysis in March, 2019 however should energy not escalate as this rate, it would substantially change the benefits derived in the future from the project.

Also, in the GFS analysis, it was noted that the Trane Pro-forma doesn't currently include any amounts necessary as part of cost of issuance of the project to obtain and secure financing and the cited interest rate of 2.5% does not leave much room for any change in interest rates that may occur between now and completion of the financing.

In addition, Trane offered as part of the project to have Trane Financing Services perform the financing to assist the County in completing the project. After further analysis and citations from Government Financial Strategies, it was determined that this approach does not meet best practice, and thus the Department of Financial Services plans (should the debt committee support) to procure a Municipal Financial Advisor in order to complete the energy projects financing.

<u>Base Project Recommendations:</u>

1. Support the Base project to move to the full Board on its merits that it accomplishes a substantial amount of deferred capital at an affordable cost even after the considerations presented above; and

2. Direct Chief Financial Officer to work with Trane to bring a revised pro-forma to the Board of Supervisors with the Financing item should it proceed more accurately reflecting the project merits; and
3. Direct the Chief Financial Officer to secure a scope of work with a municipal financial advisor to assist with the financing in accordance with Best Practices.

Energy Storage Project

The Energy project as described above includes the installation of 3 Battery Storage systems at three different locations which would have the ability to store up to 2,800 Kwh and discharge at a rate of 700Kw over a four hour period daily. The Investment Grade Audit assumed that the County would secure a 20 year power purchase agreement with a Community Choice Aggregator (CCA) in order to purchase the power at a rate of 9.0 cents per kilowatt or a rate of $90 a megawatt.

Associated with the project was a 20-year projection that had a variety of key assumptions as specified below:

Assumption	**Factor**
Discount Rate	6.00%
Inflation Rate	3.00%
Escalation Rate (Electricity)	4.00%
Escalation Rate (Gas & Water)	1.00%
Years of Analysis	20
Capital Cost	$6,500,000
Rebates	$2,880,000
Interest Rate	2.50%
Financing Term (Years)	15.0
Financed Amount	$6,500,0000
Annual Debt Service	$524,982
Estimated Net Benefit (20 year)	$1,548,018

The Energy storage project also received review by GFS and ARC alternatives. The pro-forma is appropriate from a timeframe standpoint as long as the project was able to achieve a 20-year Power Purchase Agreement (PPA) with a CCA that would minimize the risk. However, there were various items suggested as part of the analysis to improve the project including:

- Revenue Assumptions – The Battery project the way it is structured is dependent on $4,885,500 in revenues from a CCA over the 20 year project. Thus, it is recommended that the County proceed but should the County not be able to secure a power-purchase agreement with a CCA, the County have the ability to opt out of the project without penalty.
- Timing of Project – Currently the timing as proposed with the Battery project would not coincide with the broader base project and thus the County should consider bi-furcating the financing.

Energy Storage Project Recommendation:

1. Proceed with the project to the Full Board but only with appropriate risk mitigation measures in place such as an option to opt out without penalty if CCA revenues aren't secured to make the project economically viable.
2. Bi-furcate the financings to have them timed more appropriately with the need to construct the project and reduce risk in case CCA revenues aren't secured.

3. Apply similar recommendations as above to direct Chief Financial Officer to fine-tune pro-forma as needed and use a municipal financial advisor to complete the financing.

Attachments:

Attachment A – Trane Pro-Forma-

Attachment A1 – Combined project Pro-Forma

Attachment A2 – Base Energy project Pro-Forma

Attachment A3 – Energy Storage project Pro-Forma

Attachment B – Governmental Financial Strategies Analysis

Attachment C – ARC Alternatives Analysis

Attachment D – Trane Investment Grade Audit

Attachment E – Debt, Obligations, and Borrowing Policy

[1] Based on review and discussion with the Trane Energy Services Company and Governmental Financial Strategies, an equipment lease/purchase financing appears to be most appropriate as it would use the value of the equipment as the collateral for financing and the County would own the equipment at the end of the financing.

Attachment A1 - Full Pro-Forma

Yolo County - Base + Energy Storage

Discount Rate	6.00%	Capital Cost of Upgrades	$ 16,885,378	Interest Rate	2.50%
Inflation Rate	3.00%	SGIP (1st Year)	$ (1,440,000)	Financing Term (Payback)	15.0
Escalation Rate (Elec)	4.00%	SGIP (Years 5)	$ (1,440,000)	Financed Amount	$ 16,885,378
Escalation Rate (Gas & Water)	1.00%				
Years of Analysis	20	Net Project	$ 14,005,378		

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
POST Project Upgrades (Total County) (SAVINGS)																					
Utility Expenditures (Elec)		$ 434,169	$ 443,111	$ 462,831	$ 576,630	$ 599,695	$ 623,683	$ 648,630	$ 674,576	$ 701,559	$ 729,621	$ 758,806	$ 789,158	$ 820,724	$ 853,553	$ 887,696	$ 923,203	$ 960,131	$ 998,537	$ 1,038,478	$ 1,080,017
Gas		$ 3,444	$ 3,478	$ 3,513	$ 3,548	$ 3,584	$ 3,620	$ 3,656	$ 3,692	$ 3,729	$ 3,767	$ 3,804	$ 3,842	$ 3,881	$ 3,920	$ 3,959	$ 3,998	$ 4,038	$ 4,079	$ 4,120	$ 4,161
Water		$ 62,378	$ 63,002	$ 63,632	$ 74,571	$ 75,317	$ 76,070	$ 76,831	$ 77,599	$ 78,375	$ 79,159	$ 79,950	$ 80,750	$ 81,557	$ 82,373	$ 83,197	$ 84,029	$ 84,869	$ 85,718	$ 86,575	$ 87,441
Credits		$ 11,287	$ 11,739	$ 12,208	$ 12,697	$ 13,204	$ 13,733	$ 14,282	$ 14,853	$ 15,447	$ 16,065	$ 16,708	$ 17,376	$ 18,071	$ 18,794	$ 19,546	$ 20,328	$ 21,141	$ 21,986	$ 22,866	$ 23,780
Unclaimed RESBCT Credit		$ 79,603	$ 82,787	$ 86,099	$ 89,543	$ 93,124	$ 96,849	$ 100,723	$ 104,752	$ 108,942	$ 113,300	$ 117,832	$ 122,545	$ 127,447	$ 132,545	$ 137,847	$ 143,361	$ 149,095	$ 155,059	$ 161,261	$ 167,712
Avoided Operational Expenses		$ 99,000	$ 101,970	$ 105,029	$ 108,180	$ 111,425	$ 114,768	$ 118,211	$ 121,758	$ 125,410	$ 129,173	$ 133,048	$ 137,039	$ 141,150	$ 145,385	$ 149,746	$ 154,239	$ 158,866	$ 163,632	$ 168,541	$ 173,597
Avoided Life Cycle Capital Renewal		$ 937,000	$ 787,000	$ 675,000	$ 525,000	$ 375,000	$ 375,000	$ 330,000	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Base Project Benefit by Year		**$ 1,626,881**	**$ 1,493,087**	**$ 1,408,312**	**$ 1,390,169**	**$ 1,271,350**	**$ 1,303,723**	**$ 1,292,333**	**$ 1,027,230**	**$ 1,033,463**	**$ 1,071,084**	**$ 1,110,148**	**$ 1,150,711**	**$ 1,192,831**	**$ 1,236,570**	**$ 1,281,990**	**$ 1,329,157**	**$ 1,378,140**	**$ 1,429,010**	**$ 1,481,840**	**$ 1,536,708**
Revenue Roll-up (Total County)																					
Capacity Credits (CCA)		$ 94,500	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000
Additional Dispatch Credits (CCA)		$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000
RESBCT Peak Shift Credit		$ 141,147	$ 146,793	$ 152,665	$ 158,771	$ 165,122	$ 171,727	$ 178,596	$ 185,740	$ 193,169	$ 200,896	$ 208,932	$ 217,289	$ 225,981	$ 235,020	$ 244,421	$ 254,198	$ 264,366	$ 274,940	$ 285,938	$ 297,375
Battery Monitoring & Maintenance		$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)
Battery Extended Warranty		$ -	$ -	$ -	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SGIP Incentives		$ 1,440,000	$ 288,000	$ 288,000	$ 288,000	$ 288,000	$ 288,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Storage Benefit by year	**$ -**	**$ 1,696,647**	**$ 644,793**	**$ 650,665**	**$ 618,794**	**$ 625,145**	**$ 631,750**	**$ 350,619**	**$ 357,763**	**$ 365,192**	**$ 372,919**	**$ 418,932**	**$ 427,289**	**$ 435,981**	**$ 445,020**	**$ 454,421**	**$ 464,198**	**$ 474,366**	**$ 484,940**	**$ 495,938**	**$ 507,375**
Total Benefit by year	**$ -**	**$ 3,323,528**	**$ 2,137,880**	**$ 2,058,977**	**$ 2,008,963**	**$ 1,896,495**	**$ 1,935,473**	**$ 1,642,952**	**$ 1,384,993**	**$ 1,398,655**	**$ 1,444,003**	**$ 1,529,080**	**$ 1,578,000**	**$ 1,628,812**	**$ 1,681,590**	**$ 1,736,411**	**$ 1,793,355**	**$ 1,852,506**	**$ 1,913,950**	**$ 1,977,778**	**$ 2,044,083**

Capital Investments	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Capital Outlays	$ 16,885,378																				

Program Cashflow Comparison In Years	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
Net Annual Benefit	$ (16,885,378)	$ 3,323,528	$ 2,137,880	$ 2,058,977	$ 2,008,963	$ 1,896,495	$ 1,935,473	$ 1,642,952	$ 1,384,993	$ 1,398,655	$ 1,444,003	$ 1,529,080	$ 1,578,000	$ 1,628,812	$ 1,681,590	$ 1,736,411	$ 1,793,355	$ 1,852,506	$ 1,913,950	$ 1,977,778	$ 2,044,083
Cumulative Net Annual Benefit	$ (16,885,378)	$ (13,561,850)	$ (11,423,970)	$ (9,364,993)	$ (7,356,031)	$ (5,459,536)	$ (3,524,063)	$ (1,881,111)	$ (496,118)	$ 902,537	$ 2,346,540	$ 3,875,620	$ 5,453,620	$ 7,082,432	$ 8,764,022	$ 10,500,433	$ 12,293,788	$ 14,146,294	$ 16,060,244	$ 18,038,022	$ 20,082,105
Simple Payback Calc		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	-0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financing Payments																					
Financing Payment Plan	$ 16,885,378	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	($1,363,772)	$0	$0	$0	$0	$0
Capital Allowance (Battery renewal in out years)														($750,000)		($750,000)					
Program Cashflow Comparison In Years																					
Year Term Financing Net Annual Benefit	$ -	$ 1,959,756	$ 774,108	$ 695,205	$ 645,191	$ 532,723	$ 571,701	$ 279,180	$ 21,221	$ 34,883	$ 80,231	$ 165,308	$ 214,228	$ (484,960)	$ 317,818	$ (377,361)	$ 1,793,355	$ 1,852,506	$ 1,913,950	$ 1,977,778	$ 2,044,083
Cumulative Net Annual Benefit	**$ -**	$ 1,959,756	$ 2,733,864	$ 3,429,068	$ 4,074,259	$ 4,606,982	$ 5,178,682	$ 5,457,862	$ 5,479,083	$ 5,513,966	$ 5,594,197	$ 5,759,505	$ 5,973,733	$ 5,488,773	$ 5,806,590	$ 5,429,229	$ 7,222,584	$ 9,075,090	$ 10,989,040	$ 12,966,818	$ 15,010,901

Net Present Value Analysis	**20 Years**
20-Year Cumulative Cash Flow	$ 15,010,901
Net Present Value (NPV)	$ 5,027,342

Attachment A2 - Base Project Pro-Forma

Yolo County - Base

Discount Rate:	6.00%	Capital Cost of Upgrades	$ 10,385,378	Interest Rate	2.50%
Inflation Rate	3.00%	Rebates and Discounts (1st Year)	$ -	Financing Term (Payback)	15.0
Escalation Rate (Elec)	4.00%	Rebates and Discounts (by Year 5)	$ -	Financed Amount	$ 10,385,378
Escalation Rate (Gas & Water)	1.00%				
Years of Analysis	20	Net Project	$ 10,385,378		

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Status Quo Operations (Total County)																					
Utility Expenditures (Elec)		$ 2,860,112	$ 2,974,516	$ 3,093,497	$ 3,217,237	$ 3,345,927	$ 3,479,764	$ 3,618,954	$ 3,763,712	$ 3,914,261	$ 4,070,831	$ 4,233,664	$ 4,403,011	$ 4,579,131	$ 4,762,297	$ 4,952,789	$ 5,150,900	$ 5,356,936	$ 5,571,214	$ 5,794,062	$ 6,025,825
Gas		$ 174,769	$ 176,517	$ 178,282	$ 180,065	$ 181,865	$ 183,684	$ 185,521	$ 187,376	$ 189,250	$ 191,142	$ 193,054	$ 194,984	$ 196,934	$ 198,903	$ 200,892	$ 202,901	$ 204,930	$ 206,980	$ 209,049	$ 211,140
Water		$ 371,066	$ 374,777	$ 378,524	$ 382,310	$ 386,133	$ 389,994	$ 393,894	$ 397,833	$ 401,811	$ 405,829	$ 409,888	$ 413,987	$ 418,126	$ 422,308	$ 426,531	$ 430,796	$ 435,104	$ 439,455	$ 443,850	$ 448,288
Credits		$ (932,450)	$ (970,228)	$ (1,021,517)	$ (1,062,378)	$ (1,104,873)	$ (1,149,068)	$ (1,195,031)	$ (1,242,832)	$ (1,292,545)	$ (1,344,247)	$ (1,398,017)	$ (1,453,937)	$ (1,512,095)	$ (1,572,579)	$ (1,635,482)	$ (1,700,901)	$ (1,768,937)	$ (1,839,695)	$ (1,913,282)	$ (1,989,814)
Operational Expenses		$ 99,000	$ 101,970	$ 105,029	$ 108,180	$ 111,425	$ 114,768	$ 118,211	$ 121,758	$ 125,410	$ 129,173	$ 133,048	$ 137,039	$ 141,150	$ 145,385	$ 149,746	$ 154,239	$ 158,866	$ 163,632	$ 168,541	$ 173,597
Life Cycle Capital Renewal		$ 937,000	$ 787,000	$ 675,000	$ 525,000	$ 375,000	$ 375,000	$ 330,000	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Status Quo Costs		$ 3,509,497	$ 3,444,552	$ 3,408,815	$ 3,350,414	$ 3,295,477	$ 3,394,142	$ 3,451,550	$ 3,257,847	$ 3,338,187	$ 3,452,729	$ 3,571,637	$ 3,695,084	$ 3,823,247	$ 3,956,314	$ 4,094,476	$ 4,237,935	$ 4,386,899	$ 4,541,586	$ 4,702,220	$ 4,869,036
POST Project Upgrades (Total County) (SAVINGS)																					
Utility Expenditures (Elec)		$ 434,169	$ 443,111	$ 462,831	$ 576,630	$ 599,695	$ 623,683	$ 648,630	$ 674,576	$ 701,559	$ 729,621	$ 758,806	$ 789,158	$ 820,724	$ 853,553	$ 887,696	$ 923,203	$ 960,131	$ 998,537	$ 1,038,478	$ 1,080,017
Gas		$ 3,444	$ 3,478	$ 3,513	$ 3,548	$ 3,584	$ 3,620	$ 3,656	$ 3,692	$ 3,729	$ 3,767	$ 3,804	$ 3,842	$ 3,881	$ 3,920	$ 3,959	$ 3,998	$ 4,038	$ 4,079	$ 4,120	$ 4,161
Water		$ 62,378	$ 63,002	$ 63,632	$ 74,571	$ 75,317	$ 76,070	$ 76,831	$ 77,599	$ 78,375	$ 79,159	$ 79,950	$ 80,750	$ 81,557	$ 82,373	$ 83,197	$ 84,029	$ 84,869	$ 85,718	$ 86,575	$ 87,441
Credits		$ 11,287	$ 11,739	$ 12,208	$ 12,697	$ 13,204	$ 13,733	$ 14,282	$ 14,853	$ 15,447	$ 16,065	$ 16,708	$ 17,376	$ 18,071	$ 18,794	$ 19,546	$ 20,328	$ 21,141	$ 21,986	$ 22,866	$ 23,780
Unclaimed RESBCT Credit		$ 79,603	$ 82,787	$ 86,099	$ 89,543	$ 93,124	$ 96,849	$ 100,723	$ 104,752	$ 108,942	$ 113,300	$ 117,832	$ 122,545	$ 127,447	$ 132,545	$ 137,847	$ 143,361	$ 149,095	$ 155,059	$ 161,261	$ 167,712
Avoided Operational Expenses		$ 99,000	$ 101,970	$ 105,029	$ 108,180	$ 111,425	$ 114,768	$ 118,211	$ 121,758	$ 125,410	$ 129,173	$ 133,048	$ 137,039	$ 141,150	$ 145,385	$ 149,746	$ 154,239	$ 158,866	$ 163,632	$ 168,541	$ 173,597
Avoided Life Cycle Capital Renewal		$ 937,000	$ 787,000	$ 675,000	$ 525,000	$ 375,000	$ 375,000	$ 330,000	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Benefit by Year		$ 1,626,881	$ 1,493,087	$ 1,408,312	$ 1,390,169	$ 1,271,350	$ 1,303,723	$ 1,292,333	$ 1,027,230	$ 1,033,463	$ 1,071,084	$ 1,110,148	$ 1,150,711	$ 1,192,831	$ 1,236,570	$ 1,281,990	$ 1,329,157	$ 1,378,140	$ 1,429,010	$ 1,481,840	$ 1,536,708

Capital Investments	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*	*Year 11*	*Year 12*	*Year 13*	*Year 14*	*Year 15*	*Year 16*	*Year 17*	*Year 18*	*Year 19*	*Year 20*
Capital Outlays	$ 10,385,378																				

Program Cashflow Comparison In Years	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*	*Year 11*	*Year 12*	*Year 13*	*Year 14*	*Year 15*	*Year 16*	*Year 17*	*Year 18*	*Year 19*	*Year 20*
Net Annual Benefit	$ (10,385,378)	$ 1,626,881	$ 1,493,087	$ 1,408,312	$ 1,390,169	$ 1,271,350	$ 1,303,723	$ 1,292,333	$ 1,027,230	$ 1,033,463	$ 1,071,084	$ 1,110,148	$ 1,150,711	$ 1,192,831	$ 1,236,570	$ 1,281,990	$ 1,329,157	$ 1,378,140	$ 1,429,010	$ 1,481,840	$ 1,536,708
Cumulative Net Annual Benefit	$ (10,385,378)	$ (8,758,497)	$ (7,265,410)	$ (5,857,098)	$ (4,466,929)	$ (3,195,579)	$ (1,891,857)	$ (599,523)	$ 427,707	$ 1,461,169	$ 2,532,253	$ 3,642,401	$ 4,793,112	$ 5,985,943	$ 7,222,513	$ 8,504,502	$ 9,833,660	$ 11,211,800	$ 12,640,810	$ 14,122,650	$ 15,659,358
Simple Payback Calc		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financing Payments																					
Financing Payment Plan	$ 10,385,378	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	($838,790)	$0	$0	$0	$0	$0
Program Cashflow Comparison In Years																					
Year Term Financing Net Annual Benefit	$ -	$ 788,091	$ 654,297	$ 569,522	$ 551,378	$ 432,560	$ 464,933	$ 453,543	$ 188,440	$ 194,673	$ 232,294	$ 271,358	$ 311,921	$ 354,041	$ 397,779	$ 443,200	$ 1,329,157	$ 1,378,140	$ 1,429,010	$ 1,481,840	$ 1,536,708
Cumulative Net Annual Benefit	$ -	$ 788,091	$ 1,442,388	$ 2,011,910	$ 2,563,288	$ 2,995,848	$ 3,460,780	$ 3,914,324	$ 4,102,763	$ 4,297,436	$ 4,529,730	$ 4,801,087	$ 5,113,008	$ 5,467,049	$ 5,864,828	$ 6,308,028	$ 7,637,185	$ 9,015,325	$ 10,444,335	$ 11,926,176	$ 13,462,883

Net Present Value Analysis	20 Years
20-Year Cumulative Cash Flow	$ 13,462,883
Net Present Value (NPV)	$ 4,647,078

Attachment A3 - Energy Storage Pro-Forma

Yolo County - Energy Storage

Discount Rate:	6.00%	Capital Cost of Upgrades	$ 6,500,000	Interest Rate	2.50%
Inflation Rate	3.00%	SGIP (1st Year)	$ 1,440,000	Financing Term (Payback)	15.0
Escalation Rate (Elec)	4.00%	SGIP (Year 5)	$ 288,000	Financed Amount	$ 6,500,000
Escalation Rate (Gas & Water)	1.00%				
Years of Analysis	20	Net Project	$ 3,620,000		

YEAR	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Revenue Roll-up (Total County)																					
Capacity Credits (CCA)		$ 94,500	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000	$ 189,000
Additional Dispatch Credits (CCA)		$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000	$ 60,000
RESBCT Peak Shift Credit		$ 141,147	$ 146,793	$ 152,665	$ 158,771	$ 165,122	$ 171,727	$ 178,596	$ 185,740	$ 193,169	$ 200,896	$ 208,932	$ 217,289	$ 225,981	$ 235,020	$ 244,421	$ 254,198	$ 264,366	$ 274,940	$ 285,938	$ 297,375
Battery Monitoring & Maintenance		$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)	$ (39,000)
Battery Extended Warranty		$ -	$ -	$ -	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ (37,977)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
SGIP Incentives		$ 1,440,000	$ 288,000	$ 288,000	$ 288,000	$ 288,000	$ 288,000							$ -		$ -					
Total Benefit by year	$ -	$ 1,696,647	$ 644,793	$ 650,665	$ 618,794	$ 625,145	$ 631,750	$ 350,619	$ 357,763	$ 365,192	$ 372,919	$ 418,932	$ 427,289	$ 435,981	$ 445,020	$ 454,421	$ 464,198	$ 474,366	$ 484,940	$ 495,938	$ 507,375

Capital Investments	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*	*Year 11*	*Year 12*	*Year 13*	*Year 14*	*Year 15*	*Year 16*	*Year 17*	*Year 18*	*Year 19*	*Year 20*
Capital Outlays	$ 6,500,000																				
Program Cashflow Comparison In Years	*Year 0*	*Year 1*	*Year 2*	*Year 3*	*Year 4*	*Year 5*	*Year 6*	*Year 7*	*Year 8*	*Year 9*	*Year 10*	*Year 11*	*Year 12*	*Year 13*	*Year 14*	*Year 15*	*Year 16*	*Year 17*	*Year 18*	*Year 19*	*Year 20*
Net Annual Benefit	$ (6,500,000)	$ 1,696,647	$ 644,793	$ 650,665	$ 618,794	$ 625,145	$ 631,750	$ 350,619	$ 357,763	$ 365,192	$ 372,919	$ 418,932	$ 427,289	$ 435,981	$ 445,020	$ 454,421	$ 464,198	$ 474,366	$ 484,940	$ 495,938	$ 507,375
Cumulative Net Annual Benefit	$ (6,500,000)	$ (4,803,353)	$ (4,158,560)	$ (3,507,896)	$ (2,889,101)	$ (2,263,956)	$ (1,632,206)	$ (1,281,587)	$ (923,825)	$ (558,632)	$ (185,713)	$ 233,219	$ 660,508	$ 1,096,489	$ 1,541,509	$ 1,995,930	$ 2,460,128	$ 2,934,494	$ 3,419,434	$ 3,915,372	$ 4,422,747
Simple Payback Calc		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financing Payments																					
Financing Payment Plan	$ 6,500,000	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	($524,982)	$0	$0	$0	$0	$0
Capital Allowance (Battery renewal in out years)														($750,000)		($750,000)					
Program Cashflow Comparison In Years																					
Year Term Financing Net Annual Benefit	$ -	$ 1,171,665	$ 119,811	$ 125,683	$ 93,812	$ 100,163	$ 106,768	$ (174,363)	$ (167,219)	$ (159,790)	$ (152,063)	$ (106,050)	$ (97,693)	$ (839,001)	$ (79,962)	$ (820,561)	$ 464,198	$ 474,366	$ 484,940	$ 495,938	$ 507,375
Cumulative Net Annual Benefit	$ -	$ 1,171,665	$ 1,291,476	$ 1,417,159	$ 1,510,971	$ 1,611,134	$ 1,717,902	$ 1,543,539	$ 1,376,320	$ 1,216,530	$ 1,064,467	$ 958,417	$ 860,725	$ 21,724	$ (58,238)	$ (878,799)	$ (414,601)	$ 59,764	$ 544,705	$ 1,040,643	$ 1,548,018

Net Present Value Analysis	20 Years
20-Year Cumulative Cash Flow	$ 1,548,018
Net Present Value (NPV)	$ 380,264

Notes:

Batteries are sized at 2,800kWh and are capable of discharging 700kW for up to (4) hours, as well as being capable of dispatching 1,000kW for 2.5 hours

Calculations are based on direct discussions with local Community Choice Aggregation leaders and utilize the following calculations:

Capacity: $7.50/kW/Month, each battery discharges 700kW every month ($7.50 x 700 x 12 x 3 = $189,000/yr). First year credits are reduced by 1/2 due to the expected timeline and RA capacity of local CCA

Energy Dispatch: $200/MW-hr, 40 discharges per year x 2.5MWh dispatch (2.5 hours @ 1,000kW) which equals 100 MW-hr "economic" dispatches per battery (40 x 2.5 x 3 = 300MW-hr), ($200 x 300 = $60,000/yr)

RESBCT Peak Shift Credit: To determine the increase in utility credits by shifting energy export from off-peak to on-peak hours, the delta of energy rates between the two TOU periods were multiplied by the energy capacity (kWh) of the energy storage system using a customized excel spreadsheet.

County of Yolo

Energy Projects
Financial Review Report

November 8, 2019

Government Financial Strategies

INTRODUCTION

The County has received a proposal from Trane to finance energy projects. The proposal involves the consideration of implementing projects across three scopes of work:

- Base recommendation of energy efficiency and infrastructure renewal equipment
- The above equipment plus battery storage
- The above projects plus landfill gas modernization

We understand Trane's recommendation is to implement the base recommendation plus the battery storage. The landfill gas modernization has been deferred and is not currently under consideration. Therefore, only the first two scopes of work will be reviewed in this report.

This report does not include analysis associated with the energy aspects of the projects, such as technical specifications, project cost, energy generation or energy usage reduction, utility rates and tariffs, etc. We understand an independent energy expert is conducting a third-party review of the energy aspects of the projects. This report focuses on the financial aspects of the projects including the proposed financing and financial pro forma.

Documents reviewed for this report were:

- Information presentation titled "Investment Grade Audit Review and Proposal" dated October 24, 2019
- Report titled "Yolo County Investment Grade Audit Report" dated October 23, 2019
- Financial pro forma and schedule dated October 16, 2019
- Information presentation titled "Stakeholders Review Energy Proposal Recommendations" dated June 4, 2019
- Peer review letter from Western Cooling Efficiency Center Energy and Efficiency Institute University of California, Davis dated March 21, 2019
- Information presentation titled "Energy Sustainability Project, Trane Proposal" not dated

PROJECT SUMMARY

Trane's recommended project involves the following:

- 266 HVAC units at 27 facilities
- 10,000+ lighting units at 34 facilities
- 29 transformer units at 8 facilities
- 576 water fixture units at 21 facilities
- 3 energy storage battery systems at 3 sites

A summary of the key financial aspects of the project, per the financial pro forma prepared by Trane, includes:

- Estimated cost of the project is $16,885,378
- Estimated savings, revenues, and rebates total $35,467,481 over 20 years

- Estimated financing payments total $20,456,580 with a 2.50% interest rate over 15 years
- Net benefit of $15,010,901 over 20 years
- Net present value (NPV) benefit is positive at $4,362,764 with a 6% discount rate

FINANCING

Key terms associated with the financing are described and analyzed below.

Type of Financing

The type of financing is identified as a "tax exempt muni lease"[1]. We infer this to mean lease-purchase financing, where the County would own the asset at the end of the financing term, as opposed to a true lease, where the County would not own the asset. Lease-purchase financing can be tax-exempt and available in two types: a real-property lease-purchase financing where the financing is secured by a building as collateral, or an equipment lease-purchase financing where the financing is secured by equipment as collateral. While not specifically stated, based on conversations with County staff, we believe the proposed financing to be an equipment lease-purchase, where the energy equipment associated with the project would serve as collateral.

We believe an equipment lease-purchase to be an appropriate type of financing for the project. A real-property lease-purchase is generally less expensive (approximate interest rate reduction of 0.25% or less) due to more secure collateral, but collateral owned by the County that is free and clear of existing liens is a scare resource. Based on our review of the County's remaining collateral options and further discussion with County staff, we recommend collateral be preserved for future financing needs, and therefore, we support the selection of an equipment lease-purchase financing for the type of financing.

Other considerations for types of financings:

The California Energy Commission offers a loan program with a fixed 1% interest rate to counties and certain other public agencies for energy projects. However, the maximum loan amount is $3 million, meaning less than 20% of the project could be funded with this method. Further, obtaining a CEC loan involves a lengthy application process that typically takes about six months, and includes application review, site visit, and document review and approval.

Another option is to include this project into financings the County is already planning to undertake, such as the 2020 capital improvements projects financing. If schedule permits, including this project as part of a financing already being undertaken could result in economies of scale and reduce financing costs. However, this would also require adding more collateral to secure the 2020 capital improvements projects financing. As noted previously, collateral owned

[1] Information presentation titled "Investment Grade Audit Review and Proposal" dated October 24, 2019

by the County that is free and clear of existing liens is a scare resource and should be preserved for future financing needs.

Upfront Issuance Costs

The estimated financing amount is $16,885,378 and exactly equal to the estimated project cost, meaning no upfront issuance costs have been included in the budget. Upfront issuance costs may include:

- Bank financing fees
- Bank escrow fees
- Bank legal counsel fees
- County bond counsel fees
- County financial advisor fees
- California Debt and Investment Advisory Commission (CDIAC) fees

The fees associated with the bank will be dependent upon the financing proposals received, and the fees associated with County bond counsel and financial advisor will be dependent upon the level of external services the County chooses to engage. However, we would conservatively suggest a budget of $100,000 for all the above fees, with the hope that the end result will likely come in under budget. In addition, reimbursement for any upfront planning/consulting expenses could be added to this budget at the County's option.

Interest Cost

The estimated interest cost is 2.5% for the 15-year term of borrowing. We believe this to be a reasonable interest rate given current market conditions. However, this does not allow for the possibility that interest rates may increase between now and financing implementation. To be conservative, the County may wish to budget for potential volatility in interest rates. Assuming a one-month timeframe between now and when financing proposals are received (which often will include an interest rate lock of 30 – 60 days) we would suggest 0.25%, and for a longer timeframe of 3 – 4 months, 0.50%[2]. Again, this would be conservative with the hope that the end result will likely come in under budget.

Term

The proposed term of the financing is 15 years, yet the project cash flow is 20 years. These should not be mismatched and we would suggest the following:

- If the useful life of the projects is expected to be 20 years, then the term of the financing could be extended to match, which will improve cash flow. We note there are several years of marginally positive or even negative cash flow in the project pro forma (as much

[2] Based on historical volatility in over 90% of the respective timeframes in the benchmark Bond Buyer 20-Bond index from 1/1/84 to 1/1/19.

as nearly $500,000 of negative savings, or cost) in the first 15 years of the pro forma, followed by savings of $1.8 - $2.0 million per year in years 16 – 20 of the pro forma.

- If the useful life of the projects is expected to be 15 years, then the term of the financing should remain as is, but the project pro forma should be reduced to 15 years to more appropriately estimate cash flow and project benefit.

A financing with a 20-year term is expected to have an interest rate approximately 0.25% higher. At a 2.75% interest rate, payments would be reduced from approximately $1,360,000 per year to approximately $1,110,000 per year, a cash flow savings of over $250,000 per year. This would improve the lean years of savings, as well as the years where there are anticipated to be additional cost. However, extending the term of the financing to 20 years should only be undertaken if the projects are reasonably expected to last for 20 years. Equipment warranties should be considered in this estimation because it provides an indication of the manufacturer's expectations for equipment failure.

Based on further conversations with County staff, we understand the useful life of the projects is expected to be 15 years, and as a result we recommend the term of the financing should remain as is, but the project pro forma should be reduced to 15 years to match. A 20-year pro forma could be viewed as an upside scenario should the equipment last longer.

Structure

The structure of the financing is 15 years of level payments, of approximately $1,340,000 per year. The first year of project pro forma compares the first year's payment to the first year's benefit of approximately $3,320,000 (consisting of $1,880,000 of savings and $1,440,000 of rebates). The result is a positive cash flow of nearly $1,960,000. The first year is not specified as to whether it refers to calendar year or fiscal year, but both are considered herein.

The structure appears to create a significant cash flow problem in relation to the project schedule prepared by Trane. The schedule does not identify the financing completion date, though shows equipment procurement beginning 12/2/19 and construction beginning 3/3/20, with project completion on 12/8/20.

For illustrative purposes, we assume financing is completed on 1/1/20 though the exact date could be adjusted as needed. Below is how the financing schedule would align with the project schedule.

1/1/20 financing completed → 1/1/21 financing payment due (1 year later)
12/8/20 project completed → 1/1/21 less than one month of project savings accrued

The above illustrates that when the time comes to make a full year's payment of $1,340,000 the County will have only achieved savings for less than one month – under $160,000. This would be a significant cash flow shortfall (and this shortfall would be even worse if there are delays in completing the projects). The first year also identifies rebates of $1,440,000 though the exact timing of when the rebates would be received is unclear, and may not be in time to make the financing payment.

Even on a fiscal year basis (July 1 – June 30) only about ½ of the annual savings (or less than 7 months' worth of savings - under $1.1 million) will have accrued in the same fiscal year as the full year's payment. Therefore, in the County's budget for fiscal year 2020-21, the cash flow benefits

would be significantly less than shown in the pro forma. Therefore, the pro forma includes an inaccurate representation of the expected cash flow.

The timing of the project savings and the timing of the financing should be matched. We recommend this be addressed as follows:

- The project pro forma should be set on a fiscal year basis to align with the County budget.
- The project savings should be reduced to show the expected savings that will occur in the first fiscal year of project operation.
- The financing structure can be adjusted to accommodate the reduced savings if necessary (for example, reduced principal, or an interest-only payment).

Timing

We understand the portion of the project involving the energy efficiency and infrastructure renewal equipment is work that Trane is prepared to begin immediately. However, the battery storage portion of the project is still at an early stage. The concept behind the battery storage project is to store energy produced by the County's solar energy systems, and to then generate revenue through the sale of this resource to Valley Clean Energy (a local community choice aggregation (CCA) program). Trane estimates that any agreement with Valley Clean Energy is likely to take 3 – 6 months beginning January, which suggests timing of April – July. Further, Trane estimates there is 4 - 9 months lead time on procurement of the battery storage systems, though Valley Clean Energy does not fully benefit from receiving this resource until 2022.

The timing of the financing for the battery storage equipment creates two concerns:

- Risk: there is risk that an agreement with Valley Clean Energy does not happen, or happens at reduced revenue levels than assumed in the pro forma, or is delayed and revenue is received later than assumed in the pro forma. We understand that Trane has undertaken preliminary research and believes the risk to be low, but nevertheless risk is present. Undertaking a financing at this time would put risk on the County of needing to make a debt payment without sufficient revenue in place.
- Expense: the County would be responsible for carrying interest cost on the financing of the battery storage project while waiting for the project to be implemented, which could potentially take significant time and add up to significant expense.

As a result of the above concerns, we recommend the financing be bifurcated into two parts:

- Energy efficiency and infrastructure renewal equipment financing can proceed immediately.
- Battery storage equipment financing should be postponed until such time that an agreement is in place with Valley Clean Energy, and that it is confirmed the resulting revenue will support the cost of the project.

The method by which the financing would be bifurcated could involve either two separate financings (one now and one later) with the later financing subject to either a fixed interest rate lock or a floating interest rate tied to an index, and the other option is a line of credit style financing involving a draw down for one project now and the other project later. Both options could be requested in a financing RFP.

Implementation

The proposed implementation method is that Trane will "run financial RFP on behave (*sic*) of Yolo County"[3]. We would not recommend Trane be the lead firm managing and advising on the financing. Trane is not an independent municipal advisor registered with either the Securities and Exchange Commission or the Municipal Securities Rulemaking Board. Unlike a municipal advisor, Trane does not have a fiduciary duty to the County, and we would wonder about Trane's finance qualifications and expertise. An equipment lease-purchase financing is one of the few types of financings where Trane's proposed role is not illegal, but it is certainly not a best practice.[4] We recommend the County use the services of a municipal advisor to implement any financing.

Additional Financing Terms

Additional financing terms are not addressed but should be part of the County's consideration of any financing proposal, including the following:

- Interest rate: fixed, floating, or reset, and timing and duration of a rate lock,
- Upfront cost: fees and expenses associated with the financing,
- Default remedies: understanding the remedies upon a potential payment default and the bank's recourse to the County,
- Prepayment option and penalties: what restrictions and penalties, if any, are associated with the option to prepay, or refinance, the proposed financing in the future.

FINANCIAL PRO FORMA

Key assumptions in the financial pro forma are described and analyzed below.

Electricity Escalation Rate Assumption

A key assumption in the pro forma is the future escalation rate in the cost of electricity, assumed to be 4% annually. This appears reasonable to us as a base case assumption, based on published information we have seen from the California Energy Commission[5] (which provides guidance of 4%) and a report by the UC Davis Energy Efficiency Center[6] (which provides forecasts ranging from

[3] Information presentation titled "Investment Grade Audit Review and Proposal" dated October 24, 2019.

[4] Government Finance Officers Association, Best Practice, Selecting and Managing Municipal Advisors, February 2014.

[5] "Proposition 39: California Clean Energy Jobs Act –2013 Program Implementation Guidelines", California Energy Commission, Revised June 2014.

[6] "The Future of Electricity Prices in California", UC Davis Energy Efficiency Center, December 2013

approximately 2% - 6%). While these reports are a few years old at this point, they are the most recent publications we have obtained.

That said, the 4% assumption is stated as "Guidance from Yolo Staff" without any analysis of the County's historical rate increases or PG&E's historical rate increases more broadly. It is justified as "based upon peer review recommendation". The peer review recommendation we have received notes "EIA data shows an average 3% increase annually between 2008-2018 for all commercial customers in California". Therefore, we recommend a sensitivity analysis be prepared showing how the pro forma would look under alternate assumptions, such as a 3% growth assumption, and in addition, what the minimum growth rate would need to be for the County to break-even (incur neither a project savings nor cost, but generate just enough savings sufficient to pay for all project expenses).

Inflation Rate Assumption

Another assumption in the pro forma is the future inflation rate, which is for the purpose of estimating operational expenses, and is assumed to be 3% annually. This appears reasonable to us as an assumption, based on review of the Consumer Price Index (CPI, United States) and the California Consumer Price Index (CCPI)[7]. For comparison, the CPI averaged:

2.3% over the 25-year time period 1994-2018
1.9% over the 15-year time period 2004-2018
1.2% over the 5-year time period 2014-2018

and the CCPI average:

2.4% over the 25-year time period 1994-2018
2.2% over the 15-year time period 2004-2018
2.1% over the 5-year time period 2014-2018.

Discount Rate Assumption

Another assumption in the pro forma is the discount rate, which is used for calculating net present value, and is assumed to be 6% annually. The appropriate discount rate should be consistent with both the type and riskiness of the cash flow being discounted.[8] Commonly used discount rates are a financing interest rate or an investment earnings rate. A 6% annual discount rate in this case appears conservatively high to us, but the result is that the savings on a net present value basis is estimated conservatively low. Even with a conservatively low estimate, we

[7] State of California, Department of Industrial Relations with source cited as U.S. Department of Labor, Bureau of Labor Statistics. Data for all urban consumers.

[8] Asworth Dasmodaran , NYU Professor of Finance and author of Investment Valuation: Tools and Techniques for Determining the Value of Any Asset, 2012.

note that the net present savings is positive, which is an indication that project is financially beneficial and should proceed.[9]

Term Assumption

The pro forma has an assumed term of 20 years. As noted previously, this is mismatched with the financing term of 15 years. If the projects can reasonably last for 20 years, the financing term should be extended to match, which will improve cash flow. If not, then the pro forma should be reduced to 15 years. We note that if reduced to 15 years, the total project savings is reduced from approximately $15 million (average of $750,000 per year) to $5.4 million (average of $360,000 per year). Based on further conversations with County staff, we understand the useful life of the projects is expected to be 15 years and so it would be more appropriate to view the pro forma over the first 15 years of savings. The existing 20-year pro forma could be viewed as an upside scenario should the equipment last longer.

CONCLUSION

The financing and financial pro forma include a number of aspects that appear reasonable and appropriate, and a number of aspects that could be improved, as summarized below.

On the financing:

- Type: an equipment lease-purchase financing is appropriate.
- Upfront issuance costs: none are budgeted, and this is not conservative as costs are likely to be incurred without an identified budget.
- Interest rate: the assumption is reasonable, though not conservative.
- Term: the term is reasonable in consideration of the project's useful life.
- Structure: the structure creates a significant timing problem that fails to account for the construction schedule, which should be addressed through restructuring the financing payment schedule.
- Timing: the timing of the financing for the battery storage equipment creates risk and expense for the County, and we recommend the financing be bifurcated into two parts: the energy efficiency and infrastructural renewal equipment financing can proceed now, and the battery storage financing should be postponed until such time as a revenue agreement is in place.
- Implementation: the financing implementation does not follow best practices and should be managed by an independent registered municipal advisor.

[9] The positive net present value savings indicating the project should proceed assumes the underlying analysis of benefits (energy savings, rebates, revenues, etc.) are reasonable, which are being reviewed by an independent energy expert.

On the financial pro forma assumptions:

- Electricity rate: the assumption is reasonable, though a sensitivity analysis is recommended to better understand and quantify risk.
- Inflation rate: the assumption is reasonable.
- Discount rate: the assumption is on the high side (but the result of a high discount rate is a lower estimate of net present value savings, which we note is still positive). The positive net present value savings is an indication that project is financially beneficial and should proceed (assuming the estimated benefits of savings, rebates, revenues, etc. are reasonable, which are being reviewed by an independent energy expert).
- Term: the term of the pro forma is mismatched with the term of the financing, and should be reduced if the reasonable useful life of the projects is 15 years to more appropriately quantify the project benefits over the estimated useful life. The existing 20-year pro forma could be viewed as an upside scenario should the equipment last longer.

We invite questions and comments to our report.

Memorandum

To:	Chad Rinde, Chief Financial Officer, County of Yolo
From:	Russell Driver, Principal, ARC Alternatives
CC:	Curtis Schmitt, Principal, ARC Alternatives Simon Olivieri, Senior Engineer, ARC Alternatives Danny Ulbricht, Associate Engineer, ARC Alternatives Keith Weaver, Client Services Director, Government Financial Strategies
Date:	Monday, November 11, 2019
Re:	Review of Trane energy efficiency project proposal

Background and Description of Work

The County is in receipt of energy program recommendations from Trane, based upon surveys of County facilities (including solar facilities) and utility usage. ARC Alternatives hired to perform a high-level review of the Trane proposal with the goal of validating the scope and savings of the projects identified.

ARC Alternatives reviewed the projects, as well as their associated costs and savings, and focused on the following:

- Review and validation of Trane's proposed energy projects (costs and savings);
- Identify project risks and mitigations

Review of Proposed Projects

Water and Energy Efficiency Projects

ARC's Alternatives review and analysis of energy efficiency projects focused on the 16 buildings throughout the County with high energy use and excluded the buildings with lower use. Detailed calculations for each project were not available to be reviewed within the scope of this effort, so ARC considered high-level metrics to provide a comparison to similar projects and industry norms. The buildings included in our review account for 92% of the proposed total projected energy efficiency related kilowatt-hour savings. The percent energy savings for each project type, and the energy savings per square foot for these buildings were used as metrics to gauge the overall reasonableness of the presented energy efficiency savings values. A summary of these metrics, as well as the baseline energy use for these 16 buildings, taken directly from the Trane Investment Grade Audit (IGA) document, is shown below. The percent savings vary greatly between facilities. However, the values are within a typical range of what is expected for these types of energy efficiency projects.

Table 1. Proposed project percent reduction from baseline by project type

Site	Electric Saving Projects				Water Saving Projects
	Lighting	*Transformer*	*HVAC*	Total	
Monroe	*10.8%*	*2.4%*	*5.3%*	18.5%	0.0%
Animal Shelter	*10.4%*	*0.0%*	*2.4%*	12.8%	NA
Juvenile Detention Center	*21.7%*	*0.0%*	*0.0%*	21.7%	NA
Central Landfill	*1.1%*	*2.3%*	*0.6%*	4.0%	NA
DA	*9.1%*	*0.0%*	*7.7%*	16.8%	36.9%
Admin Bldg	*14.2%*	*4.2%*	*9.4%*	27.8%	46.7%
Public Defender	*17.9%*	*0.0%*	*9.1%*	27.0%	22.2%
Bauer Bldg	*14.4%*	*4.0%*	*0.0%*	18.1%	8.0%
Gonzalez	*16.1%*	*2.3%*	*11.5%*	29.9%	39.0%
Community Service	*20.2%*	*3.0%*	*7.3%*	30.5%	26.9%
Ag Weights and Msrmts	*24.6%*	*0.0%*	*20.8%*	45.4%	45.1%
Bldg maint shop	*17.4%*	*0.0%*	*10.4%*	27.7%	0.0%
Dept of GS	*5.8%*	*0.0%*	*7.8%*	13.7%	39.3%
Davis Library	*19.6%*	*0.0%*	*4.1%*	23.7%	38.7%
WS Bldg A	*23.8%*	*0.0%*	*12.3%*	36.1%	39.9%
WS Bldg B	*12.5%*	*0.0%*	*14.8%*	27.3%	32.1%
Total	***10.4%***	***1.4%***	***6.2%***	**21.6%**	**19.0%**

ARC also compared the total efficiency-related project savings included in the Measurement and Verification (M&V) plan to the overall savings. Approximately 90% of the savings are included in the M&V plan under either Option A or Option C (assumed to be the guaranteed amount, discounted from actual calculated savings), which provides some assurance that the savings will be realized.

While the above discussion reasonably validates the first-year savings figures, the financial proforma estimates the energy savings over 20 years for all measures, with escalation factored in each year. However, HVAC package units have an effective useful life (EUL) of 15 years by both the California Energy Commission (CEC) and California Public Utility Commission (CPUC) Database for Energy Efficient Resources (DEER) sources. LED lighting has a 15-year EUL according to the CEC source, and 16 years according to the CPUC. The HVAC and lighting measures account for all of the gas savings and approximately 92% of the electric savings, respectively, representing approximately $5.9M of the revenue stream over years 16-20 in the proforma. The County should consider whether it is appropriate for energy savings to be counted beyond the EUL of the measures implemented. It is not standard practice, unless

appropriate costs for replacement or extended warranties are included to ensure savings beyond the useful life of the equipment.

Finally, no comment can be made on the costs of the individual measures or simple paybacks as individual measure costs were not presented in the IGA. A discussion of the overall program cost is provided below.

Battery Storage

The battery energy storage project proposed includes three 1 MW nominal capacity batteries located at three facilities. The proposal does not specify the type or manufacturer of the batteries. The analysis assumes the batteries will operate for 20 years. This is beyond the typically expected useful life of a battery storage system. However, the proforma includes costs for extended warranties and additional capital for mechanical renewal of the devices in years 13 and 15. A summary of the lifecycle 20-year expected revenues and operating costs are shown in the two tables below.

Table 2. Lifecycle revenues by component for the battery storage project.

Site/Project	Peak Shift Credit (NEM Program)	Capacity Credits (CCA)	Additional Dispatch Credits (CCA)	Grants, Incentives, and Rebates	Total Revenue
Grasslands Non-NEM	$1,053,162	$1,228,500	$400,000	$2,880,000	$3,641,662
Monroe Detention	$1,574,964	$1,228,500	$400,000		$4,163,464
Cottonwood Campus	$1,574,964	$1,228,500	$400,000		$4,163,464
Total	**$4,203,090**	**$3,685,500**	**$1,200,000**	**$2,880,000**	**$11,968,590**
Percent of total Savings	*35.1%*	*30.8%*	*10.0%*	*24.1%*	

Table 3. Lifecycle operating costs for the battery storage project.

Site/Project	Battery Monitoring & Maintenance Costs	Battery Extended Warranty Costs	Battery Mechanical Renewal Capital Costs	Total Operating Costs
Grasslands Non-NEM	$260,000	$88,613	$1,500,000	$848,613
Monroe Detention	$260,000	$88,613		$848,613
Cottonwood Campus	$260,000	$88,613		$848,613
Total	**$780,000**	**$265,839**	**$1,500,000**	**$2,545,839**

As presented, the battery storage project is projected to generate roughly $12 million of revenue over the assumed operating life of 20 years. Over that time, the County will need to spend roughly $2.5 million in operating expenses, leaving roughly $9.5 million in total net revenue. The assumed upfront capital cost of the battery is stated as $6.5 million, leaving $3.0 million in projected lifecycle net benefit for the project.

The $12.5 million in revenue from the battery systems is broken into three components: (1) peak shifting utilizing the utility's NEM program and TOU pricing (~35% of revenue); (2) capacity and dispatch credits as part of a proposed plan to secure fixed revenue as a participant in the local CCA's resource adequacy requirement (~41% of revenue); and (3) incentives from PG&E's SGIP incentive program (~24%).

The peak shifting and SGIP incentive revenue portions of the savings appear to be calculated using the correct utility rates. There is some concern the peak shift analysis slightly overstates the expected savings due to potential overlap with existing NEM benefits. However, this cannot be confirmed with the materials provided for this review. These two savings components appear reasonable in magnitude and together represent roughly 59% of the identified revenue.

The savings proposed from the capacity and dispatch credits from the CCA, roughly 41% of the total project revenue, represent a source of revenue for the battery project that, at this time, is not secured nor guaranteed. To receive these benefits, the County would need to negotiate and enter into an agreement with the local CCA to secure them. Trane has had exploratory conversations with the County's CCA that are being portrayed as promising. These conversations serve as the basis for the revenue calculations. However, there is no deal in place and without these revenues, the project becomes much more tenuous from a financial perspective. It is important to note that no additional comment can be made about the appropriateness of the magnitude of the capacity and dispatch savings values included given the materials provided and the scope of this review.

Additional concerns with the CCA savings component include the specific impact to the NEM savings and anticipated peak shift savings due to operational constraints of the CCA agreement. While these may represent a smaller risk, if the capacity and dispatch agreements cede operational control of the battery to the CCA, there may be a risk to the peak-shifting benefit as currently modeled. No bounding analysis to the magnitude of this risk is performed here as it is out of the scope of this review.

Overall Project Pro-forma

In total, Trane projects roughly $37 million in total revenue over 20 years against a total capital outlay of $18.8 million. The revenue by category presented on the proforma breaks down as follows.

Table 4. Lifecycle revenues by project component

Revenue Category	Revenues	Percent of Total
Efficiency Measures	$16,644,033	45%
Storage*	$8,042,751	22%
Incentive Revenue	$2,880,000	8%
RES-BCT/NEM Credit	$2,706,538	7%

Operational Savings	$2,660,169	7%
Capital	$4,034,000	11%
Total	**$36,967,491**	

** Total revenue minus monitoring, maintenance and extended warranty*

As noted in the table, roughly 45% of cost savings from the project result from the recommended energy efficiency measures, while storage and incentives make up an additional 30%. The remaining 25% percent of savings can be attributed to three categories; RES-BCT rebalancing, operational, and capital. The RES-BCT rebalancing category is associated with the clerical task of appropriately allocating RES-BCT benefits to maximizes their use. While this is a real, and significant item, the inclusion of its revenue in this proforma could be argued because it could be a County-performed task that does not relate to the rest of the portfolio and is not dependent on moving forward with the Trane contract to implement.

The operational and capital items include savings associated with lower maintenance costs (labor and capital) and avoided replacement costs due to the implementation of the program. In our experience with public agencies, these two items are not necessarily realized in terms of tangible general fund savings. Operational savings generally only materialize with reductions in staff, and it's more likely that the benefit would be to make existing staff available to address the backlog of maintenance or other priorities. Capital savings are real if the $4M are (or would be) in the budgets and spent in 2022-2028, but oftentimes capital replacements and deferred maintenance are not fully funded. The County is in the best position to ascertain how tangible these savings are, and the appropriateness of their inclusion.

In reviewing the report and proforma, several inconsistencies with the report were noted. We find that inconstancies like this are often due to revisions and ongoing changes, and usually can be cleared up, but the reconciliation is beyond the scope of this review. Specifically, the following items were found:

- Baseline utility costs for the status quo and proposed cases in the proforma vary from those presented in the report on Page 19. It is difficult to clearly determine the cause for the discrepancy and it may be a misinterpretation of the documents. However, under the worst-case interpretation, the total discrepancy results in $8.5 million of additional life cycle utility cost savings being inappropriately included in the project proforma. If removed, this amount would represent a 57% reduction from the total net energy cost savings of the proposed program. Based on the limited scope of this review, we were unable to validate the accuracy of either number with the documents provided by Trane and the County.
- The sum of energy savings is roughly $1.7 million higher than the expected amount based on the first-year savings in conjunction with the escalation rate used in the analysis. The figure below shows that the total utility savings diverges in year four from

the expected trend calculated from the first-year values. The divergence in Year 4 coincides with an unexplained savings related to water projects at Grasslands Non-NEM in that year, but there appear to also be variances by years in the escalations rates that attribute to the inconsistencies.

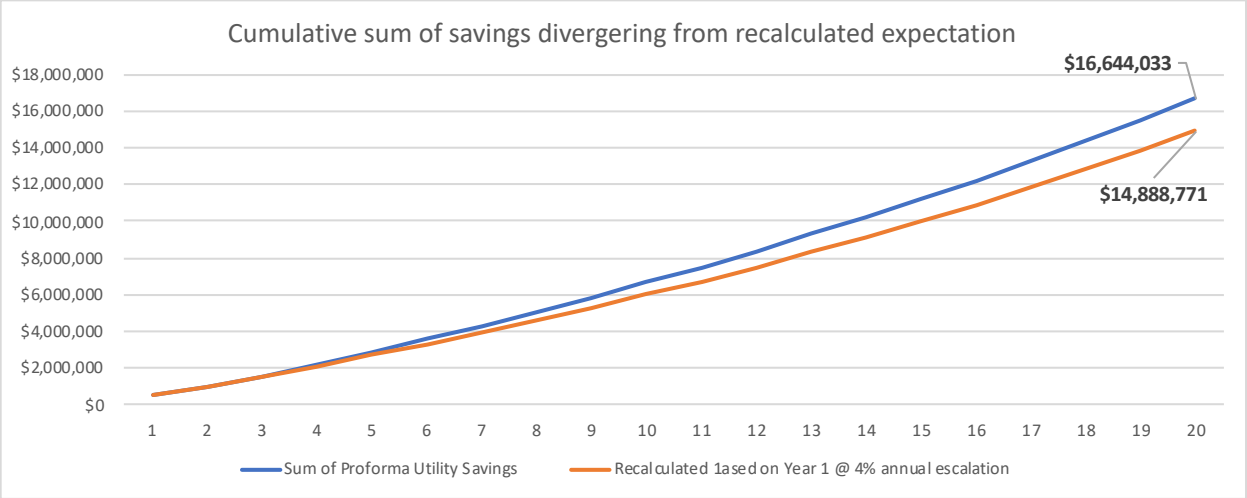


Figure 1. Out-year energy savings calculation discrepancy based a comparison of the proforma and projection of first-year value

Recommendations and Next Steps

Energy Efficiency & Proforma Specific Recommendations

- Focus on M&V plan development to ensure the County has adequate opportunity to review and approve the results.
- Validate appropriateness for County to include operational and capital savings in project cash flow.
- Validate appropriateness of the EUL assumptions supporting the 20-year savings projection.
- Reconcile proforma figures and IGA report, including possible clerical, formula or versioning errors.

Battery Storage Specific Recommendations

- Work out a mechanism to protect the County in the event that the Capacity and Dispatch credits from the CCA either fall through or do not meet the pre-negotiated expectations. This could be resolved through project sequencing or separating out the battery component of the project, so the County doesn't commit to purchasing the battery systems until the agreement with the CCA is closer to reality.

- Ensure that there is a specific guarantee around demand savings from the operation of the battery. The guarantee should require the specific calculation of savings from battery storage system, isolated from the solar systems on site.
- Ensure that the battery operation contract covers the County from needing to manage their participation in any CCA or Cal-ISO capacity and dispatch programs themselves.
- Ensure that the battery operations contract assigns ownership of all revenue generation opportunities, currently known and unknown, to the County.

YOLO COUNTY INVESTMENT GRADE AUDIT REPORT

October 23, 2019

Prepared for:
Yolo County Department of General Services

Trane Representative:
Reggie Ingram
Regional Executive – Client Solutions

TRANE® BUILDING ADVANTAGE™

TABLE OF CONTENTS

Executive Summary

The County of Yolo selected Trane Energy Service through a competitive RFP process in November of 2017. Subsequent to this selection, Trane has worked closely with the County Administration to develop an energy program that focused on the following goals:

- Develop Infrastructure renewal/resiliency projects paid for by energy reductions
- Reduce long term exposure to rising utility expense and the ever changing California Energy Market
- Protect the economic value the County has made past Solar infrastructure investments (2010-2012)
- Contribute to the County's goal for long term financial sustainability
- Reduce Capital infusion needs for future County budgets
- Contribute to the County's Climate Action Plan
- Development of an Energy project construction process designed to minimize the impact on stakeholders of the County.

Trane performed an energy analysis for the Yolo County to evaluate the facilities' energy usage and to determine the potential/feasibility for improving the facility's overall performance. Preliminary analysis was performed in the summer of 2018, and the Investment Graded Audit (IGA) was performed in the summer of 2019. This IGA report is intended to summarize the audit findings and is divided into two sections. The first section will focus on the overall county's energy usage summary, the impacts of rate change to the county, and a comprehensive solution of energy conservation measures for the County. The second section will discuss about each of the facilities' existing conditions and operating schedules, and the detailed descriptions of the recommended scope. To better narrate facility improvement measures, the audited facilities were grouped into eight campuses based on the functionality and the location of the buildings.

Project Summary

Trane reviewed a wide range of facility improvement measures associated with the existing systems on site, as well as advanced grid services measures that will be able to improve the county's operations. In summary we Trane makes the recommendation that the County of Yolo invest in its future and implement the recommended projects, thus benefiting and contributing to the achievement of the goals set forth by the County Administration and Board of Supervisors.

Trane recommends the following energy conservation measures:

1) Mechanical Solutions – 266 unit replacement at 27 buildings
2) Lighting Solutions – 10,000+ Interior and exterior LED fixtures upgrade at 34 buildings
3) Transformer Solutions – 29 transformer units upgrade at 8 buildings
4) Water Solutions – 576 Domestic plumbing fixtures retrofit at 21 buildings
5) Energy Storage Opportunities – Installation of 3 energy storage systems

Total Cost Savings over 20 Years

$ 15,274,818

Total Project Cost	$16,885,378
Calculated Rebate Incentive	$2,880,000
Net Present Value	$4,606,722
Simple Payback	<9 years

Measures	Annual kWh Savings	Annual kW Savings	Annual kGal Savings
Mechanical	566,635	2,474	
Lighting	1,301,648	5,403	
Transformer	163,967	219	
Water			4,096

Total	2,032,250	8,095	4,096

1. List of Facilities

There is a total of seventy-six (76) individual buildings/ remote parks that are operated by the County of Yolo. Facilities include detention facility, offices, court room, libraries, and few remote boat launch and parks. Some of buildings are grouped under one main facility based on its electrical as noted in the left most column in the table below. Furthermore, the facilities are then grouped in campuses based on its geographical location.

SITE #	Site Name	Address	City	Zip Code	Campus
1	Monroe Facility	2420 E. Gibson Rd.	Woodland	95776	Detention
1	Auger Monster House	2420 E. Gibson Rd.	Woodland	95776	Detention
1	Cameron Training Facility	2420 E. Gibson Rd.	Woodland	95776	Detention
1	Leinberger Facility	2420 E. Gibson Rd.	Woodland	95776	Detention
2	Sheriff Admin./Coroner	2500 E. Gibson Rd.	Woodland	95776	Detention
2	Morgue	2500 E. Gibson Rd.	Woodland	95776	Detention
3	Animal Shelter	2640 E. Gibson Rd.	Woodland	95776	Detention
3	Small Animal Annex	2640 E. Gibson Rd.	Woodland	95776	Detention
4	Probation - Main	2780 E. Gibson Rd.	Woodland	95776	Detention
5	Juvenile Detention Facility	2880 E. Gibson Rd.	Woodland	95776	Detention
6	Landfill - Esparto	27075 County Rd. 19A	Esparto	95627	Landfill
7	Landfill - New Building #1	44090 County Road 28H @ Road 104	Woodland	95776	Landfill
7	Modular Building (New)	44090 County Road 28H @ Road 104	Woodland	95776	Landfill
7	Yolo County Central Landfill	44090 County Road 28H @ Road 104	Woodland	95776	Landfill
7	Landfill - New Building #2	44090 County Road 28H @ Road 104	Woodland	95776	Landfill
8	District Attorney	301 Second St.	Woodland	95695	Court
9	Administrative Building	625 Court St.	Woodland	95695	Court
10	Historic Courthouse	725 Court St.	Woodland	95695	Court
11	Public Defender (Old Jail)	814 North St.	Woodland	95695	Court
12	Bauer Building (Health & Human Services)	137 N. Cottonwood St.	Woodland	95695	Cottonwood
13	Communication Center	35 N. Cottonwood St.	Woodland	95695	Cottonwood
14	Gonzalez Bldg. (Health & Human Services - Woodland)	25 N. Cottonwood St.	Woodland	95695	Cottonwood
15	Community Services (Planning & Public Works)	292 W. Beamer St.	Woodland	95695	Woodland
15	Cache Creek Conf Room (Parks Shop)	292 W. Beamer St.	Woodland	95695	Woodland
16	Planning & Public Works Garage/ Fleet Services	294 W. Beamer St.	Woodland	95695	Woodland
17	Central Library Archives	226 Buckeye St.	Woodland	95695	Woodland
18	Agriculture & Weights and Measures	70 Cottonwood St.	Woodland	95695	Woodland
18	Agriculture Department Shop Facility	70 Cottonwood St.	Woodland	95695	Woodland
19	Agriculture Department Shop (Buckeye) Administrative Services	221 Buckeye St.	Woodland	95695	Woodland
20	Building Maintenance Shop	101 Imperial St.	Woodland	95695	Woodland
21	Department of General Services	120 W. Main St. Suite A & Suite C	Woodland	95695	Woodland
22	Gibson Museum	512 Gibson Rd	Woodland	95695	Woodland
23	Mary L. Stephens Davis Library	315 E. 14th St.	Davis	95616	Davis
24	Board of Supervisors Office	600 A St.	Davis	95616	Davis
25	Arthur F. Turner (West Sac.) Branch	1212 Merkley Ave.	West Sacramento	95691	West Sac
26	Health & Human Services (West Sacramento)	500-A Jefferson Blvd.	West Sacramento	95691	West Sac
26	Probation - West Sacramento	500-A Jefferson Blvd.	West Sacramento	95605	West Sac
27	Knights Landing Branch Library	42351 Third St.	Knights Landing	95645	Remote
28	Yolo Branch Library	37750 Sacramento St.	Yolo	95697	Remote
29	Esparto Regional Library	17065 Yolo Ave.	Esparto	95627	Remote
30	Winters Community Library	708 Railroad Ave	Winters	95694	Remote
31	Clarksburg Library	52915 Netherlands Rd.	Clarksburg	95612	Remote
32	Grasslands Solar Array				
33	Child Support Services	100 W. Court St.	Woodland	95695	
34	DESS Storage	529 & 533 Community Ln.	Woodland	95695	
35	Clarksburg Boat Launch	38125 County Rd. E9	Clarksburg	95612	Remote
36	Knights Landing Boat Launch	9350 Highway 45	Knights Landing	95645	Remote

37	South Davis Montgomery Library	1441 Danbury St.	Davis	95618	
38	County Courthouse	1000 Main St.	Woodland	95695	
39	Winters - Health & Human Services	111 E. Grant Ave.	Winters	95694	
40	Cache Creek Regional Park & Campground	1475 Hwy 16	Rumsey	95679	
41	Esparto Community Park	17001 Yolo Ave.	Esparto	95627	
42	Vernon Nichols	17195 County Road 57	Guinda	95637	
43	Elkhorn Regional Park	18989 Old River Rd.	West Sacramento	95691	
44	Camp Haswell	1999 Highway 16	Rumsey	95679	
44	Valley Vista Regional Park	1999 Highway 16	Rumsey	95679	
45	Putah Creek	24135 Highway 128	Winters	95694	
46	Grasslands Regional Park	30475 County Road 104	Davis	95616	Remote
47	Dunnigan Park	County Road 89A	Dunnigan	95937	
48	Wild Wings Park	Goldeneye St. & Wood Duck St.	Woodland	95695	
49	AIRPORT	Aviation- Runway lights			
50	CLARKSBURG COUNTY SERVICE AREA LIGHTS	BOX 1268 WOODLAND			
51	DUNNIGAN COUNTY SERVICE AREA LIGHTS	BOX 1268 WOODLAND			
52	NORTH DAVIS MEADOWS COUNTY SERVICE AREA	24131 FAIRWAY DR # WELL,@ 1MI.S/29			
53	STREETLIGHTS	PO BOX 1268			
54	WAREHOUSE TANFORAN	1542 TANFORAN AVE			
55	WILD WINGS COUNTY SERVICE AREA	MALLARD DR- LIFT STATION			
56	ESPARTO Aquatics Center	17257 YOLO AVE	Esparto	95627	Remote
57	COMMUNITY SERVICES DEPARTMENT - ROADS				
58	CR 98/31 TRAF LIGHT				
59	CR98/CR24 TRAFFIC LIGHT				
60	EL MACERO COUNTY SERVICE AREA				
61	ELKHORN BOAT LAUNCH				
62	ELKHORN OLD LAUNCH				
63	NICHOLS PARK				
64	OLD JUVENILE HALL BUILDING				
65	PARKS - CAPAY OPEN SPACE				
66	PUTAH CREEK PARK				
67	YOLO CO AIRPORT				

2. Utility Information

1.1. Electricity

Onsite electricity is provided by Pacific Gas & Electric (PG&E) and by a few solar systems. The County of Yolo currently owns three major solar systems at the Grasslands (4 MW), Detention Center (1 MW), and Cottonwood campus (0.8 MW). There are a total of twenty-nine (29) facilities that are benefitting from the solar system through either Net Energy Metering (NEM) or Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT) program. Starting in 2007, in order to participate in the solar programs, the facilities must select an Otherwise Applicable Rate Schedule (OAS), which is a time-of-use (TOU) rate. The cost per kWh varies by season and time of day. TOU rate plan can help business save money because they offer lower energy rates when energy demand is low and higher energy rates when demand is high. For commercial and industrial: A-6, A-10, E-19, and E-20 are the corresponding TOU rates. PG&E has defined the TOU periods for two seasons:

- Winter (November-April). During winter, there are two rate periods: off-peak and partial-peak.
- Summer (May-October). During summer, there are three rate periods: off-peak, partial-peak and peak for small and medium business customers

Majority of the electricity accounts at the County of Yolo are under either A-6 –Small General Time-of-Use Service, or A-10 Medium General Demand-Metered Service, or A-1 Small General Service.

In addition, Trane had identified that the county was auto-enrolled in the Valley Clean Energy (VCE) program in July 2018. In 2002, a California law authorized cities and counties to form Community Choice Aggregation/Energy programs (or CCA/CCE) enabling them to purchase electricity on behalf of their residents and businesses. Transmission/delivery, customer service and billing remains under the management of the local investor owned utility—in our case, that's PG&E. Programs like VCE are "greening the grid," so that everyone's electricity is cleaner and less polluting. There is a total of forty-four (44) VCE service accounts that are added to the PG&E account since enrollment, and those accounts are non-NEM and non-RES-BCT accounts. The county receive monthly consolidated bill issued by PG&E that includes generation charges from VCE and transmission charges from PG&E.

Monthly PGE bills for all county facilities were utilized as part of the IGA analysis. Annual energy consumption draw for the all county facilities from the electric grid from June 2018 to May 2019 was approximately 8.8 million kWh. Annual solar generation for all systems summed to be approximately 11.9 million kWh, in which 2.7 million kWh were utilized at the detention facilities and cottonwood campus through NEM, 4.6 million kWh was transferred back to the grid for renewable energy transfer credit purpose, and 4.6 million kWh was sold through the power purchasing agreement. Total electricity consumption for the county summed up to be approximately 16.1 million kWh. Sum of maximum demand was 3,505 kW. Annual electricity spend summed up to approximately $1.5 million. Average electricity blended rate for all accounts was $0.17/kWh.

Energy analysis shows the communication center, animal shelter, yolo County Central Landfill, and building maintenance shop had the highest energy usage intensity in comparison to other county buildings. Reasons for the high energy usage could potentially be the data center and long operation hours. The agricultural department shop, historic courthouse, Winters Library, and Central Library Archives were shown to be the lower energy users. Reasons for the relatively lower energy usage could potentially be the minimal usage of the facility or effective efficient equipment on site at the Winters Library. Recent vacancy of the historic courthouse could also be a reason for lower energy usage. Based on the audit information and energy analysis, Trane reviewed a wide range of facility improvement measures associated with the existing systems on site, as well as advanced grid services measures that will be able to improve the county's operations.

The County of Yolo Landfill site utilizes onsite landfill gas to generate electricity. The generators were recently acquired by the county of Yolo in 2017. The annual electricity generation from 2017 was recorded to be approximately 10.9 million kWh and the electricity is currently being sold to the Sacramento Municipal Utility District (SMUD) through a Power Purchasing Agreement. The agreement is effective until June 2026.

1.1.1. Solar Resources

The summary of the solar photovoltaics (PV) system and annual generation is shown in the list and table below:

a) Grasslands – 4 MW
b) Detention Facility – 1MW
c) Cottonwood – 0.8 MW
d) Remote Libraries
    a. Davis Library
    b. Knights Landing Library
    c. Esparto Library
    d. Yolo Branch Library (recently removed)

Location	Detention	Grasslands PV (PPA)	Grasslands PV (Credit)	Cottonwood	Total
Capacity (MW)	1	2	2	0.8	5.8
System	Ground-mounted system; NEM to three facilities	Ground-mounted system; PPA (20 years since 2012)	Ground-mounted system; Feed to the grid and county buildings benefit from the Renewable Transfer Credits	Ground-mounted system; NEM to three facilities	
Interconnection Date		Jul-2013	Jun-2013	Jun-2013	
Operation Start	Jan-2011	Jul-2013	Jun-2013	Jun-2013	
Grandfather ends	Dec-2020		May-2023	May-2023	
# of panels		13,696		2,368	
# of facilities	3		18	3	24
June 2018 - May 2019 Monthly Generation (kWh)	1,745,891	4,616,811	4,587,057	986,639	11,936,398
May2017 - April2018 Monthly Generation (kWh)	1,839,317	4,540,793	4,432,391	1,146,466	11,958,968
May2016 - April2017 Monthly Generation (kWh)	1,796,902	4,391,787	4,267,493	1,101,950	11,558,132

1.2. Natural Gas

Onsite natural gas is provided by Pacific Gas & Electric (PG&E). There are a total of thirty-six (36) natural gas accounts within the County of Yolo. Monthly bills were used for this analysis. Annual natural gas usage for all accounts from June 2018 to May 2019 summed to be approximately 147,000 therms. The county spent approximately $174,000 on annual natural gas. Average natural gas blended rate was $1.64/therm.

1.3. Water

Domestic water is provided by a number of entities throughout the county due to the locations of the facilities. Providers include the City of Woodland, City of Davis, City of West Sacramento, Esparto community Services, and City of Winters. Scanned monthly bills were provided to Trane. There is a total of thirty-four (34) water accounts within the County of Yolo. With the given information, annual water usage was summed to be approximately 22,000 kGal. Annual water spent was $390,000. Average water blended rate was $18/kGal.

1.4. County-wide Utility Consumption

The overall utility consumption and generation for the county of Yolo is summarized in the table below. Utility information from June 2018 to May 2019 was used for the analysis. Landfill generators and Grasslands power purchasing agreement benefits were estimated based on the annual generation and the market price listed in the interconnection agreement. Solar net energy metering credits were also estimated based on the interval data and utility rate. Based on the utility information and assumptions listed above, the net operating cost for the county for the most recent twelve months was calculated to be approximately $776,000.

Utility Cost Analysis (May 2018 - April 2019)											
Site	PGE Electricity Draw (kWh)	Electricity Generation (kWh)	Total Electricity Consumption (kWh)	PGE Demand Draw (Max kW)	PGE Demand Draw (Sum kW)	PGE Total Electricity Costs (Pre-Credits) ($)	Credits (NEM $/ RES-BCT $) *Calculated	PGE Electricity Bill Costs ($)	PGE Natural Gas Costs ($)	Water Costs ($)	Overall Costs ($)
NEM-Detention	1,356,546	1,745,891	3,102,437	626	4,551	$800,034	($537,288)	$262,746	$64,093	$123,145	$449,984
NEM-Cottonwood	928,823	986,639	1,915,462	520	4,438	$444,105	($276,501)	$167,603	$29,796	$83,762	$281,161
RESBCT	5,232,554	4,572,040	9,804,594	1,631	16,336	$1,300,897	($605,635)	$695,262.24	$57,939	$111,826	$865,027
Non-RESBCT	838,256	0	838,256	526	3,243	$213,498	$0	$213,498	$16,511	$54,358	$284,366
Solo-NEM	458,132	37,466	495,598	202	1,401	$103,246	$0	$103,246	$6,067	$17,053	$126,366
Total	**8,814,311**	**7,342,036**	**16,156,347**	**3,505**	**29,969**	**$2,861,780**	**($1,419,424)**	**$1,442,356**	**$174,405**	**$390,144**	**$2,006,905**
Solar PPA		4,616,811					($524,352)				($524,352)
Landfill Generators		10,941,383					($706,887)				($706,887)
Total	**8,814,311**	**11,958,847**	**16,156,347**	**3,505**		**$2,861,780**	**($2,650,663)**	**$1,442,356**	**$174,405**	**$390,144**	**$775,666**

1.5. Site Utility Consumption

Utility consumption for each site is summarized in the table below.

SITE #	Site Name	filter	Rate	Total kWh	Max kW	Sum kW	E cost ($)	$/kWh	Annual kWh Generation	Solar Generation %	TOTAL kWh Consumption	# of Gas Meters	Therms	G cost ($)	$/Therms	kWh/ Sq. Ft.	Therms/ Sq. Ft.	Total kBtu	kBtu/ Sq. Ft.	Water Usage (kGal)	H20 Cost ($)	$/kGal	TOTAL UTILITY SPEND
1	Monroe Facility	NEM-Detention	NEM	624,756	365	2,450	$83,398	$0.13	1,340,063	68%	1,964,819	3	51,598	$54,069	$1.05	15	0.39	11,863,763	91	2,159	$123,145	$57.03	$260,613
1	Auger Monster House	NEM-Detention																0					
1	Cameron Training Facility	NEM-Detention																0					
1	Leinberger Facility	NEM-Detention		247,510	105	788	$65,312	$0.26	125,936	34%	373,446		8,083	$9,925	$1.23	18	0.40	2,082,498	102	0	$0	$0	$75,237
2	Sheriff Admin./Coroner	NEM-Detention																0					
2	Morgue	NEM-Detention																0					
3	Animal Shelter	RESBCT	RESBCTB	139,121	37	353	$14,282	$0.10			139,121	1	11,984	$14,560	$1.21	13	1.09	1,673,081	152	0	$0	$0	$28,842
3	Small Animal Annex	NEM-Detention																0					
4	Probation - Main	RESBCT	RESBCTB	136,957	91	578	$20,128	$0.15			136,957		0	$0	$0.00	14	0.00	467,297	47	0	$0	$0	$20,128
5	Juvenile Detention Facility	NEM-Detention	NEM	484,280	156	1,314	$114,036	$0.24	279,892	37%	764,172	1	0	$100	$0.00	20	0.00	2,607,355	67	0	$0	$0	$114,135
6	Landfill - Esparto	Non-RESBCT	A1X	1,472	5	24	$449	$0.30			1,472		0	$0	$0.00	6	0.00	5,022	21	0	$0	$0	$449
7	Landfill - New Building #1		A1															0					
7	Modular Building (New)																	0					
7	Yolo County Central Landfill	RESBCT		545,344	39	825	$121,735	$0.22			545,344		0	$0	$0.00	46	0.00	1,860,714	155	0	$0	$0	$121,735
7	Landfill - New Building #2																	0					
8	District Attorney	RESBCT	RESBCTB	308,747	116	916	$33,445	$0.11			308,747	1	1,237	$1,670	$1.35	15	0.06	1,177,145	57	157	$4,149	$26	$39,263
9	Administrative Building	RESBCT	RESBCTB	668,092	240	1,894	$69,298	$0.10			668,092	1	6,929	$8,526	$1.23	9	0.10	2,972,430	42	1,136	$14,986	$13	$92,810
10	Historic Courthouse	RESBCT	RESBCTB	50,749	20	119	$6,498	$0.13			50,749	1	68	$535	$7.87	1	0.00	179,956	4	1,171	$11,287	$10	$18,320
11	Public Defender (Old Jail)	RESBCT	RESBCTB	316,403	103	733	$32,886	$0.10			316,403	1	9,596	$11,658	$1.21	14	0.41	2,039,167	88	90	$3,201	$0	$47,745
12	Bauer Building (Health & Huma	EM-Cottonwoo	A1X	647,529	201	1,862	$128,771	$0.20	122,575	16%	770,104	1	12,285	$14,603	$1.19	11	0.18	3,856,095	55	8,251	$63,391	$8	$206,765
13	Communication Center	EM-Cottonwoo	NEM	87,841	58	538	($450)	($0.01)	263,227	75%	351,068		0	$0	$0.00	47	0.00	1,197,844	161	0	$2,154	$0	$1,703
14	Gonzalez Bldg. (Health & Huma	EM-Cottonwoo	A1X	193,453	261	2,038	$39,283	$0.20	600,837	76%	794,290	1	12,330	$15,192	$1.23	13	0.20	3,943,117	63	1,658	$18,218	$11	$72,693
15	Community Services (Planning	Non-RESBCT	A10SX	376,847	142	992	$79,982	$0.21			376,847	1	4,275	$5,320	$1.24	10	0.11	1,713,302	46	985	$14,047	$14	$99,350
15	Cache Creek Conf Room (Parks Shop)																	0					
16	Planning & Public Works Garage/ Fleet Services																	0					
17	Central Library Archives	RESBCT	RESBCTB	131,279	56	381	$21,444	$0.16			131,279	1	1,073	$1,464	$1.36	10	0.08	555,224	43	245	$3,815	$16	$26,723
18	Agriculture & Weights and Me	Non-RESBCT	A1X	78,369	37	311	$18,568	$0.24			78,369	2	3,843	$4,879	$1.27	7	0.34	651,695	57	102	$3,643	$36	$27,090
18	Argriculture Department Shop	Non-RESBCT		4,679	4	23	$1,156	$0.25			4,679		1,096	$1,443	$1.32	1	0.18	125,565	21	0	$0	$0	$2,599
19	Agriculture Department Shop (	Non-RESBCT	A1X	12,454	6	48	$2,920	$0.23			12,454		0	$0	$0.00	3	0.00	42,493	9	0	$0	$0	$2,920
20	Building Maintenance Shop	RESBCT	RESBCTB	65,434	38	279	$10,103	$0.15			65,434	1	1,927	$2,484	$1.29	19	0.57	415,961	122	19	$1,357	$71	$13,944
21	Department of General Service	RESBCT	RESBCTB	736,098	168	1,586	$11,488	$0.02			736,098	5	3,645	$5,098	$1.40	22	0.11	2,876,066	85	145	$5,675	$39	$22,261
22	Gibson Museum	Non-RESBCT	A1X	25,645	14	81	$4,001	$0.16			25,645	1	310	$524	$1.69	5	0.06	118,501	24	1,025	$10,448	$10	$14,973
23	Mary L. Stephens Davis Library	NEM-Library	NEM	403,409	156	1,088	$89,321	$0.22			403,409	1	3,411	$4,428	$1.30	13	0.11	1,717,532	55	367	$14,509	$40	$108,258
24	Board of Supervisors Office	RESBCT	RESBCTB	105,872	54	391	$13,910	$0.13			105,872	1	5,228	$6,247	$1.19	8	0.37	884,035	63	940	$11,905	$13	$32,063
25	Arthur F. Turner (West Sac.) Br	RESBCT	RESBCTB	175,247	75	590	$34,727	$0.20			175,247	1	2,541	$3,337	$1.31	10	0.14	852,043	47	269	$4,006	$15	$42,071
26	Health & Human Services (Wes	RESBCT	RESBCTB	408,087	137	1,171	$59,009	$0.14			408,087		0	$0	$0.00	13	0.00	1,392,393	45	1,533	$37,507	$24	$96,516
26	Probation - West Sacramento	RESBCT	RESBCTB	417,280	78	1,145	$84,794	$0.20			417,280		0	$0	$0.00	14	0.00	1,423,759	47	1,054	$12,154	$12	$96,948
27	Knights Landing Branch Library	NEM-Library	NEM	13,435	11	83	$3,449	$0.26	6,799		20,234		0	$0	$0.00	7	0.00	69,038	23	0	$0	$0	$3,449
28	Yolo Branch Library	Non-RESBCT	A1	707	0	0	$1,266	$1.79			707	1	519	$718	$1.38	1	0.48	54,312	50	0	$0	$0	$1,984
29	Esparto Regional Library	NEM-Library	NEM	41,288	35	230	$10,476	$0.25	30,667		71,955	1	1,213	$1,639	$1.35	13	0.22	366,810	66	480	$2,544	$5	$14,659
30	Winters Community Library	RESBCT	RESBCTB	98,949	48	344	$13,242	$0.13			98,949	1	1,236	$1,674	$1.35	8	0.10	461,214	38	112	$1,783	$16	$16,699
31	Clarksburg Library	Non-RESBCT	A1X	11,460	9	71	$2,776	$0.24			11,460	1	377	$547	$1.45	3	0.11	76,802	22	0	$0	$0	$3,323

32	Grasslands Solar Array	Non-RESBCT	A1X		0	0	$13,044	($0.00)	4,572,040		4,572,040		0	$0	$0.00			15,599,799		0	$0	$0	$13,044
33	Child Support Services	RESBCT	RESBCTB	141,691	71	654	$24,431	$0.17			141,691		0	$0	$0.00			483,450		0	$0	$0	$24,431
34	DESS Storage	Non-RESBCT		1,196	2	22	$514	$0.43			1,196		0	$0	$0.00			4,081		0	$0	$0	$514
35	Clarksburg Boat Launch	Non-RESBCT	A1X	1	0	0	$121	$120.92			1		0	$0	$0.00			3		0	$0	$0	$121
36	Knights Landing Boat Launch	Non-RESBCT	A1X	3,726	1.00	8.33	$921	$0.25			3,726		0	$0	$0.00			12,713		0	$0	$0	$921
37	South Davis Montgomery Library																	0					$0
38	County Courthouse																	0					$0
39	Winters - Health & Human Ser	Non-RESBCT		17,066	15	91	$8,080	$0.47			17,066	3	570	$957	$1.68			115,229		0	$0	$0	$9,037
40	Cache Creek Regional Park & Campground																	0					$0
41	Esparto Community Park	Non-RESBCT	A1X															0					$0
42	Vernon Nichols																	0					$0
43	Elkhorn Regional Park																	0					$0
44	Camp Haswell																	0					$0
44	Valley Vista Regional Park																	0					$0
45	Putah Creek																	0					$0
46	Grasslands Regional Park	Non-RESBCT	A1X	9,793	12	74	$2,428	$0.25			9,793		0	$0	$0.00			33,414		0	$0	$0	$2,428
47	Dunnigan Park																	0					$0
48	Wild Wings Park	RESBCT	RESBCTB	636,411	167	3,470	$89,341	$0.14			636,411	2	82	$279	$3.40			2,179,634		0	$0	$0	$89,620
49	AIRPORT	Non-RESBCT	A1X	26,785	9	0	$4,483	$0.17			26,785		0	$0	$0.00			91,390		0	$0	$0	$4,483
50	CLARKSBURG COUNTY SERVICE	Non-RESBCT	LS1-A	5,343	0	0	$2,723	$0.51			5,343		0	$0	$0.00			18,230		0	$0	$0	$2,723
51	DUNNIGAN COUNTY SERVICE A	Non-RESBCT	LS1-A	7,307	0	0	$5,129	$0.70			7,307		0	$0	$0.00			24,931		0	$0	$0	$5,129
52	NORTH DAVIS MEADOWS COU	Non-RESBCT	RESBCTB	150,793	93	906	$34,501	$0.23			150,793	1	299	$407	$1.36			544,406		0	$0	$0	$34,908
53	STREETLIGHTS	Non-RESBCT	LS1-A	11,818	0	0	$2,339	$0.20			11,818		0	$0	$0.00			40,323		0	$0	$0	$2,339
54	WAREHOUSE TANFORAN	Non-RESBCT	A1X	19,870	12	100	$4,856	$0.24			19,870		0	$0	$0.00			67,796		0	$0	$0	$4,856
55	WILD WINGS COUNTY SERVICE	Non-RESBCT	A1X	15,000	11	87	$4,283	$0.29			15,000		0	$0	$0.00			51,180		0	$0	$0	$4,283
56	ESPARTO Aquatics Center	Non-RESBCT	A1	34,800	26	121	$7,519	$0.22			34,800									179	$26,220		$33,739
57	zNo Opp- COMMUNITY SERVIC	Non-RESBCT		1,837	0	0	$391	$0.21			1,837		0	$0	$0.00			6,268		0	$0	$0	$391
58	zNo Opp- CR 98/31 TRAF LIGHT	Non-RESBCT		180	0	0	$154	$0.86			180		0	$0	$0.00			614		0	$0	$0	$154
59	zNo Opp- CR98/CR24 TRAFFIC	Non-RESBCT		242	0	0	$165	$0.68			242		0	$0	$0.00			826		0	$0	$0	$165
60	zNo Opp- EL MACERO COUNTY	Non-RESBCT	A1	81,681	184	952	$23,595	$0.29			81,681							278,696					$23,595
61	zNo Opp- ELKHORN BOAT LAU	Non-RESBCT		7,942	8	42	$1,487	$0.19			7,942		0	$0	$0.00			27,098		0	$0	$0	$1,487
62	zNo Opp- ELKHORN OLD LAUN	Non-RESBCT		608	0	0	$252	$0.42			608		0	$0	$0.00			2,074		0	$0	$0	$252
63	zNo Opp- NICHOLS PARK	Non-RESBCT		783	2	2	$356	$0.45			783		0	$0	$0.00			2,672		0	$0	$0	$356
64	zNo Opp- OLD JUVENILE HALL	Non-RESBCT		66,065	19	132	$16,269	$0.25			66,065	1	1,612	$2,124	$1.32			386,614		0	$0	$0	$18,392
65	zNo Opp- PARKS - CAPAY OPEN	Non-RESBCT		3,974	3	27	$719	$0.18			3,974		0	$0	$0.00			13,559		0	$0	$0	$719
66	zNo Opp- PUTAH CREEK PARK	Non-RESBCT		22	0	0	$125	$5.66			22		0	$0	$0.00			75		0	$0	$0	$125
67	zNo Opp- YOLO CO AIRPORT	Non-RESBCT		10,584	5	36	$2,427	$0.23			10,584		0	$0	$0.00			36,113		0	$0	$0	$2,427
		Total	**Rate**	**8,814,311**	**3,505**	**29,969**	**$1,442,356**	**$0.16**	**7,342,036**		**16,156,347**	**36**	**147,367**	**$174,405**	**$1.64**					**22,078**	**$390,144**	**$18**	**$2,006,905**

3. Pacific Gas & Electric Utility Programs

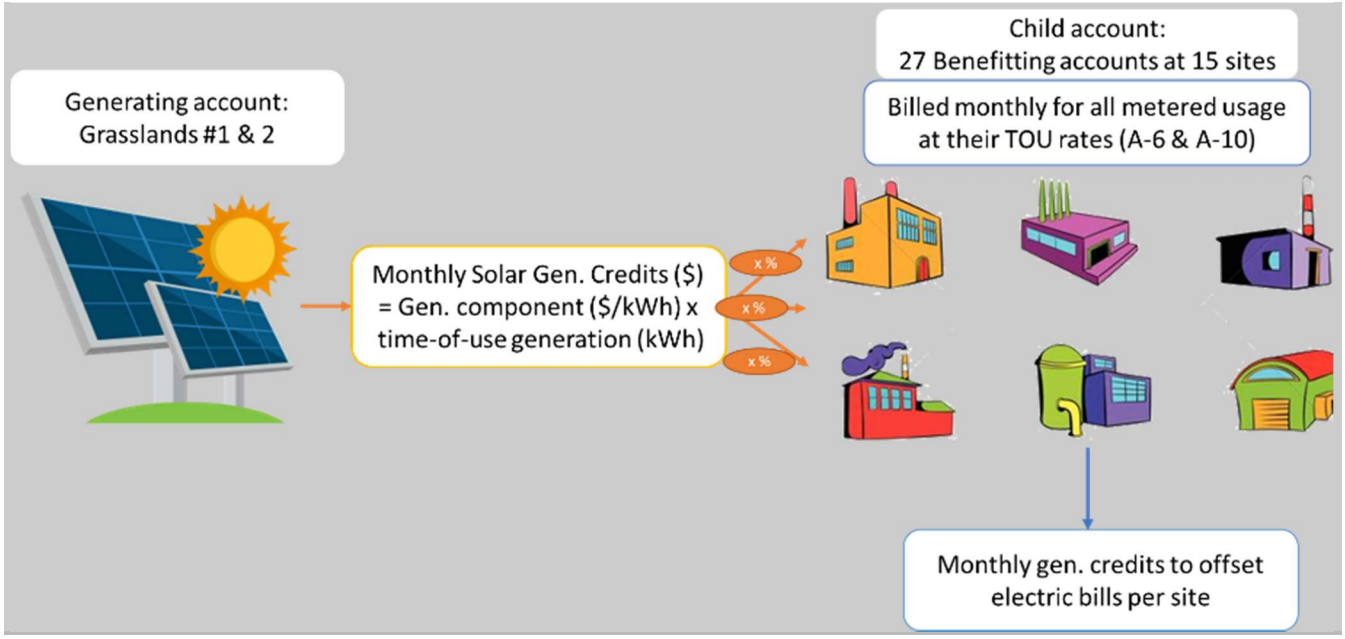
1.1. Renewable Energy Self-Generation Bill Credit Transfer (RES-BCT)

The county is currently participating in the RES-BCT Program. It allows a Local Government with one or more eligible renewable generating facilities to export energy to the grid and receive generation credits to benefitting accounts of the same Local Government. Solar generation of the 2+ MW solar system at the Grasslands site is exported to receive renewable generation credits. The solar system is connected to the Interconnection agreement #1 and #2. Monthly time-of-use generation is captured through a service account (#5109685575) and the monthly generation credits in dollars are calculated based on the generation component of the associated time-of-use rate.

There are a total of twenty seven (27) renewable energy self-generation bill credit transfer benefitting accounts across eighteen (18) facilities. Each of those accounts are also under commercial time-of-use rate at which they get charged for their usage based on the time-of-use rate. In addition, they receive a monthly generation credit in dollars based on their generation credit allocation percentage. It was observed that the generation credits would typically offset about 40-60% of the monthly bills. Summary of the RES-BCT accounts and generation allocation percentage is shown in the table below. One of the 27 accounts could not be identified. The rest of the 26 accounts add up to 97% generation allocation.

The annual generation for the solar system under the RES-BCT program from June 2018 to May 2019 was approximately 4.6 MWh. Annual generation credits based on the solar generation were approximately $798,000. However, due to the fact that the generation credits could only applied to the generation cost components for the benefitting accounts, only $605,000 of the generation credits were applied to the county. The remaining allocation of $180,000 will be reset to $0 after each 12-month true-up cycle period. Trane has observed that this impact placed a significant disadvantage to the county as they are not able to fully utilize the generation credits. Trane's recommendations to maximize the generation credits will be discussed in the adjusted baseline section of the report.

REC-BCT Program



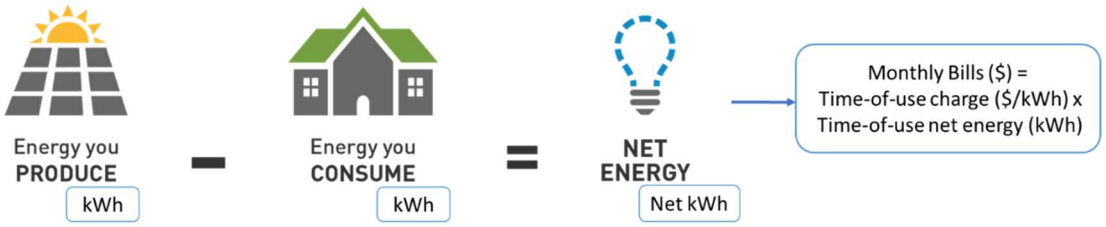
1.2. Net Energy Metering (NEM)

The solar system at the Detention campus is 1 MW. Utility information shows that the solar system is currently tied to the net energy metering program at three of the electricity meters (Monroe facility, Leinberger facility, and the Juvenile facility). Interconnection agreement documentation were not provided to Trane at the time of analysis. However, based on news article and county's personnel confirmation, operation of the solar system is assumed to start in January 2011.

The solar system at the Cottonwood campus is 0.8 MW and it has been in operation since July 2013. Interconnection agreement for net energy metering of solar electric generation at Cottonwood was entered with PG&E in February 2013. The solar system is currently tied to the net energy metering program at three of the electricity meters (Bauer Building, Communication Center, and Gonzalez Building). There are four remote libraries that have on-site solar systems as well, which are linked to the NEM program.

Net energy is defined as measuring the difference between the energy (kWh) supplied by PG&E, through the electric gird to the eligible customer-generator and energy (kWh) generated by an eligible customer-generator and fed back into the electric grid over a relevant period. At the end of the relevant period, a true up is performed by PG&E to bill the customer for energy (kWh) used during that period.

Net energy is defined as measuring the difference between the energy (kWh) supplied by PG&E and energy (kWh) generated by the solar system that gets fed back into the electric grid. Monthly bills are determined by applying the time-of-use net energy (kWh) and the time-of-use rate charge ($/kWh). If the energy (kWh) generated exceeds the energy (kWh) consumed at the end of the relevant period, there will be a compensation for any excess energy generated, which will be credited to future bill charges.



1.3. Grandfather Period for Solar PG&E Customers

PG&E drafted a settlement document on grandfathered rates for solar PG&E customers in January 2018.[1] The settlement agreements will not get formal approval from the California Public Utility Commission (CPUS) until August, but because they are uncontested settlements they are virtually assured of being approved with only minor changes. The settlement stated the following in regards to the transition of time-of-use schedule for commercial solar customers:

- For non-residential systems, this transition mitigation measure continues for ten years after issuance of a permission to operate. In no event shall the duration continue beyond December 31, 2027 (for schools) or July 31, 2027 (for all other non-residential).

The grandfather period would potentially allow the Grasslands RESBCT solar systems and the Cottonwood solar systems to remain under the current time-of-use period and rate until May 2023. Interconnection agreement for the solar system at the detention center were not provided at the time of analysis. However, based on news

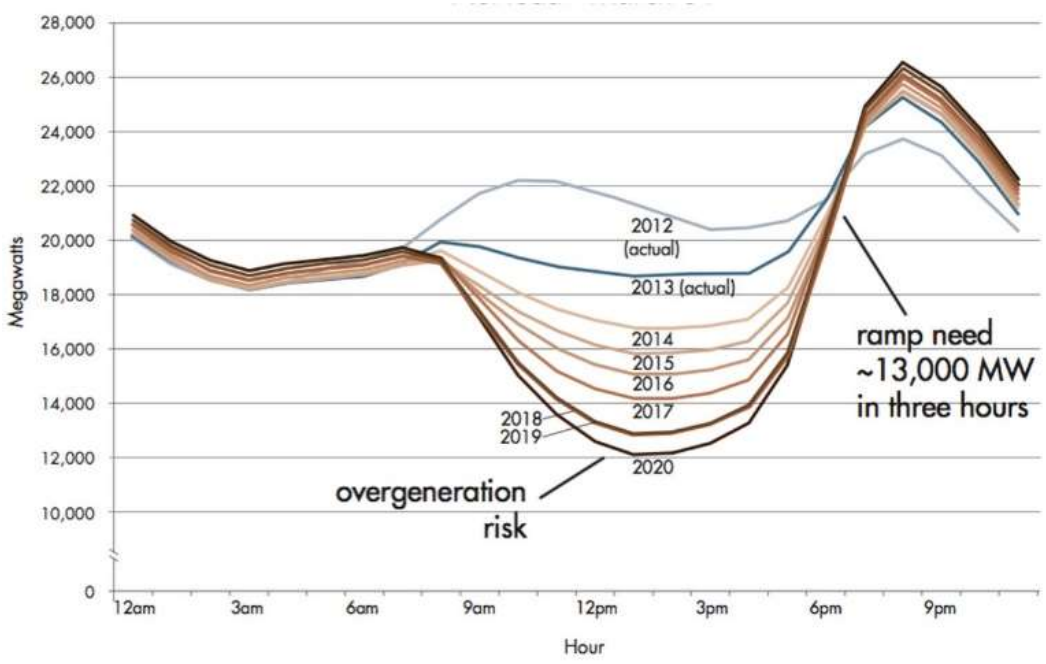
[1] Pacific Gas & Electric, 1/2018, https://static1.squarespace.com/static/54c1a3f9e4b04884b35cfef6/t/5a6ec240652dea30bd17ed55/1517208149962/PGE+GRC+Solar+Transition+Issues+Settlement.pdf

article and county's personnel confirmation, operation of the solar system is assumed to start in January 2011. The detention facility would be permitted under the current time-of-use period and rate until December 2020.

4. Time-of use Schedule & Rate Change

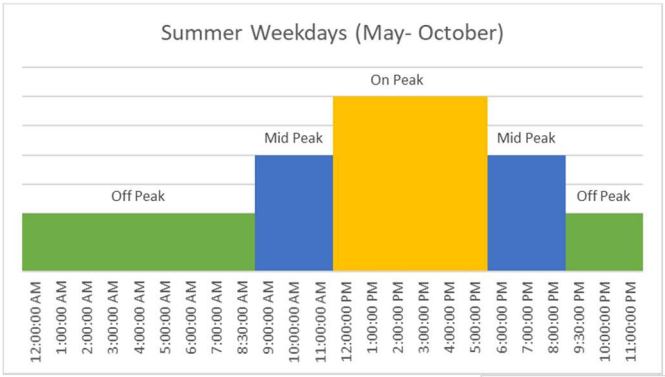
The electric grid and the requirement to manage it are changing significantly due to increase penetrations of renewable energy resources. High solar adoption creates a challenge for utilities to balance supply and demand on the grid. When the sun is shining, solar floods the market and then drops off as electricity demand peaks in the evening. Another challenge with high solar adoption is over-generation as it leads to curtailment of solar generation, which reduces its economic and environmental benefits. The duck curve—named after its resemblance to a duck—shows the difference in electricity demand and the amount of available solar energy throughout the day, produced by the California Independent System Operator in 2013. In response, utilities in the state are implementing new time-of-use (TOU) rate schedules to align demand with the midday solar bellies and steep evening necks.

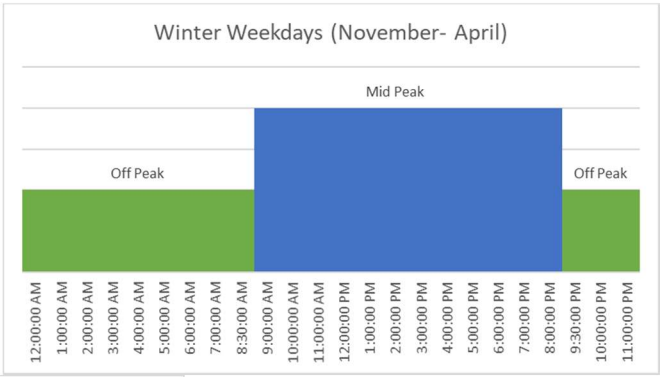
Each of California's largest utilities has proposed shifting the timing of peak rates later in the day in time-of-use (TOU) rate structure. Pacific Gas & Electric (PG&E) has already shifted TOU peak for residential customers and there are proposed settlements for commercial customers. PG&E will potentially be implementing the new structure for commercial customers in November 2019. Southern California Edison (SCE) has already shifted peak for all customers in March 2019. San Diego Gas & Electric (SDG&E) shifted peak hours in December 2018 for both residential and commercial customers. The most notable of changes are the on-peak times. PG&E currently have peak times from 12 pm to 6 pm during summer months and no peak times during winter months. PG&E's new peak is 4pm to 9pm daily all year. The summer months are also changing from spanning six months (May- October) to four months (June to September).

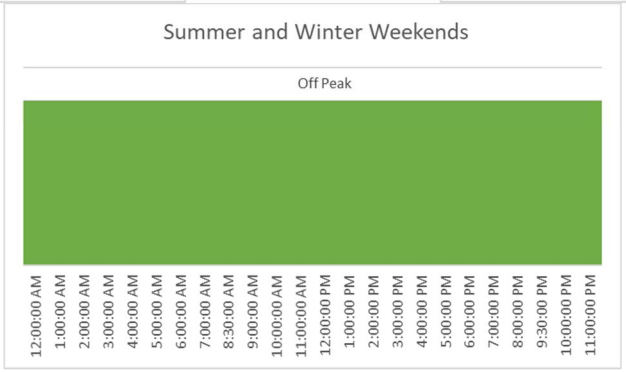


Current PG&E Time-of-Use schedule:

		Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Current rate schedule	Summer (May-October)	Weekday	Off Peak									Mid Peak			On Peak						Mid Peak			Off Peak		
		Weekend	Off Peak																							
Current rate schedule	Winter (November- April)	Weekday	Off Peak									Mid Peak												Off Peak		
		Weekend	Off Peak																							

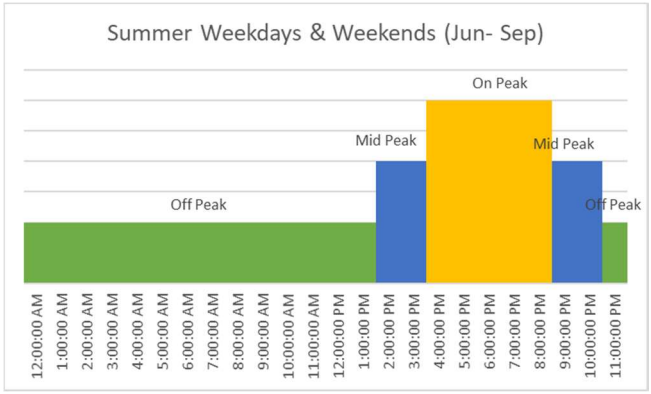


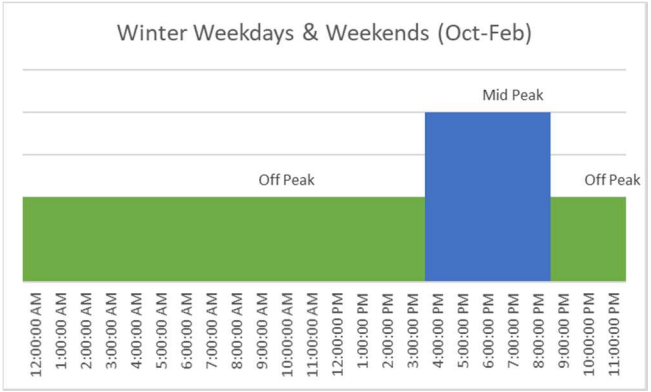


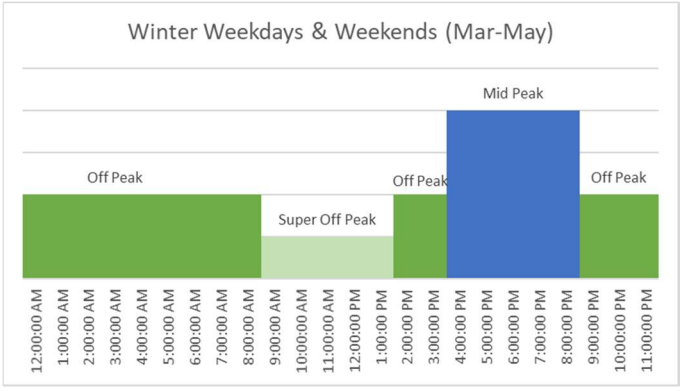


Proposed PG&E Time-of-Use Schedule:

		Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
New rate schedule	Summer (June-September)	Weekday	Off Peak														Mid Peak		On Peak					Mid Peak		Off Peak
		Weekend	Off Peak														Mid Peak		On Peak					Mid Peak		Off Peak
New rate schedule	Winter (October- May)	Weekday	Off Peak																Mid Peak					Off Peak		
		Weekend	Off Peak																Mid Peak					Off Peak		
		March - May	Off Peak									Sup. Off Peak					Off Peak		Mid Peak					Off Peak		







In addition to the time-of-use change, PGE settlement document includes the proposed rate for different tariffs. Pictures below shows the current and proposed rate tariff s (A-1, A-6, and A-10) that are more common for the electricity accounts for the County of Yolo. These adjusted rate tariffs were utilized to simulate anticipated utility costs for the County of Yolo, which will be discussed in the next section.

Current PG&E TOU A-1	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.27749	0	
Mid-Pk Cons. ($)	0.26816	0	
Off-Pk Cons. ($)	0.23976	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.20195	0	
Off-Pk Cons. ($)	0.18213	0	
Customer Charge $/Meter/Month	20.00		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Grandfathered PG&E TOU A-1	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.2436	0	
Mid-Pk Cons. ($)	0.2436	0	
Off-Pk Cons. ($)	0.21889	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.19601	0	
Off-Pk Cons. ($) & Super Off-Peak ($)	0.19543	0	
Customer Charge $/Meter/Month	39.97		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Proposed PG&E TOU A-1	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.29442	0	
Mid-Pk Cons. ($)	0.24519	0	
Off-Pk Cons. ($)	0.22438	0	
Winter			
Mid-Pk Cons. ($)	0.21899	0	
Off-Pk Cons. ($)	0.20288	0	
Super Off-Peak Cons. ($)	0.18646	0	
Customer Charge $/Meter/Month	25.00		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Current PG&E TOU A-6	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.56478	0	
Mid-Pk Cons. ($)	0.26796	0	
Off-Pk Cons. ($)	0.19637	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.21389	0	
Off-Pk Cons. ($)	0.19565	0	
Customer Charge $/Meter/Month	26.10		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Grandfathered PG&E TOU A-6	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.29867	0	
Mid-Pk Cons. ($)	0.25716	0	
Off-Pk Cons. ($)	0.20468	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.19564	0	
Off-Pk Cons. ($) & Super Off-Peak ($)	0.19459	0	
Customer Charge $/Meter/Month	39.97		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Proposed PG&E TOU A-6	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.3316	0	
Mid-Pk Cons. ($)	0	0	
Off-Pk Cons. ($)	0.21323	0	
Winter			
Mid-Pk Cons. ($)	0.22355	0	
Off-Pk Cons. ($)	0.20381	0	
Super Off-Peak Cons. ($)	0.1874	0	
Customer Charge $/Meter/Month	25.00		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

PG&E TOU A-6 Current Gen Credits (RES-BCT)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.36486	0	
Mid-Pk Cons. ($)	0.12528	0	
Off-Pk Cons. ($)	0.06699	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.10503	0	
Off-Pk Cons. ($)	0.08754	0	
Customer Charge $/Meter/Month			
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Grandfathered PG&E TOU A-6 Gen Credits (RES-BCT)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.12965	0	
Mid-Pk Cons. ($)	0.12965	0	
Off-Pk Cons. ($)	0.0959	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.08652	0	
Off-Pk Cons. ($)	0.08581	0	
Customer Charge $/Meter/Month			
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Proposed PG&E TOU A-6 Gen Credits (RES-BCT)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.16732	0	
Mid-Pk Cons. ($)	0	0	
Off-Pk Cons. ($)	0.09616	0	
Winter			
Mid-Pk Cons. ($)	0.1038	0	
Off-Pk Cons. ($)	0.08675	0	
Super Off-Peak Cons. ($)	0.07033	0	
Customer Charge $/Meter/Month			
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	0.00	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	0	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0		

Current PG&E TOU A-10 (Secondary)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.22337	0	
Mid-Pk Cons. ($)	0.16824	0	
Off-Pk Cons. ($)	0.14017	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.14054	0	
Off-Pk Cons. ($)	0.12347	0	
Customer Charge $/Meter/Month	139.90		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	19.52	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	11.76	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0.55		

Grandfathered PG&E TOU A-10 2019 (Secondary)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.18914	0	
Mid-Pk Cons. ($)	0.18914	0	
Off-Pk Cons. ($)	0.16235	0	
Winter			
On-Pk Cons. ($)	0.13867	0	
Mid-Pk Cons. ($)	0.13796	0	
Off-Pk Cons. ($)	0.13796	0	
Customer Charge $/Meter/Month	139.90		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	11.28	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	11.28	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0.55		

Proposed PG&E TOU A-10 2019 (Secondary)	Delivery	Generation	
	Total	UG	DWREC
Energy Charge - $/kWh/Meter/Month			
Summer			
On-Pk Cons. ($)	0.24955	0	
Mid-Pk Cons. ($)	0.18786	0	
Off-Pk Cons. ($)	0.1553	0	
Winter			
On-Pk Cons. ($)	0	0	
Mid-Pk Cons. ($)	0.17328	0	
Off-Pk Cons. ($)	0.13781	0	
Customer Charge $/Meter/Month	139.90		
Demand Charge $/kW of Billing Demand/Meter/Month			
Facilities Related	0		
Time Related			
Summer			
On-Pk Demand ($)	0	11.26	
Mid-Pk Demand ($)	0	0.00	
Winter			
Mid-Pk Demand ($)	0	11.26	
Off-Pk Demand ($)	0	0	
Power Factor Adjustment - $/kVAR	0.55		

5. Adjusted Baseline

5.1. PG&E Rate Change

The adjusted time-of use period and rate change will place a significant impact on the county's utility spending as the value of solar resources will be depreciated with the on-peak time shift. The rate change will take into effect in three different phases for the county's facilities. The first wave will affect the accounts that are currently non-RES-BCT and non-NEM in Nov 2020. The second rate change will affect the NEM accounts at the detention center in January 2021. The last rate change will affect the benefitting accounts under RES-BCT and NEM accounts at the Cottonwood campus in June 2023. Trane have considered the rate change timeline for the county and performed an energy analysis to simulate the anticipated electricity costs after the rate change becomes effective. However, to simplify the analysis, the study assumed that the rate change would affect all of the county facilities starting in January 2021.

The table below summarizes the anticipated overall costs for the county in 2021. Results show that the pre-credit electricity costs will drop by approximately 10% and the solar credits will drop by approximately 18%, resulting in an overall costs increase of approximately $187,000 (24%).

	Utility Cost Analysis (May 2018 - April 2019)						PG&E Rate Change (2021)			
Site	**PGE Total Electricity Costs (Pre-Credits) ($)**	**Credits (NEM $/ RES-BCT $)**	**PGE Electricity Bill Costs ($)**	**PGE Natural Gas Costs ($)**	**Water Costs ($)**	**Overall Costs ($)**	**PGE Total Electricity Costs (Pre-Credits) ($)**	**Credits (NEM $/ RES-BCT $)**	**PGE Electricity Bill Costs ($)**	**Overall Costs ($)**
NEM-Detention	$800,034	($537,288)	$262,746	$64,093	$123,145	$449,984	$708,343	($378,245)	$330,098	$517,336
NEM-Cottonwood	$444,105	($276,501)	$167,603	$29,796	$83,762	$281,161	$371,113	($179,659)	$191,454	$305,012
RESBCT	$1,300,897	($605,635)	$695,262.24	$57,939	$111,826	$865,027	$1,195,467	($390,543)	$812,210	$981,975
Non-RESBCT	$213,498	$0	$213,498	$16,511	$54,358	$284,366	$199,446	$0	$199,446	$270,314
Solo-NEM	$103,246	$0	$103,246	$6,067	$17,053	$126,366	$96,339	$0	$96,339	$119,459
Total	**$2,861,780**	**($1,419,424)**	**$1,442,356**	**$174,405**	**$390,144**	**$2,006,905**	**$2,577,993**	**($948,446)**	**$1,629,547**	**$2,194,096**
Solar PPA		($524,352)				($524,352)		($524,352)		($524,352)
Landfill Generators		($706,887)				($706,887)		($706,887)		($706,887)
Total	**$2,861,780**	**($2,650,663)**	**$1,442,356**	**$174,405**	**$390,144**	**$775,666**	**$2,577,993**	**($2,179,685)**		**$962,856**
	$0.18		$0.16	$1.18	$17.67	$ changes	($283,787)	($470,978)		$187,191
						$ changes (%)	-10%	-18%		24%

5.2. Detention Expansion and RES-BCT Allocation Adjustment

In addition to the rate change impacts, the county is currently undergoing a construction for the detention expansion and will anticipate completing construction in 2020. Future energy load of the detention center was modeled using an energy simulation software based on construction documents provided by the County. Anticipated energy costs for the detention campus was then calculated based on the energy load.

When investigating further into the RES-BCT solar credits, Trane has observed that the county was not able to maximize their benefits by allocating all of the generation credits to the benefitting accounts in the past. In order to maximize the generation credits, Trane recommends the county to modify their allocation percentage after the grandfather period ends. The recommended allocation percentage for the RES-BCT sites are shown in the table below. The county will be able to benefit an addition of $70,000 in RES-BCT credits after the rate change becomes effective.

SITE #	Site Name	RES-BCT Allocation %	New Available/ Applicable RES-BCT Offsets ($)	Proposed RES-BCT Allocation % based on shortfalls	New RES-BCT Allocation per proposed %($)
3	Animal Shelter	2%	($9,219)	2%	($9,219)
4	Probation - Main	2%	($9,219)	2%	($9,219)
7	Yolo County Central Landfill	4%	($18,437)	6%	($27,656)
8	District Attorney	5%	($23,046)	7%	($32,265)
9	Administrative Building	19%	($66,953)	15%	($69,139)
10	Historic Courthouse	10%	($25,975)	6%	($27,656)
11	Public Defender (Old Jail)	4%	($18,437)	7%	($32,265)
17	Central Library Archives	1%	($4,609)	1%	($4,609)
20	Building Maintenance Shop	1%	($4,609)	1%	($4,609)
21	Department of General Services	19%	($73,693)	16%	($73,748)
24	Board of Supervisors Office	2%	($9,219)	2%	($9,219)
25	Arthur F. Turner (West Sac.) Branch	2%	($9,219)	2%	($9,219)
26	Health & Human Services (West Sacramento)	7%	($32,265)	9%	($41,483)
26	Probation - West Sacramento	4%	($18,437)	9%	($41,483)
30	Winters Community Library	2%	($9,219)	2%	($9,219)
33	Child Support Services	2%	($9,219)	2%	($9,219)
48	Wild Wings Park	9%	($41,483)	9%	($41,483)
52	NORTH DAVIS MEADOWS COUNTY SERVICE AREA	2%	($7,286)	2%	($9,218.54)
		97%	**($390,543)**	**100%**	**($460,927)**

Lastly, due to the time of use schedule and rate change occurring in 2019, generation credits for solar production through NEM or RES-BCT program will be decreased due to the on peak time shift. As a result, the sell back market price for solar to PG&E through PPA will also potentially be impacted significantly in 2024 during the renewal of PPA. Coupled with the detention expansion, adjusted RES-BCT credits, and the reduced sell price for the PPA agreement, the overall utility spending for the county is summarized in the table below. Results show that the overall utility credits and PPA credits will decrease by approximately 23% and that the overall utility spending will increase by $557,000 (72%).

Utility Cost Analysis (May 2018 - April 2019)							PG&E Rate Change (2021) + Expansion + RES-BCT New Allocation % + PPA @ $0.07/kWh (2023) *Without Escalation					
Site	PGE Total Electricity Costs (Pre-Credits) ($)	Credits (NEM $/ RES-BCT $)	PGE Electricity Bill Costs ($)	PGE Natural Gas Costs ($)	Water Costs ($)	Overall Costs ($)	PGE Total Electricity Costs (Pre-Credits) ($)	Credits (NEM $/ RES-BCT $)	PGE Electricity Bill Costs ($)	PGE Natural Gas Costs ($)	Water Costs ($)	Overall Costs Difference
NEM-Detention	$800,034	($537,288)	$262,746	$64,093	$123,145	$449,984	$881,107	($382,820)	$498,287	$64,093	$123,145	$685,525
NEM-Cottonwood	$444,105	($276,501)	$167,603	$29,796	$83,762	$281,161	$371,113	($179,659)	$191,454	$29,796	$83,762	$305,012
RESBCT	$1,300,897	($605,635)	$695,262.24	$57,939	$111,826	$865,027	$1,195,467	($460,927)	$812,210	$57,939	$111,826	$981,975
Non-RESBCT	$213,498	$0	$213,498	$16,511	$54,358	$284,366	$199,446	$0	$199,446	$16,511	$54,358	$270,314
Solo-NEM	$103,246	$0	$103,246	$6,067	$17,053	$126,366	$96,339	$0	$96,339	$6,067	$17,053	$119,459
Total	**$2,861,780**	**($1,419,424)**	**$1,442,356**	**$174,405**	**$390,144**	**$2,006,905**	**$2,821,141**	**($1,023,406)**	**$1,797,736**	**$174,405**	**$390,144**	**$2,362,285**
Solar PPA		($524,352)				($524,352)		($323,177)				($323,177)
Landfill Generators		($706,887)				($706,887)		($706,887)				($706,887)
Total	**$2,861,780**	**($2,650,663)**	**$1,442,356**	**$174,405**	**$390,144**	**$775,666**		**($2,053,469)**	**$1,797,736**			**$1,332,221**
	$0.18		$0.16	$1.18	$17.67	$ changes	($40,639)	($597,194)	$355,380			$556,555
						$ changes (%)	-1%	-23%	25%			72%

6. Energy Conservation Measures (ECM's) Matrix

After evaluating the existing utility information and onsite audits, Trane recommends the following energy conservation measures for forty (40) buildings across twenty-nine (29) facilities at the County of Yolo as shown below.

SITE #	Site Name	HVAC	Lighting	Transforme	Water	Battery	Overall ECMs
1	Monroe Facility	X	X	X		X	4
1	Auger Monster House		X				1
1	Cameron Training Facility	X	X				2
2	Sheriff Admin./Coroner	X	X				2
2	Morgue	X	X				2
3	Animal Shelter	X	X		X		3
3	Small Animal Annex	X	X				2
4	Probation - Main		X	X			2
5	Juvenile Detention Facility		X				1
7	Yolo County Central Landfill	X	X	X			3
8	District Attorney	X	X		X		3
9	Administrative Building	X	X	X	X		4
11	Public Defender (Old Jail)	X	X		X		3
12	Bauer Building (Health & Human Services)		X	X	X	X	4
13	Communication Center	X	X				2
14	Gonzalez Bldg. (Health & Human Services - Woodland)	X	X	X	X		4
15	Community Services (Planning & Public Works)	X	X	X	X		4
15	Cache Creek Conf Room (Parks Shop)	X	X				2
16	Planning & Public Works Garage/ Fleet Services	X			X		2
17	Central Library Archives	X		X	X		3
18	Agriculture & Weights and Measures	X	X		X		3
18	Argriculture Department Shop Facility	X	X				2
19	Agriculture Department Shop (Buckeye) Administrative Services	X	X				2
20	Building Maintenance Shop	X	X		X		3
21	Department of General Services	X	X		X		3
22	Gibson Museum		X		X		2
23	Mary L. Stephens Davis Library	X	X		X		3
24	Board of Supervisors Office	X			X		2
25	Arthur F. Turner (West Sac.) Branch		X		X		2
26	Health & Human Services (West Sacramento)	X	X		X		3
26	Probation - West Sacramento	X	X		X		3
27	Knights Landing Branch Library	X	X				2
29	Esparto Regional Library		X		X		2
30	Winters Community Library		X		X		2
31	Clarksburg Library	X					1
32	Grasslands Solar Array					X	1
35	Clarksburg Boat Launch		X				1
36	Knights Landing Boat Launch		X				1
46	Grasslands Regional Park		X				1
56	ESPARTO Aquatics Center				X		1
		27	**34**	**8**	**21**	**3**	**40**
							93

7. Project Scope

7.1. Mechanical Solutions

During the site audit, Trane identified that the county utilize a mix of rooftop-mounted packaged units, split condensing units, air-cooled chillers, and swamp coolers to provide space heating and cooling for the district. There are approximately 500 units audited in the analysis, in which the majority of the units are packaged gas heat units, followed by split condensing units, and air-cooled chillers. The majority of the packaged units were installed in late 1990's and early 2000's, which have passed or are closely approaching their life expectancy of 15 years according to the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE). Trane recommends replacing the aging equipment with higher energy efficient like-for-like equipment to improve the county's operations while delivering comfort to the occupants. New units will be connected to the county-wide mechanical controls platform, Delta, to ensure efficient operations. Details about the mechanical scope of work can be found in Exhibit B.

7.2. Lighting Solutions

The county has a mixture of T8 linear fluorescent lamps with electronic ballasts in recessed troffers, compact fluorescent lamps throughout the interior of the buildings and metal halide lamps throughout the exterior of the buildings. The most common interior lighting throughout the facilities are ceiling mount recessed- and surface-mounted T8 linear fluorescent fixtures housing 2-4 lamps, and a number of high-bay metal halide fixtures in higher ceiling facilities. Interior fixtures are controlled by wall mounted switches and it appeared that there were few, if any, occupancy sensors or daylighting controls. Exterior lighting fixtures were observed to be controlled by photocells. In some cases, Yolo County has spot-replaced exterior fixtures with LED replacements or retrofit kits. Trane recommends a county-wide lighting retrofits, which consists of replacing existing interior fluorescent 32W lamp to T8-LED lamps with new driver and replacing existing exterior compact fluorescent and incandescent lamps with LED screw-in/plug-in lamps.
Trane recommends the following:

A. Interior Lighting Measures – Interior LED luminaire kits are available in a variety of wattages, allowing for increased savings, as well as improved lighting quality. In addition to the reduced energy usage of the lamps and drivers being provided, Trane's recommended solution includes a multi-current output driver that can be adjusted with a simple setting during installation to reduce lighting levels.
    a. Trane shall supply and install the following:
        i. Type C T8 LED retrofit, including lamps & drivers
        ii. Type C T5 LED retrofit, including lamps & drivers
        iii. High Bay LED retrofit kits
        iv. Recessed can LED retrofit kits
        v. Replacement LED screw-in type lamps
        vi. Replacement LED pin type lamps
        vii. New LED Exit Signs

B. Exterior Lighting Measures – Exterior luminaires will be replaced with new LED luminaires that take advantage of increased savings while providing
    a. Trane shall supply and install the following:
        i. Recessed can LED retrofit kits
        ii. Replacement LED screw-in type lamps
        iii. Replacement LED pin type lamps
        iv. New LED fixtures

C. Occupancy Sensors – To increase energy savings as well as meet California Title 24 requirements, Trane will provide and install occupancy sensors in those areas that meet the requirements and are not currently controlled based upon room occupancy.

7.3. Transformer Solutions

Inventory of transformers were gathered from the electrical as-built drawings that were provided to Trane. Low-voltage dry-type transformers are commonly used in commercial facilities to transform utility provided 408/277 Volt power to 208/210 Volt and to distribute power internally. Loads served by such transformers typically include wall plugs, lights, fans, and other office equipment. A perfect transformer provides useful output power equal to the input power; however, in reality, the transformation process is not 100% efficient as some power and energy is lost through waste heat and vibration. Most of the existing transformers are approaching the effective useful life of 30 years. Trane recommends replacing aging transformers with state-of-the-art transformers at eight (8) facilities. Details about the transformer scope of work can be found in Exhibit B.

7.4. Water Solutions

Inventory of plumbing fixtures were collected during the audit. There is a variety of different plumbing fixture configurations and flow rates across the county. Fixtures include toilets, urinals, restroom and kitchen faucets, and bathtubs. Existing flow rates of toilets and urinals range from 0.5 to 9 gallons per flush, where the average flow rate is approximately 2.03 gallons per flush. The highest flow rate was observed to run for over one minute at the Agricultural Building. Trane recommends the following:

A. TOILETS – High efficiency toilets (HET) are available in a wide variety of fixture types and configurations. Commercial flush-valve HETs are designed at 1.28 gallons per flush (gpf), which is a 20% reduction from their 1.6 gpf low-flow predecessors, and a >60% reduction from older high flow toilets. Tank-type HETs are available from 0.8 to 1.28 gpf; and can utilize pressure vessel or canister flush technologies for improved performance over the traditional flapper assemblies, which helps reduce leaks, clogs, and fixture maintenance (yielding and average annual direct O&M savings of $2.00 per fixture).

a. Trane shall supply and install the following:

i. (34) 1.0 gpf HET Floor Mount Floor Discharge ADA Pressure Assisted Tank Toilet
ii. (7) 1.0 gpf HET Floor Mount Floor Discharge Elongated Pressure Assisted Tank Toilet
iii. (47) 1.1 /1.6 gpf HET Floor Mount Floor Discharge Toilet China, Elongated Open Front Seat
iv. (45) 1.1 /1.6 gpf HET Floor Mount Floor Discharge ADA Toilet China, Elongated Open Front Seat
v. (5) 1.1 /1.6 gpf HET Floor Mount Rear Discharge Toilet China, Elongated Open Front Seat
vi. (82) 1.1 /1.6 gpf HET Wall Hung Toilet China, Elongated Open Front Seat
vii. (1) 1.28 gpf HET Infant Gravity Tank Toilet

B. URINALS – High efficiency urinals (HEU) are available in a variety of different flush rates ranging from 0.125 gpf (pint-flush) up to 0.5 gpf, resulting in as much as a 90% reduction in consumption from typical existing fixtures. Waterless urinals are available that can virtually eliminate urinal water use, but due to extensive maintenance and potentially damaging effect to a facility's sewer plumbing infrastructure, they are not typically recommended.

a. Trane shall supply and install the following:

i. (2) 0.25 gpf HEU Manual Urinal Valve
ii. (1) 0.25 gpf HEU Sensor Urinal Valve
iii. (5) 0.125-0.5 gpf HEU Nano Pint Urinal (9" to 11" Footprint)
iv. (16) 0.125-0.5 gpf HEU Pint Urinal (18" to 21" Footprint)
v. (15) 0.125-0.5 gpf HEU Retrofit Pint Urinal (21" to 24" Footprint)
vi. (2) 0.125-0.5 gpf HEU Small Pint Urinal (16" to 20" Footprint)

C. FAUCETS – Faucets can typically be retrofit with high efficiency flow restriction devices (aerated or laminar flow). High efficiency flow restrictors are available in a range of flows from 0.25 gpm up to 1.5 gpm. Faucets incapable of simple retrofit may warrant replacement with a modern threaded faucet in order to achieve reduced flow. It should be noted, commercial deep well kitchen sinks, janitor slop sinks, and others that are primarily used for filling a fixed volume are not candidates for flow restriction.

a. Trane shall supply and install the following:
    i. (194) 0.5 gpm Tamperproof PCA Spray Flow Control for Existing Lavatory Faucet
    ii. (63) 1.0 gpm Tamperproof Laminar Flow Control for Existing Lavatory Faucet
    iii. (45) 1.5 gpm Tamperproof Laminar Flow Control for Existing Kitchen Faucet
    iv. (1) New 4" Centerset Brass Valve Lavatory Faucet with 0.5 gpm Tamperproof Flow Control

D. SHOWERHEADS – High efficiency showerheads are available with a range of flow rates from 1.25 gpm up to 2.0 gpm. It is important to understand that the lowest flow showerhead is not always the best recommendation. Selecting showerheads that provide maximum water efficiency without sacrificing end-user satisfaction is key. HE showerheads are available in a variety of different configurations including traditional post-mounted, handheld shower wands, and a variety of different institutional wall-mounted or nozzle configurations.

a. Trane shall supply and install the following:
    i. (7) 1.5 gpm Low-Flow Pressure-Compensating Handheld Showerheads
    ii. (4) 1.5 gpm Low-Flow Pressure-Compensating Traditional Showerheads

In addition to domestic fixture upgrades, Trane recommends implementing an ozone laundry system at the Animal Shelter and installing a sub-meter for the cooling tower at the Bauer Building.

7.5. Energy Storage Opportunities

Community Choice Aggregation (CCA/CCE) is a program that allows cities and counties to buy and/or generate electricity for residents and businesses within their areas. Valley Clean Energy (VCE) is a public agency that was formed within the geographic boundaries of Yolo County for the purposes of implementing a CCA/CCE program. The cities of Davis and Woodland, along with the unincorporated portions of Yolo County have all elected to allow VCE to provide electric generation service within their respective jurisdictions.

Launched in June 2018, VCE has provided the California Public Utility Commission (CPUC) with an IRP plan recommending a “Cleaner Base” portfolio that seeks higher amounts of Renewable Portfolio Standard (RPS) eligible energy, resulting in a portfolio that uses 80% RPS eligible renewables by 2030. Additionally, VCE explored a “Local” portfolio that emphasized the use of local solar, biomass, and geothermal resources that are sourced from Yolo County. Although VCE has selected the Cleaner Base as its preferred resource portfolio, it considers local resources to be a key in its long term procurement strategy.

Under its Resource Adequacy program, the CPUC requires load-serving entities (including CCAs) to demonstrate that they have purchased capacity commitments of no less than 115% of their peak loads. These requirements are intended to secure sufficient commitments from actual, physical resources to ensure system reliability. By 2021, VCE will need to have in place long-term renewable supply contracts of terms of at least 10 years in duration for at least 65% of its minimum RPS obligations.

The CPUC Resource Adequacy requirement establishes a need for local capacity resources that can be contracted with VCE to provide system reliability. VCE will be required to demonstrate its local capacity requirement for each month of the following calendar year. The local capacity requirement is a percentage of the total PG&E service area local capacity requirements adopted by the CPUC based on VCE’s forecasted peak load.

With some adjustments, the existing Yolo County solar PV system provides a resource that can be made available to VCE to meet its requirements for local capacity and allow Yolo County to make better use of its established

solar infrastructure. While solar generation benefits will be impacted by a shift in peak demand hours, the integration of storage would allow the County to offset that loss of benefits by making their resource available during the new peak hours.

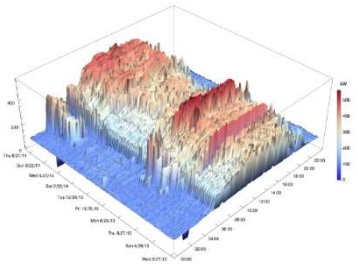
Trane proposes installing three energy storage systems across the county. The three battery systems will be sized identically and located adjacent to the existing solar PV systems at Grasslands, Cottonwood, and the Monroe Detention Center. Each site would be served by (1) 1MW turnkey outdoor-rated lithium-ion energy storage systems that includes AC/DC protection, power conversion, energy storage, thermal management, and controls. The systems will be equipped to provide 87-92% round trip efficiency and have a 3-phase AC interface. During standard operation, the batteries will provide 2,800MWh of daily capacity to the County, creating an opportunity to generate revenue through the sale of this resource to Valley Clean Energy.

8. Energy Savings Calculations

Energy savings calculations for each measure are summarized below.

8.1. Trane Optics

Trane utilized Trane Energy Optics to understand existing building operations and analyze the energy savings potential in performing a controls upgrade at each facility. Trane Optics provides a detailed look into building performance through interval data analysis. Using Optics' built in optimization software, Trane is able to visualize the baseload and weather dependent operations. Each of the buildings included in the analysis were analyzed through Trane Optics and the observations are summarized in the campus report in the appendix.



8.2. Mechanical Solutions

Two different calculations methodologies were performed to capture the energy savings for the mechanical unit replacement based on available utility information and the HVAC scope. For sites with majority unit upgrades (11 sites), a TRACE 700 energy model was created to establish the baseline and projected energy usage after the rate change becomes effective. Reduction in energy usage was determined by the difference in baseline and projected energy usage in each time-of-use period. Energy savings were then applied to the applicable TOU rates to determine the energy cost savings. TRACE 700 software is the complete load, system, energy and economic analysis program that compare the energy and economic impact of such building alternatives as architectural features, HVAC systems, building utilization or scheduling and economic options. TRACE 700 calculations apply techniques recommended by the ASHRAE. The program is tested in compliance with ASHRAE Standard 140-2007, Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs, and it meets the requirements for simulation software set by ASHRAE Standard 90.1-2007 and the LEED® Green Building Rating System. TRACE 700 is also accepted as a valid energy and cost analysis tool for investment owned utility (IOU's) and Energy Efficiency (EE) incentive programs. For sites with only few unit upgrades (8 sites), a customized spreadsheet was created to capture energy savings. The calculation takes into account office operating schedules. An electricity blended rate based on utility information was calculated per site and used to determine the energy cost savings.

8.3. Lighting Solutions

A lighting audit was performed to gather data on the existing lighting system; fixture types and counts. Manufacturer specification sheets and operating hours were used to perform a spreadsheet calculation for energy savings. Operating hours are based on the Database for Energy Efficiency Resources[2] (DEER), which has been developed by the California Public Utilities Commission (CPUC) with funding provided by California ratepayers. An electricity blended rate based on utility information was calculated per site and used to determine the energy cost savings.

8.4. Transformer Solutions

Transformer inventory was gathered from the electrical single line drawings provided to Trane. A customized spreadsheet was utilized to determine the annual energy losses from the existing transformers and the proposed annual energy losses from upgraded transformers. Energy savings were calculated based on the difference in the

[2] Database for Energy Efficiency Resources[2] (DEER), http://www.deeresources.com/index.php/23-deer-versions

energy losses. An electricity blended rate based on utility information was calculated per site and used to determine the energy cost savings.

8.5. Water Solutions

Domestic plumbing fixture water use is based primarily on facility occupancy. Population counts are estimated based on using International Plumbing Code (IPC) standards of quantity of fixtures required per occupant. Hours of operation and schedule is based on publish business hours and staffs reporting of usage, where provided. All utility rates, including water and sewer rates, have been estimated from utility data provided and published rates for the corresponding city water utilities. Building on a common water meter were aggregated for water consumption analysis. For buildings without sufficient historic water consumption data to build an annual baseline the annual water consumption is based on modeled water consumption. Water savings is calculated using the differences in measured baseline and post-installation flush/flow rates. Appropriate water rates were then applied to the water volume savings to determine water cost savings.

8.6. Energy Storage Opportunities

To utilize the County of Yolo's existing solar resources most effectively, Trane analyzed the expected impact of upcoming changes to the standard rate structure and time-of-use peak hours. As shown, to maximize the value of the generation and capacity of the systems, it is important for the County to make those resources available during the most critical hours of the day. With the decline in the cost of battery storage, Trane analyzed the potential cashflow generation created by shifting the available capacity resource to peak hours and entering into a fixed price agreement with local Community Choice Aggregators.

Calculations for the cashflow opportunity from the energy storage system consist of two components. First, to determine the cashflow by selling stored energy to the local Community Choice Aggregators, Trane has been in communications with a few of the interested parties. Based on discussions with them, this analysis assumed a selling price of $90/kW. The selling price was then multiplied to the maximum power discharge capacity (kW) of the energy storage to determine the annual cashflow opportunity. In addition, to determine the increase in utility credits by shifting energy export from off-peak to on-peak hours, the delta of energy rates between the two TOU periods were multiplied by the energy capacity (kWh) of the energy storage system.

9. Measurement and Verification (M&V) Method

Energy savings for the base scope will be guaranteed for three years. Details about the M&V methods are outlined in the Exhibits. Two different M&V methods will be used to verify the savings for this project – Option A and C. Each method is in accordance with the International Performance Measurement and Verification Protocol (IPMVP). The table below shows the ECMs and the selected M&V methods for each facility.

Option A. Retrofit Isolation: Key Parameter Measurements. The verification techniques for Option A determine energy savings by measuring the capacity or efficiency of a system before and after a retrofit, and multiplying the difference by a mutually agreed-upon factor, such as hours of operation or load on the system. Careful review of ECM design and installation ensure that the mutually agreed upon values fairly represent the probable actual value.

Option C. Whole Facility. Verification techniques for Option C determine savings by studying overall energy use in a facility and identifying the effects of energy projects from changes in overall energy use patterns. This approach is intended for measurements of the whole-facility or specific meter baseline energy use, and measurements of whole-facility or specific meter post-implementation (Post) energy use can be measured. The

methodology to establish baseline and Post parameter identification, modeling approach and baseline or model adjustments will be defined in the applicable sub-Exhibit. Periodic inspections of baseline energy usage, operating practices, and facility and equipment, and meter measurements of the will be necessary to verify the on-going efficient operation of the equipment, systems, practices and facility, and saving attainment.

SITE #	Site Name	HVAC	Lighting	Transform	Water	Battery	Overall ECMs	Electricity M&V Option	H2O M&V Option
1	Monroe Facility	X	X	X		X	4	C	
1	Auger Monster House		X				1		
1	Cameron Training Facility	X	X				2		
2	Sheriff Admin./Coroner	X	X				2		
2	Morgue	X	X				2		
3	Animal Shelter	X	X		X		3	C	A
3	Small Animal Annex	X	X				2		
4	Probation - Main		X	X			2	A	
5	Juvenile Detention Facility		X				1	A	
7	Yolo County Central Landfill	X	X	X			3	C	
8	District Attorney	X	X		X		3	C	A
9	Administrative Building	X	X	X	X		4	C	A
11	Public Defender (Old Jail)	X	X		X		3	C	A
12	Bauer Building (Health & Human Services)		X	X	X	X	4	A	A
13	Communication Center	X	X				2	C	
14	Gonzalez Bldg. (Health & Human Services - Woodland)	X	X	X	X		4	C	A
15	Community Services (Planning & Public Works)	X	X	X	X		4	C	A
15	Cache Creek Conf Room (Parks Shop)	X	X				2		
16	Planning & Public Works Garage/ Fleet Services	X			X		2		A
17	Central Library Archives	X		X	X		3	C	A
18	Agriculture & Weights and Measures	X	X		X		3	C	A
18	Argriculture Department Shop Facility	X	X				2		
19	Agriculture Department Shop (Buckeye) Administrative Services	X	X				2		
20	Building Maintenance Shop	X	X		X		3	C	A
21	Department of General Services	X	X		X		3	C	A
22	Gibson Museum		X		X		2	A	A
23	Mary L. Stephens Davis Library	X	X		X		3	C	A
24	Board of Supervisors Office	X			X		2	C	A
25	Arthur F. Turner (West Sac.) Branch		X		X		2	A	A
26	Health & Human Services (West Sacramento)	X	X		X		3	C	A
26	Probation - West Sacramento	X	X		X		3	C	A
27	Knights Landing Branch Library	X	X				2	C	
29	Esparto Regional Library		X		X		2	A	A
30	Winters Community Library		X		X		2	A	A
31	Clarksburg Library	X					1	C	
32	Grasslands Solar Array					X	1		
35	Clarksburg Boat Launch		X				1		
36	Knights Landing Boat Launch		X				1	A	
46	Grasslands Regional Park		X				1	A	
56	ESPARTO Aquatics Center				X		1		A
		27	**34**	**8**	**21**	**3**	**40**	**C- 19**	**21**
							93	**A- 9**	
								28	

10. Energy Savings

Building and measure energy savings summary for each building are shown in the tables below.

Building or ECM (Exhibit ID#)	Option A & C Energy Savings			Option A Partially Measured Water and Sewer Conservation	
	kWh	kW	E $	Water DP kGal	Water DP $
Monroe Facility	363,252	1,282	$82,977	0	$0
Animal Shelter	17,866	80	$3,580	0	$0
Main Probation	23,926	91	$5,131	0	$0
Juvenile Detention Facility	165,946	425	$36,943	0	$0
Yolo County Central Landfill	21,805	69	$5,558	0	$0
District Attorney	51,722	273	$11,464	58	$982
Administrative Building	185,535	807	$38,887	531	$8,994
Public Defender	85,307	381	$20,419	20	$720
Bauer Building	139,514	507	$27,112	663	$11,227
Communication Center	14,855	84	$2,854	0	$0
Gonzalez Building	237,564	840	$50,555	647	$10,957
Community Service	114,986	464	$23,644	265	$4,479
Central Library Archives	12,477	37	$2,613	40	$675
Agriculture Weights and Measures	35,590	199	$8,040	46	$768
Building Maintenance Shop	18,151	92	$4,576	2	$32
Department of General Services	100,478	420	$20,906	57	$962
Gibson Museum	5,265	43	$1,206	74	$1,245
Davis Library	95,767	430	$19,650	142	$1,710
Davis Board of Supervisors Office	12,859	70	$3,151	191	$2,297
Turner Library	30,120	137	$6,847	79	$572
West Sacramento Building A	135,359	559	$31,533	612	$4,425
West Sacramento Building B	106,518	431	$25,347	338	$2,439
Knights Landing Library	5,607	47	$1,382	0	$0
Esparto Library	19,226	117	$4,777	194	$622
Winters Library	29,588	192	$6,620	89	$1,501
Clarksburg Library	674	9	$173	0	$0
Clarksburg Boat Launch	0	0	$0	0	$0
Knights Landing Boat Launch	1,656	5	$410	0	$0
Grasslands Regional Park	635	2	$158	0	$0
Esparto Aquatics Center	0	0	$0	50	$159
Total	**2,032,250**	**8,095**	**$446,513**	**4,096**	**$54,765**

Building or ECM (Exhibit ID#)	Option A Partially Measured Retrofit Isolation								
	Lighting Improvements			Energy/Utility Distribution			Option A Total		
	Lighting kWh	Lighting kW	Lighting $	Transformer kWh	Transformer kW	Transformer $	kWh	kW	E $
Monroe Facility	0	0	$0	0	0	$0	0	0	$0
Animal Shelter	0	0	$0	0	0	$0	0	0	$0
Main Probation	18,059	83	$3,873	5,867	8	$1,258	23,926	91	$5,131
Juvenile Detention Facility	165,946	425	$36,943	0	0	$0	165,946	425	$36,943
Yolo County Central Landfill	0	0	$0	0	0	$0	0	0	$0
District Attorney	0	0	$0	0	0	$0	0	0	$0
Administrative Building	0	0	$0	0	0	$0	0	0	$0
Public Defender	0	0	$0	0	0	$0	0	0	$0
Bauer Building	108,385	464	$21,063	31,129	43	$6,049	139,514	507	$27,112
Communication Center	0	0	$0	0	0	$0	0	0	$0
Gonzalez Building	0	0	$0	0	0	$0	0	0	$0
Community Service	0	0	$0	0	0	$0	0	0	$0
Central Library Archives	0	0	$0	0	0	$0	0	0	$0
Agriculture Weights and Measures	0	0	$0	0	0	$0	0	0	$0
Building Maintenance Shop	0	0	$0	0	0	$0	0	0	$0
Department of General Services	0	0	$0	0	0	$0	0	0	$0
Gibson Museum	5,265	43	$1,206	0	0	$0	5,265	43	$1,206
Davis Library	0	0	$0	0	0	$0	0	0	$0
Davis Board of Supervisors Office	0	0	$0	0	0	$0	0	0	$0
Turner Library	30,120	137	$6,847	0	0	$0	30,120	137	$6,847
West Sacramento Building A	0	0	$0	0	0	$0	0	0	$0
West Sacramento Building B	0	0	$0	0	0	$0	0	0	$0
Knights Landing Library	0	0	$0	0	0	$0	0	0	$0
Esparto Library	19,226	117	$4,777	0	0	$0	19,226	117	$4,777
Winters Library	29,588	192	$6,620	0	0	$0	29,588	192	$6,620
Clarksburg Library	0	0	$0	0	0	$0	0	0	$0
Clarksburg Boat Launch	0	0	$0	0	0	$0	0	0	$0
Knights Landing Boat Launch	1,656	5	$410	0	0	$0	1,656	5	$410
Grasslands Regional Park	635	2	$158	0	0	$0	635	2	$158
Esparto Aquatics Center	0	0	$0	0	0	$0	0	0	$0
Total	**378,880**	**1,469**	**$81,897**	**36,996**	**51**	**$7,308**	**415,876**	**1,520**	**$89,204**

Building or ECM (Exhibit ID#)	Option C Building or ECM (Exhibit ID#)											
	Lighting Improvements			Energy/Utility Distribution			HVAC			Option C Total		
	Lighting kWh	Lighting kW	Lighting $	Transformer kWh	Transformer kW	Transformer $	HVAC kWh	HVAC kW	HVAC $	kWh	kW	E $
Monroe Facility	211,478	679	$46,542	47,960	66	$10,555	103,815	538	$25,880	363,252	1,282	$82,977
Animal Shelter	14,473	54	$2,900	0	0	$0	3,393	26	$680	17,866	80	$3,580
Main Probation	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Juvenile Detention Facility	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Yolo County Central Landfill	5,870	32	$1,497	12,452	17	$3,174	3,482	20	$887	21,805	69	$5,558
District Attorney	27,949	149	$5,642	0	0	$0	23,773	125	$5,822	51,722	273	$11,464
Administrative Building	94,659	493	$18,711	28,047	38	$5,544	62,829	275	$14,632	185,535	807	$38,887
Public Defender	56,511	236	$10,978	0	0	$0	28,797	144	$9,441	85,307	381	$20,419
Bauer Building	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Communication Center	13,198	71	$2,536	0	0	$0	1,658	13	$318	14,855	84	$2,854
Gonzalez Building	128,193	523	$24,855	18,115	25	$3,512	91,256	293	$22,188	237,564	840	$50,555
Community Service	76,002	378	$15,403	11,308	11	$2,292	27,676	75	$5,949	114,986	464	$23,644
Central Library Archives	0	0	$0	9,088	11	$1,903	3,389	26	$710	12,477	37	$2,613
Agriculture Weights and Measures	19,314	119	$4,454	0	0	$0	16,276	81	$3,586	35,590	199	$8,040
Building Maintenance Shop	11,356	54	$2,863	0	0	$0	6,795	38	$1,713	18,151	92	$4,576
Department of General Services	43,011	208	$7,980	0	0	$0	57,467	212	$12,927	100,478	420	$20,906
Gibson Museum	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Davis Library	79,094	338	$16,228	0	0	$0	16,673	92	$3,421	95,767	430	$19,650
Davis Board of Supervisors Office	0	0	$0	0	0	$0	12,859	70	$3,151	12,859	70	$3,151
Turner Library	0	0	$0	0	0	$0	0	0	$0	0	0	$0
West Sacramento Building A	89,189	362	$19,903	0	0	$0	46,170	197	$11,631	135,359	559	$31,533
West Sacramento Building B	48,786	211	$10,872	0	0	$0	57,732	220	$14,475	106,518	431	$25,347
Knights Landing Library	3,686	27	$908	0	0	$0	1,921	20	$473	5,607	47	$1,382
Esparto Library	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Winters Library	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Clarksburg Library	0	0	$0	0	0	$0	674	9	$173	674	9	$173
Clarksburg Boat Launch	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Knights Landing Boat Launch	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Grasslands Regional Park	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Esparto Aquatics Center	0	0	$0	0	0	$0	0	0	$0	0	0	$0
Total	**922,768**	**3,933**	**$192,271**	**126,970**	**168**	**$26,981**	**566,635**	**2,474**	**$138,057**	**1,616,373**	**6,575**	**$357,309**

Appendices

The following appendices describe the existing operations for each of the audited facilities. Facilities are grouped in campus report, as outlined below:

1. Detention Campus
    a. Monroe Detention Center
    b. Boat and Evidence Building
    c. Cameron Training Building
    d. Sheriff Admin/ Morgue
    e. Monster house
    f. Animal Shelter and Cat Annex
    g. Juvenile Detention Center and Probation Main
2. Yolo Landfill
3. Court
    a. District Attorney
    b. Public Defender
    c. Administration Building
4. Cottonwood
    a. Bauer
    b. Communication Center
    c. Gonzalez
5. Woodland
    a. Community Service
    b. Central Library Archives
    c. Agricultural Building
    d. Building Maintenance Building
    e. DGS
    f. Gibson Museum
6. Davis
    a. Davis Library

    b. Davis Board of Supervisor
7. West Sac
    a. Turner Lib
    b. West Sac A
    c. West Sac B
8. Remote Sites
    a. KL Library
    b. Esparto Library
    c. Winters Community Library
    d. Clarksburg Library
    e. Clarksburg Boat Launch
    f. Grasslands Regional Park
    g. Esparto Aquatics Center

County of Yolo

Administrative Policies and Procedures Manual

TITLE: POLICY ON BORROWING, DEBTS AND OBLIGATIONS	DEPARTMENT: FINANCIAL SERVICES
TYPE: POLICY	DATE: FEBRUARY 6, 2018

A. PURPOSE

This policy provides guidance on borrowing, financing and debt management activities that demonstrate fiscal responsibility and promote fiscal sustainability, in accordance with the County's long-term financial plan.

B. APPLICABILITY

This policy applies to any transaction or event that either obligates a county fund now or in the future, or affects the County's borrowing capacity. This policy applies largely to the financing of capital asset acquisition and construction, as described in the County's capital improvement plan and in the *Policy on Capital Assets*. It also applies to decisions concerning employee compensation. This policy is consistent with the best practices recommended by the Government Finance Officers Association (GFOA) and the California Debt and Investment Advisory Commission (CDIAC), and complies with the Securities and Exchange Commission (SEC) regulations, and relevant California Codes. The policy does not apply to short-term borrowing (under six months) which occurs during the fiscal year as part of the routine cash flow management in the county treasury.

C. DEFINITIONS

For the purpose of this policy, the following definitions apply:

"Borrowing" refers to any mutual transfer of resources between two parties (legal or accounting entities) with intent to return at least the principal. It is usually accomplished through a written agreement between the parties that states the amount borrowed and the terms and date of repayment.

"Debt" refers to a formal borrowing between two legal entities and involves interest costs. A debt is normally recognized as a liability on the County's ledger. Debt often refers to bonded indebtedness and long-term loans. For the sake of brevity, the term "debt" is used throughout this policy to refer to a borrowing, a debt issue or an obligation.

"Obligation" refers to any amount, known or undetermined, that the County owes to an external party now or in the future, as a result of an action undertaken by the County, a triggering event or a law. Obligations may be recognized or not yet recognized as a liability on the County's ledger, and may be funded or not funded. Examples include compensated absences, pension benefit obligation, other post-employment benefits (OPEB) obligation, landfill and pollution remediation, and claims and judgments.

"Inter-generational equity" is an essential concept in fiscal responsibility and refers to the notion of each generation being able to fund its needs without borrowing from, or transferring its debt burden to, the future generations.

TITLE: POLICY ON BORROWING, DEBTS AND OBLIGATIONS	DEPARTMENT: FINANCIAL SERVICES
TYPE: POLICY	DATE: FEBRUARY 6, 2018

D. POLICY

1. FISCAL SUSTAINABILITY

The County shall remain fiscally sustainable; this is a fundamental principle for all County borrowing, debt issuance or commitment to any financial obligation.

For this purpose, *Fiscal Sustainability* is defined as the County government's ability and willingness to generate inflows of resources necessary to honor service commitments and to meet financial obligations as they come due, without transferring financial obligations to future periods unless they result in commensurate benefits.

To support this fundamental principle, the following seven governing principles must guide all debt, borrowing and obligation transactions:

The seven governing principles of borrowing, debt and obligations are stated below:

1) A healthy debt capacity shall be built and preserved.
2) No borrowing shall be made to fund on-going operations.
3) All borrowing shall follow a long-term financial plan or a capital improvement plan.
4) The term of a debt shall never exceed the asset's life.
5) No inter-generational transfer of obligation shall be created.
6) Borrowing shall never be done for speculative purposes.
7) No obligation shall be incurred unless there is a realistic plan to pay it off.

2. TYPES OF ALLOWABLE DEBTS

The following types of debt are allowable under this policy:

a) General obligation bonds
b) Bond or grant anticipation notes
c) Lease revenue bonds; certificates of participation; and lease-purchase transactions
d) Tax and revenue anticipation notes
e) Land-secured financings: such as special tax revenue bonds issued under Mello-Roos Community Facilities Act of 1982, as amended; and limited obligation bonds issued under applicable assessment statutes
f) Tax increment financings as permitted under state law
g) Conduit financings
h) Commercial loans and lines of credit

3. DEBT APPROVAL

a) ***Debt Committee.*** A Debt Committee shall be convened to review and approve borrowing, debt or obligation that potentially have a material effect on the County's fiscal

sustainability; this includes any proposed transaction that meets any one of the criteria below:

(i) The amount of the debt or obligation exceeds $500,000.
(ii) The annual debt service or obligation payment exceeds $150,000.
(iii) The borrowing, debt or obligation may result in a significant change to the County's financial health in the long-term.
(iv) The transaction involves an agreement with another governmental agency.
(v) The Chief Financial Officer determines that an issue merits review by the Debt Committee.
(vi) The refinancing of an existing debt.

b) ***Composition of Debt Committee.*** The Debt Committee is comprised of the following:

(i) The two members of the Board of Supervisors who are assigned to the Financial Oversight Committee;
(ii) County Administrator or designee;
(iii) Chief Financial Officer;
(iv) Director of General Services, or Director of Public Works, or Director of Human Resources as appropriate for the project.

The Debt Committee may rely on advisors from the department proposing the debt or obligation, independent bond counsel, independent financial advisors, underwriters, disclosure counsel or other experts as appropriate.

c) ***Review and Approval of Debts.*** Any debt proposal submitted to the Debt Committee must include an analysis that addresses all the relevant factors described in this policy. The Debt Committee and staff shall review this analysis and make a recommendation to the Board of Supervisors, who shall make the final decision, except as provided below.

d) ***Delegation of Authority.*** The Board of Supervisors authorizes the Chief Financial Officer and the County Administrator, acting jointly, to approve borrowings, debts and obligations that are below the thresholds for the Debt Committee as mentioned in Section 3 above, except in circumstances that require Board approval, such as when another governmental agency is involved. The Debt Committee shall ascertain the marginal impact of the new proposed debt on fiscal sustainability and refer the matter to the Board of Supervisors if this marginal impact borders on or exceeds the acceptable limits. In most cases, the Board of Supervisors would need to ratify any agreements made between the County and another party.

e) ***Lease-purchase of Equipment***. For equipment that has been approved as part of the County Capital Improvement Plan and for which funds have been budgeted, County departments may enter into lease purchase arrangements for a term not to exceed 10 years, provided the manufacturer's suggested life of the asset equals or exceeds the lease term.

4. PURPOSES AND CONDITIONS FOR DEBT-ISSUANCE

Incurring debt may be an appropriate means to fund a project or activity under certain circumstances. Long-term debt may be issued to finance the construction, acquisition, or rehabilitation of capital assets for use by the County. A department head considering using debt to fund a project should evaluate the following conditions before sending a proposal to the Debt Committee, County Administrator or Chief Financial Officer:

a) Debt is Part of a Long-term Plan: The proposed debt must be part of the capital improvement plan, other long-term planning effort or strategic project approved by the Board of Supervisors in furtherance of county strategic goals. In rare cases, a debt may merit stand-alone consideration due to unique circumstances that must be explained to the Debt Committee or County Administrator.

b) One-time versus On-going Needs. Debt is more appropriate for a one-time investment (e.g. construction of a facility, acquisition of an asset) than a project addressing an on-going need (e.g. maintenance of a facility or an asset, operation of a program). Debt should not be used to fund the normal upkeep and maintenance of capital assets. Debt may be appropriate for a project that expands the capacity or the useful life of an asset but should not be used to fund its operational cost.

c) Matching Benefits with Costs. When a capital asset is expected to generate long-term benefits, debt can help distribute the payments for cost of the asset over its useful life so that benefits more closely match costs and create intergenerational equity.

d) Sources of Repayments. Debt should be used only when long-term forecasts of financial resources indicate that the County will be able to meet its debt obligations without undue distress. Sources of repayments, either general or earmarked, must be identified for future debt service.

e) Favorable Market Conditions. Consider issuing debts only when credit market conditions are favorable (refer to the Bond Buyer 20-bond Index or other relevant indices).

f) Impact on Fiscal Sustainability. Debt should be proposed only when the additional debt does not cause the County to exceed any of the critical thresholds for financial ratios stipulated in Section 5 – Constraints on Debt Amounts, and after careful evaluation of the potential impact on the ratios in Section 6 – Constraints on Non-debt Obligations.

g) Prohibition Against Funding On-going Operations. Long-term debt shall not be used to fund on-going operations since this would shift the burden for funding current services to future taxpayers. In special circumstances, the Board of Supervisors may approve a borrowing or debt to eliminate an operating deficit as part of a corrective action plan to address a structural budget deficit.

5. CONSTRAINTS ON DEBT AMOUNTS

This section applies specifically to bonded debts, long-term loans and leases. The debt burden should be managed so that it does not increase the net outflow of economic resources in the long-run and substantially impact fiscal sustainability. This potential impact on fiscal sustainability should be monitored annually and managed by imposing certain constraints on the debt burden, as measured by the following ratios. The County should not engage in any debt financing that would cause the first two ratios to fall in the unacceptable range in any year during the life of the proposed obligation.

All numeric values for computing the ratios below are obtained or derived from the County's comprehensive annual financial reports.

a) ***Debt service as percentage of governmental fund expenditures***: This is the ratio of governmental fund-supported debt service to the total governmental fund expenditures. This is a measure of the debt's budgetary impact on the county. Generally, lower ratio means less impact. The County should strive to maintain this ratio below 8.0% (Low end of Standard & Poor's Debt and Contingent Liabilities Score range).

b) ***Net Direct Debt as percentage of total governmental funds revenue****:* Debt to revenues measures the total debt burden on the county revenue position and gives an indication of the extent of annual revenue that is needed to pay off the debt. Lower ratio means lighter debt burden. The County should strive to maintain a ratio below 30 (Low end of Standard & Poor's Debt and Contingent Liabilities Score range)

The ratios below do not represent constraints on debts but should be regularly monitored and considered in a new debt issue when relevant:

c) ***Ratio of debt to assessed value***: This ratio of total outstanding debt to total assessed values gives an indication as to the strength of the tax base in supporting the debt of the government. Generally, lower ratio means a stronger base. This ratio should be maintained below 3.0% (Low range of Standard & Poor's benchmark).

d) ***Debt per capita***: The amount of debt per capita measures the residents' average share of the total outstanding debt. Generally, lower amount means lower debt burden per resident. This amount should be maintained below $1,000 (Very low range of Standard & Poor's benchmark).

e) ***Overlapping debt ratios***. With respect to total direct and overlapping debts (debts related to the activities of overlapping jurisdictions such as cities or districts), Debt to Assessed Value should not exceed 6% (Moderate range of Standard and Poor's benchmark).

f) ***Coverage ratio***. In the case of revenue debt, in which the debt is repaid through a dedicated revenue stream, the debt service coverage ratio should be greater than 1.25 (Good range of Standard & Poor's benchmark). This measure shows the extent to which revenues are available to cover annual debt service (principal & interest) after operating costs are paid.

The debt amount to be used for the above calculations is the net direct debt. Direct debt is the total of the County's long-term obligations supported by general revenues and taxes, such as bonds and leases. Net direct debt is the County's total debt less any accumulated resources earmarked for paying off such debts.

6. CONSTRAINTS ON NON-DEBT OBLIGATIONS

This section applies to all obligations which are not covered in Section 4 above. Such obligations may arise from actions or decisions pertaining to:

- Employee compensation
- Retiree benefits
- Capital projects financing
- Revenue sharing arrangements
- Economic development incentives
- Landfill and pollution remediation
- Settlement of claims and judgments

Before committing the County to any long-term future obligations, or before taking any action that may create or modify such obligations, County staff shall assess the long-term financial impact of such action through trend analysis and financial projections. This assessment should include the determination of both the obligation and the funding sources to repay the obligations. The assessment and supporting information shall be presented to the Debt Committee for review and further determination on its effect on the County's fiscal sustainability. For the purpose of this assessment the criteria for the Debt Committee review in Section 3 apply.

Two indicators that must be monitored carefully are ratios of unfunded liabilities to total covered payroll. This information is obtained from actuarial reports. These ratios indicate the relative size of the liability in terms of the active payroll. A trend analysis of these ratios indicates the sustainability of the liabilities. The ratios must trend down toward zero in the long-term:

a) Ratio of pension unfunded liabilities to payroll

b) Ratio of OPEB (other post-employment benefits) unfunded liability to payroll

7. DEBT STRUCTURING

Debt should be structured to provide control on the risk of debt usage:

a) Length of Issue. The weighted average life of a debt shall not exceed the weighted average useful life of the asset/project that is being financed and must never exceed 30 years.

b) Matching of Payment with Benefit. The proposed debt payment schedule must match the generation of net benefits to County residents. For example, the debt service schedule should generally correspond with the amortization or depreciation schedule of the purchased asset. In

the long-term, an obligation must not be passed on to the next generation without the commensurate benefit.

c) ***Debt Service Schedule.*** The debt service schedule should be structured to match the estimated pattern of revenues or sources of funds to be used for repayment. Absent any discernible pattern, general obligation bonds should be amortized on a level principal basis, to the extent practical.

d) ***Use of Credit Enhancement.*** Credit enhancements (letter of credit, bond insurance, surety bond) may be used if the cost of the enhancement is more than offset by the net decrease in net borrowing costs, or when the enhancement provides significant benefits.

e) ***Capitalization of Interest.*** Bond proceeds may be used to pay the interest due for a period commencing on the issue date and ending on the date that is the later of three years from the issue date or one year after the date of completion.

8. DEBT ISSUANCE

a) ***Competitive Sale***. The County shall seek to issue its debt obligations in a competitive sale. When the County deems the bids received are unsatisfactory or does not receive bids, it may, at the election of the Debt Committee, enter into negotiation for sale of the securities.

b) ***Negotiated Sale***. The Board of Supervisors may authorize bond issuance through a negotiated sale without going through competitive bidding if the Debt Committee has determined that any one of these conditions exist: market conditions are volatile, the issue is under a compressed timeline, or the debt has unique credit factors that would be better marketed through a negotiated sale.

c) ***Private Placement***. Under certain conditions (e.g. interim financings or small issuance) the Board of Supervisors may authorize a private placement or limited public offering.

d) ***Financing Team.*** In addition to the Debt Committee and County finance staff, the service of other professional providers (financial advisor; bond counsel; underwriter; paying agent) should be obtained through a competitive selection process or other means in accordance with County purchasing policies.

e) ***Credit Rating.*** If a credit rating service is recommended by the financing team, staff should endeavor to obtain the highest rating.

9. DEBT MANAGEMENT AND INTERNAL CONTROL

The Chief Financial Officer shall maintain a debt management program to ensure that all debt-related promises are fulfilled, guarantees are maintained, and the interests of all parties involved are protected. This program shall include at the minimum:

a) ***All debts are recorded*** and properly reflected in the accounts and ledgers, in accordance with generally accepted accounting principles.

b) ***Debt service*** is made timely and accurately.

c) ***Investment of Bond Proceeds.*** Bond proceeds shall be invested in accordance with bond covenants and should be accounted for separately from other funds. Any difference with the County Investment Policy, such as maturity requirement, must be approved by the Board of Supervisors.

d) ***Arbitrage.*** In regard to tax-exempt bond proceeds, county staff shall take steps to monitor and minimize arbitrage liability and avoid IRS penalties.

e) ***Compliance & Disclosure.*** County staff shall maintain a system to ensure compliance with all bond covenants, disclosure and filing requirements contained in the bond indentures, ordinances or state and federal laws.

f) **All tax-exempt debts** must comply with the tax compliance requirements described in the *County of Yolo Compliance Procedures for Tax-exempt Bonds*

10. REFINANCING OF DEBT

County staff should monitor the debt portfolio for opportunities to refinance debts in response to changing economic or market conditions.

a) ***Interest Saving***. The county may issue refunding bonds (as defined for federal tax law purposes) when advantageous, legally permissible, prudent, and net present value savings expressed as a percentage of the par amount of the refunded bonds equals or exceeds 3%. Staff analysis should be evaluated by the Debt Committee for recommendation to the Board.

b) ***Restructuring of Debt.*** County staff may find a restructuring of debt service or debt covenant necessary to adjust to changing revenue trends or other economic and legislative trends. Staff analysis should be evaluated by the Debt Committee for recommendation to the Board.

11. SHORT-TERM DEBTS

a) ***Lines and Letters of Credit***. The Chief Financial Officer may from time to time judge it prudent and advantageous for the County to enter into agreements with commercial banks or other financial institutions for lines or letters of credit that provide the County with access to credit under the terms and conditions of those agreements. Any agreements with financial institutions for the acquisition of lines or letters of credit shall be subject to the advance approval of the Board of Supervisors.

b) ***Tax and Revenue Anticipation Notes (TRAN)***. The Chief Financial Officer may ascertain the need to fund internal working capital cash-flow with TRAN. Before issuing such notes,

cash-flow projections shall be prepared by Chief Financial Officer staff. Board of Supervisors' approval is required.

c) ***Dry Period Financings.*** From time to time, the County or a city or district depositor in the county treasury may request a temporary cash advance within the fiscal year for operational purposes during dry revenue periods. The Chief Financial Officer shall evaluate such request and send to the Debt Committee for review as necessary prior to making the allowable fund transfers pursuant to Section 6, Article XVI of the California Constitution.

12. INTERFUND BORROWING

It may be appropriate for certain funds to borrow from other funds for either cash flow purposes or other short-term financing needs. Examples are:

- Advance contributions to restricted reserves for future debt services when dedicated revenue streams are not yet available.
- Interim cash flows for a capital project while waiting for long-term financing solution.
- Temporary (less than six months) funding of operating deficit while long-term solution is finalized.
- Interim funding for program while awaiting state or federal funds.
- In the normal course of managing cash resources within the County treasury, the Chief Financial Officer may allow certain funds to incur temporary overdrafts.

The following requirements must be met in all cases:

1. The Chief Financial Officer has determined that inter-fund borrowing is in the best interest of the County after examining all possible alternatives and analyzing impact on cash balances.
2. The Chief Financial Officer has determined that the borrowing does not adversely impact the long-term financial condition of the lending fund.
3. The legality of the transaction is established by County Counsel.
4. The term cannot exceed 5 years, and the sources for repayment and debt service schedule are clearly identified.
5. If the original lending fund is the General Fund the term cannot exceed 3 years and the County's general reserve must be maintained at the level prescribed by County policy.
6. The transaction is memorialized in a formal communication between the parties involved, and approved by the Board of Supervisors if other than temporary.
7. The loan is recorded in the County general ledger.

13. CONVERSION OF OBLIGATION TO DEBT – PENSION AND OPEB

The County should carefully evaluate the benefits and risk before deciding to convert a future obligation into a hard debt, such as issuing bonds to fund pension obligation (POB) or to fund other post-employment benefits (OPEB):

Potential benefits of issuing bonds:

- Net long-term saving as represented by the net present value of cash savings resulting from lower debt service on the bond compared to CalPERS (PERS) amortization of the unfunded actuarial accrued liability (UAAL).
- Ability to structure the payment of obligation to match with county cash flows.
- Pre-determined debt service schedule facilitates budgeting and financial planning.
- Existence of a disciplined method to pay down the obligation.

Potential risks of issuing bonds:

- Conversion of an accrued liability (projected benefit payments to employees based on past service) of which only a small portion must be paid in the near-term into a likely larger liability that must be paid to bondholders.
- Diminished flexibility in cash flows caused by requirement of a fixed debt service schedule.
- Reduction of county debt capacity due to debt issuance.
- Risk that actual PERS investment returns are lower than the interest rate on the bonds resulting in negative net cash savings.
- Risk that future PERS returns are higher than their assumed actuarial rate, resulting in surplus, causing bond indebtedness to be relatively more expensive.
- A new UAAL may be created from future benefit enhancements or other factors.

14. STRATEGY TO REDUCE FINANCIAL OBLIGATION

As soon as a material financial obligation has been recognized by application of generally accepted accounting principles (GAAP), and irrespective of the necessity to record this obligation in the County's accounts, the Chief Financial Officer shall analyze its impact on the County's fiscal sustainability and recommend to the Board of Supervisors a course of action to mitigate this impact. Examples of such financial obligations are the unfunded liabilities related to the County's pension plan and to the retirees' health benefit program; and any liability related to pollution remediation.

15. OTHER DEBTS

a) Assessment and Improvement District. All of the County's improvement assessment indebtedness under the control of the Board of Supervisors shall be self-supporting so as to minimize County liability exposure. The property tax burden as a percentage of sales price or assessed value as appropriate generally should not exceed 2% (Standard recommended by California Debt & Investment Advisory Commission). The debt service shall be made on a level basis or other manner that matches cash flows. Prior to issuance by the County, the Chief Financial Officer's office shall prepare projected cash flows which incorporate schedules for assessment contract payments, prepayments, delinquencies, and non-payments.

All improvement district and assessment financing shall be subject to advance approval by the Board of Supervisors.

b) Special Assessment Districts/Mello-Roos. The County may establish special assessment or Mello-Roos Community Facilities Districts under various sections of State law to issue bonds for the financing of infrastructure and public facilities improvements in connection with land development. The issuance of these bonds is subject to a two-thirds approval of the landowners voting within the proposed district. The security for the bonds is provided by properties within the district. The properties are assessed for amounts proportionate to the benefit received from the improvements financed for the payment of annual principal and interest on the bonds. Such amounts generally should not exceed 2% of sales price or assessed value as appropriate (Standard recommended by California Debt & Investment Advisory Commission). The County is not liable for the repayment of these bonds, but rather acts as an agent for the property owners/bondholders in collecting and forwarding the special assessments.

c) Conduit Financing. The County may sponsor conduit financing for those activities that have a general public purpose and are consistent with the County's strategic goals. Conduit financing may include providing a loan guarantee or issuing debts on behalf of another public agency. All conduit financing must insulate the County to the maximum extent possible from any credit risk or exposure, and from all other liability exposure, and must first be evaluated by the Debt Committee, prior to submission to the Board of Supervisors for approval.

16. ANNUAL REPORTING

Annually the Chief Financial Officer shall prepare and submit a report to the Board of Supervisors on the status of all significant county debts and obligations and the current county debt load. The report shall include:

1. Outstanding debts by category:
    a. Balance as of the last ended fiscal year
    b. Maturity date
    c. Current debt service
    d. Any debt compliance issue noted
2. Summary of long-term obligations and solutions
3. County current debt load expressed as financial ratios

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