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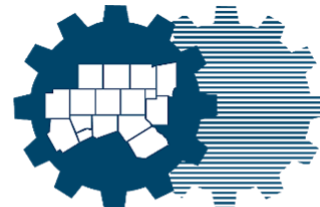


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Energy Management for Local Governments: Facility Retrofits to Reduce Overall Energy and Water Consumption

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS

AUGUST 28, 2019



**North Central Texas
Council of Governments**

Regional Energy Manager Project

PARTNERSHIP WITHIN NCTCOG, BETWEEN TRANSPORTATION AND ENVIRONMENT & DEVELOPMENT STAFF

Project Overview



Purpose

- Expand Local Government Staff Capabilities in Energy Management Topics and Compliance to SB 898 Reporting
- Increase Use of Energy and Water Benchmarking Tools
- Improve Accuracy of Emissions Reduction Data Associated with Reduced Energy Use



Outcome

- Demonstrate the value and benefits of increasing regional energy education
- Quantify facility energy consumption via benchmarking
- Assess energy reduction impacts on regional Air Quality data in order to serve as a regional template for other regions to utilize.

Project Timeline and Deliverables

May-August 2019

**February
2019**

Deploy a survey to identify the energy management needs and interests of the region

Publish digital resources (energy assessments, project-related analysis etc.) on [Conserve North Texas](#) Website

**August
2019**

Complete Project

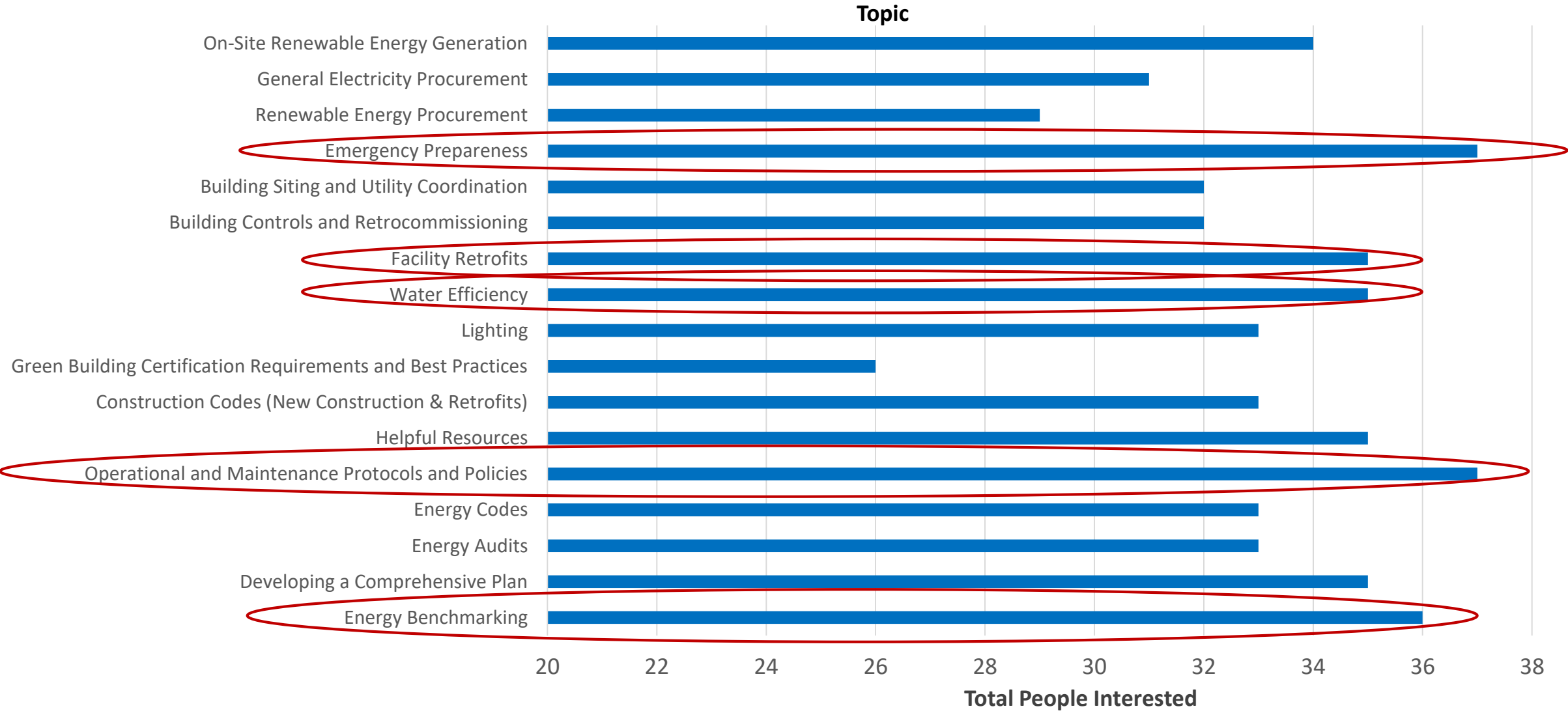
Develop workshops and trainings based on regional interests identified in survey

Create three (3) local government case studies



Regional Survey Results

Overall Interest to Lower Energy Use via:



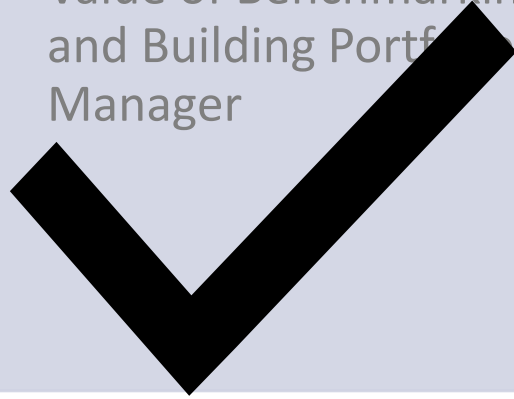
Upcoming Workshops + Trainings

May

Workshop 1

May 23

- SB 898
- Value of Benchmarking and Building Portfolio Manager

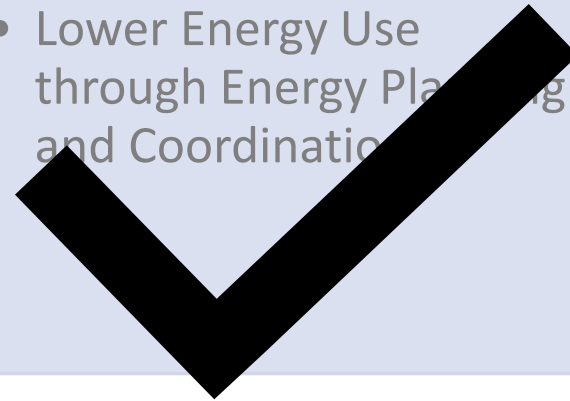


June

Workshop 2

June 28

- SB 898 (82R) / SB 241 (86R)
- Lower Energy Use through Energy Planning and Coordination



August

Workshops 3 & 4

August 28

Workshop 3 (9am-12pm)

- Facility Retrofits to Reduce Overall Energy and Water Consumption

Workshop 4 (1pm -4pm)

- Energy Efficiency for Grid Resilience

Local Government Energy Reporting - SECO

SB898 (82R) amended by SB241 (86R) Section 388.005 (c) Health and Safety Code

Purpose: Lower Local Government Energy Consumption

Requirements: Requires all political subdivisions, institutes of higher education, and state agencies in the 42 Ozone Nonattainment and Near Nonattainment Counties to establish a goal of reducing electric consumption by at least 5% each state fiscal year for ~~10 years~~ **7 years** beginning September 1, ~~2011~~ **2019** and to Submit Annual Reporting

Issues: Lack of Awareness, Non-Compliance with Annual Reporting Requirement

Local Government Energy Reporting - SECO

Who Reports?

The following entities in 42 Nonattainment or Near Nonattainment counties:

Cities and Counties

State Agencies

Institutes of Higher Education

What's Due:

Annual report to SECO regarding the entity's efforts and progress to meet the 5% energy reduction goal

DUE: November 1 (annually)

Senate Bill 898 (82R) Reporting Form
Reports due: November 1.
Form# 50-816

SECO
State Energy Conservation Office

Purpose of this Document: In 2011, the Texas Legislature passed Senate Bill 898 amending the Health and Safety Code §388.005 to require each political subdivision, institution of higher education, or state agency to establish a goal to reduce electrical consumption by at least five percent each fiscal year for ten years beginning September 1, 2011. Each entity must report to the State Energy Conservation Office (SECO) regarding the entity's efforts to meet the goal, and progress the entity has made.

Entity Name: _____
Entity Type: Municipality County State Agency Higher Education Other: _____
Address: _____ City: _____ Zip Code: _____
County: _____
Contact Name: _____ Title: _____
Email Address: _____ Phone Number: _____

Reporting Period
State fiscal year (Sep. 1 - Aug. 31): _____

Energy Consumption Data
Enter annual electrical usage in kWh for the state fiscal year (Sep. 1 - Aug. 31) and gross baseline square footage of each building. Reporting total energy consumption is mandatory. A breakdown of energy consumption by building or infrastructure is optional.

Infrastructure or Facility Type	Annual Consumption in kWh (Sep. 1 - Aug. 31)	Gross Baseline Square Footage (as of Sep. 1)
Buildings		
Traffic Lighting		
Street Lighting		
Water (pump) Facilities		
Wastewater Facilities		
Other: _____		
Other: _____		
Other: _____		
Totals:		

Bill 898 (82R), has your entity established a goal to reduce electrical consumption by at least _____ percent over the next ten years beginning September 1, 2011? Yes No

Identify the areas in which your entity has made efforts and progress toward meeting energy goals. Check the boxes below indicating the areas in which your entity has made efforts and progress toward meeting energy goals.

Energy Conservation Measures:
Heating and Power: Appliances/Equipment/Electronics Policy/Plan/Program
 HVAC Renewable Generation
 Insulation/Radiant Barrier Water/Wastewater
 Lighting Water Conservation
 Maintenance/Operation Water Heating
 Benchmarking Other: _____

Provide a brief description regarding the progress and efforts indicated above to reduce electrical consumption and a brief description of planned activities. Your description will be included in SECO's annual report. Attach additional pages if needed.

Check here if additional documentation is attached.

Bill 898, a political subdivision, institution of higher education, or state agency that does not attain this goal must implement a program and the entity has already implemented all available cost-effective measures. An entity that submits a report indicating that it has reviewed its available options, has determined that no additional measures are cost-effective, and that it has already implemented all available cost-effective measures is exempt from the annual reporting requirements if a subsequent report would indicate no change in status.

If requesting an exemption to the mandates of SB 898 please check the boxes and provide additional documentation to serve as justification for this exemption request.

The Entity listed above has reviewed its available options, has determined that no additional measures are cost-effective, and that it has already implemented all available cost-effective measures.
 The Entity has included a report to this effect.

I have read Senate Bill 898 (82R) regarding exemptions, and hereby certify that the said entity has met the exemption.

Signature: _____ Date: _____

Email completed reports to SECO at SB898.Reporting@cpa.texas.gov
or by mail to: State Energy Conservation Office
Attn: SB898 Report
111 E. 17th Street
Austin, TX 78711-1440

SECO 0015

Impact of Facility Retrofits and Upgrades

BY THE NUMBERS



Energy Use by Building Type

The top five energy-consuming building categories used about half of the energy consumed by all commercial buildings in 2012

% Consumption	Top five energy-consuming building categories:
15%	Mercantile and service - Malls and stores, Car dealerships, Dry cleaners, Gas stations
14%	Office - Professional and Government Offices , Banks
10%	Education - Elementary, Middle, and High School, Colleges
8%	Health care - Hospitals, Medical offices
6%	Lodging - Hotels, Dormitories, Nursing homes

Energy Consumption in Local Government Buildings

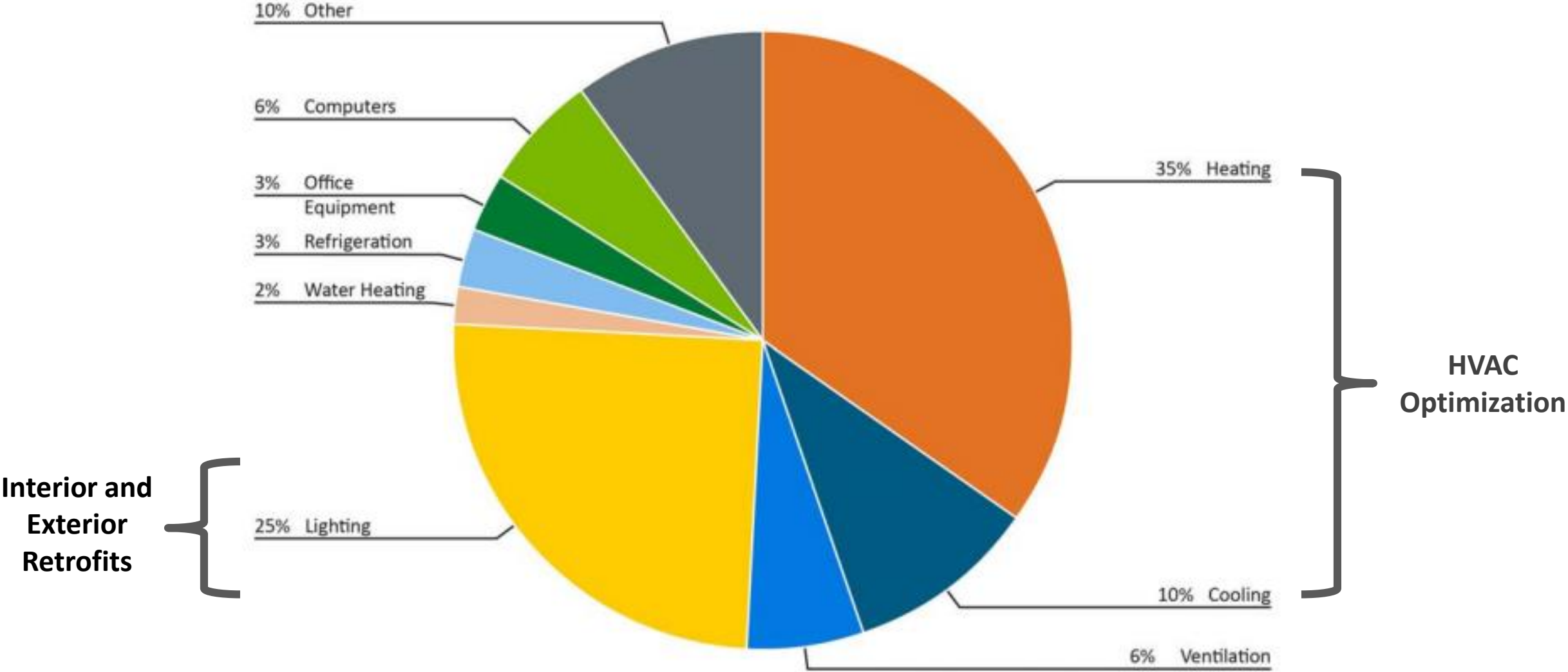


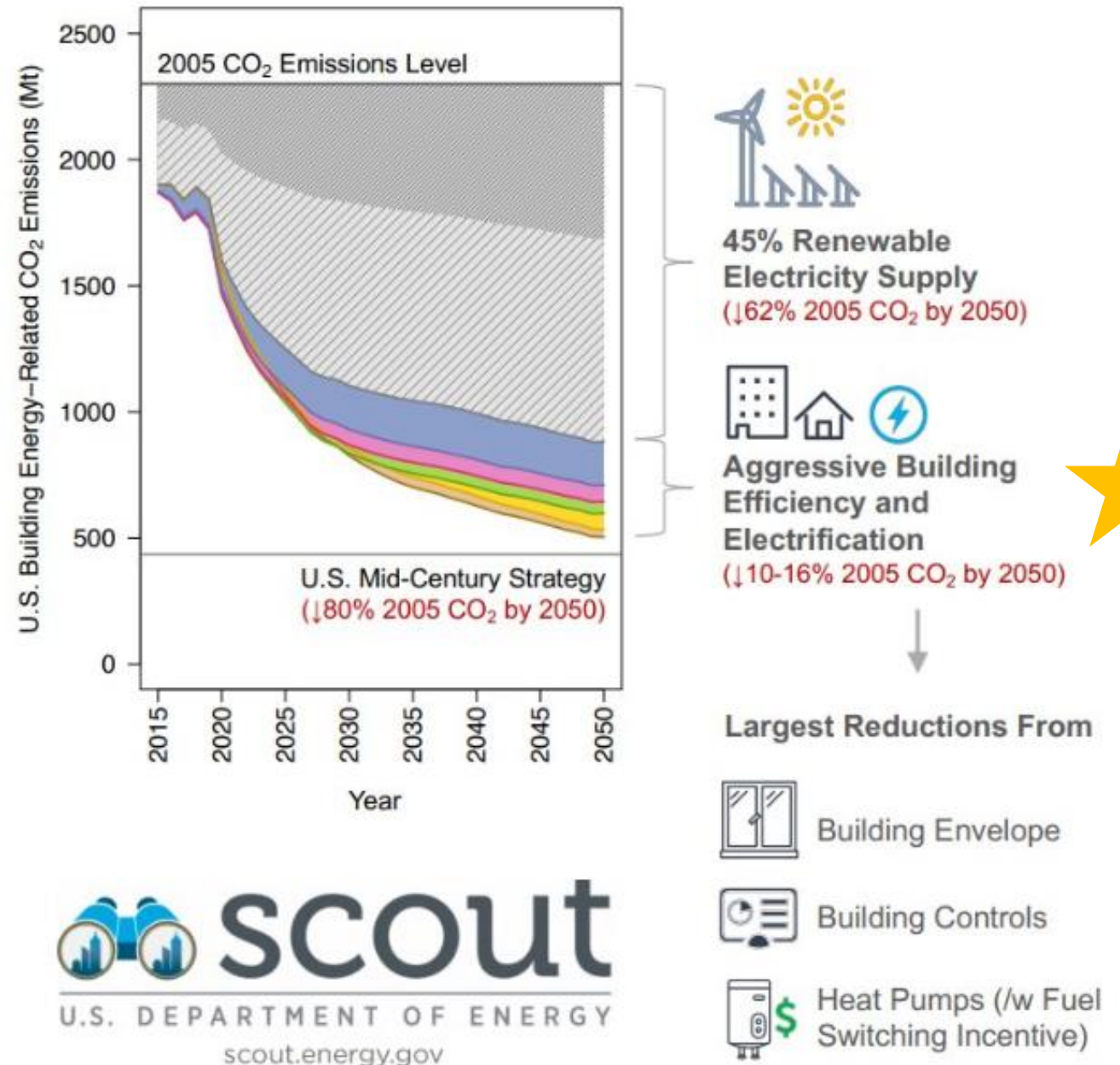
Figure 2.1. Percent Energy Use by Building System (U.S. Energy Information Administration, 2006)

Why Facility Retrofits?

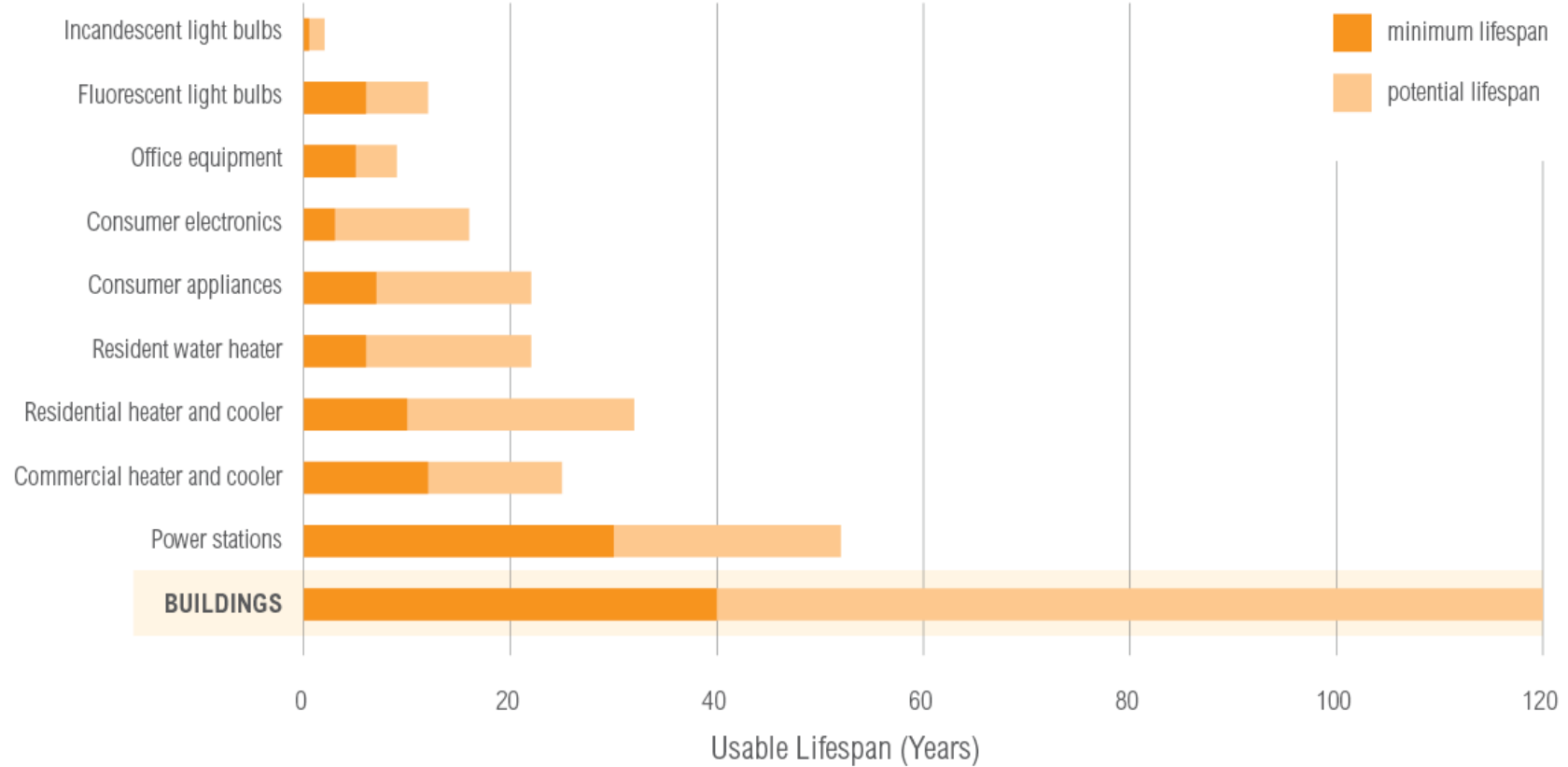
Building energy use contributes to over one third of carbon dioxide (CO₂) emissions in the U.S.

U.S. Mid-Century Strategy

- ❖ Cut 2005 level CO₂ emissions by 80%
- ❖ Install highly energy-efficient building technologies, new operational approaches, and electrification of building systems that consume fossil fuels directly,
- ❖ Increased share of electricity generated from renewable energy sources



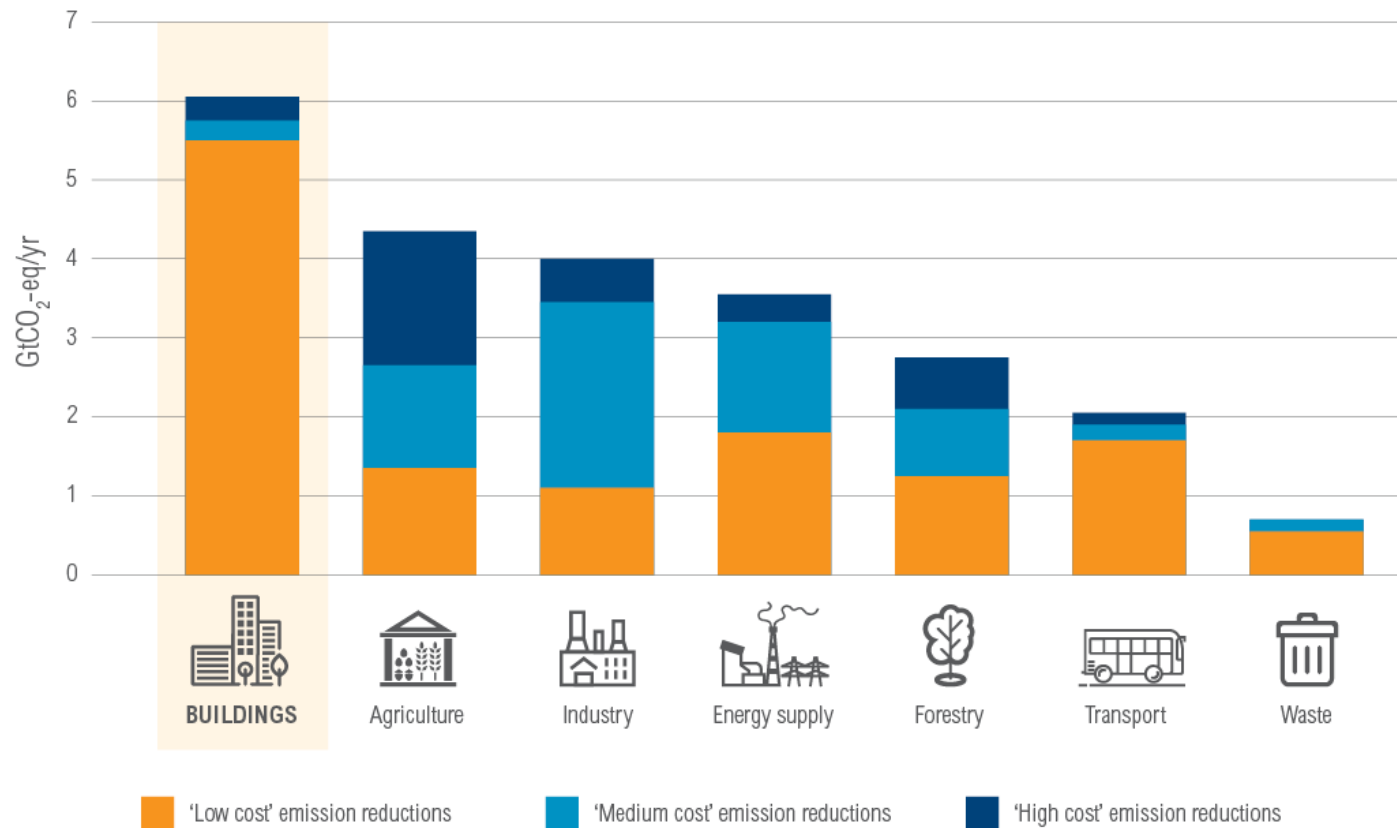
Buildings Have Long Economic Lifespans Compared to Other Energy-Consuming Infrastructure



Source: International Energy Agency. 2013. Transition to Sustainable Buildings: Strategies and Opportunities to 2050. http://www.iea.org/publications/freepublications/publication/Building2013_free.pdf.

wri.org/buildingefficiency

Building Efficiency Is One of the Most Affordable Ways to Cut Emissions



Note: 'Low cost' emission reductions = carbon price <20 US\$/tCO₂-eq. 'Medium cost' emission reductions = carbon price <50 US\$/tCO₂-eq.

'High cost' emission reductions = carbon price <100 US\$/tCO₂-eq.

Source: IPCC. 2007. IPCC Fourth Assessment Report: Climate Change 2007: Synthesis Report. "4.3 Mitigation options." https://www.ipcc.ch/publications_and_data/ar4/syr/en/mains4-3.html

Facility Retrofit Benefits:



Overall

Buildings can cut energy use by 15% by implementing no to low cost measures and 45% from deep retrofit measures



Financial Benefits

- For every \$1 invested in energy efficiency, avoids \$2 spent on the energy supply
- Resulting energy savings can increase available capital

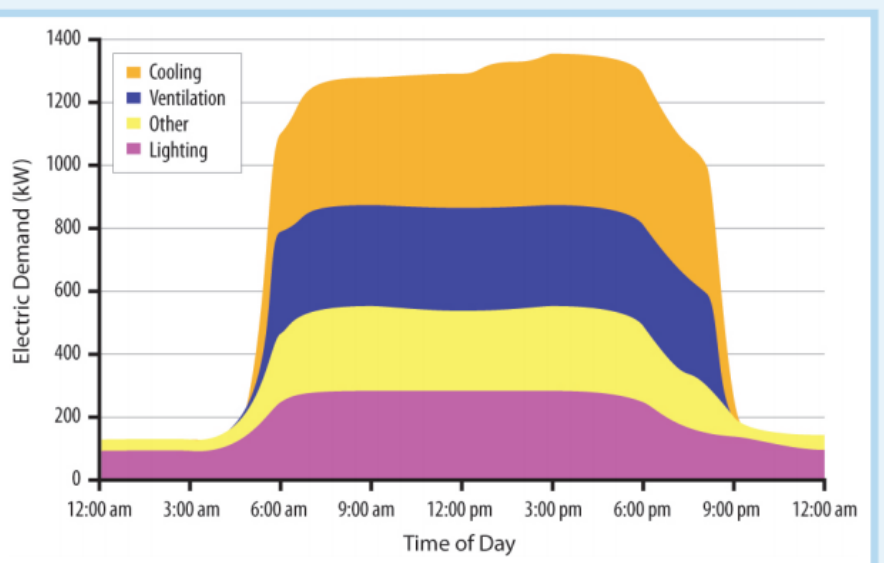


Environmental Benefits

- Reduce emissions and improve indoor and outdoor air quality
- Smooth out energy demand by reducing peak load demand and facilitating renewable sources onto the grid

Energy Impact on Building Load Profiles

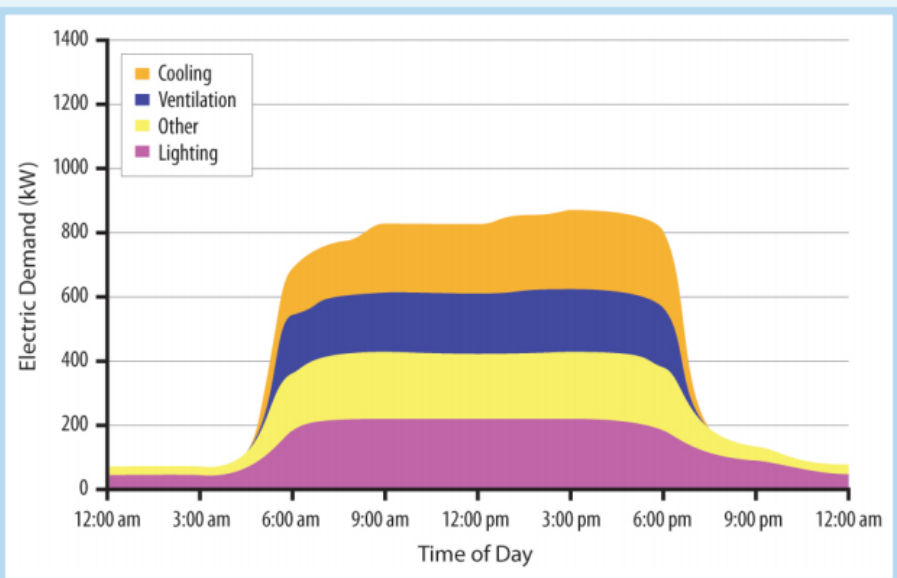
Typical Office Building Load Profile



30% Reduction



Load Profile Post-Upgrade Implementations



Implementing a suite of energy efficiency upgrades could significantly reduce the building's energy consumption. The graphic below illustrates the energy loads for the same building after implementing several upgrades, including:

- O&M/re-commissioning measures (e.g., optimizing temperature setpoints, HVAC scheduling, etc.).
- Lighting measures (CFLs, daylighting controls, etc.).
- HVAC measures (high efficiency chillers, premium efficiency motors, etc.).

*for a typical 250,000 square foot office building in Chicago during the summer



Preliminary Energy Assessments (PEAs)

The [State Energy Conservation Office \(SECO\)](#) provides [preliminary energy assessments \(PEAs\)](#) at no charge to municipal and county governments, ISDs, county hospitals, port authorities, major airports, public water authorities and municipally-owned utilities.

PEAs recommend **cost-effective resource efficiency measures** that could be implemented to reduce utility consumption or utility costs.

Check out these PEA Performing Entities!

Cities

City of Denton (2018)

City of Fort Worth (2015)

City of Rockwall (2010)

City of Richland (2007)

Water Districts

Tarrant Regional Water District (2015)

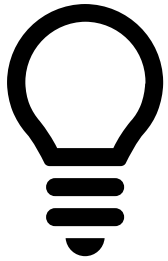
Trinity River Authority (2016)

City of Fort Worth Water Production (2016)

Ellis County (2004)

PEA Recommended Utility-Cost Reduction Measures

Lighting



Lighting upgrades and replacements

Occupancy/vacancy sensors

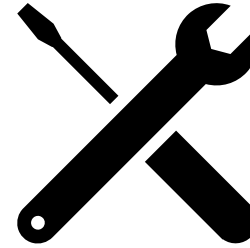
Temperature



Altering unoccupied cooling setpoints

Installing programmable thermostats

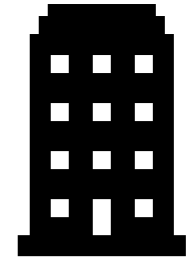
HVAC/Equipment



Variable Frequency Drive (VFD) installation

HVAC unit replacements

Building Envelope



Door and window weather stripping

Hot water piping insulation

FOR MORE INFORMATION

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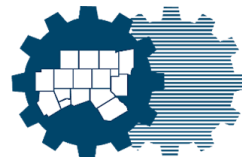
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<https://www.nctcog.org/envir/natural-resources/energy-efficiency>



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