Local Government Meet-Up

2:00 – 5:30 August 22, 2018
2:00 – 5:30 pm

• 2:00 Welcome
  • Matt Gray, City of Cleveland
  • AnnaMaria Garcia, U.S. Dept. of Energy
• 2:30 Breakout Discussions: Buildings
• 3:30 Break
• 4:00 Tools Lightning Round
• 4:30 Breakout Discussions: Beyond Buildings
• 5:25 Wrap Up
Welcome to Cleveland!
Local Government Meet-Up

Matt Gray
Chief of Sustainability
City of Cleveland
AnnaMaria Garcia, Department of Energy
Recognizing Public-Sector Energy Efficiency Accomplishments and Leadership

AnnaMaria Garcia
August 2018
Energy Efficiency Leadership Pathway

Leadership Building Blocks
- Design Programs or Initiatives
- Implement Data Management
- Establish Financing
- Develop Workforce and Expertise
- Improve Organization

Sources: EPA Energy Star, EPA LBE Best Practices Guide
Public-Sector Leadership in the Better Buildings Challenge

80+ Partners and over 1 billion square feet

Success!
10 Public-Sector Goal Achievers
Better Buildings Challenge Local-Government Goal Achievers:
20%+ Reduction in Energy Use Intensity

- Arlington County, VA
- Atlanta, GA
- Boston, MA
- Chattanooga, TN
- Chicago, IL
- Chula Vista, CA
- Clark County, NV
- Cleveland, OH
- Columbia, MO
- Cook County, IL
- Denver, CO
- District of Columbia
- Ft. Lauderdale, FL
- Hall County, GA
- Hillsboro, OR
- Houston, TX
- Kauai County, HI
- King County, WA
- Knoxville, TN
- Margate, FL
- Medford, MA
- Milwaukee, WI
- Orlando, FL
- Philadelphia, PA
- Placer County, CA
- Reno, NV
- Roanoke, VA
- Rochester, NY
- Salt Lake City, UT
- San Diego, CA
- Seattle, WA
- West Palm Beach, FL
- Will County, IL
Leadership in Other DOE Initiatives

Public-Sector Successes

- **ESPC Toolkit**: Achieved over $2 billion in public-sector energy efficiency investments via Energy Savings Performance Contracting (ESPC).
- **Low-Income Energy Program Toolkit**: Committed up to $335 million to help 155,000 low-income households access energy efficiency and renewable energy benefits.
- **Outdoor Lighting Toolkit**: Achieved a commitment to upgrade 1.3 million street lights with an expected annual savings of $48 million.

New Resource Available!

Current WIP Initiatives

- **Sustainable Wastewater Infrastructure of the Future (SWIFT) Accelerator**: 70+ wastewater facility partners in 23 states working to achieve 30+% energy savings.
- **Commercial and Residential Property Assessed Clean Energy (C-PACE) & (R-PACE) Working Groups**: 24 partners across 13 states and 11 local governments working to make significant progress launching successful PACE programs.

Other Accelerators of Interest:

- CHP for Resiliency & Zero Energy Schools/Districts
Energy Efficiency Leadership Pathway: Mapping and Analysis

- Analyzed **100+** public sector-focused Showcase Projects with a total annual energy savings of **2+ Billion kBtu**
  
  - The most commonly used technologies include HVAC, lighting, controls, and envelope upgrades, as well as technology packages involving three or all four measures.
  - More projects in southern and sunnier geographic regions include solar PV/heating.
  - More projects in northern and colder geographic regions upgrade HVAC systems.

- The Midwest, Southwest, and Southeast led the pack in actual and expected savings combined.

- Higher education/correctional facilities, hospitals, the building type we defined as large social buildings, had the highest actual and expected annual energy savings.

- Mapped **400+** public sector-focused Solutions
  - Case Studies
  - Fact Sheets
  - Guides
  - Implementation Models
  - Partner Profile
  - Reports
  - Solutions-At-A-Glance
  - Specifications
  - Tools
<table>
<thead>
<tr>
<th>Element</th>
<th>Challenges</th>
</tr>
</thead>
</table>
| Organizational Buy-In                       | - Lack of information showing cost/benefit  
  - Competing priorities: energy management is not a priority  
  - Energy efficiency and related energy data management don’t receive sustained senior-level attention and resources  
  - Disparate management of energy across organization  
  - Don’t see savings from energy data management  
  - Don’t see how data management relates to organizational mission/goals |
| Collect Data to Establish Baseline          | - Getting utility bills (because they are handled/paid by another office)  
  - Lack of time to research where utility bills handled/paid  
  - Format of data delivered by utility  
  - Lack of dedicated staff person to enter data into data management system  
  - Utility can't/won't provide data  
  - Don’t have historical data to establish baselines  
  - Underserved sector (industrial/utility, outdoor lighting, etc.) |
| Benchmark, Review, and Verify Data (Quality Assurance) | - Volume of data to verify  
  - Difficult to verify the accuracy of utility charges due to the number of utility accounts  
  - Difficulty matching utility bill to building  
  - Accountability for energy and utility accounts dispersed across departments  
  - Lack of management systems  
  - Lack of unified organizational plan to manage energy data  
  - Lack of knowledge of appropriate data management systems  
  - Lack of staff time to analyze energy performance data  
  - Lack of a commonly accepted energy data management tool |
| Track Energy Performance Regularly          | - Offices don't enter data in centralized management system  
  - Perception of organizational risk around investments in more efficient equipment  
  - Lack of real-time data  
  - Lack of access to consistent and transparent building performance data  
  - Limited or no centralized management system  
  - Time spent on data collection and verification  
  - Don’t have historical data to establish baselines |
| Analyze Results for Decision-Making         | - Lack of dedicated staff person  
  - Limited or no similar assets for comparison  
  - Limited capability  
  - Limited or no centralized management system |
| Revise and Communicate Results (feed project results back into system to revise program based on results) | - Not understanding who key stakeholders are  
  - What points of information influences decision-making  
  - Tool/software that allows you to create customized reports  
  - Lack of capacity/knowledge/capability to take detailed data and turn into high-level reports |
## Example: Energy Data Management Solution

<table>
<thead>
<tr>
<th>Element</th>
<th>Challenge</th>
<th>Solution</th>
<th>Outcome</th>
<th>Tool Used</th>
<th>Title</th>
<th>Author</th>
<th>Jurisdiction Size (Population)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analyze Results for Decision-Making</td>
<td>Limited or no centralized management system</td>
<td>Delaware OMB and DNREC utilized EPA's Portfolio Manager to benchmark state building energy use, analyze building energy performance and strategically identify and prioritize retrofit projects</td>
<td>Benchmarked 80% of buildings, achieving a 17% energy use reduction with average annual improvement of 3%.</td>
<td>Portfolio Manager</td>
<td><strong>Centralized Benchmarking &amp; Project Prioritization</strong></td>
<td>Delaware</td>
<td>Small State (&lt; 3M)</td>
</tr>
</tbody>
</table>
We Need Your Input!

How can we make this more impactful for you?

1. What does success (leadership) look like?

2. What is most essential, impactful, and cost effective?

3. How can we better define this in the pathway and building blocks we’re creating?

4. What specific barriers have you encountered?

5. What’s missing?

Contact Us: stateandlocal@ee.doe.gov
Thank you!
Meet-Up Agenda

2:00 – 5:30 pm

• 2:00 Welcome
• 2:30 Breakout Discussions: Buildings
• 3:30 Break
• 4:00 Tools Lightning Round
• 4:30 Breakout Discussions: Beyond Buildings
• 5:25 Wrap Up
Breakout Discussions: Buildings

- Advanced Energy Planning
- Building Performance Strategies
- Energy Data Management
- Water Management
- Zero Energy Strategies
Meet-Up Agenda

2:00 – 5:30 pm

• 2:00   Welcome
• 2:30   Breakout Discussions: Buildings
• 3:30   Break
• 4:00   Tools Lightning Round
• 4:30   Breakout Discussions: Beyond Buildings
• 5:25   Wrap Up
Break
2:00 – 5:30 pm

- 2:00  Welcome
- 2:30  Breakout Discussions: Buildings
- 3:30  Break
- 4:00  Tools Lightning Round
- 4:30  Breakout Discussions: Beyond Buildings
- 5:25  Wrap Up
Tools Lightning Round
Tools Lightning Round

- State and Local Energy Data (SLED) Platform – Jonah Steinbuck, DOE
- Energy Data Management Guide – Adam Guzzo, DOE
- Home Energy Score – Madeline Salzman, DOE
- Asset Score & Standard Energy Efficiency Data (SEED) Platform – Harry Bergmann, DOE
- REopt Lite – Emma Elgqvist, NREL
- Better Buildings Financing Navigator – Holt Mountcastle, RE Tech Advisors
Jonah Steinbuck, Department of Energy
State and Local Energy Data (SLED) Platform

City Energy Profiles for 23,400+ U.S. Cities

https://apps1.eere.energy.gov/sled/
State & Local Energy Data

See City Energy Profile
Get comprehensive energy use and activity data that can help your city plan and implement clean energy projects. A city's energy profile includes summary reports on:

- Greenhouse gas emissions
- Electricity generation
- Natural gas and other fuel source costs
- Renewable energy resource potential
- Transportation, buildings, and industry data
- Applicable policies and incentives

Enter ZIP Code or City, State
Get Summary Report

https://apps1.eere.energy.gov/sled/
Electricity and Natural Gas Summary for Cleveland, Ohio

Find details about the electricity and natural gas market in your area including utility information, rates, renewable resources, energy usage and expenditures.

<table>
<thead>
<tr>
<th>Electric Utility Names</th>
<th>Average Retail Electricity Rates ($/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Cleveland, Ohio (Utility Company)</td>
<td>City of Cleveland, Ohio (Utility Company)</td>
</tr>
<tr>
<td>Residential</td>
<td>0.1335</td>
</tr>
<tr>
<td>Commercial</td>
<td>0.1348</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.0904</td>
</tr>
</tbody>
</table>

Source: Contact your utility or search the Utility Rate Database for specific rate schedules

Source: https://apps1.eere.energy.gov/sled/
SLED: Buildings & Industry

Building Stock Summary for Cleveland, Ohio

<table>
<thead>
<tr>
<th></th>
<th>Total Area of Buildings (ft²)</th>
<th>Number of Buildings</th>
<th>Average Area of Buildings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Total area of buildings: Industrial, Commercial, Residential
- Number of buildings: Industrial, Commercial, Residential
- Average area of buildings: Industrial, Commercial, Residential

Source, API Download Data: https://apps1.eere.energy.gov/sled/
SLED: Electricity & Natural Gas

**ELECTRICITY EXPENDITURES ($1000)**

**NATURAL GAS EXPENDITURES ($1000)**

*Source: API, Download Energy Use Averages, Download Energy Cohort Data*

https://apps1.eere.energy.gov/sled/
SLED: Commercial Building Stock

Commercial Building Energy Benchmarking for Cleveland, Ohio

https://apps1.eere.energy.gov/sled/

Source, API, Download Data
Small Building Rooftop PV Potential for Cleveland, Ohio

- **Suitable Small Buildings**
  - 108,900 buildings
- **Unsuitable Small Buildings**
  - 25,200 buildings

<table>
<thead>
<tr>
<th>Category</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suitable area</td>
<td>4,958,921 m²</td>
</tr>
<tr>
<td>Capacity potential</td>
<td>734,213 kW</td>
</tr>
<tr>
<td>Energy generation potential</td>
<td>777,300 MWh</td>
</tr>
</tbody>
</table>

Source, API, Download data: [https://apps1.eere.energy.gov/sled/](https://apps1.eere.energy.gov/sled/)
Thank You!

Jonah Steinbuck
U.S. Department of Energy
202-586-0844
Jonah.Steinbuck@ee.doe.gov
Adam Guzzo, Department of Energy
Use the Energy Data Management Guide's step-by-step approach to establish a robust and sustainable energy data management program in your state, local government, or school district.

Access the guide's:

- Proven strategies with demonstrated, portfolio-wide energy savings
- Data management tools and resources
- Customizable templates and worksheets
- Relevant examples and case studies.

Learn more about the guide.

Step-by-Step Process

You're only seven steps away from taking control of your energy data.

Generate Buy-In
1. Define the Merits of Tracking Energy Data
2. Align with Organizational Goals

Build a Solid Foundation
3. Create a Central Database
4. Streamline Access to Data
5. Leverage Data Management Tools

Hardwire Energy Management
6. Optimize the Organizational Structure
7. Drive Engagement and Communicate Results
Generate Buy-In

To establish an energy data management program, your first step is to generate buy-in from senior leadership and other key stakeholders. Buy-in from the beginning paves the way to ultimate success. It’s critical to obtain resources and build on initial energy management initiatives.

Buy-in promotes collaboration across the organization as well as with other important stakeholders, such as utility companies and the general public. It starts with developing a concise business case for the merits of tracking energy data. Then, you perfect the value proposition by aligning energy data management with existing organization goals.

Best Practices

To generate buy-in for your energy data management program, follow these two steps:

**Step 1. Define Merits of Tracking Data**
Learn how to develop a concise business case for the merits of tracking data by articulating the cost-benefits of energy data management, and how it supports more effective goal setting and budgeting.

**Step 2. Align with Organizational Goals**
Learn how to invest time upfront to develop and perfect the value proposition for energy data management by tying the effort to larger organizational goals and motivate action by:

- identifying opportunities for aligning on common goals
- implementing targeted engagement strategies
- building on initial successes
- appealing to a collective desire for excellence in the organization.
Step 1: Define the Merits of Tracking Energy Data

Organizations that have established robust energy data management programs report benefits in three areas:

- Energy and cost savings
- Enhanced goal setting
- Improved control of energy budgets.

Energy data management begins with consistent monitoring of energy consumption through energy data tracking, which is a continuous process of data collection and measurement. Data is used to:

- Assess the performance of buildings and other assets in a portfolio
- Set realistic goals
- Identify opportunities for improvement
- Verify results of energy reduction efforts
- Monitor trends
- Measure success
- Reassess or revalue your goals

See the U.S. Department of Energy (DOE) State and Local Solution Center to learn about accessing and using energy data.
Local Government Spotlight: City of Gillette, Wyoming

Creating Sustainability in America’s Energy Capital

*Information in this Spotlight is based on primary research conducted in 2014.*

The City of Gillette, Wyoming is the seat of Campbell County, and the self-proclaimed energy capital of the nation where approximately 30% of U.S. coal is produced. While energy is abundant and relatively low cost, one of the city’s goals is to demonstrate to its citizens, utility customers, and neighboring communities that the city government is a good steward of taxpayer funds and natural resources.

While the city has engaged in various energy efficiency and sustainability efforts over the years, an opportunity to significantly expand these efforts presented itself in 2012, with the launch of the Better Buildings Initiative, part of which encouraged building owners to track energy consumption and reduce energy use in buildings by 20% by the year 2020.

Approach: The Sustainability Manager approached the council to join this national initiative. Building on the city’s goals and principles, the city’s Sustainability Manager addressed the city’s values and goals to decision makers to generate buy-in for implementing new sustainability initiatives. This new initiative, the sustainability manager identified that city-owned buildings was well-aligned with the city’s goals and the opportunity for state leadership in energy conservation, namely a value proposition to the City Council.

Strategies for generating buy-in across the organization:

- Identify leadership’s drivers and goals
- Create win-win solutions that address these goals
- Foster teamwork and collaboration across the city’s participants
- Develop a process that integrates energy management into the city’s operations

Following multiple meetings and presentations to the City Council, the city’s efforts to reduce energy use by joining the DOE’s Better Buildings program, Gillette has committed to a 20% reduction in energy use city-wide, which will save the city-owned buildings and become the first local government in Wyoming to achieve this outcome. By carefully crafting the value proposition to leadership, the sustainability manager has elevated its relevance and visibility with decision makers. This has also helped the city become more fiscally responsible by incorporating energy-related projects into the budget planning.

Utility Bill Analysis Recovers Costs from Errors

Detailed utility billing analysis by the State of Maryland revealed a $91,000 electronic billing error after examining all of its meters during a comprehensive rate appropriateness review. The state of North Carolina discovered that they had received and paid for bills that serviced buildings the state no longer owned or occupied. As a result of this review, the state was able to recover more than $500,000 in erroneous charges from the new tenants.

The City of Virginia Beach identified numerous accounts for which it paid a monthly charge but for which power usage was zero. Closing these accounts saved the city future costs.
Tools, Templates & Worksheets

Comparison of Resource Requirements and Efficacy of Three Widely-used Data Access Solutions

<table>
<thead>
<tr>
<th>Time and Resources Required</th>
<th>Individual Paper or Online Billing</th>
<th>Consolidated Billing</th>
<th>EDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of Effort to Implement Solution</td>
<td>LOW</td>
<td>Limited staff training</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Cost Implications (Excluding Staff Time)</td>
<td>LOW</td>
<td>No cost</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Impact on Data Access Improvement</td>
<td>LOW</td>
<td>Tracking data outside of cost and consumption adds significant time to the effort</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Bill Period Available for Review</td>
<td>SLOW</td>
<td>Past 4 to 12 weeks or more</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Comprehensiveness of Utility Bill Data</td>
<td>LOW</td>
<td>Tracking data outside of cost and consumption adds significant time to the effort</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Data Quality</td>
<td>LOW</td>
<td>Manual entry introduces errors in the database</td>
<td>MEDIUM-HIGH</td>
</tr>
<tr>
<td>Operational Efficiency</td>
<td>LOW</td>
<td>Redundancy in databases and data entry for energy tracking and accounts payable functions</td>
<td>MEDIUM</td>
</tr>
</tbody>
</table>

Table of Data Metrics and Performance Indicators for Leadership and Executive Staff

- **Status (this is where we are today…)**: Percent overall improvement and improvement by energy metric (BTUs, kWh, GHGs, etc.) relative to baseline year
- **Progress towards energy savings goals by department and overall progress**: Dollar value ($) and energy metric (BTUs, kWh, GHGs, etc.)
- **Largest energy users (agencies or end use sectors)**: Dollar value and energy metrics (BTUs, kWh, GHGs, etc.)
- **Avoided costs (optional; avoided consumption and GHGs, etc.)**: Dollars saved and associated emissions avoided
- **This is our strategy**: Energy efficiency projects and associated savings
- **Energy efficiency projects and associated savings**: Dollars saved and associated emissions avoided
- **Power purchase and project value with projected savings**: Dollars saved and associated emissions avoided

To put things in perspective…

- **Total energy consumption trends over time**: Percent change and change by energy metric (BTUs, kWh, GHGs, etc.)
- **Ongoing and cumulative yearly savings from energy conservation measures**: Dollar value ($) and energy metric (BTUs, kWh, GHGs, etc.)

Optional Metrics

- **Year-to-date energy and cost savings, projects completed, GHG emissions avoided**: Dollar value ($) and energy metric (BTUs, kWh, GHGs)
Take control of your energy data in seven steps!

Use the Energy Data Management Guide's step-by-step approach to establish a robust and sustainable energy data management program in your state, local government, or school district.

Access the guide's:

- Proven strategies with demonstrated, portfolio-wide energy savings
- Data management tools and resources
- Customizable templates and worksheets
- Relevant examples and case studies.

Learn more about the guide.

Step-by-Step Process

You're only seven steps away from taking control of your energy data.

Generate Buy-In

1. Define the Merits of Tracking Energy Data
2. Align with Organizational Goals

Build a Solid Foundation

3. Create a Central Database
4. Streamline Access to Data
5. Leverage Data Management Tools

Hardwire Energy Management

6. Optimize the Organizational Structure
7. Drive Engagement and Communicate Results
Thank You!

Adam Guzzo
U.S. Department of Energy
202-287-1689
Adam.Guzzo@ee.doe.gov
Madeline Salzman, Department of Energy
DATA SOLUTIONS FOR CITIES
DOE Building Technologies Office

Implement a Home Energy Labeling Policy
Enable market to account for energy use and use information to meet local energy goals.

Improve Housing Stock
Fix market failure by giving real estate energy information to appraise value and provide financing

Contact to Learn More: Madeline.Salzman@ee.doe.gov | Visit Our Website: www.homeenergyscore.gov
Harry Bergmann, Department of Energy
The U.S. Department of Energy’s
DATA SOLUTIONS FOR CITIES

**Prioritize Upgrades for Public Building Portfolios**
Collect, manage, and analyze your building data to more strategically identify cost-effective energy efficiency improvement opportunities across your building portfolio.

**Data Fields**
- Building Features
  - e.g., size, address, HVAC equipment, wall type
- Energy Bills
  - Monthly usage data

**Tools**
- Building Asset Score
  - Rates efficiency of commercial buildings based on its features
- Portfolio Manager
  - Measures & tracks actual energy consumption and emissions
- ENERGY STAR Score
  - Shows how efficiently a building is performing compared to similar buildings (1-100 scale)

**Reports**
- Building Asset Score Report
  - Shows how efficient a building is built (1-10 scale) and recommends cost-effective upgrades
- ENERGY STAR Score
  - Shows how efficiently a building is performing compared to similar buildings (1-100 scale)

**Database**
- SEED Platform
  - Combines and matches data sets to enable data cleansing, organization, and analysis

**Next Steps to Consider**
Prioritize buildings for further analysis, evaluation of incentive programs, and share data with the Building Performance Database for benchmarking and peer comparisons.

- See both asset and performance data on buildings in your portfolio
- Identify highest potential investment opportunities
- Compile list of cost-effective improvements to consider for each building
- Help prioritize buildings on which to perform more in-depth audits

Contact to Learn More: Harry.Bergmann@ee.doe.gov | Visit Our Website: https://www.energy.gov/eere/buildings/analysis-tools
Emma Elgqvist, NREL
The REopt Lite Web Tool offers a no-cost subset of NREL's more comprehensive REopt model.

- Beta version of web tool launched September 2017; additional features added through 2018 and beyond.

- **Financial mode** optimizes PV and battery system sizes and battery dispatch strategy to minimize life cycle cost of energy.

- **Resilience mode** sizes PV+storage systems to sustain critical load during grid outages.
Required Site Specific Inputs
Additional Inputs Can Be Edited, Or Left As Defaults

- Location and utility rate
- Typical load profile (simulated or actual)
- Critical load profile required for resilience mode along with outage start
- Technologies to evaluate
Summary Results Include System Sizes and Savings

Results for Your Site

These results from REopt Lite summarize the economic viability of PV and battery storage at your site. You can edit your inputs to see how changes to your energy strategies affect the results.

Your recommended solar installation size

781 kW
PV size

Measured in kilowatts (kW) of direct current, this recommended size minimizes the life cycle cost of energy at your site.

Your recommended battery power and capacity

131 kW
battery power

556 kWh
battery capacity

This system size minimizes the life cycle cost of energy at your site. The battery power and capacity are optimized for economic performance.

Your potential life cycle savings (20 years)

$439,275

This is the net present value of the savings (or costs if negative) realized by the project based on the difference between the life cycle cost of doing business as usual compared to the optimal case.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Resilience</th>
<th>Financial</th>
</tr>
</thead>
<tbody>
<tr>
<td>PV Size</td>
<td>1,112 kW</td>
<td>781 kW</td>
</tr>
<tr>
<td>Battery Power</td>
<td>330 kW</td>
<td>131 kW</td>
</tr>
<tr>
<td>Battery Capacity</td>
<td>2,095 kWh</td>
<td>556 kWh</td>
</tr>
<tr>
<td>Net Present Value</td>
<td>$235,242</td>
<td>$439,275</td>
</tr>
<tr>
<td>Average Resiliency</td>
<td>968 hours</td>
<td>8 hours</td>
</tr>
</tbody>
</table>
• Outage occurring June 7-8
• Critical load 50% of typical load
Effect of Resilience Costs and Benefits

This chart shows the cumulative effect of resilience costs and benefits on the project’s net present value (NPV). The microgrid upgrade cost and avoided outage costs are not factored into the optimization results.

- **Microgrid Upgrade Cost**: 25% of system capital cost
- **Avoided Outage Costs**: $100 per kWh
Contact Information and Resources

- Emma Elgqvist, NREL, emma.elgqvist@nrel.gov

Resources

- REopt website: https://reopt.nrel.gov/
- REopt Lite web tool: https://reopt.nrel.gov/tool
Holt Mountcastle, Re Tech Advisors
The Better Buildings Financing Navigator is an online tool that helps public and private organizations find financing solutions for energy efficiency and renewable energy projects.

With the Navigator, you can…

1. **Explore:** Learn the basics of the clean energy financing market

2. **Find:** Answer a few simple questions to see which financing options might be a fit for your project

3. **Connect:** Speak to Better Buildings Financial Allies who may be able to finance your project

Available at: [https://betterbuildingssolutioncenter.energy.gov/financing-navigator](https://betterbuildingssolutioncenter.energy.gov/financing-navigator)
Live Demo
FINANCING LANDSCAPE

The diagram below summarizes the energy efficiency and renewable energy financing options available in the market. “Traditional” options are commonly used to finance energy projects in addition to other types of goods and services, whereas “specialized” options are specifically designed for energy projects. Organizations can also fund projects internally without seeking third-party financing. For a more detailed typology of financing options, see LBNL’s "Current Practices in Efficiency Financing" report.
TELL US ABOUT YOUR ORGANIZATION

1) Sector (required)
   - Select -

TELL US ABOUT YOUR PROJECT

2) Project Cost (required)
   $

3) Building Ownership
   - None -

4) Project Type (required)
   - Select -
   - Energy Efficiency
   - Renewable Energy
   - Other Generation

YOUR PREFERENCES

5) Do you want the financing to be on or off balance sheet?
   - None -

6) How important is it to minimize your performance risk?
   - None -
<table>
<thead>
<tr>
<th>BASIC ATTRIBUTES</th>
<th>OPTION 1</th>
<th>OPTION 2</th>
<th>OPTION 3</th>
<th>OPTION 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable Sectors</td>
<td>✓</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Building Ownership</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Project Size</td>
<td>✓</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Project Type</td>
<td>✓</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>CONTRACT STRUCTURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contract Complexity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Risk</td>
<td>✔</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>TAX &amp; BALANCE SHEET</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Balance Sheet Treatment</td>
<td>✓</td>
<td>✔</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Tax Deductions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTRACT TERMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Typical Close Time</td>
<td>✓</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Products</td>
<td>Sectors</td>
<td>Technologies</td>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>--------------------------------</td>
<td>----------------------------------------</td>
<td>-----------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>SELECT ALL</td>
<td></td>
<td>Efficiency-as-a-service</td>
<td>Power Purchase Agreements (PPAs)</td>
<td></td>
</tr>
<tr>
<td>Leases</td>
<td></td>
<td>Property Assessed Clean Energy (PACE)</td>
<td>Performance Insurance</td>
<td></td>
</tr>
<tr>
<td>Debt or Loans</td>
<td></td>
<td>On-Bill Financing/Repayment</td>
<td>Secondary Market Investment &amp; Services</td>
<td></td>
</tr>
<tr>
<td>Bonds</td>
<td></td>
<td>Grants or Below-Market Loans</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abundant Power</th>
<th>Advantage Energy</th>
<th>AFL-CIO Housing Investment Trust</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abundant Power Solutions</td>
<td>Advantage Energy provides full life-cycle fund and asset management services for long-lived infrastructure assets, especially on...</td>
<td>The AFL-CIO and its affiliated labor unions are engaged in energy-saving building retrofits and infrastructure improvements...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>All American Investment Group</th>
<th>Allumia</th>
<th>Bank of America Merrill Lynch</th>
</tr>
</thead>
<tbody>
<tr>
<td>All American Investment Group (AAIS) was formed in 1999 to provide true capital markets access for privately placed debt...</td>
<td>Allumia is an efficiency-as-a-service provider focused on making it simple, affordable, and painless for small and mid-sized...</td>
<td>Bank of America is one of the world's largest financial institutions, serving individual consumers, small businesses, middle...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BioStar Renewables</th>
<th>Blue Hill Partners LLC</th>
<th>BlueFlame Energy Finance LLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BioStar Renewables is a renewable energy investment firm that specializes in energy infrastructure projects and companies.</td>
<td>Blue Hill Partners is a green sector investment firm which provides capital, management support, and strategic guidance to...</td>
<td>BlueFlame Energy Finance LLC is a specialty finance company focused on low-cost, low-risk financing solutions for distributed...</td>
</tr>
</tbody>
</table>
WHAT IS EFFICIENCY-AS-A-SERVICE?

Efficiency-as-a-service is a pay-for-performance, off-balance sheet financing solution that allows customers to implement energy and water efficiency projects with no upfront capital expenditure. The provider pays for project development, construction, and maintenance costs. Once a project is operational, the customer makes service payments that are based on actual energy savings or other equipment performance metrics, resulting in immediate reduced operating expenses. The energy services agreement (ESA) is the most common type of arrangement, but other models such as lumens-as-a-service and energy subscription agreements are also in use.

SEE CASE STUDIES

CONNECT WITH PROVIDERS

EFFICIENCY-AS-A-SERVICE MAY BE A GOOD FIT IF YOUR ORGANIZATION...

▶ Wants to pursue retrofits across your portfolio without spending your own capital
▶ Prefers off-balance sheet treatment for the delivery of efficiency services
▶ Wants a pay-for-performance solution where a third party takes on performance risk and provides project management and maintenance
▶ Is looking for a financing mechanism with a contract term ranging from 5 to 15 years, with periodic buy-out options
▶ Wants a new way to procure energy efficient technologies across your portfolio without the hassle of ownership

To compare efficiency-as-a-service to other financing options that might be a good fit, answer a few questions about your organization.
SECTOR-SPECIFIC FINANCING RESOURCES
This section contains energy efficiency and renewable energy financing resources designed specifically for certain sectors. To view the resources for a sector, click on the title to expand the accordion.

› Affordable Multifamily
› Commercial
› Government
› Healthcare
› Higher Education
› K-12
› Multifamily
› Non-profit

PROGRAMS AND POLICIES BY LOCATION
This section contains resources related to energy efficiency and renewable energy financing policies and programs in specific regions, states, and cities.

Coalition for Green Capital
This website includes information about green bank programs in the U.S. and globally.

DSIRE Database
This searchable database provides information on incentives and policies that support renewables and energy efficiency in the U.S.

On-bill Financing, Cost-Free Energy Efficiency Improvements
This website provides information on state legislation relevant to on-bill financing.
Meet-Up Agenda

2:00 – 5:30 pm

• 2:00 Welcome
• 2:30 Breakout Discussions: Buildings
• 3:30 Break
• 4:00 Tools Lightning Round
• 4:30 Breakout Discussions: Beyond Buildings
• 5:25 Wrap Up
Breakout Discussions: Beyond Buildings

- Financing
- Resiliency
- Solar
- Street Lighting
- Transportation
Join Us: No-host Local Government Networking Event & Dinner
6:00 pm Thursday
Butcher and the Brewer (2043 E 4th Street)

Thursday
- Community/Utility Partnerships That emPOWER Success (8:30 AM)
- Follow the Sun: Successful Strategies for Solar Adoption (10:30 AM)
- Leveraging Commercial PACE to Drive Economic Development and Resiliency (10:30 AM)
- Spreading the Love, Upping the Likes (10:30 AM)
- Energy Planning: State, Local, Utility, and Private Sector Perspectives (2:00 PM)
- Saving Energy Cleans Up the Air! Tales from the Trenches (2:00 PM)
- Learning What Works: Energy Data Management (2:00 PM)
- A Level Playing Field: New Tools and Programs for Energy Affordability (4:00 PM)
- Cross-Sector Success: ESPC as an Energy Efficiency Strategy (4:00 PM)
- We’re Engaged! Building Relationships that Lower Energy Intensity (4:00 PM)
- Turning Data into Information with DOE Data Tools (4:00 PM)

Friday
- Workforce Matters: Training and Credentialing (8:30 AM)
- Going Deep on Building Enclosure Commissioning (8:30 AM)