

# Common Energy Conservation Measures (ECM's)

The following table lists commonly reported and recommended Energy Conservation Measures (ECM's) for entities throughout the state. The information was derived from the SB12 entity annual report narratives, Preliminary Energy Assessments (PEA's) conducted by SECO, and with the assistance of SECO engineering contractors. The figures in the table are approximations and do not necessarily reflect the entire range of projects and their potential savings, and are based on a variety of project scopes.

ECM Type	Estimated Project Implementation Cost Range	Estimated Annual Return on Investment (ROI)	ECM Potential Annual Savings	Details
<b>ENERGY / POWER MANAGEMENT</b>				
Energy Star Power Management Software	No cost	n/a (depends on equipment)	\$25 - \$150 per machine	This is a low to no-cost measure that is built into most computers, and involves setting the computer to engage "Sleep Mode" after 30-60 minutes of inactivity. This global network signal feature activates the Power Saver feature of the PC. Libraries and City Halls are common facilities to utilize this measure.
Energy Management and Control Systems	\$8,000 - \$160,000	6 - 16 yrs	6% - 15%	These systems can be integrated into facility operations to efficiently manage multiple systems to achieve the highest energy efficiency. These measures commonly entail an upgrade and integration of existing thermostats into the energy management system or an upgrade of outdated energy management systems. City Halls, Police Departments and Jails are common facilities to utilize this measure.
Vending Machine Economizers	\$100 - \$250	1.3 - 3.3 yrs	\$30 - \$75 per machine	Vending machine economizers are simple devices similar to lighting-related occupancy or motion sensors which are compatible with most vending machines. They assure that power to the vending machine is off while there are no occupants in the vicinity.
<b>HEATING VENTILLATION AND AIR CONDITIONING (HVAC)</b>				
Control Software / Equipment Retrofits	\$11,600 - \$31,200	3.5 - 5.6 yrs	18% - 28%	These retrofits generally reduce the overall running time of the HVAC system and maximize efficiency through upgraded mechanical and operating elements.
Occupancy Based Settings and Controls	\$200 - \$250 (per thermostat)	10 - 20 yrs	\$50 per thermostat	This low cost measure involves setting the HVAC controls in facilities to optimal temperature settings. This can be done with existing programmable thermostats or through manual settings. City Halls, Police Departments, Offices and Community Centers are common facilities to utilize this measure.
Programmable Thermostats	\$200 - \$1,700	6.6 - 10 yrs	10% - 15%	This measure involves the installation and integration of programmable thermostats with existing HVAC systems. Libraries, City Halls, Police Stations and Courthouses are common facilities to utilize this measure.
System Retrofits	\$3,400 - \$200,000	5.5 - 16.6 yrs	6% - 18%	This measure can vary greatly in cost and savings depending on the application and existing conditions of the current HVAC system. This measure typically includes upgrades and replacements of window units, spot coolers, chillers and cooling towers with split system heat pumps. Fire Stations, Police Stations, City Halls, Jails and Courthouses are common facilities to utilize this measure.
<b>LIGHTING</b>				
Ballast / Fixture Replacement	\$300 - \$100,000	10 - 12.5 yrs	8% - 10%	This measure typically involves replacing magnetic ballasts which house T-12 lighting with high efficiency 28-watt electronic T-28 ballasts which house modern higher efficiency lighting. Offices, Community Centers and Jails are common facilities to utilize this measure.
Bulb Replacement	\$100 - \$5,000	1.3 - 6 yrs	16% - 79%	This measure varies depending on the ballast type, but typically involves replacing existing bulbs with the bulbs with the highest available efficiency.
Day Lighting Control	\$6,000 - \$15,000	8.3 - 14.3 yrs	7% - 12%	This measure involves the integration of natural lighting into facilities to supplement the lighting needs of the facility. Such measures can work as a retrofit project and as design specifications for facilities. It can also integrate an automated system that varies lighting production based on actual lighting needs for the facility and thus can be a costly expense.
Street Light Bulb Replacement	\$400 - \$1,200	2 - 4 yrs	40%	This measure typically involves replacing high pressure sodium and mercury vapor street lighting with high efficiency metal halide lighting. Other lighting technology such as convection lighting may be a feasible consideration for parking lot and other applications.
Motion / Occupancy Sensors	\$350 - \$2,000	3.1 - 6.6 yrs	15% - 32%	This is a relatively low-cost measure that integrates technology in which lighting is activated only when an occupant is present. Offices, Libraries, IT buildings, Recreation Centers, Police and Fire Departments, and Municipal Courts are common facilities to utilize this measure.
Traffic Signal Bulb / Fixture Replacement (LED)	\$3,000 - \$30,000 per intersection	1.2 - 2.5 yrs	40% - 85%	This measure involves replacing the incandescent traffic signal bulbs and fixtures with LED lights. The estimated cost range is intended to reflect the cost of one intersection. These retrofits not only significantly decrease consumption but also typically result in lower maintenance costs due to longer lasting technology.
<b>OPERATIONS AND MAINTENANCE (O &amp; M)</b>				
Air Coil Cleaning	\$200	4.7 yrs	5% - 15%	This low cost measure involves standard maintenance to clear the coils of debris. This measure can be integrated into routine maintenance procedures.
Commissioning	\$21,000 - \$340,000	3.3 - 5.6 yrs	18% - 30%	Many facilities, including those that are newly constructed, are subject to human or technological errors or variations. This measure involves a thorough checkup and tune-up of facilities to ensure that the building and facility systems operate at optimal levels. City Halls, Detention Centers, Court Houses and Conference Centers are common facilities to utilize this measure.
Retro - commissioning	Varies	n/a	5% - 15%	This measure involves taking a 'big picture' look at your facilities and the design standards and specifications used, and provides alternatives and recommendations to design standards and specifications and building codes, and helps to identify inherent flaws in these areas.
<b>PUMPS AND MOTORS</b>				
High Efficiency Motors	\$2,000 - \$4,500	10 - 12.5 yrs	8% - 10%	This measure typically involves upgrading HVAC fan motors and Pump motors with High efficiency models.
Variable Frequency Drive (VFD) Motor Applications	\$5,000 - \$12,000	8.3 - 12.5 yrs	8% - 12%	Variable Frequency Drives are a technology that applies to many areas including various types of pumps, motors and drives. Although these improvements can be costly, they can provide significant savings for entities involved with pumps and HVAC Air Handlers
Variable Frequency Drive (VFD) Pump Applications	\$17,500 - \$43,000	10 - 20.3 yrs	7% - 25%	This measure typically involves integrating VFD technology, or Premium Efficiency Pumps into water / wastewater, pumping / processing and well operations.
<b>WATER USE and DISTRIBUTION</b>				
Low Flow Plumbing Fixtures	\$500 - \$10,000	9.7 yrs	10%	Although this measure has an approximate ROI of 9 years, it helps the entity to conserve electricity and water at one time through more efficient plumbing fixtures. The 10% estimate does not include water savings and associated savings from pumping / processing the water.
Water Heater Timers / Time Clock	\$170	5.6 - 11 yrs	1% - 3%	This measure allows the user to determine times which the water heater does not need to operate, and can be used with Energy Efficient, Tankless and Roof-Mounted solar water heaters.
<b>WATER TREATMENT and PROCESSING</b>				
Waste Water Treatment Plant Bubble Diffusers / Aerators	\$125,000 - \$250,000	3.3 - 4 yrs	25% - 30%	Although this measure is relatively costly compared to other measures, it can result in substantial energy and monetary savings, with an approximate ROI of 3 to 4 years. Common applications include upgrades or enhancements to waste-heat recovery and digester gas systems.
Dissolved Oxygen Sensor (Install)	\$5,000 - \$10,000	1 - 4.5 yrs	20% - 40%	Many water treatment facilities require a certain concentration of oxygen in order to proceed with processing. This measure allows automatic detection of oxygen levels which, when used with variable speed motors, can greatly increase efficiency by modulating the motors to operation levels needed to complete the processing.

<b>SECO Programs and Other Resources</b>			
PROGRAM NAME	WEBSITE INFORMATION	SECO CONTACT	DESCRIPTION
Alternative Fuels Program	<a href="http://www.seco.cpa.state.tx.us/alt.html">http://www.seco.cpa.state.tx.us/alt.html</a>	Mary-Jo Rowan Mary-Jo.Rowan@cpa.state.tx.us 512-463-2637	The Alternative Fuels Program promotes Texas' energy security and air quality by supporting public and private partnerships that deploy clean-burning alternative fuel vehicles (AFVs) and build their associated fueling infrastructure.
Building Energy Codes	<a href="http://www.seco.cpa.state.tx.us/sa_codes.html">http://www.seco.cpa.state.tx.us/sa_codes.html</a>	Felix Lopez Felix.Lopez@cpa.state.tx.us 512-463-1080	Building Codes and Standards provides education and outreach for residential, commercial and institutional facilities on compliance verification with adopted energy codes in Texas.
Energy Services Coalition (TX Chapter)	<a href="http://www.energyservicescoalition.org/chapters/TX/">http://www.energyservicescoalition.org/chapters/TX/</a>	Theresa Sifuentes Theresa.Sifuentes@cpa.state.tx.us 512-463-1896	This is a coalition of companies who work with entities on a full spectrum of energy services and products related to energy performance contracting and projects.
Innovative Energy Demonstration Program	<a href="http://www.seco.cpa.state.tx.us/re.htm">http://www.seco.cpa.state.tx.us/re.htm</a> <a href="http://www.infinitepower.org">www.infinitepower.org</a>	Pamela Groce pam.groce@cpa.state.tx.us 512-463-1889	Provides technical training and educational information on Texas renewable energy resources.
LoanSTAR Revolving Loan Program	<a href="http://www.seco.cpa.state.tx.us/lr.htm">http://www.seco.cpa.state.tx.us/lr.htm</a>	Theresa Sifuentes Theresa.Sifuentes@cpa.state.tx.us 512-463-1896	Energy efficiency retrofit loans available for state agencies, school districts, higher education, local governments and county hospitals.
Preliminary Energy Assessments (PEA's)	<a href="http://www.seco.cpa.state.tx.us/sch-gov.htm#pea">http://www.seco.cpa.state.tx.us/sch-gov.htm#pea</a>	Glenda Baldwin (Schools) Glenda.baldwin@cpa.state.tx.us 512-463-1731 Stephen Ross (Local Governments) Stephen.Ross@cpa.state.tx.us 512-463-1770	Preliminary audits available to local governments, county hospitals and school districts. These audits are essential for entities that are interested in reducing electricity consumption and lack the resources for detailed assessments. The assessments will examine 4 - 6 facilities and will provide a report showing potential projects, savings, costs and returns on investment for each.
SB12 / Texas Energy Partnership	<a href="http://www.seco.cpa.state.tx.us/sb5compliance.htm">http://www.seco.cpa.state.tx.us/sb5compliance.htm</a>	Stephen Ross Stephen.Ross@cpa.state.tx.us 512-463-1770	The program provides technical assistance and workshops to local governments regarding energy efficiency, facilities operations / maintenance / auditing, with a goal of assisting with SB12 compliance and meeting its electrical consumption reduction mandates.

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