Proposal for Sonoma County School Districts to participate in Sonoma County Efficiency Financing (SCEF) Program

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Sonoma County Efficiency Financing Program – The Specifics

Sonoma County Water Agency (SCWA) is enrolling public and non-profit facilities in a guaranteed savings program designed to improve energy and water efficiency. Participating organizations will receive substantial utility cost savings, including a contractual guarantee sufficient to cover the full cost of all retrofit work. The Program intends to use tax-exempt bonds to finance the projects. Your facilities may qualify if:

- Your organization is tax exempt
- You have existing facilities that are at least five years old and need more efficient lighting, HVAC, pumps, chillers, irrigation controls or other equipment
- Your organization has a credit rating and can borrow

How it Works

1. Check Eligibility — Call Amy Bolten at 707-547-1981 to set up a meeting to review your eligibility and potential projects. It is important to have someone responsible for your facility maintenance at this meeting to talk about potential energy and water retrofit work. We will answer your questions about the program and help identify potential retrofit measures.

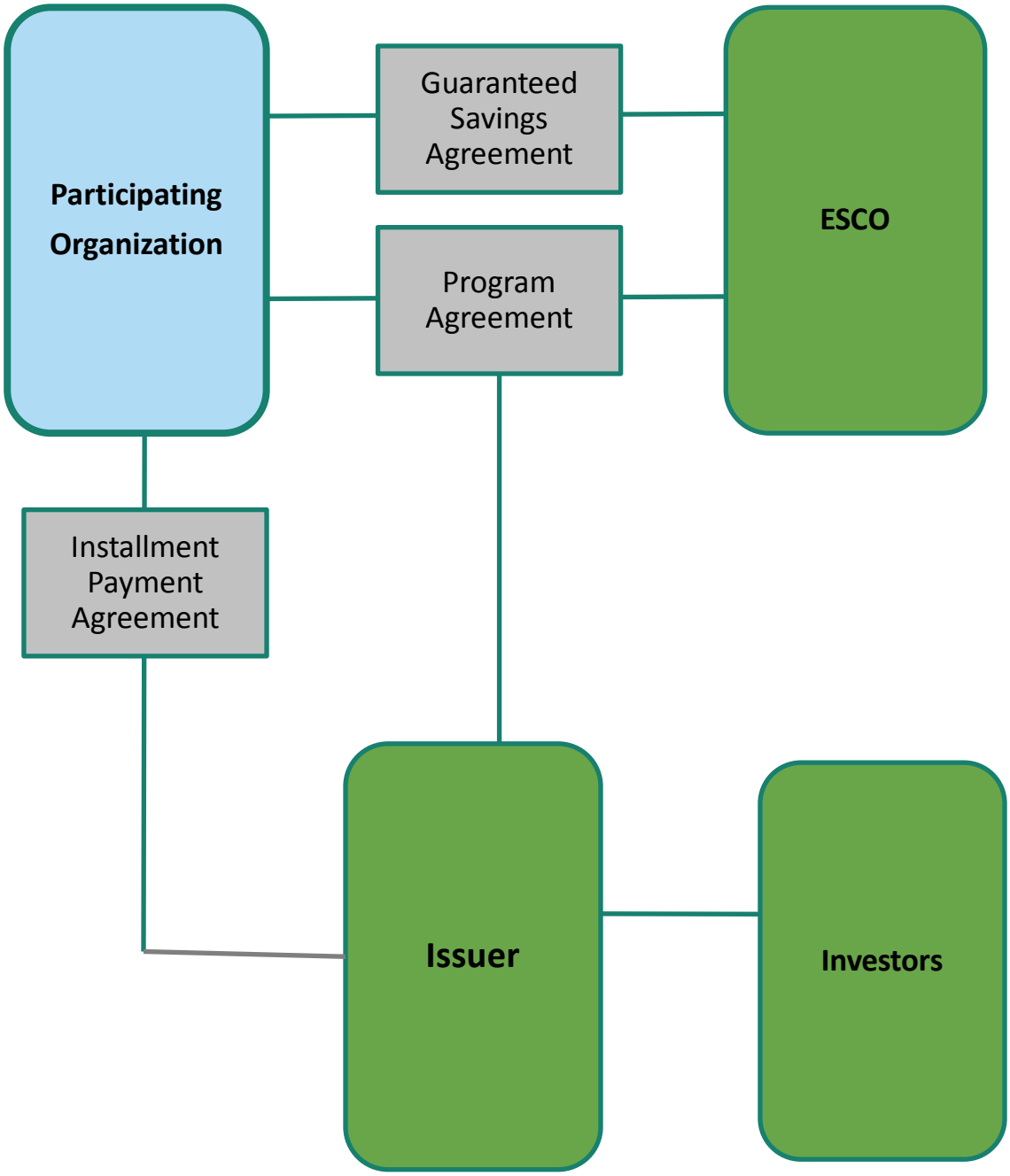
2. Get Started — The first step in getting started is to sign a non-binding Letter of Interest. These letters help us attract high-quality Energy Service Companies or "ESCOs" who will compete to do the retrofit work and guarantee your utility cost savings. Once you've signed a Letter of Interest, you can attend a workshop where you will meet representatives from each of the pre-screened ESCOs and learn more about what they offer. Additionally, at the workshop, the SCEF team will review in detail how the financing will work.

3. Pick an ESCO — After the workshop, if you are interested in participating, you will need to provide the ESCO(s) with access to your site, facilities staff and energy and water bills. We are working with PG&E to help make access to electric bills from multiple sites a simple process. Then, you can select an ESCO to provide you with a preliminary audit of your facility and propose a set of retrofits. The proposal will include project costs and a preliminary estimate of financial savings that the ESCO would be prepared to guarantee. We will hold a review session to go over the proposal and give you an opportunity to ask questions before committing. At this point, you can move forward with an investment grade audit or opt out of the program.

4. Do the Retrofits — When you authorize the work, both your agency and the ESCO will sign a Guaranteed Savings Agreement developed by SCWA to ensure that your financial savings are truly guaranteed. Your particular guarantee can cover any period of time from 1 to 20 years, and will be established based on the expected life of the energy and water savings measures. When your agency signs an agreement with its selected ESCO to perform an investment grade energy audit, the ESCO must guarantee financial savings for this second audit which are within 10% of the preliminary audit. You then have another opportunity to review and approve the final plan before the work is completed. If you opt out of the program at this late stage, you will need to pay part of the cost of the investment grade audit.

5. Check Results — Once the retrofits are completed by the ESCO, all of the equipment will be checked regularly to ensure performance specifications are met. The savings guarantee is then tested against your utility bills and your financial savings will be verified over a minimum period of time. The verification process is very important and you will receive regular reports from the ESCO documenting them. If the actual savings you see is less than the guarantee, then the ESCO must pay you the difference or offer additional retrofit work to compensate. In most cases, we expect the actual savings will be higher than the guarantee since that helps protect the ESCO from losing money.

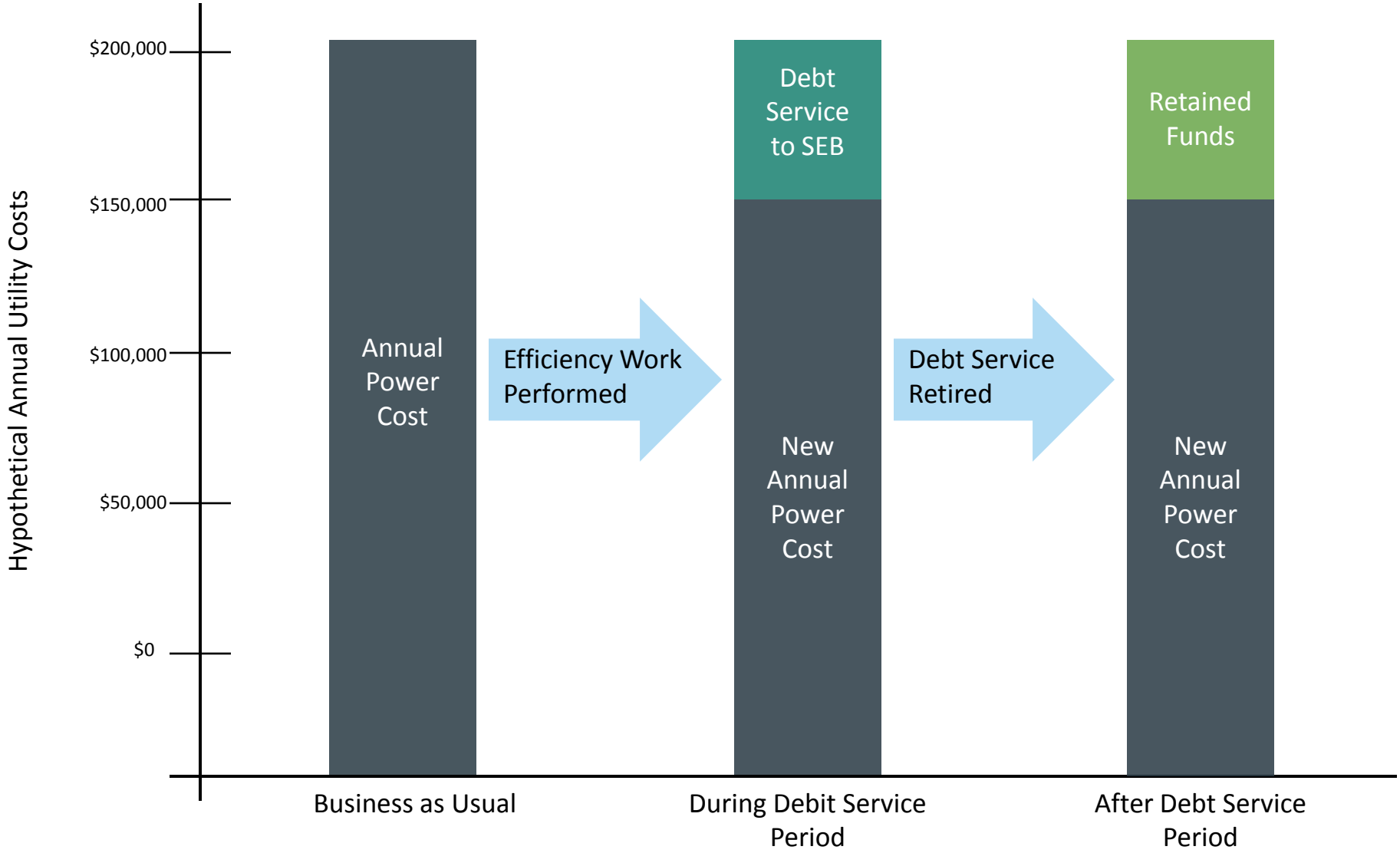
Illustration of Efficiency Financing*



*Different forms of financing are under consideration.

Illustration of Sustainable Energy Bond Program Outcome to End Users

(saving amounts for conceptual illustrative purposes only)



Potential Energy and Water Efficiency Projects for Schools:

Improvements to Consider:

- ☐ Heating, Ventilation and Air Conditioning Systems
  - ☐ Consolidate System
  - ☐ Update Equipment
  - ☐ Automate Controls
  - ☐ Geothermal heat pumps

- ☐ District heating and cooling systems

- ☐ Centralized heating and cooling plant
  - ☐ Cogeneration (combined heat and power generation facility)
  - ☐ High efficiency chillers
  - ☐ High efficiency boilers
  - ☐ High efficiency cooling towers

- ☐ Lighting
  - ☐ Replace T12 with T5 and T8
  - ☐ Increase Day lighting
  - ☐ Automate Controls

- ☐ Building Envelope
  - ☐ Upgrade Windows
  - ☐ Upgrade Doors
  - ☐ Insulation of ceilings and walls
  - ☐ Seal/caulk building leaks
  - ☐ Duct leak testing and repairing
  - ☐ Duct Insulation

- ☐ Hot Water
  - ☐ Solar Hot Water
  - ☐ Tankless Water Heater
  - ☐ High efficiency hot water tank

- ☐ Cool Roof

- ☐ Energy Management System

- ☐ Water Efficiency
  - ☐ Low Flow Toilets and faucets
  - ☐ High Efficiency Irrigation
  - ☐ Native, drought resistant vegetation for landscaping

- ☐ Recycled or Rainwater systems for non-potable use

Heating, Ventilation and Air Conditioning Systems: The HVAC system is usually one of the largest energy consumers in a school. Because of this, even small improvements to the system can result in relatively large energy savings.

1. Consolidate System – evaluate the size and number of HVAC units currently in use. Consolidating equipment can provide better heating, ventilation and air conditioning coverage while reducing the cost to run and maintain the systems.
2. Update Equipment – Consider replacing old and outdated equipment with something more efficient.
    a. Variable speed/frequency drives – Offers energy savings in systems which have loads that vary with time.
    b. Variable Volume Extractors – Offers ability to control fan capacity which allows reduction in the energy consumed by the fans.
    c. Indirect/Direct Evaporative Cooling (IDEC) – Cools air through evaporation of water. Added benefit of adding moisture to the air
    d. Replace filters in Air Handlers with Electrostatic dynamic Air Filters – Electrostatic air filters are highly efficient at removing particles from air. They are able to remove fine particulate matter, such as dust and smoke, with minimal impediment to the air stream.
3. Automate Controls – Allow control of the system in response to current conditions or preset temperature set points.
    a. Adjust Temperature settings.
    b. Demand Control Ventilation - CO_2 sensors tied to digital control systems.
    c. Program Thermostats to accommodate usage patterns and comfort levels.
4. Geothermal Heat Pumps – Is a heating/cooling system that pumps heat to or from the ground. Shallow (3-8 ft) horizontal and Deep (100-500 ft) vertical systems allow the transfer of heat to and from the ground and use this temperature exchange to heat or cool the interior of a building using a heat pump.

District Heating and Cooling Systems: These are systems that produce heating and cooling energy, via hot water/steam and chilled water respectively, at a central plant which is then distributed to a network of buildings via pipelines. These systems tend to be more efficient in situations requiring the simultaneous heating/cooling of several separate buildings.

Centralized Heating and Cooling Plant: Retrofitting or upgrading efficiency in central plants.

1. Cogeneration
2. High Efficiency Chillers
3. High Efficiency Boilers
4. High Efficiency Cooling Towers
    a. Forced-draft, Open-Loop, Counter-flow Towers
    b. Replace isolation valves with Actuated valves to be controlled by energy management system
    c. Positive Closure Damper Assemblies

Lighting: In general, lighting accounts for 25% of the energy use of commercial buildings.

1. Replace T12 with T5 and T8 – More efficient lighting offers both direct and indirect energy reduction: not only is less energy used to run the bulb, but the bulb also produces less waste heat which, in turn, reduces the cooling load.
2. Increase Day Lighting – Day lighting is the highest quality light source for visual tasks. It enhances both the color and appearance of objects.
3. Automate Controls
    a. Occupancy Sensors
    b. Daylight Harvest Controls
    c. Emergency Lighting Controls

Building Envelope: An energy efficient building enclosure will reduce the building's overall operating costs by optimizing: moisture control; insulation levels; glazing; shading; air leakage control; and light-colored exterior surfaces.

1. Upgrade Windows
2. Upgrade Doors
    a. Modify handicap entrances to minimize air infiltration
3. Insulation of Ceilings and Walls
    a. Roof Board Insulation
    b. Thermal Barrier Sheet Flashing
4. Seal/Caulk Building Leaks
    a. Weather stripping
5. Duct Leak Testing and Repairing
6. Duct Insulation
7. Paint exterior surface with light-colored and/or low-e coating.

Hot Water

1. Solar Hot Water
2. Tankless Water Heater
3. High Efficiency Hot Water Tank
    a. Gas-Fired Condensing Boiler
    b. Storage Tank

Cool Roof: Have both a high solar reflectance and high thermal emittance which means that they are able to reflect a large amount of the visible, infrared and UV wavelengths of the sun and also emit or radiate heat that has been absorbed. Cool roofs reduce the heat gain of a building and, therefore, the required cooling load of said building.

Energy Management System

1. Provide adequate training for staff
2. Upgrade Communications Infrastructure, if necessary, to accommodate the energy management system
3. Information Management System
    a. Provides a system to: measure, manage, reduce, verify and forecast usage, cost and emissions
    b. Real time demand management
        i. Demand curtailment
4. Modify Sequencing to provide efficient operation of mechanical Systems

Water Efficiency

1. Promote domestic water conservation
2. Low Flow Toilets and Faucets
3. High Efficiency Irrigation
    a. Automated System
4. Native, Drought Resistant Vegetation for Landscaping
5. Recycled or Rainwater Systems for Non-Potable Uses

Savings per ECM for projects identified and selected by a participant of the Delaware SEU:

ECM	ECM Description	Electricity (kWh)	Electricity (kWh) $	Demand (kW)	Demand (kW) $	Natural Gas (Therm)	Natural Gas (Therm) $	Water (kgal)	Water (kgal) $	Sewer (kgal)	Sewer (kgal) $	Maintenance Savings	First Year Guaranteed Savings
1	Lighting Retrofit/ Control	80,418	$6,088	344	$1,067	(445)	-$542	0		0		$1,287	$7,900
1	Lighting Retrofit/ Control	73,174	$5,539	325	$1,007			0		0		$1,149	$7,695
1	Lighting Retrofit/ Control	129,426	$9,798	599	$1,855	(716)	-$874	0		0		$1,080	$11,859
1	Lighting Retrofit/ Control	6,127	$802	0				0		0		$137	$939
1	Lighting Retrofit/ Control	372,738	$28,216	1,498	$4,644	(2,055)	-$2,815	0		0		$5,947	$35,992
1	Lighting Retrofit/ Control	74,953	$5,696	166	$516	0		0		0		$1,030	$7,242
1	Lighting Retrofit/ Control	15,167	$1,148	83	$258	0		0		0		$290	$1,696
1	Lighting Retrofit/ Control	38,899	$2,945	213	$661	0		0		0		$706	$4,311
ECM 1 Summary			**Expected Device Lifetime = 15 yrs**		**Capital Cost (Not incl debt service) = $1,019,553.20**						**Total Yearly Savings =**		**$77,634**
2	Water Conservation	2,208	$167	0		1,530	$1,866	1,379	$7,642	1,379	$5,725		$15,400
2	Water Conservation	0		0		1,397	$1,913	1,357	$11,029	1,357	$7,475		$20,417
ECM 2 Summary			**Expected Device Lifetime = 20 yrs**		**Capital Cost (Not incl debt service) = $176,749**						**Total Yearly Savings =**		**$35,817**
3	Variable Volume Cond Water Loop for WSHP	579,150	$43,842	640	$1,985	0		0		0			$45,826
3	Variable Volume Cond Water Loop for WSHP	198,137	$14,999	220	$682	0		0		0			$15,681
ECM 3 Summary			**Expected Device Lifetime = 18 yrs**		**Capital Cost (Not incl debt service) = $767,285**						**Total Yearly Savings =**		**$61,507**
4	WSHP Replacement	0		0		0		0		0			
4	WSHP Replacement	0		0		0		0		0			
ECM 4 Summary					**ECM not cost-effective from Participant's Perspective**								

Savings per ECM for projects identified and selected by a participant of the Delaware SEU:

ECM	ECM Description	Electricity (kWh)	Electricity (kWh) $	Demand (kW)	Demand (kW) $	Natural Gas (Therm)	Natural Gas (Therm) $	Water (kgal)	Water (kgal) $	Sewer (kgal)	Sewer (kgal) $	Maintenance Savings	First Year Guaranteed Savings
5	Transformer Replacement	67,219	$5,088	172	$533	0		0		0			$5,621
5	Transformer Replacement	48,913	$3,703	125	$388	0		0		0			$4,091
5	Transformer Replacement	0		0		0		0		0	ECM not cost-effective from Participant's Perspective		
5	Transformer Replacement	74,689	$5,654	199	$616	0		0		0			$6,270
ECM 5 Summary			Expected Device Lifetime = 30 yrs			Capital Cost (Not incl debt service) = $343,185					Total Yearly Savings =		$15,982
6	Condensing Boiler for WSHP	0		0		0		0		0			
ECM 6 Summary					ECM not cost-effective from Participant's Perspective								
7	Lab Fume Hood Retrofit	50,873	$3,851	158	$491	7,706	$9,401	0		0			$13,743
7	Lab Fume Hood Retrofit	89,696	$6,790	263	$816	8,265	$11,323	0		0			$18,929
ECM 7 Summary			Expected Device Lifetime = 20 yrs			Capital Cost (Not incl debt service) = $430,822					Total Yearly Savings =		$32,672
8	AHU To WSHP Conversion	0		0		0		0		0			
ECM 8 Summary					ECM not cost-effective from Participant's Perspective								
9	VFD Retrofit For Cooling Tower Fans	164,910	$12,484	479	$1,484	0		0		0			$13,967
9	VFD Retrofit For Cooling Tower Fans	95,384	$7,221	107	$333	0		0		0			$7,553
ECM 9 Summary			Expected Device Lifetime = 18 yrs			Capital Cost (Not incl debt service) = $119,207					Total Yearly Savings =		$21,520
10	New JCI BMS Front End	0		0		0		0		0			
ECM 10 Summary					ECM not cost-effective from Participant's Perspective								
11	CT Chemical Treatment Improvement	0		0		0		0		0			
11	CT Chemical Treatment Improvement	0		0		0		0		0			
ECM 11 Summary					ECM not cost-effective from Participant's Perspective								

Savings per ECM for projects identified and selected by a participant of the Delaware SEU:

ECM	ECM Description	Electricity (kWh)	Electricity (kWh) $	Demand (kW)	Demand (kW) $	Natural Gas (Therm)	Natural Gas (Therm) $	Water (kgal)	Water (kgal) $	Sewer (kgal)	Sewer (kgal) $	Maintenance Savings	First Year Guaranteed Savings
12	Walk In Box Energy MG System	0		0		0		0		0	ECM not cost-effective from Participant's Perspective		
12	Walk In Box Energy MG System	17,573	$1,330	0		0		0		0			$1,330
ECM 12 Summary			Expected Device Lifetime = 15 yrs			Capital Cost (Not incl debt service) = $34,464						Total Yearly Savings =	$1,330
13	Ice Machine Energy Recovery	1,247	$94	0		0		0		0			$94
13	Ice Machine Energy Recovery	0		0		0		0		0	ECMs not cost-effective from Participant's Perspective		
13	Ice Machine Energy Recovery	2,966	$225	0		0		0		0			$225
ECM 13 Summary			Expected Device Lifetime = 24 yrs			Capital Cost (Not incl debt service) = $3,148						Total Yearly Savings =	$319
15	Emergency Generator Replacement	0		0		14	$17	0		0		$1,820	$1,837
ECM 15 Summary			Expected Device Lifetime = 30 yrs			Capital Cost (Not incl debt service) = $52,394						Total Yearly Savings =	$1,837
16	Variable Volume Chilled Water Pumping	68,131	$5,158	84	$260	0		0		0			$5,417
16	Variable Volume Chilled Water Pumping	86,764	$6,568	53	$163	0		0		0			$6,731
ECM 16 Summary			Expected Device Lifetime = 18 yrs			Capital Cost (Not incl debt service) = $384,334						Total Yearly Savings =	$12,148
17	CV To VAV Conversion	0		0		0		0		0	ECMs not cost-effective from Participant's Perspective		
17	CV To VAV Conversion	150,421	$19,690	530		(1,265)	-$1,543	0		0			$18,147
17	CV To VAV Conversion	27,561	$2,086	153	$475	485	$664	0		0			$3,225
17	CV To VAV Conversion	0		0		0		0		0	ECMs not cost-effective from Participant's Perspective		
ECM 17 Summary			Expected Device Lifetime = 20 yrs			Capital Cost (Not incl debt service) = $291,903						Total Yearly Savings =	$21,372
18	Condensing Domestic Water Heater	0		0		0		0		0	ECMs not cost-effective from Participant's Perspective		
18	Condensing Domestic Water Heater	0		0		0		0		0	ECMs not cost-effective from Participant's Perspective		
18	Condensing Domestic Water Heater	0		0		1,051	$1,440	0		0			$1,440
18	Condensing Domestic Water Heater	52,827	$3,999	477	$1,477	(1,221)	-$1,673	0		0			$3,804
ECM 18 Summary			Expected Device Lifetime = 20 yrs			Capital Cost (Not incl debt service) = $109,777						Total Yearly Savings =	$5,244

Savings per ECM for projects identified and selected by a participant of the Delaware SEU:

ECM	ECM Description	Electricity (kWh)	Electricity (kWh) $	Demand (kW)	Demand (kW) $	Natural Gas (Therm)	Natural Gas (Therm) $	Water (kgal)	Water (kgal) $	Sewer (kgal)	Sewer (kgal) $	Maintenance Savings	First Year Guaranteed Savings
19	Chiller VFD Retrofit	87,473	$6,622	228	$708	0		0		0			$7,329
19	Chiller VFD Retrofit	0		0		0		0		0			
ECM 19 Summary			Expected Device Lifetime =23 yrs			Capital Cost (Not incl debt service) = $78,023						Total Yearly Savings =	$7,329
20	Premium Efficiency Motors	44,396	$3,361	0		0		0		0			$3,361
ECM 20 Summary			Expected Device Lifetime = 18 yrs			Capital Cost (Not incl debt service) = $114,280						Total Yearly Savings =	$3,361
21	Condenser Water Pump Replacement	0		0		0		0		0			
22	New VAV System	0		0		0		0		0			
23	PC Energy Management	0		0		0		0		0			
23	PC Energy Management	0		0		0		0		0			
23	PC Energy Management	0		0		0		0		0			
23	PC Energy Management	0		0		0		0		0			
23	PC Energy Management	0		0		0		0		0			
ECM 21-23 Summary					ECMs not cost-effective from Participant's Perspective								
24	Building Envelope Improvements	3,212	$243	0		679	$829	0		0			$1,072
24	Building Envelope Improvements	22,109	$1,674	0		0		0		0			$1,674
24	Building Envelope Improvements	2,029	$154	0		429	$523	0		0			$677
24	Building Envelope Improvements	14,198	$1,859	0		0		0		0			$1,859
24	Building Envelope Improvements	2,802	$212	0		592	$812	0		0			$1,024
ECM 24 Summary			Expected Device Lifetime = 20 yrs			Capital Cost (Not incl debt service) = $49,711						Total Yearly Savings =	$6,306

Savings per ECM for projects identified and selected by a participant of the Delaware SEU:

ECM	ECM Description	Electricity (kWh)	Electricity (kWh) $	Demand (kW)	Demand (kW) $	Natural Gas (Therm)	Natural Gas (Therm) $	Water (kgal)	Water (kgal) $	Sewer (kgal)	Sewer (kgal) $	Maintenance Savings	First Year Guaranteed Savings
25	Solar DHW System	0		0		382	$523	0		0			$523
ECM 25 Summary			Expected Device Lifetime = 25 yrs			Capital Cost (Not incl debt service) = $65,256					Total Yearly Savings =		$523
26	Ground Source Heat Pump	0		0		0		0		0			
ECM 26 Summary					ECM not cost-effective from Participant's Perspective								
27	Demand Based Ventilation Control	2,011	$152	33	$101	563	$771	0		0			$1,024
ECM 27 Summary			Expected Device Lifetime = 15 yrs			Capital Cost (Not incl debt service) = $15,970					Total Yearly Savings =		$1,024
28	Kitchen Hood VAV	46,172	$3,495	0		3,820	$5,233	0		0			$8,729
ECM 28 Summary			Expected Device Lifetime = 20 yrs			Capital Cost (Not incl debt service) = $42,433					Total Yearly Savings =		$8,729
29	New DDC Control Systems	0		0		0		0		0			
30	Cogeneration	0		0		0		0		0			
31	Sports Field Irrigation System	0		0		0		0		0			
32	Pneumatic to DDC Wilmington E Bldg	0		0		0		0		0			
ECM 29-32 Summary					ECMs not cost-effective from Participant's Perspective								
TOTAL PROJECT	TOTAL CAPITAL COST (Not incl debt service) = $4,145,338	Total Yearly Electricity Usage Savings (kWh) 2,793,974	Total Yearly Electricity Usage Savings ($) $220,952	Total Yearly Electricity Demand Savings (kW) 7,149	Total Yearly Electricity Demand Savings ($) $20,520	Total Yearly Natural Gas Savings (Therm) 21,210	Total Yearly Natural Gas Savings ($) $27,867	Total Yearly Water Savings (kgal) 2,736	Total Yearly Water Savings ($) $18,671	Total Yearly Sewer Savings (kgals) 2,736	Total Yearly Sewer Savings ($) $13,199	Total Yearly Maintenance $13,446	TOTAL FIRST YEAR GUARAN-TEED SAVINGS ($) $314,656