SECO – Energy Topics
Funding Opportunities and Select Analysis

Nov 1, 2018
Introductions

- Welcome
- Presenter Introductions
- Thanks to NCTCOG & Texas Energy Aggregation
- Introduction to the State Energy Conservation Office (SECO)
Agenda

1. Overview of SECO
   - SECO Schools and Local Government Program
   - SECO LoanSTAR Revolving Loan Program

2. Changes in HVAC Design
   - Schools and Local Governments Considerations

3. Utility Rate Analysis
   - Basic Method
SECO – Schools and Local Governments Program

RENEWABLE PROJECTS QUALIFY
SECO – Schools & Local Governments Program

STATE ENERGY CONSERVATION OFFICE
SECO partners with Texas local governments, county governments, public K-12 schools, public institutions of higher education and state agencies, to reduce utility costs and maximize efficiency. SECO also adopts energy codes for single-family residential, commercial, and state-funded buildings.

Programs

- Alternative Fuels Program
- Clean Energy Incubators
- Industrial Energy Efficiency
- Innovative Energy Demonstration Program
- Local Governments Program
  - Schools Program
  - State Agency and Higher Ed. Program
  - Pantex Program

Energy Codes

- Training & Code Compliance
- Energy Code Adoption Process
- Code Contacts
- Commercial & Multi-Family Construction
- Single-Family Construction
- State-Funded Buildings
- Local Ordinances
- Texas Water Conservation Standards

Resources

- Combined Heat and Power in Texas
- Energy Efficiency Best Practices Guide
- Energy Savings Performance Contracting
- SECO Reports
- Remote Energy Audits

About Us

- Contact Us
- Sign up to receive updates

Funding & Incentives

- SECO Funding Opportunities
- LoanSTAR Revolving Loan Program
- Other Funding Resources

Energy Reporting

- State Agencies and Institutions of Higher Ed.
- Local Government
- Utilities
- Schools

https://comptroller.texas.gov/programs/seco/
SECO – Schools & Local Governments Program

TECHNICAL ASSISTANCE FOR LOCAL GOVERNMENTS

SECO makes energy engineering expertise available to political subdivisions in Texas through its Technical Assistance Program (TAP). Eligible public entities include municipalities, counties, and other special-purpose districts such as port and transit authorities and airports.

SECO contracts with leading engineering firms having a high degree of technical knowledge. They provide customized, on-site, energy-related services across a broad spectrum, ranging from basic consultation to feasibility studies.

Officials of eligible entities may request assistance with either energy or water-related technical matters. Upon determination that the requested services are reasonable and within the contractors’ scope of work, SECO will assign an engineer to contact the officials to determine the level of service necessary to provide assistance. There is no charge to the entity.

How to Apply

To initiate participation in the program, complete the Technical Assistance Request Form and email it to Stephen Ross.

Download Technical Assistance Request Form (PDF)

For more information about TAP, contact Program Manager Stephen Ross.
Submit Service Request Form

- 1 page

SECO assigns an Engineer to provide a site visit and Technical Services

- Fast Mobilization

SECO Funded Report is issued to end Client

- No Obligation

SECO – Schools & Local Governments Program
Total Square Feet Assessed:
28M sq ft

Annual Energy Savings:
213,266 MMBtu

Annual Water Savings:
71 Million Gallons

Identified Potential Annual Savings (2014 – 2016)
SECO – LoanSTAR Revolving Loan Program
SECO – LoanSTAR Revolving Loan Program

Programs
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- LoanSTAR Revolving Loan Program
- Other Funding Resources

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SECO – LoanSTAR Revolving Loan Program

Availability and Interest Rates

• Issuance: October 19, 2018
• Deadline: August 31, 2019 at 2:00 p.m. CT

• Maximum Loan Amount: $8.0 million
• Maximum 3 loans per borrower per application period

• Recent NOLFA Interest Rates
  – 2% interest
  – 1% interest (ARRA restrictions and reporting)
300 loans, Over $400 million

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<th>Borrower</th>
<th>Number of Loans</th>
<th>Average Simple Payback (years)</th>
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<tr>
<td>K-12 Public Schools</td>
<td>134</td>
<td>8</td>
</tr>
<tr>
<td>State Agencies</td>
<td>72</td>
<td>7</td>
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<tr>
<td>Local Governments</td>
<td>57</td>
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<tr>
<td>Higher Education</td>
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<td>9</td>
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<tr>
<td>Hospitals</td>
<td>13</td>
<td>8</td>
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<table>
<thead>
<tr>
<th>Borrower</th>
<th>Number of Design Build or Design Bid Build Contracts</th>
<th>Number of Energy Savings Performance Contracts</th>
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<td>K-12 Public Schools</td>
<td>126</td>
<td>8</td>
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<td>State Agencies</td>
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<td>13</td>
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<td>16</td>
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<tr>
<td>Higher Education</td>
<td>13</td>
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<tr>
<td>Hospitals</td>
<td>12</td>
<td>1</td>
</tr>
</tbody>
</table>
SECO – LoanSTAR Revolving Loan Program

Application Phase

Application

Utility Assessment Report

Application Review and Commitment of Funds
One week

Third Party Review and Acceptance

Loan Agreement

140 calendar days to complete

Typically 30-45 calendar days to complete
SECO – LoanSTAR Revolving Loan Program

- Design
- Third Party Review and Acceptance • 50%, 100%
- Retrofit Activities
- Third Party Review and Acceptance • 50%, 100%
- Loan Repayment Schedule

Retrofit Phase
Texas State Energy Conservation Office (SECO)
https://comptroller.texas.gov/programs/seco

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HVAC Design Changes
Schools and Local Governments Considerations

Nov 1, 2018

Presented by:
Mack Wallace, PE
Program Manager
Jacobs Engineering Group,
Fort Worth, TX
What’s Happening?

Changes in HVAC Design
And
What they mean to you
From 2004 to 2013, Eight Climate Zones for 90.1

Figure B-1 Climate Zones for United States Locations  (Page 134 of Std. 90.1-2010)

ASHRAE 90.1 and the IECC agreed on this map
New 9 Climate Zones—Standards 169-2013 and 90.1-2016

New for 2016

The IECC 2018 did not change climate zones
50% AEDGs 7 years old

Advanced Energy Design Guide for Small to Medium Office Buildings

Achieving 50% Energy Savings Toward a Net Zero Energy Building
Net Zero - 2018 AEDG – Schools First

Posted originally, 1/11/2018
Reposted with errata dated 1/31/18 incorporated, 2/1/2018

ACHIEVING ZERO ENERGY
Advanced Energy Design Guide for K–12 School Buildings
Target Site EUI

6 | Advanced Energy Design Guide for K-12 School Buildings

![Graph showing EUI by Climate Zone for Primary and Secondary School Site EUI with a box highlighting 2A and an arrow pointing to IECC.](image-url)
Right here in DFW – page 21 of the AEDG

RICHARD J. LEE ELEMENTARY SCHOOL

The Coppell Independent School District (CISD) set out to construct a sustainable 21st Century school that is sustainable, while providing the best educational environment for the students. The floor plan is arranged in eight “neighborhoods” with collaborative teaching spaces that each open up into a large multipurpose learning space.

The 358 KW solar photovoltaic (PV) system is composed of approximately 1100 panels, all roof mounted. The entire PV system was constructed within the allocated budget.

KEY ENERGY EFFICIENCY AND SUSTAINABLE FEATURES

- Variable-speed dedicated outdoor air system (DOAS) with demand-controlled ventilation to provide appropriate outdoor air to the learning environment and control building CO₂
- All spaces can control their temperature and lighting
- Geothermal HVAC
- LED lighting with 0.60 W/ft² lighting power density (LPD)
- Orientation and windows to maximize natural lighting and students’ views
- 2900 W wind turbine
- Recycled products integrated into design
- Reduced construction waste.
- 20,000 gal rainwater storage tank for flushing toilets and urinals
Changing in Your Building – HVAC Cost %

How many of you have a humidistat in your building?

- Latent Loads
  - Outside Air
  - DDC Controls
  - Variable Everything

- Sensible Loads
  - Lighting
  - Envelope Equipment
  - Everything
Richard J. Lee

- Used DOAS to control outside air – normally largest cooling load in DFW
- Used Demand-Controlled Ventilation to reduce outside air
- Used Geothermal HVAC to reduce cost of rejecting heat and serve the loads with water instead of air.
  - Do not blow air for long distances (2018 Decentralized systems)
  - AEDG 2018 – Single zone chilled water fan coils, VRF systems, and GSHP
  - What happened to VAV systems?
- You have to use DOAS in the DFW area
- You do not have to use Geothermal
ASHRAE 62.1 VAV rules – Most popular System

1. 15F max difference between supply and T stat 100 FPM 4’ from floor
   Or 20% more OA to supply warm air and return warm air at the ceiling

2. % OA supplied to space is set by the space that needs the highest % served by the AHU

3. Low sensible load. Cooling CFM at full load less than 0.5 CFM.
   Part load down to 0.2 CFM cooling. Heating CFM more than the 50% allowed by ASHRAE 90.1
   People want to have air movement in the space. Water flow very low.
   Series Fan Powered Boxes are needed.
Single Zone DOAS – to the room / to the unit

SINGLE ZONE CONFIGURATIONS

Fan coil units
Radiant panels
Water source heat pumps
Convector

OA
Conditioned Outdoor Air

DEDICATED OUTDOOR AIR UNIT

Conditioned Outdoor Air

EA

RA

Fan coil units
Zone Air Handlers
Water source heat pumps
Parallel fan boxes

SA

RA

SA

EA
Multiple Zone – to the room / to the unit
ASHRAE 62.1
Use Energy Recovery – Everybody Does
Double Wheel DOAS
New RTUs – Variable Speed Compressors
Questions

mack@wisewatt.com
SECO – Basic Utility Bill Analysis

Nov 1, 2018

Presented by:

Carlos Teran, PE
Senior Energy Engineer
Jacobs Engineering Group, Houston, TX
Utility Rate Analysis - Energy Cost Savings

- Typical billing parameters for analysis:
  - **Supply**
    - Customer Charges
    - Supply Charges (kWh)
      - Time-of-Use (Month, Day, Hour)
      - Consumption Blocks
  - **Delivery**
    - Transmission & Distribution (kW, kWh)
      - Time-of-Use (Month, Day, Hour)
      - NCP (kW)
      - 4CP (kW)
      - Demand Ratchet (kW)
      - Power Factor (kW)
      - Riders (kW, kWh)
  - **Taxes**
Utility Rate Analysis - Energy Cost Savings

- Sample Bill

<table>
<thead>
<tr>
<th>Rate Schedule for TXU/Oncor Tariff SS &gt; 10 kW Non IDR NCP for Electric</th>
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<tbody>
<tr>
<td><strong>Component</strong></td>
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<tr>
<td>----------------------------</td>
</tr>
<tr>
<td><strong>Customer Charge:</strong></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td><strong>Consumption Charge</strong></td>
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<tr>
<td><strong>Demand Charge</strong></td>
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</tbody>
</table>
Utility Rate Analysis - Energy Cost Savings

- Time-of-Use

### SUMMARY OF BILLING COMPONENTS:

<table>
<thead>
<tr>
<th>Component</th>
<th>Summer (Jun-Sep)</th>
<th>Winter (Oct-May)</th>
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</thead>
<tbody>
<tr>
<td>Customer Charge:</td>
<td>$1,000.00/month</td>
<td>$1,000.00/month</td>
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<tr>
<td>Energy Charges:</td>
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<td></td>
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<tr>
<td>Block 1, first 250 KWH/KW:</td>
<td>$0.0369/KWH</td>
<td>$0.0369/KWH</td>
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<tr>
<td>Block 2, all remaining KWH:</td>
<td>$0.0329/KWH</td>
<td>$0.0329/KWH</td>
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<tr>
<td>Average Fuel Adj. Cost¹:</td>
<td>$0.01104/KWH</td>
<td>$0.01104/KWH</td>
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<tr>
<td>Average Reg. Adj. Cost¹:</td>
<td>$0.00271/KWH</td>
<td>$0.00271/KWH</td>
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<tr>
<td>Demand Charges:</td>
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<tr>
<td>Direct Demand Charge:</td>
<td>$10.45/KW</td>
<td>$8.30/KW</td>
</tr>
</tbody>
</table>
Utility Rate Analysis - Energy Cost Savings

- Riders

| II. Nuclear Decommissioning Charge: | See Rider NDC per kWh |
| III. Transmission Cost Recovery Factor: | See Rider TCRF |
| IV. Energy Efficiency Cost Recovery Factor: | See Rider EECRF |
| V. Competitive Meter Credit: | See Rider CMC |

Other Charges or Credits

| VI. Rate Case Expense Surcharge: | See Rider RCE per kWh |
| VII. Remand Surcharge: | See Rider RS per kWh |
| VIII. Capital Structure Refund: | See Rider CSR per kWh |
| IX. Distribution Cost Recovery Factor: | See Rider DCRF per kWh |
| X. Tax Refund Factor: | See Rider TRF per kWh |
Utility Rate Analysis - Energy Cost Savings

- Power Factor

<table>
<thead>
<tr>
<th>Meter</th>
<th>Type</th>
<th>Dates</th>
<th>Current Meter Read</th>
<th>Previous Meter Read</th>
<th>Multiplier</th>
<th>kWh Usage</th>
<th>kW Demand</th>
<th>Power Factor</th>
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<tbody>
<tr>
<td>091692353LG</td>
<td>ACT</td>
<td>03/18 - 04/16</td>
<td>5919.03</td>
<td>5798.99</td>
<td>1500</td>
<td>180,039.60</td>
<td>890.00</td>
<td>0.9</td>
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**Current Charges**

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<tr>
<th>Electric Service</th>
<th>Qty</th>
<th>Rate</th>
<th>Amount</th>
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<tbody>
<tr>
<td>CKWH : Commercial Energy</td>
<td>180,039.60</td>
<td>0.05530</td>
<td>$9,956.19</td>
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<td>HUB-LZ Basis Charge</td>
<td>180,039.60</td>
<td>0.00291</td>
<td>$523.97</td>
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<td>TDSP : TDSP Pass-Through Charges</td>
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<td>$8,587.00</td>
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<td>DIS001:Distribution Charge</td>
<td>939.00</td>
<td>5.01000</td>
<td>$4,704.39</td>
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<tr>
<td>MSC025:Nuclear Decommissioning</td>
<td>1,222.00</td>
<td>0.04400</td>
<td>$53.77</td>
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<tr>
<td>BAS001:Basic Customer Charge</td>
<td>1.00</td>
<td>6.80000</td>
<td>$6.80</td>
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<td>TRN002:Firm Point to Point Transmission Service Charge for long term or short term firm</td>
<td>845.00</td>
<td>3.77038</td>
<td>$3,185.97</td>
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<tr>
<td>BAS003:Delivery Point Charge</td>
<td>1.00</td>
<td>22.14000</td>
<td>$22.14</td>
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<tr>
<td>MSC041:Energy Efficiency Cost Recovery Factor (EERCF)</td>
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<td>0.00035</td>
<td>$63.55</td>
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<td>MSC049:Rate Case Expenses Surcharge</td>
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<td>0.01140</td>
<td>$13.93</td>
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<tr>
<td>MSC029:Recovery of securitized portion of stranded assets and costs</td>
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<td>0.17200</td>
<td>$210.18</td>
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<tr>
<td>MSC036:Recovery of securitized regulatory assets - stranded costs (TC2)</td>
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<td>0.26700</td>
<td>$326.27</td>
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<tr>
<td><strong>Total Current Charges</strong></td>
<td></td>
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<td>$19,067.16</td>
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Utility Rate Analysis - Energy Cost Savings

- Unmetered Facilities

### MONTHLY RATE

I. Unmetered Facilities

Points of Delivery (POD) Charge: $57.41 per governmental entity served by the Competitive Retailer.

<table>
<thead>
<tr>
<th>Lamp</th>
<th>Watts</th>
<th>Lumens</th>
<th>kWh</th>
<th>Schedule</th>
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<td></td>
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<td>Δ</td>
<td>R*</td>
<td>C* and D</td>
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<tr>
<td>Metal Halide</td>
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<td>65</td>
<td>$12.42</td>
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<tr>
<td></td>
<td>175 (see note 2)</td>
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<td>65</td>
<td>$12.42</td>
<td>$18.80</td>
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<td>250</td>
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<td>400</td>
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<td>160</td>
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<tr>
<td></td>
<td>1,000*</td>
<td>110,000</td>
<td>370</td>
<td>$17.75</td>
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<tr>
<td>LED/Low Wattage (See Note 3)</td>
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<td>40</td>
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<td>N.A.</td>
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