HUD VIRTUAL EPC INDUSTRY DAY
November 16, 2021

Session Two – Energy Services Companies and the Energy Performance Contract (EPC)

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Session Two Panel Members

Mary Fox, Vertical Market Director,
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Don Gilligan, President, National Association
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Decarbonization and Electrification for Affordable Housing

Mary Fox

Vertical Market Director

Johnson Controls

Johnson Controls Joins The Climate Pledge, co-founded by Amazon and Global Optimism to Support Accelerated Net-Zero Carbon Ambition

Fossil Free

EPC

Prime Retrofit

Smart Communities

Owner Direct P3

Renewables

As a Service

Reimagine Your Housing Stock
Electrification & Decarbonization
"Fossil Free Energy"

- Electrification the conversion of a fossil fuel system to the efficient use of electrical power (New or Retrofit)
  - NG steam plant decouple the space and domestic heat to DHW heat pumps, downsize boiler system, and space temp controls
  - Propane system to electric space, domestic and cooking with Solar

- Decarbonization the phasing out of carbon dioxide emissions from the use of fossil fuels off site
  - Removal of window A/C units to ductless mini-splits
  - Cold Weather Heat Pumps
  - Buy Green Power

- Repayment through **EPC HUD Incentives**, Grants, Rebates and Capital Fund Investments

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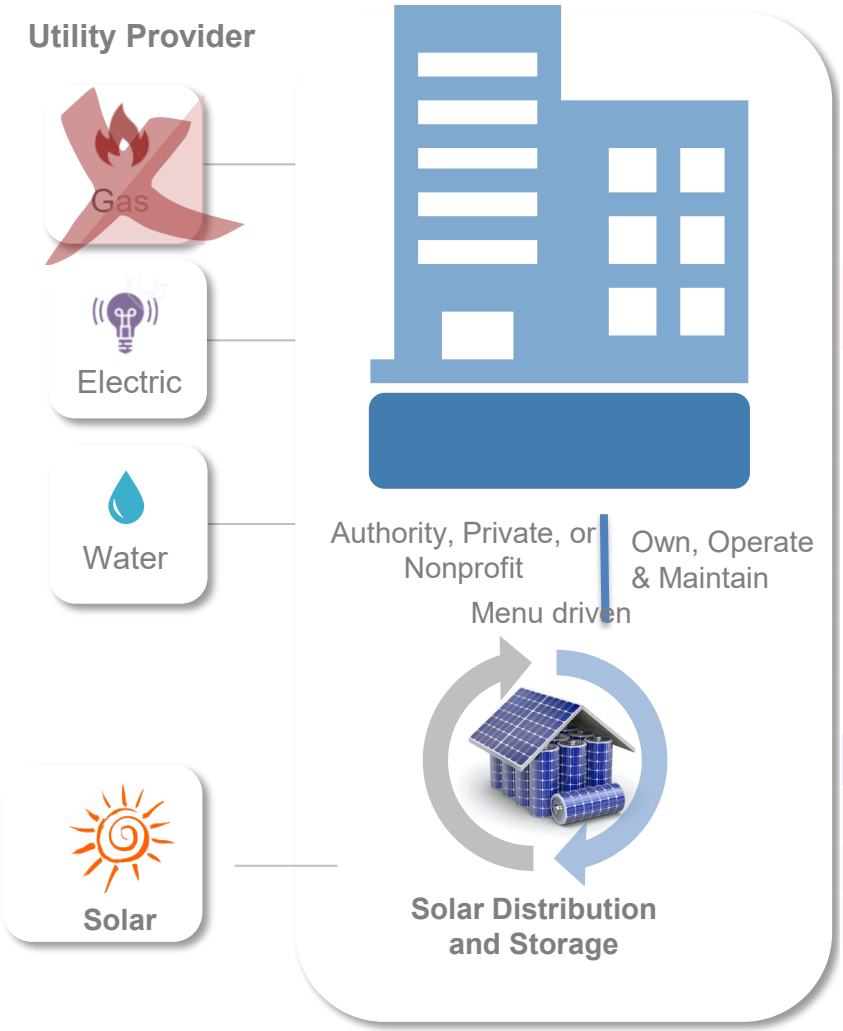
Build Back Fossil Free

Refresh and Rehab with EPC



Energy	Uses	Offerings
Natural Gas	Domestic Water Heating	Decouple Domestic from Space Heat convert to Heat Pumps Domestic Water and Downsize boiler (NG or Elec.) Solar Domestic Water Heating Electric Boiler
	Space Heat (Boiler or Forced Air)	
	Cooking (NG Range)	Electric Stove
	Common Clothes Dryers	Electric Clothes Dryers (own or 3rd party)
	Back-up Generators	Solar/Storage or Fuel Cells
Electric	Lighting	LED Increase light levels/ smart lighting Occupancy / Daylight / Photocells sensors
	Commercial, Household Appliances	Energy Star Appliance – Microwaves
	Air Conditioning Units / Chiller	Mini-splits/VRF/High Efficiency Terminal Units
	Elevators	Update
	Security, Fire and Access	Update (As a Service)
	Medical Devices (Electric Shooters)	Solar Charging Stations
	Automotive	EV Station (Solar/Storage)
		Charging Controls
Water/Sewer	Bathing, Cooking and Water Closet	Water-saving Technologies
	Clothes Washing Machine	Convert to Horizontal Axis
	Irrigation	Xeriscape, Smart Irrigation Controls. Drip Systems
	Water Softener, Chemical Treatment , Boiler Feed, Cooling Tower	Salt Free Water Conditioner, Non-Chemical Water Treatment and Metering
	Gardens	Grey Water, Rainwater Collection/, Drip Systems

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Jerome D. Ryans
President
Chief Executive Officer

Tampa Housing Authority

- EPC Investment $24 M
- 20 Year Term
- $62M in EPC HUD Incentives (15 Yrs.)
- Consumption Reduction
  - 218,993,864 kWh (Electric)
    - 155,157 metric tons of greenhouse gas emissions
  - 2,908,388 Therms (Natural Gas)
    - 15,942 metric tons of greenhouse gas emissions
  - 4,290,213 Kgallons (Water)

- New solar PV system
- LED lighting in all units
- Interior water conservation
- Rainwater collection system for gardens
- Heating system replacements (NG to Elec)
- Water heater replacements (NG to Elec)
- Window and door replacements
- Programmable thermostat
- Building controls and automation
- New weatherization
- Meter replacement & strategies
- Conversion to tenant-paid utilities
- Installation of air conditioning split systems
- Appliance upgrades

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Tampa Housing Authority

Johnson Controls - Section 3 Track Record

Tampa Housing Authority - Youth Build Program

- Project - Photovoltaic 350 KW roof mount system
- Largest solar project with a public housing authority - $3.5M
- 7 Youth Build participants were employed as part of the PV installation in skilled positions
- 4 Youth Build participants have been offered and accepted full time positions that are green jobs

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Client	Unique Improvements
Tampa PHA	Solar, White Roof, Dehumidification, Electrification, Broadband with Resident Computers, Rainwater Collection, Drip System, Data Center
Kansas City KS PHA	O&M PSA, Add Air Conditioning, Metering Strategies
King County PHA	ERVs, Elevators, Solar, Conditioned Space
Marin PHA	Smart Irrigation, Xeriscaping and Humidity Control
Pueblo PHA	Community Solar Garden for Revenue Generation , Solar on Site
Chester County PHA	Add Air Conditioning, Elevators, Smart Building Controls, Solved for Air Flow Issues (Zoned the Residential Units)
Utica PHA	Optimization of Existing EPC, VRF
East Hartford PHA	Solar and RECs (Revenue Generation)
Quincy PHA	Solar Garden, Add Air Conditioning
Cheyenne PHA	Well Water for Irrigation, Smart Controls and Water Storage
Port Huron PHA	Solar, Windows, Electrification

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Electrification & Decarbonization Offerings Today

1 Decarbonization Advisory Services

- Cultural and organization-wide alignment
- GHG inventory (Scope 1,2,3) baseline
- Decarbonization roadmap and strategy
- Financial assessment and solutions
- Peer and market benchmarking
- Master planning

2 Safe, Secure, Healthy Environments

- Building code compliance for occupant safety
- Indoor air quality and ventilation
- Fire safety, building and cyber security strategies and technologies
- Industry-leading certification of health and safety (i.e. BOMA/ WELL)

3 Digitally Enabled Environments

- Energy management information systems
- Streamlined data acquisition
- Data-driven building decision-making using predictive, automated, responsive capabilities
- Leveraging digital models for master planning and scenario assessment
- Transparent, traceable decarbonization dashboards

4 Electrification and Efficient Infrastructure

- Savings and outcome-based energy efficiency program
- Deferred maintenance resolution
- Infrastructure resiliency
- **Electrification solutions**
- Portfolio energy management

5 Sustainable Operations

- Continuous decarbonization operations management plan
- Training or staffing future-ready infrastructure experts
- Sustainable lifecycle management and technology obsolescence planning
- Condition-based, predictive maintenance

6 Distributed Energy Resources

- Distributed Energy Strategy
- **Right-sized On-Site Generation & Storage**
- EV Charging
- Advanced Optimization
- Grid Interactivity & Services
- Demand Response

7 Renewable Energy Supply Services

- Renewable Energy Advisory
- Renewable Energy Procurement (PPAs, VPPAs, RECs, RNG, Carbon Offsets)
- **Energy Supply & Billing Management**
- Renewable Finance, Development & Trading

8 Certify and Recognize Impact

- Transparent, traceable decarbonization dashboards, accounting and reporting
- Brand public relations and communications
- Industry-leading certifications facilitation

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Johnson Controls

Net Zero Leadership Made Easy

Your proven path to hit decarbonization and renewable energy goals while optimizing your building's performance.

One Source Turnkey Delivery

- We support your commitments, performance goals, and reporting requirements
- Easy turnkey access to benchmarks, road mapping, designing, financing, building, operating, maintaining and retrofitting, across the full spectrum and lifecycle of building solutions & services
- Experienced delivery to minimize business disruption

Bringing you into the know

- Hear first where policy is changing and how this will impact you – ahead of time and benefit from our leadership expertise
- See how it works: Digital Twin and dynamic modeling
- Tap into best practice roadmaps from your industry, learn about plans that succeeded and how to avoid pit falls

Trade Up Instead of Trade Off

- We build your business case and roadmap wherever you are on your sustainability journey
- Optimize your building performance with technology that delivers up to 50% in energy savings and a corresponding drop in CO_2 emissions and 100% renewable electricity
- Balance the traditional conflict between cost savings & investment to achieve sustainability targets

Flexible Risk Sharing Models

- From upfront capital decisions to taking responsibility for design & construction, to owning your decarbonization goals & reporting
- Pay for your expected outcomes not the assets
- Flexible and tailored deal structures to meet your needs
- Includes option for simple fixed-fee model (as a Service)

OpenBlue
Net Zero Buildings

Johnson Controls

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"Sustainability is at the heart of our business and fundamental to everything we do as a company." Johnson Controls

2004 - Johnson Controls became one of the first companies to be a **UN Global Compact signatory.**

2007 - Chosen as a **World`s Most Ethical Company** for the first time. As of 2021 on the list 14 times.

2010 – Named to **CDP A List.**

2020 - Johnson Controls to be one of the first industrial companies to issue a **Green Bond** in the U.S. Dollar debt capital markets.

49% of our revenue contributes to the **clean economy.**

We have reduced **our global greenhouse gas** emissions intensity by over 50 percent, since 2002.

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Johnson Controls

FT CLIMATE LEADERS 2021

Johnson Controls named to prestigious FT European Climate Leaders list

GLOBAL100

Named in the Global 100 for Most Sustainable Corporations in the world

2021 WORLD'S MOST ETHICAL COMPANIES

Awarded World's Most Ethical Company in 2021 by Ethisphere Magazine. Nominated 14 times since 2007.

JBL 100 BEST CORPORATE CITIZENS 2021

Named one of the 100 Best Corporate Citizens by Corporate Responsibility Magazine for the 16th year in row.

CDP

Johnson Controls recognized by CDP for Leadership in Climate Action

EURONEXT VE

Named to Euronext Vigeo Eiris World 120 and U.S 50

Calvert An Eaton Vance Company

Listed on the Calvert Responsible Index since February 2009

CLEAN200™

Honored as one of the Carbon Clean 200 by Corporate Knights and As You Sow since 2016.

Corporate ESG Performance Prime ISS ESG

Awarded Prime status by ISS ESG

MSCI

MSCI AAA rating since 2018.

S&P 500 ESG Index

Listed on the S&P ESG Index

FTSE4Good

FTSE4Good Index Series and FTSE Environmental Opportunities 100 Index

UN GLOBAL COMPACT

Since 2004, Johnson Controls has been committed to the UN Global Compact and its principles of human rights, labor, the environment and anti-corruption.

2020 ecovadis

Ecovadis Gold Sustainability Rating 2019 & 2020

Most Efficient 2021 ENERGY STAR

ENERGY STAR Most Efficient 2020

Achieving Sustainable Public Housing

HUD Industry Day: ESCOs and the EPC – November 16, 2021

AMERESCO
Green • Clean • Sustainable

ameresco.com

About Ameresco

Ameresco, Inc. (NYSE:AMRC) is a leading **cleantech integrator** and renewable energy asset developer, owner and operator.

Founded in 2000 | Public in 2010

Advanced Technology Portfolio

Objective approach and in-house technical expertise delivers the most advanced technologies to meet the unique needs of each customer. Majority of projects are budget-neutral, funded by energy cost savings.

$10 Billion+ in energy solution projects, 280+ MWe of Owned Assets in Operation

Customer Driven

8,000+ customers across Federal/Municipal Governments, Public Housing, Higher Ed, K12 schools, C&I, Healthcare, Transportation. Achieved market reputation across North America & Europe for excellence in customer satisfaction.

In 2020, our renewable energy assets and customer projects delivered a carbon offset equivalent to approx. 12.6M metric tons of CO_2

Recognized as a Trusted **Industry Leader**

Acclaimed a Leader in *Guidehouse Insights*' 2020 Leaderboard Report

Energy Service (ESCO) Companies

Ranked #1 in Revenue Market Share in *Atlas Energy Intelligence's* 2021 Report

#1 U.S. ESCO Market Leader

Acclaimed #1 Leader in *Guidehouse Insights*' 2021 Leaderboard Report

Energy-as-a-Service Companies

Multifamily & Affordable Housing Experience

Ameresco has implemented more than $900 million in performance-based energy and water projects benefiting over 175,000 units in 900 public and privately owned properties across North America.

Ameresco Experience in Public Housing

Federal, State & Canadian Public Housing: Over $800 million in projects in 150,000 units in 780 properties. Projects are reducing GHG emissions by over 180,000 MTCO2e annually.

On-site and Off-site Solar: 19 MW in MA and OH

Key Measures: Plant decentralizations (infrastructure); ventilation improvements (home health); major mechanical equipment replacements, electrification with AC & heat pumps, solar PV, solar thermal, comprehensive LED lighting and water upgrades

Job Creation and Sustenance: 1) Project Labor Agreements with Boston and New York City; **2**) Use of Local Contractors; **3**) Aggressive pursuit of Section 3 Opportunities

HUD Utility Policy: 30+ Years (including predecessor company), including Asset Management Rule Neg Reg, HUD Administrative Initiatives with NAESCO, HUD, CLPHA, PHADA, NAHRO

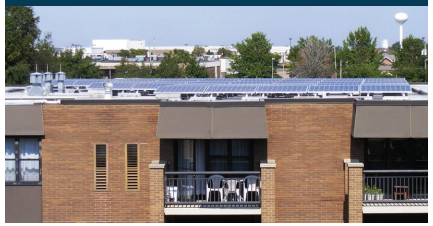
Diverse Experience in Efficiency & Renewable Solutions for PHAs

Efficiency, Conservation Infrastructure, Cleantech

- ✓ Investment-grade Energy Audit
- ✓ Asset Sustainability Planning
- ✓ ACC, MTW, RAD Transitions

- ✓ Energy & Water Efficiency
- ✓ Equipment Replacement, Controls
- ✓ Fiber optic networks
- ✓ Sub-metering, utility meter consolidation
- ✓ HVAC / System Infrastructure
- ✓ Central Plant Decentralization
- ✓ Envelope Insulation
- ✓ Windows, Roofs
- ✓ Cogeneration
- ✓ Electrification, Central AC Integration
- ✓ On-site & Community Solar
- ✓ Clean Energy Supply/Supply Mgt

Akron Metropolitan Housing Authority, OH



Boston Housing Authority, MA

Chicago Housing Authority, IL

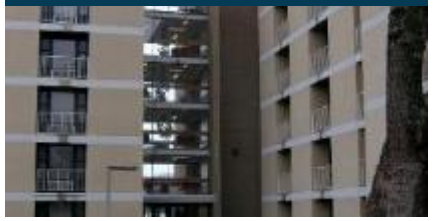
Columbia Housing Authority, MO

Decatur Housing Authority, IL

Fall River Housing Authority, MA

Holyoke Housing Authority, MA

Knoxville's Community Development Corporation, TN



Lowell Housing Authority, MA

Diverse Experience in Efficiency & Renewable Solutions for PHAs

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- ✓ Electrification, Central AC Integration
- ✓ On-site & Community Solar
- ✓ Clean Energy Supply/Supply Mgt

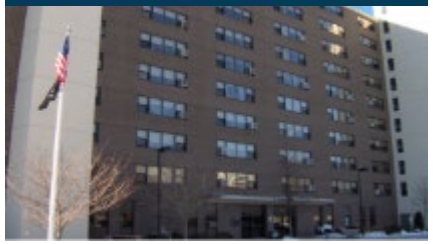
Manchester Housing Authority, NH

MA Housing Authorities - Community Solar in Fairhaven, Mattapoisett, New Bedford, Kingston, Plymouth

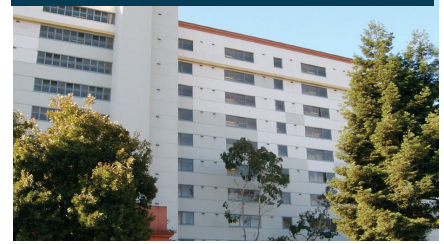
New Bedford Housing Authority, MA

New York City Housing Authority, NY

Providence Housing Authority, RI



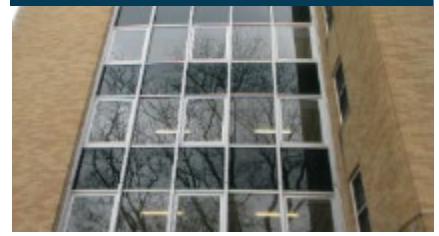
San Francisco Housing Authority, CA



Syracuse Housing Authority, NY

Toronto Community Housing, ON

Worcester Housing Authority, MA



EPC in Sustainability Plan

New York City Housing Authority, NY

Ameresco and NYCHA have a longstanding relationship starting with a 2002 “pilot” EPC.

Current Ameresco EPC A and B projects are two of four NYCHA initiated in 2015. In 2020 NYCHA qualified 4 companies for a $400M EPC IDIQ.

Over 145 residents have been employed to date on Ameresco projects

Project Highlights

Technology Type:

- Energy Performance Contract
- Guaranteed Energy Savings

Improvements include high-efficiency, LED lighting throughout the buildings, ventilation improvements, water conservation, new heating plants and building control and related upgrades

Facility Size: 29 sites, 34,780 units

- Capital Investment: $178M
- Savings of $15M annually
- CO2 emissions reductions of over 50,000 tons annually

NYCHA’s Sustainability Agenda commits to a 40% reduction in GHG emissions by 2030 and 80% reduction by 2050

Achieving Sustainability Goals

Environmental Equity

Better Comfort and Health Outcomes from… Reduced Emissions ■ Ventilation and Air Quality ■ Improvements in High Poverty Neighborhoods

Resilience

Solar PV and Solar Thermal on Roofs ■ Participation in Community Solar ■ Flood Control Measures ■ Shutters & Wind-Resistant ■ Windows ■ Structural Strengthening

Efficiency

HVAC and Appliance Upgrades ■ Water Heating Replacement ■ LED Lighting ■ Controls ■ Insulation and Envelope Tightening ■ Water Conservation Measures

Jobs Creation in Low Income Communities

7.75 to 10 Jobs for every $1M invested ■ Local Trades and Section 3

Infrastructure & Electrification

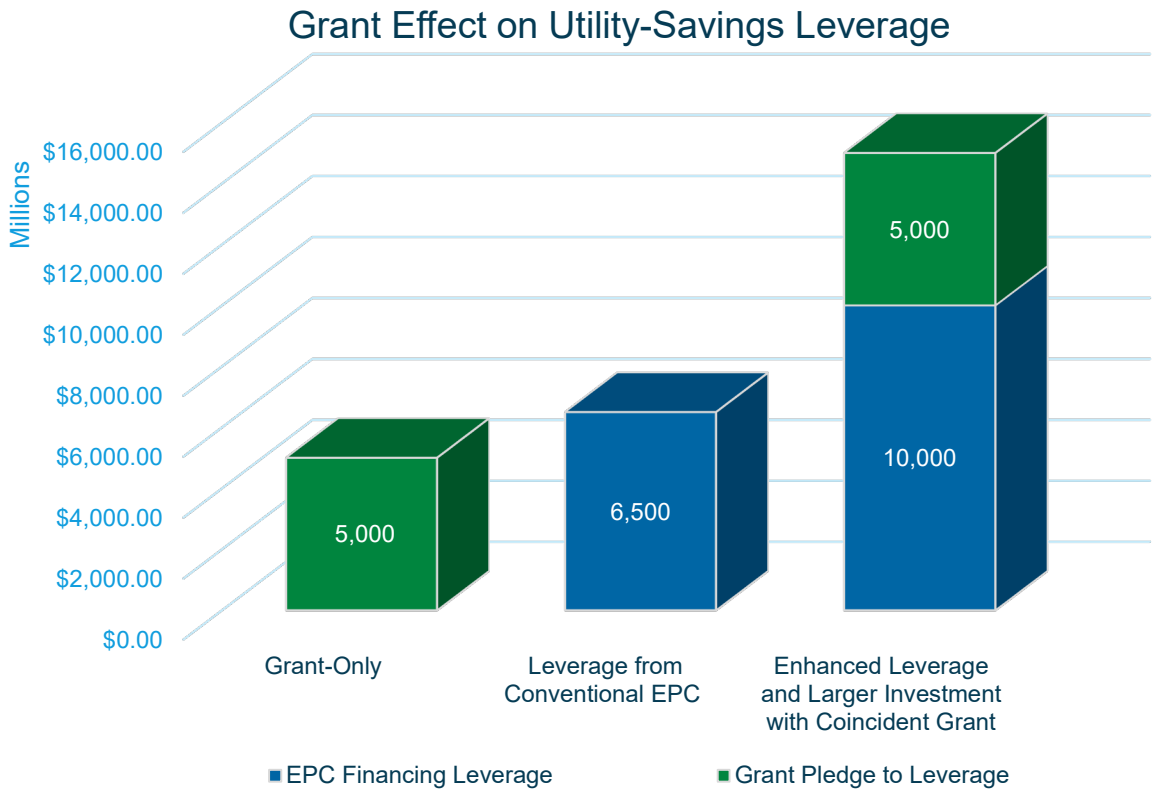
Plant Decentralization ■ Fuel Source Conversions ■ Solar with Battery Storage, Microgrids ■ Solar Carports & EV Charging Stations

50% Reduction in GHG Emissions by 2030

Requires Integration of Emerging Tech ■ Capturing and blending ALL available funding (property portfolio savings + external program contributions + HUD Grant Funding) to achieve greatest GHG Emissions reductions

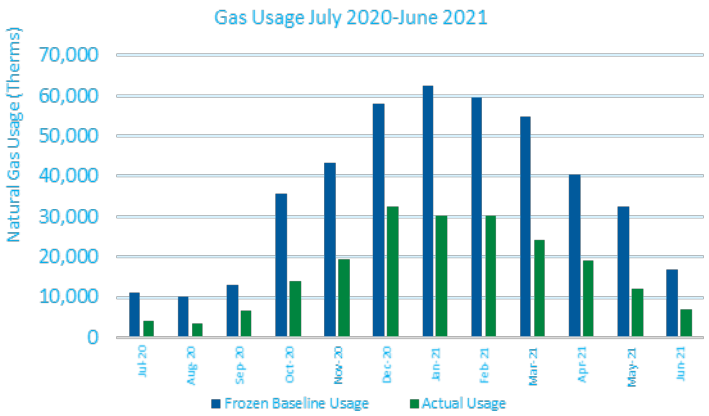
Sustainability Grants + EPC

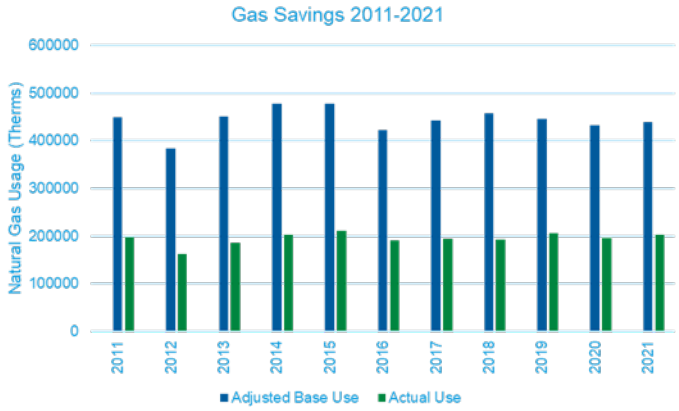
- Blend savings funding with sustainability funding to achieve goals
- Use program grants on long-payback infrastructure & resilience measures
- Use EPC financing for quicker payback efficiency measures: typically, domestic water, lighting, HVAC
- EPC Savings can as much as double with grant funding applied to achieve deeper retrofits
- Example shows targeted investments grow from 6.5B to 10B



Infrastructure – Central Plant Conversions

Lynn Housing Authority & Neighborhood Development, MA





Brought reliable service, resident control, improved comfort & health; relieved maintenance burden; reduced gas consumption and GHG emissions.

Project Highlights

- Signed in 2009 in repayment. $6.3 million affecting 455 units.
- Central Plant Conversion to 16 distributed systems serving 50 buildings (279 apartments)
- New heating & DHW equipment, sheds, distribution piping and baseboards, building insulation
- **Gas savings at Curwin Circle represent reductions of 56% and 1,317 MT CO_2 annually (4.7 MT CO_2e/apt)**

Infrastructure – Roofs & Windows
Lowell Housing Authority, Akron Metropolitan Housing Authority

New roofs (here with solar thermal) installed in 2021 in Lowell, MA

New **windows and doors** installed in 2021 in Akron, OH

Infrastructure, Efficiency, & Renewables

New Bedford Housing Authority, MA

The Ameresco team and New Bedford Housing Authority (NBHA) have had a 20-year relationship, with early projects targeting major central plant infrastructure decentralizations and the most recent focused on clean power.

Project Highlight

- Signed in 2019, Construction Underway in 1,500 low-income households
- Features the Solar Massachusetts Renewable Target program (SMART)
- Roofs replaced using Capital Fund
- On-site solar installations, & energy saving measures include water conservation, lighting upgrades, and boiler replacements
- PV will result in 2.4 MW of power generation and a predicted 45% electric use offset
- Overall project is expected to reduce costs by $19.6M over its term and reduce CO_2 emissions by 2,280 MT CO_2e annually

Community Solar – Low-Cost Renewable Power

- 16 MW Community Solar Farms (in partnership with Blue Wave Solar) in Wareham and Mattapoisett MA
- Serving Fairhaven, Mattapoisett, New Bedford, Kingston, Plymouth (MA) Housing Authorities – State portfolios
- Housing Authorities purchase power at lower rates on 20-year contract
- Annual carbon footprint is reduced by 16,276 MT CO_2

Advancing Cleantech for a **Resilient, Renewable** Future

Utility-Scale Energy Storage

On-Site Rooftop Solar PV

Wind Solutions

Distributed Solar Energy Systems

Renewable Natural Gas

Microgrid Controls for Resiliency

Next Steps

HUD EPC Virtual Industry Day - November 16, 2021

NAESCO

Next Steps Overview

- Introduction to NAESCO
- Agreement on the value of EPCs
  - HUD, PHAs, and ESCOs
- Use the full potential of EPCs
  - New goals – 50% GHG reduction by 2030 + resilience + DEI + EJ
- Resources available to meet the goals
  - Renewed HUD focus on EPCs to meet Biden Administration goals
  - Capital
  - Successful precedents from other federal agencies and other PHAs
- What we need to meet the goals

Introduction to NAESCO

- National Association of Energy Service Companies
  - National trade association of the energy services industry
- Founded in 1985
- About 130 member companies
  - 45 Energy Service Companies (ESCOs)
  - 76 Affiliates (supply equipment and services to EPCs)
  - 7 Public Sector
  - 1 International member
- NAESCO provides
  - Advocacy, accreditation, research, education and training
    - 7,000-project database at Lawrence Berkeley National Laboratory

NAESCO Accreditation

- Started in early 1990s
- Independent Accreditation Committee
  - Engineer who works for customers
  - Scientists from Lawrence Berkeley National Lab
  - Anti-trust lawyer
- Accreditation Requirements
  - Performance-based projects
  - Commitment to code of ethics (fair competition)
  - Project engineering, design, and project management
  - Assistance in arranging financing
  - Operations and maintenance capabilities
  - Capability of verifying and monitoring energy savings
- Rigorous application process
  - Examples of full project documentation
  - Financial statements
  - 10-50 projects into database (100+ data fields for each project)
  - Committee calls project references

See: NAESCO || Accreditation Process

Agreement on the value of EPCs

- More than $1.5 billion of successful projects
  - More than 250,000 units in all 10 HUD regions
  - Smallest to largest PHAs
- Continuous improvement in application process
  - Ongoing HUD/ESCO collaboration
- Integration of new technologies as they are proven
  - Project examples from Mary and Lillian
- Renewed HUD focus on EPCs
  - Last HUD EPC Industry Day was in 2012?

Use the full potential of ESCOs

- Comprehensive projects deliver what PHAs need
  - Central plant conversions
  - Community and on-site solar
  - Electrification, Broadband, Metering, Elevators, Irrigation, Windows, etc.
- Sustainability + DEI + EJ
  - Protection from natural disasters
  - Microgrids with other critical community facilities
- Implementation flexibility and speed
  - Project integration – one-stop shopping
  - Negotiated scopes of work
  - Financing assembled from multiple sources
    - Energy savings + utility incentives + grants + tax credits

Resources available

- HUD commitment to meet Biden Administration goals
- Administration and Congressional focus on public housing
  - Potential influx of appropriated capital
  - Extended and expanded tax credits
- Successful precedents from other federal agencies
  - Comprehensive projects that meet agency needs
  - Flexible contracting and financing
  - Obama Performance Contracting Challenge, GSA National Deep Energy Retrofits
- Demonstrated ESCO ability to implement what PHAs need
  - Energy savings + GHG reductions + resilience + infrastructure

What we need to meet the goals

- Focus on comprehensive projects
  - Integrate EE, solar, water, electrification, resilience, and other measures
- Flexible contracting and financing
  - Tailor the project to meet the PHA's needs
  - Contracts for the full EUL (Estimated Useful Life) of measures
  - Multi-year (not single year) savings reconciliation
  - Allow the PHAs to keep and reinvest the savings
- Leverage Capital funds and Infrastructure/Reconciliation grants
  - PHA needs may be $20-40k per unit
  - Don't pay cash for short-payback measures
    - Use Capital and grants on long-payback and resilience measures
    - ORNL studies from the ARRA programs

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Ask the Experts