# Building Retrofits for Energy Efficiency

NORTH CENTRAL TEXAS COUNCIL OF GOVERNMENTS

AUGUST 23, 2023

North Central Texas
Council of Governments

# Welcome & Housekeeping

1. Please sign in using the sign-in sheet at the front. We will send around a form attesting whether your time can be used for in-kind match.

2. We will have an open Q&A after each presentation and a roundtable discussion session at the end.

3. The workshop slides and audio recording will be posted on the Conserve North Texas website under News/Events → Event Archive at the link below. Follow-up emails to come. http://conservenorthtexas.org/event-archive

4. Additional information and resources are included in the printed materials at the front of the room. Please take a copy!

North Central Texas Council of Governments

# Workshop Sponsor


NCTCOG receives funding through SECO to work on energy management and efficiency projects within the region. As part of this work, we have provided webinars and technical assistance on a variety of energy management, energy efficiency, and renewable energy topics.

www.nctcog.org/envir/natural-resources/energy-efficiency

https://www.conservenorthtexas.org/

North Central Texas Council of Governments

# Today's Speakers

1. Cliff Braddock, CEM, LEED
   - Director of Business Development, Metco Engineering, Inc.
2. Cassidy Ellis
   - New Market Strategy Manager, Ameresco, Inc.
3. Bahman Yazdani, PE
   - Associate Director, Texas A&M University Energy Systems Laboratory

North Central Texas Council of Governments

# Building Retrofit and Energy Efficiency Workshop

## The First Step is the Easiest !

Presented to:

North Central Texas Council of Governments

August 23, 2023

Cliff Braddock, CEM, LEED®
Director Business Development
Metco Engineering, Inc.
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METCO ENGINEERING
ADVANCED ENERGY SOLUTIONS

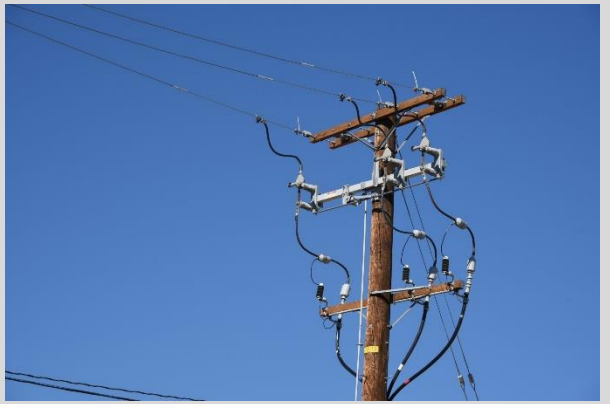
# Question:
# What do these statements have in Common?

- We want to take the first step to become “net zero” (net zero means generating enough onsite clean energy to meet 100% of the building usage over a year)
- We want to be recognized by EPA as Energy Star certified.
- We want our buildings to be LEED rated.
- We would like to avoid increases to our utilities budget.
- We need to become more “sustainable” and reduce our greenhouse gas impacts to the region.
- We must upgrade mechanical and electrical systems, but we can’t afford a capital improvement project

# They Have the SAME Answer: Time is Now To Implement a New Energy Efficiency Project

- Net Zero: Solar PV system size should NOT supply power to wasteful HVAC and lighting.
- Energy Star and LEED: EPA Portfolio Manager awards "points" for energy efficiency – (scores in the bottom 75% won't make the cut)
- Stable Utilities Budget: Reduction in energy usage = reductions in annual costs.
- Sustainability/greenhouse gas emissions: Replace one 34 watt T-8 Fluorescent Light with LED is about 16 lbs./year $CO_2$ reduction
- Pay for equipment upgrades using existing budgets: "RECHANNEL" existing utilities budget $$ to cover costs

# What are we talking about doing?
# Incentives – More than ever before.
# How to make happen.





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# Let's Discuss How to Develop a Successful Energy Service Project…

**TECHNICALLY:**

HVAC?
Lighting?
Water?
Etc.

**FINANCIALLY:**

Quick payback (ROI)?
Low-cost funding?
Etc.

**BUSINESS MODEL:**

Design – Build Services?
Project Management?
Performance assurance?

# How big is our opportunity?

(Answer:  How sick is the building?)

Energy Services Company (ESCO) Services:

- Preliminary Energy Audit (PEA)
- Examination of utility billing histories
- Benchmark energy usage and costs
- Site visits to identify opportunities to reduce costs:
  - ✓ Electricity,
  - ✓ Natural gas
  - ✓ Water/Wastewater
- Savings calculations and expected payback ROI
- Recommendations:
  - ✓ Energy savings
  - ✓ New equipment
  - ✓ Streamline operations

# Look at:

## Mechanical

- HVAC AHU's
- Exhaust & Ventilation fans
- Central Plant (chillers, pumps, cooling towers)
- Boilers and hot water heaters
- Test and balance (air and water)
- Energy Management System and Controls
- Thermal Energy Storage

## Electrical

- Power factor
- Demand rachet
- Power Quality
- Lighting & Controls
- Transformers
- Onsite generation (combined heating and power CHP, Solar PV, Battery Energy Storage System-BESS)

## Water/wastewater

- Irrigation
- Water closets
- Faucets/kitchen
- Fountains
- Cooling tower credits

## Building Envelope

- Weatherstripping
- Windows/doors/roofing

## Operations & Maintenance

# Who participates...

**Owner** provides billing histories and escorts ESCO

**ESCO** performs walk through, analyzes data and submits PEA audit

**Lender** (SECO) provides funding, third party technical review and inspections

# Now is BEST time to act

- Utility rates are not going down again
- Fantastic Equipment Options
- Financial Incentives
- (Taxes, Grants,etc.)
- Greenhouse Gas reductions

# Back to the Initial Question: Your New Energy Efficiency Project

- Net Zero: Taking the first step toward Net Zero!
- Energy Star and LEED: Energy Report Card – You can't manage what you can't measure (Peter Druker)
- Stable Utilities Budget: Energy Efficiency yields more output, with less input – Less Input = Less Cost.
- Sustainability: Environmental stewardship and sustainability is not for buildings that waste energy
- Budget: Your existing utilities budget will pay the way forward resource

*Energy Report Card*
*(Preliminary Energy Assessment)*




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# What is the cost of doing nothing?

Answer:

- 20% to 25% of your existing utilities budget
- Every Year
- For 15 years
- And no new equipment (HVAC, lighting, controls, etc.)




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# Federal Funding for Building Retrofits

August 2023

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Green • Clean • Sustainable

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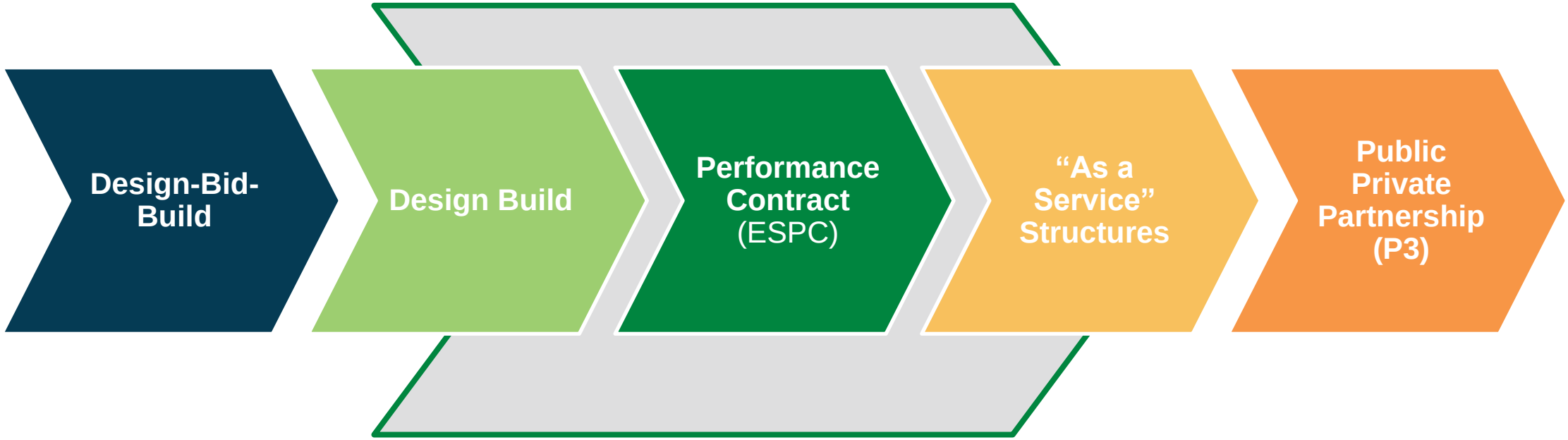
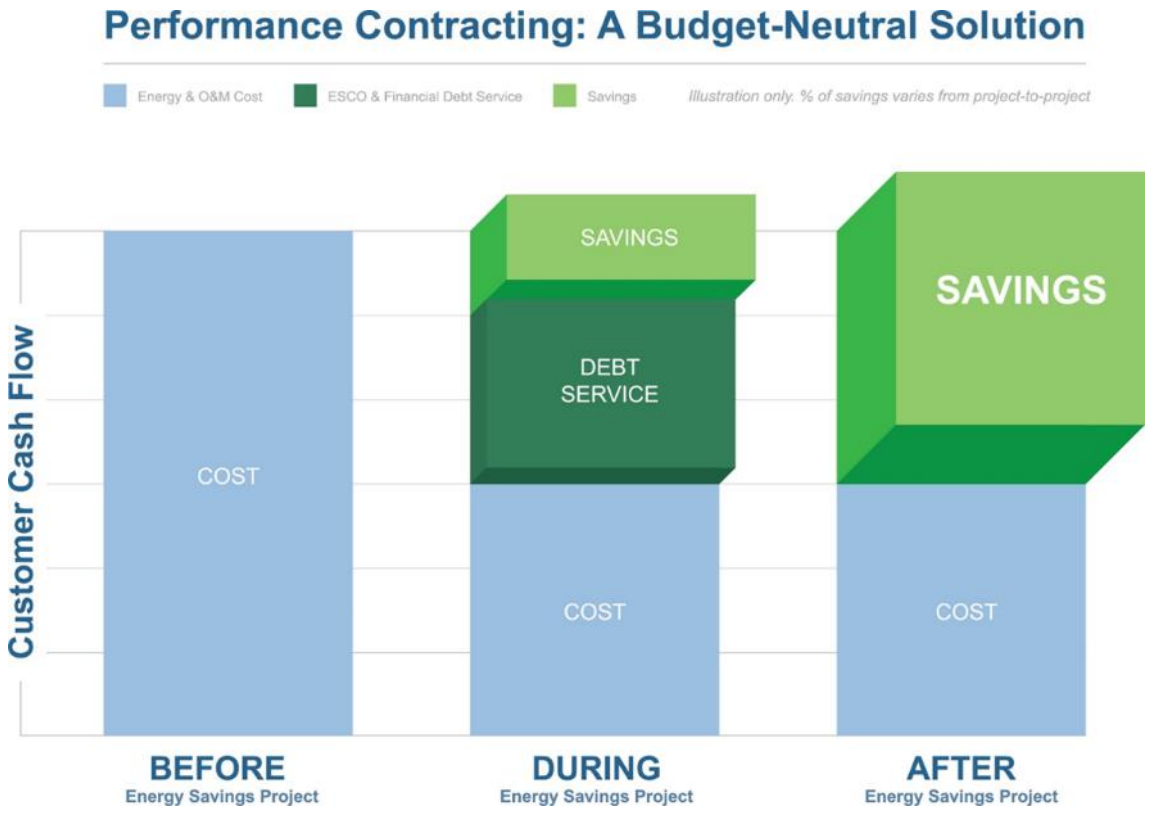
# Implementing Building Retrofits

# Range of Implementation Structures

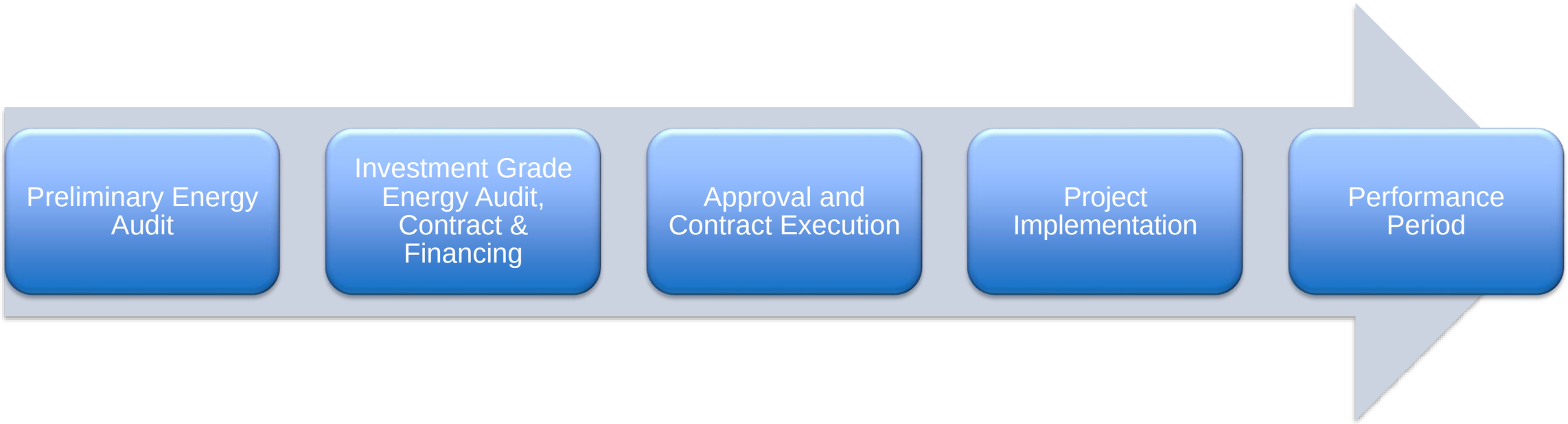


# Energy Savings Performance Contracting (ESPC)




- Texas Local Government Code Title 9. Subtitle C. Ch. 302: Energy Savings Performance Contracts for Local Governments
    - Performance is guaranteed with energy savings paying debt service
- Technical scope is customized based on building and infrastructure need
- Leveraging future savings to pay for the upfront costs of the project
- Must be verified by third-party independent professional engineer

# Energy Savings Performance Contract (ESPC) Process



# Sample Energy Conservation Measures (ECMs)

Solar PV & Solar Thermal

Pumping Improvements

EV Charging Infrastructure

Interior Lighting Retrofit

Exterior Lighting Retrofit

Energy Control Systems

Variable Frequency Drives

Water Distribution Controls

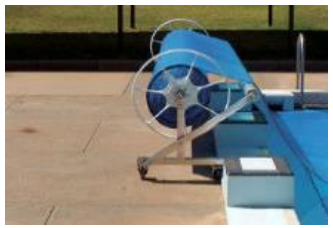
Combined Heat and Power Systems

Building Insulation

Energy Recovery System

Ionization Filters

Premium Efficiency Motors



Water Conservation

Retro-Commissioning

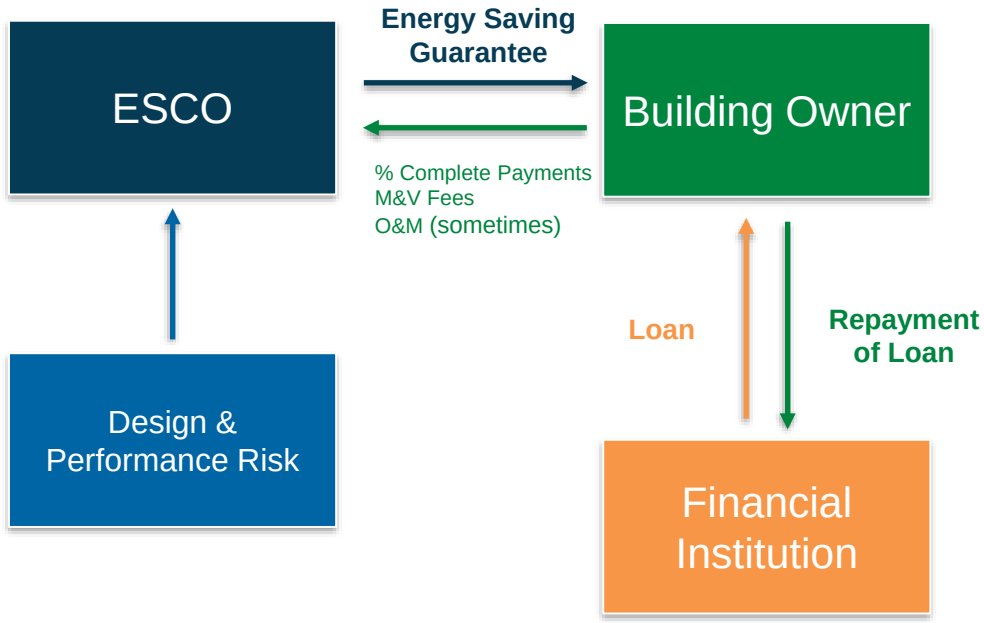
HVAC Retrofit


M&V Systems

AMI Water Meters

# ESPC Structure/Model

## Typical Performance Contract



# Wichita County, Texas

## *Wichita Falls, TX ($3.8 M)*


With a goal of conserving energy and addressing deferred maintenance items, Wichita County selected Ameresco to implement thirteen (13) utility cost reduction measures designed to upgrade nine facilities throughout the County. While replacing the main courthouse boiler, **Ameresco recognized that the vital need for more effective water treatment to ensure proper operation and service life of the new boiler** and existing equipment. Ameresco worked with the County to identify a chemical treatment system to ensure the boiler's full operational life.

## Project Highlights

**Solution Types:**

- Lighting Upgrades
- Expand and Upgrade Energy Management and Control System
- Programmable Thermostats
- Install VFDs on MZ AHUs
- Replacement of Aerators
- Install Window Film
- Recommission AHUs
- Replace Chiller
- Variable Speed CHW Pumping
- Replace Hot Water Boilers
- Replace Steam Boiler
- Replace Split Systems and Condensing Units

**Total Building SF: 330,747**

**Annual Savings:**

$267,117

# West Texas A&M University

## *Canyon, Texas ($14.3 Mil)*

Through a partnership with Ameresco, West Texas A&M University completed a **budget-neutral Campus Energy Reduction and Modernization Project** that measurably reduced deferred maintenance and included capital improvements and campus renovations based on the university's goals.

*"As stewards to the taxpayers of the State of Texas, it is essential that we do everything in our power to keep the cost of our students' education reasonable and affordable. This project will be paid 100% from the energy and water savings, so additional funding is not needed. This partnership with Ameresco achieves these goals, plus it reduces our energy and water demand now, thereby benefitting the environment.*

Randy Rikel, VP for Business and Finance
**West Texas A&M University**

## Project Highlights

**Solution Types:**

- Comprehensive LED Lighting Retrofits
- Arena Lighting Upgrade to Meet NCAA Televised Standards
- Site Lighting Decorative Pole Replacements
- Building Automation System Upgrade
- Comprehensive Submetering of Chilled Water, Steam, and Electricity
- Bipolar Ionization for Indoor Air Quality
- Replacement of Two 30,000 Pound/Hour Water Tube Boilers
- Central Plant Optimization
- Steam Trap Replacements
- High Efficiency Domestic Water Fixture Retrofits

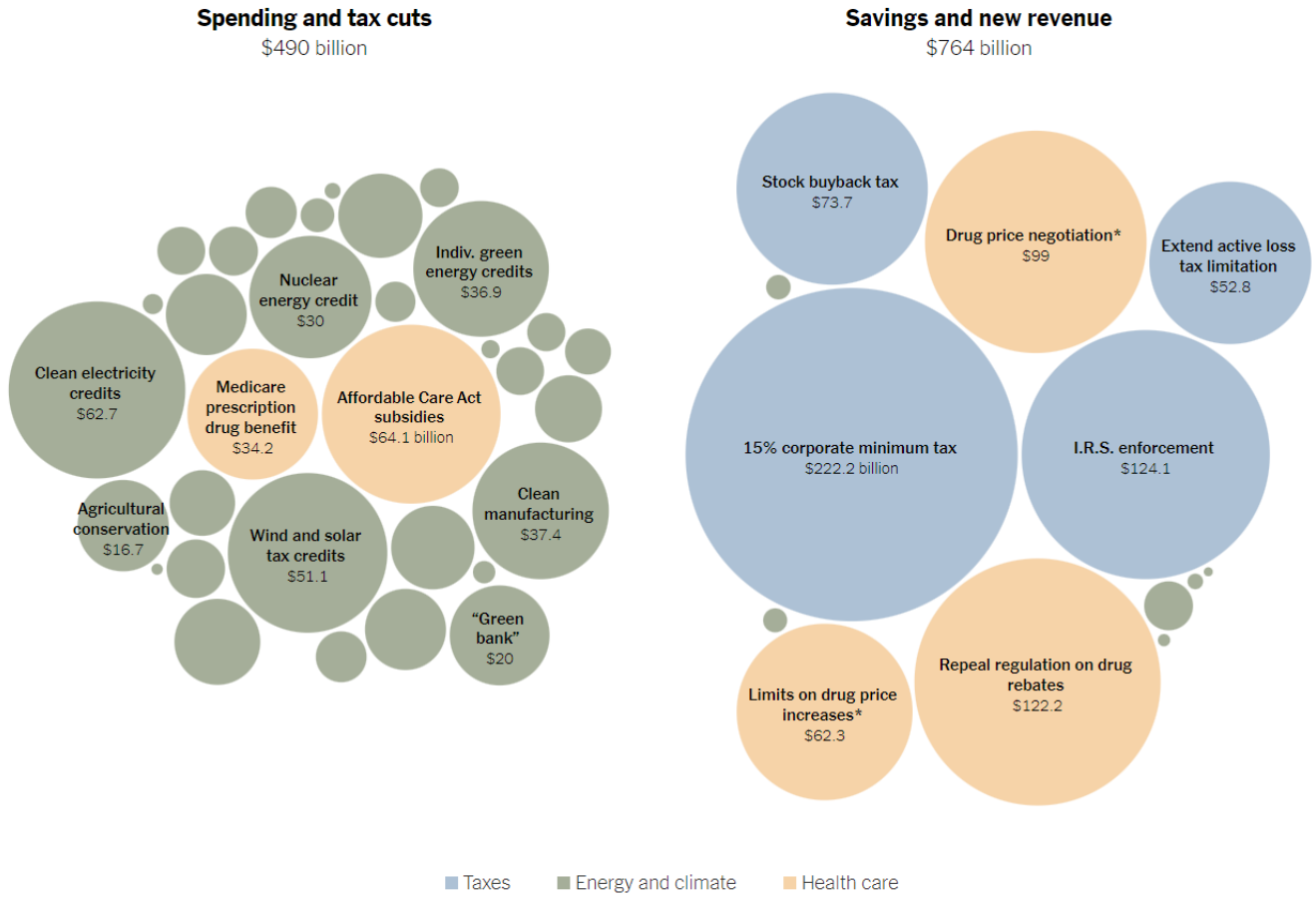
**Annual Savings:**

$1,102,935

# Federal Funding and Tax Credits

# Inflation Reduction Act of 2022

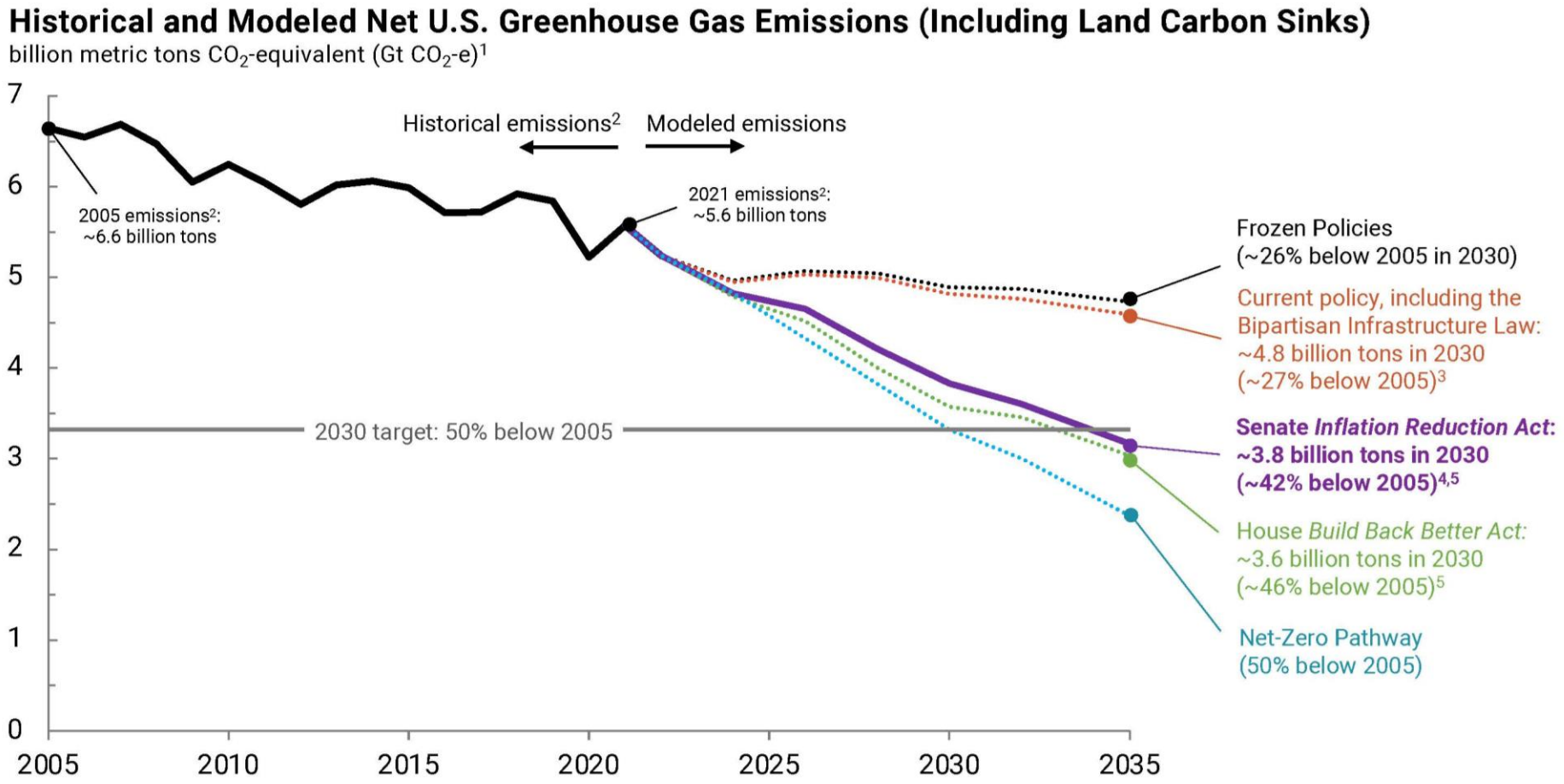
- Signed into law August 16, 2022
- $369 billion for energy and climate
- Majority of climate impact in clean energy tax credits and transportation
- Continued emphasis on equity and growing US economy




Source: New York Times

# Climate Impact of Inflation Reduction Act

*IRA could reduce U.S. GHG emissions by 32% to 40% by 2030 compared to 2005 levels*



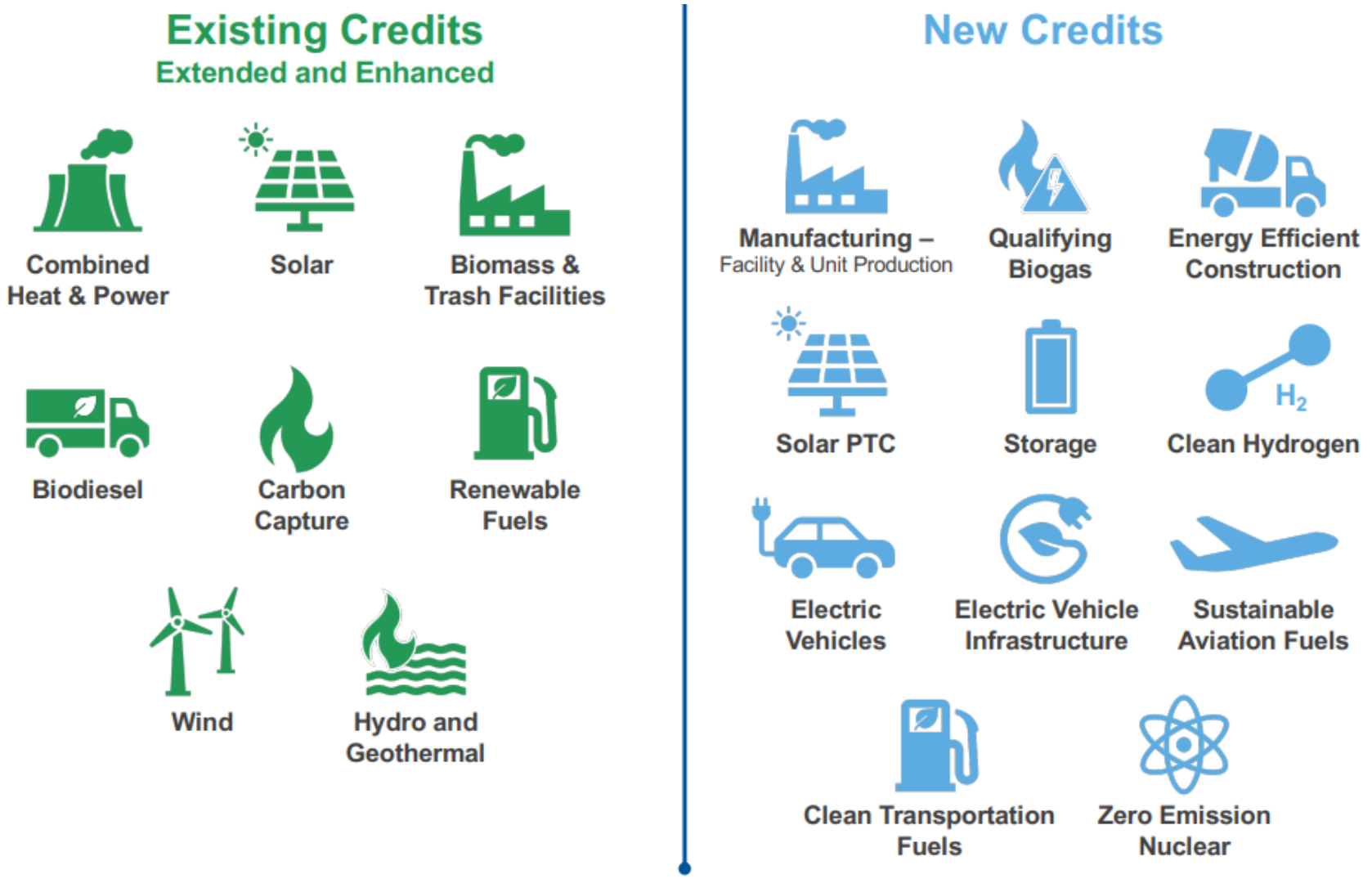

Source: Repeat Project

# Clean Energy Tax Incentives

# Available Tax Credits

- Alternative Fuel Refueling Property Credit (30C)
- Production Tax Credit (45)
- Credit for Carbon Oxide Sequestration (45Q)
- Credit for Production of Clean Hydrogen (45V)
- Clean Fuel Production Credit (45Z)
- Investment Tax Credit (48)
- Advanced Energy Project Credit (48C)
- Energy Efficiency Commercial Buildings Deduction (179D)
- Clean Electricity Production Credit (45Y) (After 2024)
- Clean Electricity Investment Credit (48E) (After 2024)
- New Energy Efficient Home Credit
- Zero-Emission Nuclear Power Production Credit

# IRA New & Existing Credits

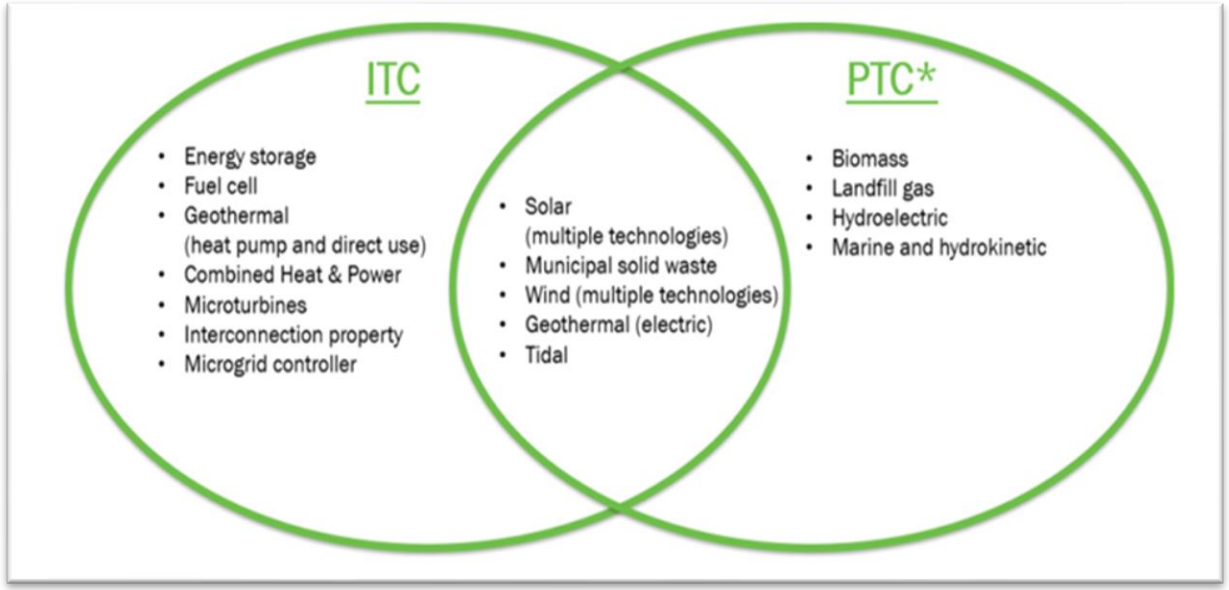


# Clean Energy Tax Credits – Non-Residential

- **New tax credits, grants, and other incentives** to support clean energy deployment
- **10+ years of tax credit certainty** (through 2032 or later)
- **Investment Tax Credit (ITC) and Production Tax Credit (PTC)**
  - ITC = 30% of system cost. Good for capital intensive projects
  - PTC = Credit per kwh of electricity for 10 years. Good for efficient tech. Now an option for solar.
- **Transition to a tech-neutral tax credit system starts 1/1/25.**
  - Can choose either PTC or ITC.  Any zero-emission electricity source is eligible.

# Enhancements to ITC/PTC

- Solar now eligible for ITC or PTC
- New technologies eligible for ITC if placed in service after Dec 31, 2022




- Interconnection property eligible for ITC if project < 5 MW
- Storage systems > 5 kwh
- Microgrid controls between 4 kw and 20 MW

# Labor Provisions in IRA

**Basic Structure v. Bonus Credit:** the ITC and PTC are set at 20% of their bonus credit value, unless a project:

- Meets wage/apprenticeship requirements
- Is under 1 MWac net output, or
- Began construction before January 28, 2023 deadline

If a project meets one of these three criteria, it will receive a bonus credit, bring the ITC from 6% to 30% (extra 24%) and the PTC from 20% of the PTC value to 100% of the PTC value.

# Direct Pay and Tax-Exempt Bonds

- Direct pay available for the following entities:
  - Tax exempt entities
  - State/local government
  - Tennessee Valley Authority
  - Tribes and Alaska Native Corps
  - Rural electric cooperatives
- Direct Pay also available for hydrogen, carbon capture for taxed entities
- Direct pay only available for projects PIS after Dec 31, 2022
- Entities planning to use direct pay must also meet domestic content requirements. Failure to do so will result in the direct pay benefit phasing out beginning in 2024.

# Bonus Credits

Domestic Content = 10% bonus

- Requires 100% steel and iron, and
- Manufactured products = 40% of the total cost of the components of such product are mined, produced, or manufactured in the U.S. until 2025. Ramps to 55% by 2027.
- Required for full direct pay starting in 2024

Energy Communities = 10% bonus

- Energy communities = brownfield; a coal mine closed after December 31, 1999; coal-fired generated retired after December 31, 2009; or an area with significant employment related to the extraction, processing, transport, or storage of coal, oil, or natural gas.

Allocated Environmental Justice Solar and Wind Capacity = 10% or 20% *allocated* bonus

- Only available for ITC. Apply through Treasury
- 1.8 GW per year competitive capacity cap split into 4 categories
- Wind, solar, or solar+storage projects under 5 MW eligible
- Awarded to projects with greatest economic, health, and justice benefits
- 10% bonus if located in low income community
- 20% bonus for low income residential building of LMI economic benefit project (community solar)
- Eligible locations aligns with New Market Tax Credits

To get full value of bonus credits, project >1 MW must meet labor provisions.

# Clean Energy Tax Credits - Residential

Energy Efficient Home Improvement Credit (25C)

- 30% credit, $1,200 annual limit
- Home energy audits ($150); exterior doors ($500); exterior windows and skylights, efficient central air conditioners, electric panel upgrades, natural gas, propane, or oil water heaters or boilers ($600); and electric or natural gas heat pump water heaters, electric or natural gas heat pumps, and biomass stoves and boilers ($2,000, annual limit does not apply)

Residential Clean Energy Tax Credit (25D)

- 30% credit for solar, wind, geothermal heat pumps, fuel cells, biomass, and storage >3 kWh

Energy Efficient New Homes Tax Credit (45L)

- $500 - $5,000 credit for new energy efficient single family, manufactured, and multifamily homes

# Transportation Tax Credits

EV Tax Credit (30D)

- Tax credit or direct rebate for EV vehicle purchase: $7,500 new / $4,000 or 30% used
- Income, price, and domestic content limits apply

Qualified Commercial Clean Vehicles (45W)

- 30% of incremental cost between EV and ICE vehicle / 15% for hybrid with >15 kWh battery
- <14,000 lbs, $7,500 max / > 14,000, $40,000 max

Alternative Fuel Refueling Property (30C)

- Placed in service before 2033
- 30% tax credit on alternative fuel refueling property up to $100,000 and a 20% tax credit on amounts over $100,000.
- 6% without prevailing wage and apprenticeship
- Non-urban or low-income areas only

Renewable Fuel Credits (40, 40B, 45Z)

- Extension of income and excise tax credits for biodiesel, second generation biofuel, sustainable aviation fuel and other alternative fuels.
- Transition to Clean Fuel Production Credit (45Z) in 2025

# 179D - Energy Efficient Commercial Buildings *Deduction*

**Sliding scale tax deduction for energy cost reduction over ASHRAE 90.1 or an EUI baseline for retrofits.**

**Retrofits require "qualified retrofit plan"**

**Minimum base deduction - $0.50/SF @ 25% improvement**

**Maximum base deduction - $1.00/SF**

**@50% improvement**

**Minimum bonus deduction – $2.50/SF @ 25%**

**Maximum bonus deduction - $5.00/SF @50%**

Prevailing wage and apprenticeship

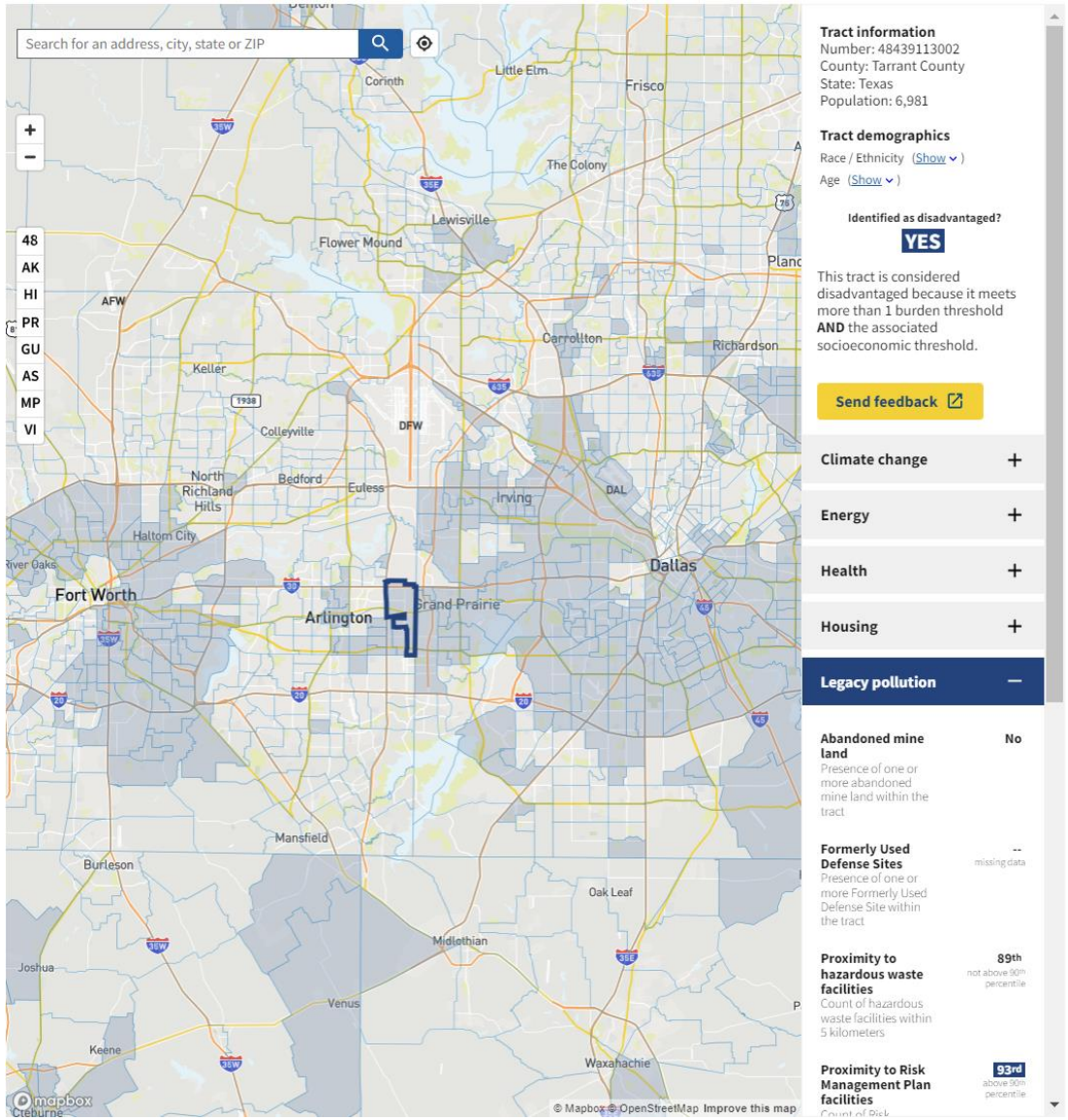
**Up from a previous maximum of $1.80/SF**

**Deduction can be assigned to "designer"**

| Date Placed in Service | Applicable Reference Standard 90.1 |
|---|---|
| Before 1/1/2015 | Reference Standard 90.1-2001 |
| After 12/31/2014 and before 1/1/2027* | Reference Standard 90.1-2007 |
| After 12/31/2026* | Reference Standard 90.1-2019 |

# Grant and Incentive Programs

# Points of emphasis with new grants




## Prioritize projects located in underserved areas

- New federal grants are prioritizing projects located in underserved or distressed communities.
- The White House Climate and Economic Justice Screening Tool can be used to identify where these communities are located. (Ex. to left)
  - https://screeningtool.geoplatform.gov/en/

## Community Benefits Plan

- Most grant applications require development of a community benefits plan.
- Rigorous, time-intensive plans that go beyond typical community outreach
- DOE overview

# Grants: State and Local Governments

## City/County Government Facility

- **Energy Efficiency and Conservation Block Grant (EECBG)**
  - Flexible funding for state and local governments for public EE, renewables, and zero-emission transportation projects. Larger metro areas to receive funding directly.

- **State Energy Program (SEP)**
  - $500M from DOE to State Energy Offices to support efficiency and renewables.
    - **SECO Municipally Owned Interior and Exterior Led Lighting Retrofits**
    - Reimbursable grants up to $50,000 for lighting at community and recreation centers
    - Application due September 22, 2023

- **Climate Pollution Reduction Grants**
  - $5B to state/local gov to develop and implement plans for addressing GHG pollution. $250M will support development of GHG reduction plans. The remaining $4.6B will then be competitively awarded to states to implement their plans.

- **FEMA Building Resilient Infrastructure and Communities (BRIC)**
  - Pre-disaster mitigation program to help state and local governments reduce their risks from natural disasters.

- **Environmental and Climate Justice Block Grants**
  - $3B to local governments, universities or nonprofits for environmental projects benefiting disadvantaged communities. Eligible activities include community-led pollution monitoring, prevention, and remediation; low- and zero-emission resilient technologies; workforce development; addressing urban heat islands; climate resiliency; reducing indoor air pollution.

- **Extended Product System and Energy Efficient Transformer Rebates**
  - To provide rebates up to $25,000 per system for qualified extended product systems (i.e., electric motor, electronic control, and driven load) or replacement of a qualified energy inefficient transformer with a qualified energy efficient transformer.

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# Thank You

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North Central Texas Council of Governments

# Building Retrofit and Energy Efficiency Workshop

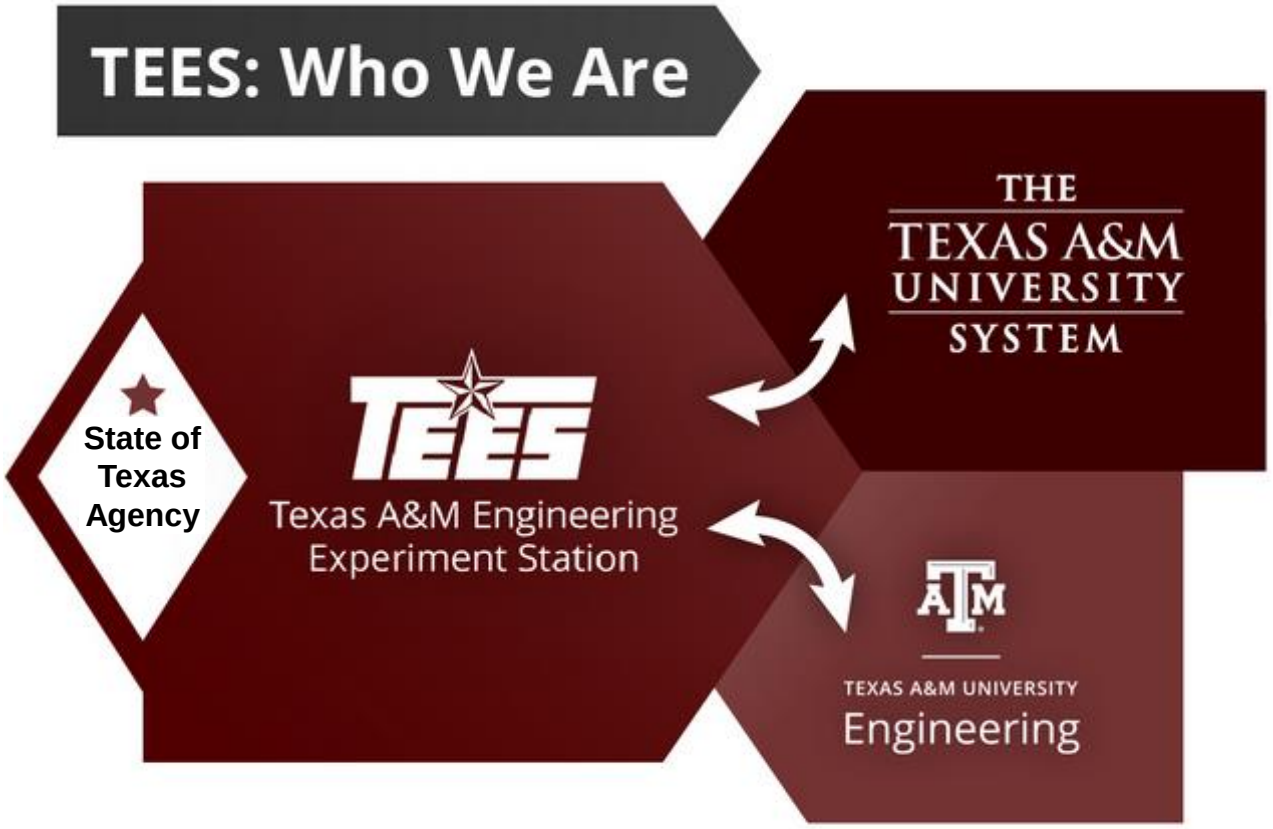
August 23, 2023

Bahman Yazdani, P.E., Associate Director
Energy Systems Laboratory, Texas A&M Engineering Experiment Station

ENERGY SYSTEMS LABORATORY
TEXAS A&M ENGINEERING EXPERIMENT STATION

# Texas A&M Engineering Experiment Station (TEES)

- A Non-profit agency of the State of Texas
- Fosters innovations in research, education and technology to support the industry
- Enhances the economic development of Texas and the nation.
- Under TERP, TEES-ESL participates in the rule making process and evaluation of energy codes and local code amendments, provides tools, energy code training, technical assistance and emissions reduction calculations.



# Energy Systems Laboratory (ESL)

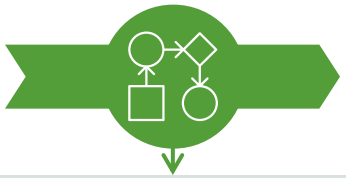
- Texas Emissions Reduction Plan (TERP)
    - Texas Energy Summit (TES)
- Energy Efficiency and Capital Improvement Program for Public Entities
- Continuous Commissioning® (CC ®) to optimize building operations
- Energy & Sustainability Management (ESM)
- Measurement & Verification (M&V)
- Industrial Assessment Center (IAC) - DOE funded over 35 years
- Building Performance Assessment Center (BPAC) - DOE Pilot Program

# Energy Efficiency and Capital Improvement Program for Public Entities

- Meet with the public official
- Discuss needs and future plans
  - Review capital improvement plans
  - Review system upgrade needs
- Perform a site visit to determine possible opportunities
- Collect utility information and building schedules
- Determine potential Utility Cost Reduction Measures (UCRM)
- Review findings with the public official
- Provide options to move forward

# Project Implementation Process
# Energy Efficiency and Capital Improvement Program for Public Entities

## DISCOVERY



- Goals
- Challenges

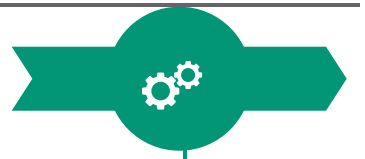
## ASSESSMENT

- Conduct Preliminary Energy Assessment (PEA):
  - Assess needs (HVAC, lighting, Continuous Commissioning®, etc.)
  - Select best options
  - Future proof design
  - Develop budget, scope and schedule

## FINANCNIG

- LoanSTAR application
- Utility Assessment Report
- Financing agreement

## CONSTRUCTION



- Project Implementation
- Mid project third party inspection

## OPERATIONS

- Owner/operator training
- Measure and verify savings

# Example Projects

**Airports**

HOUSTON AIRPORTS

DFW

Toronto Pearson

**Hospitals**

VA | U.S. Department of Veterans Affairs

3 VA hospitals in NC
6 VA hospitals in NY

**Higher Ed**

ALAMO COLLEGES DISTRICT

Tarrant County College District

TEXAS
The University of Texas at Austin

TEXAS A&M UNIVERSITY

**Military**

UNITED STATES NAVY

DEPARTMENT OF DEFENSE
UNITED STATES OF AMERICA

NASA

**City/State**

TEXAS FACILITIES COMMISSION

CITY OF HOUSTON
TEXAS

City of Dallas

FORT WORTH

CITY OF AUSTIN
FOUNDED 1839

TEXAS STATE CAPITOL
AUSTIN, TX

# Example Project: Partnership with DFW Airport

DFW

2004 - Present

**Interlocal Agreements: $6.7M**

**Cumulative Savings: Over $46.9M**

Numerous projects including many applications of the CC® Process and follow-up CC® work:

| | |
|---|---|
| Terminal D | Remote Parking Bus Terminals |
| Central Utility Plant | Vehicle Maintenance Areas |
| Administration Buildings | DPS Fire Stations |
| Skylink Stations | Data Center |

**Highlight - CC® Process at Terminal D -** 1.6 million $ft^2$

- Reduced heating - **48%**
- Reduced cooling - **23%**
- Reduced electricity - **12%**
- **2011 National Energy Project of the Year** by the Association of Energy Engineers

**DFW Airport has been recognized as the first airport in the nation to achieve carbon neutrality.**

# Example Project: Partnership with DFW Airport

DFW

2004 - Present

**Interlocal Agreements: $6.7M**

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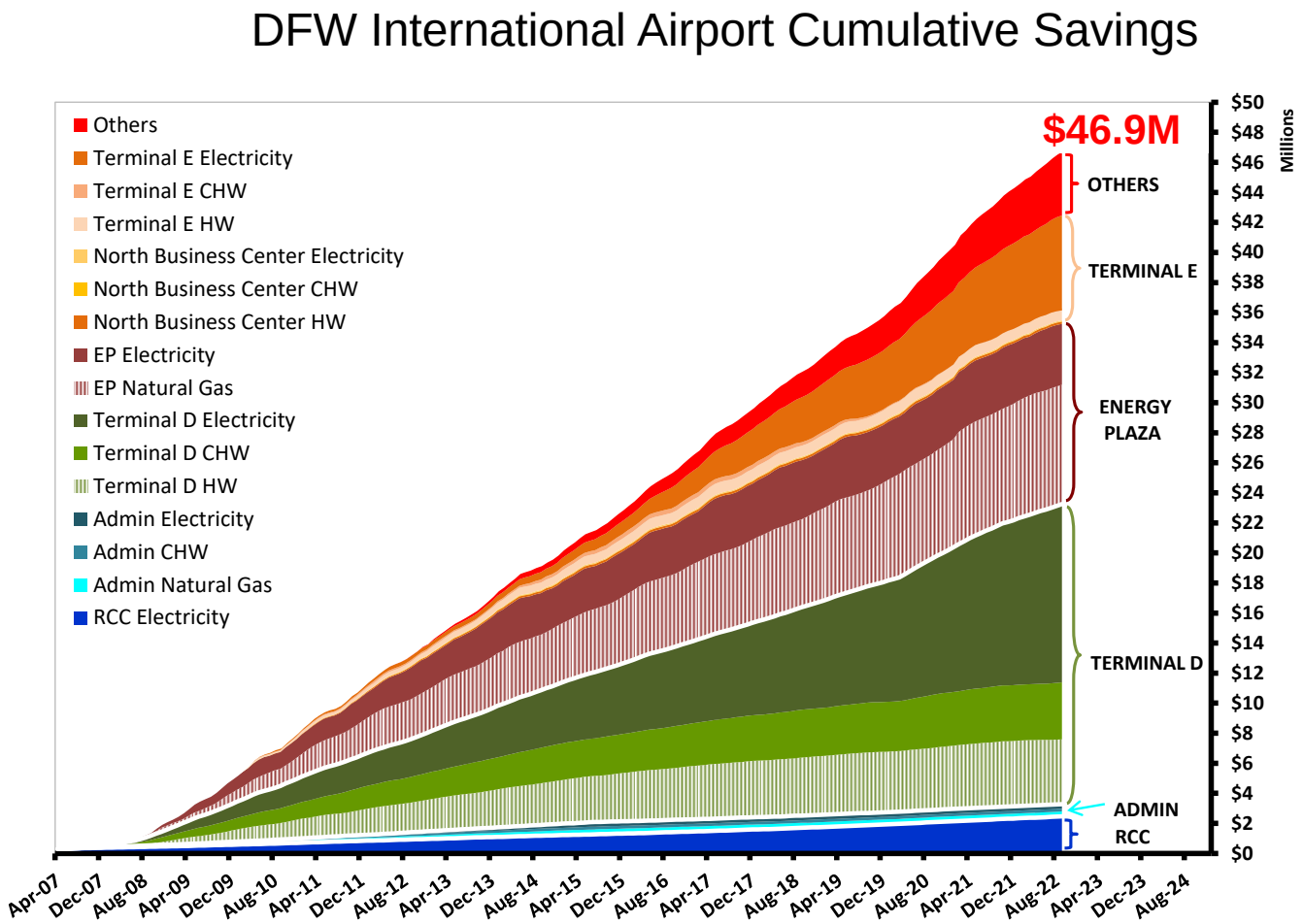


# Example Project: Partnership with Alamo Colleges

ALAMO COLLEGES

2002 - Present

**Interlocal Agreements: $7.7M**

**Cumulative Savings: Over $38.86M**

**San Antonio College**
**St. Philip's College**
**Palo Alto College**
**Northwest Vista College**
**Northeast Lake View College**

## Energy & Sustainability Management - 5-Colleges District

- Monitor & manage energy consumption for over 4.5M sqft
- Develop & implement a district-wide metering plan
- Owner representative in $450M bond CIP
- Implement ECRMs such as demand response initiatives, CC® in +100 facilities
- Design review, identify & troubleshoot mechanical/controls systems
- Manage & technical support for a $3M controls system upgrade
- Develop standard sequences of operation for HVAC equipment
- Project Manager / Technical Support Engineer
- Sustainability Officer
  - Guide & support LEED and LEED-EBOM certification process
  - Develop & maintain greenhouse gas reports & action plan

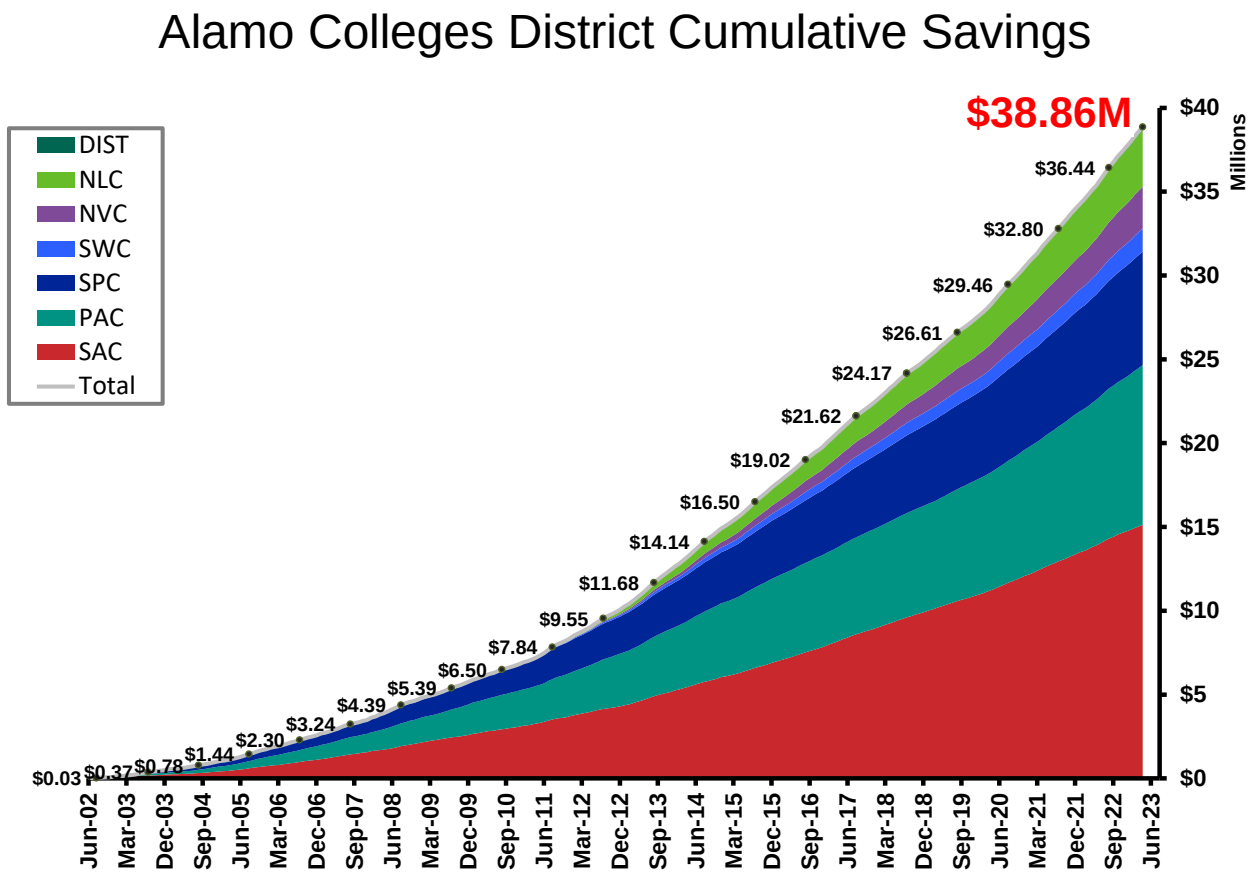
# Example Project: Partnership with Alamo Colleges

ALAMO COLLEGES

2002 - Present

**Interlocal Agreements: $7.7M**

**Cumulative Savings: Over $38.86M**



# Example Project: Partnership with Houston Airport System

HOUSTON AIRPORTS

2014 - Present

**William P. Hobby Airport (HOU)**
**George Bush Intercontinental Airport (IAH)**
**Ellington Airport (EFD)**

## Energy Efficiency Studies & Related Technical Assistance:

- Project assessment
- Project development
- Project funding
- Project implementation
- Savings verification

# Example Project: Partnership with Houston Airport System

HOUSTON AIRPORTS

**2019 - Present**

**Interlocal Agreement: $28.4M**

## Capital Improvement & Energy Efficiency Upgrades at Hobby and IAH | LoanSTAR Funding

- New chiller plant - Hobby:
  - 4 new chillers
  - New cooling towers
  - New 24'' piping to connect to Main Terminal
- LED Lighting retrofits - Hobby, Main Terminal, Red Garage
  - IAH, Terminal A, A/B, C Garages
- AHU and Cooling Coil upgrades - Hobby, IAH Terminal A
- Variable Speed Drives - Hobby
- Controls upgrade - Hobby
- Continuous Commissioning® implementation – IAH, Terminal A
- Baggage handling system upgrade – IAH, Terminal A & Hobby
- Solar PV array – Hobby, Red Garage
- Metering & Monitoring

# Example Project: Partnership with Houston Airport System

HOUSTON AIRPORTS

2019 - Present

**Predicted Annual Savings: $1.3M**

**Actual Annual Savings: Over $2M**

## Capital Improvement & Energy Efficiency Upgrades at Hobby and IAH | LoanSTAR Funding

**Benefits**

- Remove and replace outdated equipment
- Reduce utility costs
- Provide research opportunities & hands-on training to engineering students
- Provide practical training to Houston Airport System staff
- Enhance comfort and efficiency
- Increase resiliency, sustainability and redundancy
- Improve air quality
- Help reach “net-zero” energy goal for IAH
- Help Houston Airport System become carbon neutral

# What is the LoanSTAR Program?

- Revolving Loan Program Sponsored by Texas Comptroller of Public Accounts, State Energy Conservation Office (SECO)
- Energy-related, cost-reduction retrofit projects
- Texas public facilities (cities, counties, state, K-12, colleges, public hospitals)
- Interest: 2% (1% using ARRA funds)
- Maximum loan: 3 loans, $8M each
- Term:  15 years maximum

LoanSTAR
TEXAS STATE ENERGY CONSERVATION OFFICE

SECO
State Energy Conservation Office

# Expected Benefits

- ✓ Major cost savings that will pay for the loan
- ✓ Upgrade dilapidated system
- ✓ Enhance facility comfort and efficiency
- ✓ Practical training to facility staff & operators
- ✓ Reduce emissions and environmental footprint
- ✓ Enhance building automation system
- ✓ Water / Wastewater treatment plant upgrades
- ✓ Improve resiliency and reliability
- ✓ Improve operational efficiency and reduce O&M costs
- ✓ Receive substantial utility company rebates

# Benefits of Partnership with TEES

- Transparency
- Non-profit
- State Agency
- Educates students
- Least costly method
- Easy interlocal agreement
- Keep all utility savings
- Reduced project period
- Zero sponsor contribution (in most cases)
  - All costs including detailed studies are rolled into LonaSTAR package
  - The Loan will be paid from utility savings

# Example Project: City of Houston

- Implementing Utility Cost Reduction Measures (UCRM) in four (4) buildings:
  - City Hall (152,505 sqft)
  - City Hall Annex (178,400 sqft)
  - Public Works (585,550 sqft)
  - Permitting Center (185,214 sqft)

# Example Project: City of Houston
## Utility Cost Reduction Measures (UCRMs)

1. Implement Continuous Commissioning® (CC®) - All facilities
2. Lighting Upgrade / Sensor Controls - All facilities
3. HVAC Replacement - Public Works Call Center
4. HVAC Controls Upgrade - Public Works ITT Data Control Room
5. Install VFDs on the Outside Air and Exhaust Air Fan Motors - Public Works
6. Replace Dilapidated Hot Water and Chilled Water Pumps with New, Energy Efficient Pumps - City Hall & City Hall Annex
7. Solar Panels Upgrades - City Hall Annex & Houston Permitting Center

# Example Project: City of Houston

## Summary Table

| ECRM No | ECRM Title | Annual Savings | | | | | | LoanSTAR Project Cost ($) | Simple Payback (Yrs) | Estimated Lifetime (Yrs) | CoH Contribution ($) | Total Cost: LoanSTAR + CoH ($) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Electricity (kWh/yr) | Demand (kW/yr) | Electric ($/Yr) | Natural Gas (MMBtu/yr) | Natural Gas ($/yr) | Annual Savings ($) | | | | | |
| 1 | Implement Continuous Commissioning® (CC®) - All facilities | 4,695,477 | 4,199 | $248,095 | 7,681 | $29,925 | $278,020 | $1,085,000 | 3.9 | 10 | | $1,085,000 |
| 2 | Lighting Upgrade / Sensor Controls - All facilities | 3,114,552 | 8,680 | $225,957 | -691 | ($2,633) | $223,324 | $1,449,031 | 6.5 | 10 | | $1,449,031 |
| 3 | HVAC Replacement - Public Works Call Center | 221,487 | 312 | $12,227 | -1,527 | ($5,975) | $6,252 | $105,000 | 16.8 | 20 | | $105,000 |
| 4 | HVAC Controls Upgrade - Public Works ITT Data Control Room | 91,980 | 126 | $5,040 | | | $5,040 | $40,000 | 7.9 | 20 | | $40,000 |
| 5 | Install VFDs on the Outside Air and Exhaust Air Fan Motors - Public Works | 333,171 | | | | | $13,460 | $226,000 | 16.8 | 20 | | $226,000 |
| 6 | Replace Dilapidated Hot Water & Chilled Water Pumps with New, Energy Efficient Pumps - City Hall & City Hall Annex | 72,564 | | | | | $3,309 | $23,120 | 7.0 | 20 | | $23,120 |
| 7 | Solar Panels Upgrades - City Hall Annex & Houston Permitting Center | 74,442 | | | | | $3,378 | $48,698 | 14.4 | 25 | | $48,698 |
| **All** | **All ECRMs** | **8,603,673** | **13,317** | **491,319** | **5,463** | **21,317** | **$532,783** | **$2,976,849** | | | **$0** | **$2,976,849** |

| **PROJECT TOTALS** | |
|---|---|
| ECRM Implementation Cost | $2,976,849 |
| Project Management | $265,000 |
| Utility Assessment Report (UAR) Cost | $210,000 |
| Metering | $98,000 |
| Monitoring | $165,000 |
| **Total Project Cost** | **$3,714,849** |

| | |
|---|---|
| Buydown | $0 |
| Loan Amount | $3,714,849 |
| Simple Loan Payback | 7.0 |

# Example Project: City of Houston

## Cash Flow Analysis

| | |
|---|---|
| INTEREST RATE (%): | **2.00%** |
| TERM (YEARS): | **10.0** |
| ESTIMATED LOAN: | **$3,714,849** |

| END OF YEAR | EST. ANNUAL SAVINGS (*) | ANNUAL FIXED PAYMENTS | CASH FLOW | CUMULATIVE SAVINGS |
|---|---|---|---|---|
| 1 | $532,783 | ($413,561) | $119,222 | $119,222 |
| 2 | $543,439 | ($413,561) | $129,878 | $249,100 |
| 3 | $554,307 | ($413,561) | $140,746 | $389,846 |
| 4 | $565,394 | ($413,561) | $151,833 | $541,679 |
| 5 | $576,701 | ($413,561) | $163,140 | $704,819 |
| 6 | $588,235 | ($413,561) | $174,674 | $879,494 |
| 7 | $600,000 | ($413,561) | $186,439 | $1,065,933 |
| 8 | $612,000 | ($413,561) | $198,439 | $1,264,372 |
| 9 | $624,240 | ($413,561) | $210,679 | $1,475,051 |
| 10 | $636,725 | ($413,561) | $223,164 | $1,698,215 |

(*) Annual utility rate increase = 2.0%

# Regardless of the method you choose

# ACT NOW!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# Roundtable Discussion

Has your community completed any building retrofits, or offered incentives for local businesses to do the same?

How has your community/organization funded building improvements?

What questions do you have for communities/organizations that have experience retrofitting city buildings?

North Central Texas Council of Governments

# Upcoming Meetings and Events

**Energy Resiliency Roundtable**
Tuesday, August 29th from 10:30 am-12:00 pm
Meeting held virtually via Microsoft Teams.

The North Central Texas Council of Governments (NCTCOG) would like to invite you to attend a virtual roundtable on the topic of Energy Resiliency and Hazard Mitigation Planning. This roundtable will target local governments and other entities in the region with an interest in pursuing strategies to make their facilities more resilient in the face of grid disruptions and outages.

More information and register here: https://www.addevent.com/event/Fg18079369

North Central Texas Council of Governments

# Upcoming Meetings and Events

**Energy Sector Strategies to Improve Air Quality in North Texas**

Monday, September 18th from 1:00-3:00 pm

616 Six Flags Dr., CenterPoint II, Arlington, TX 76011

NCTCOG would like to invite local governments, special districts, nonprofits, and universities to assist in identifying energy strategies to improve air quality, enhance sustainability and promote equity in North Texas. The strategies identified will be incorporated into deliverables for the Climate Pollution Reduction Grants (CPRG), the Texas State Implementation Plan (SIP), and other plans developed by the NCTCOG.

The meeting will feature several different breakout sessions facilitated by NCTCOG staff to elicit a comprehensive list of multi-pollutant emission reduction strategies for the energy sector. There will be a virtual option available via Zoom, but in-person attendance is encouraged to optimize collaboration.

More information and register here: https://publicinput.com/nctcog-cprg#2

North Central Texas Council of Governments

# Stay Informed on Upcoming Events

**Upcoming NCTCOG Events**
Environment & Development: https://nctcog.org/envir/events
DFW Clean Cities: www.dfwcleancities.org/events

**NCTCOG's Free E-Mail Lists and Committee Updates**
General: https://www.nctcog.org/stay-informed?ext=
Environment & Development: https://www.nctcog.org/envir/mail

North Central Texas Council of Governments

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**www.nctcog.org/envir/natural-resources/energy-efficiency**

North Central Texas Council of Governments