

West Berkeley Public Library, Berkeley, CA



Aligning Municipal Policies and Actions with Energy and Carbon Goals



Today's Presenters



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Agenda

1. Making the Case for Alignment

- Introduction and Background
- Overview of Current Cities Support and Impact
- Best Practices for Benchmarking and Performance Reporting

2. Resources

- Public Tools
- Online Guides and Resources

Learning Objectives

1. Discuss strategic approaches to data-driven decision making
2. Identify best practices for benchmarking and prioritization of municipal buildings
3. Share impacts on policies and operations of multi-year work with six cities
4. Correlate goals with performance reporting

Leading by Example

The Role of Local Governments in Energy and Climate Leadership



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Introduction and Background

Why cities?

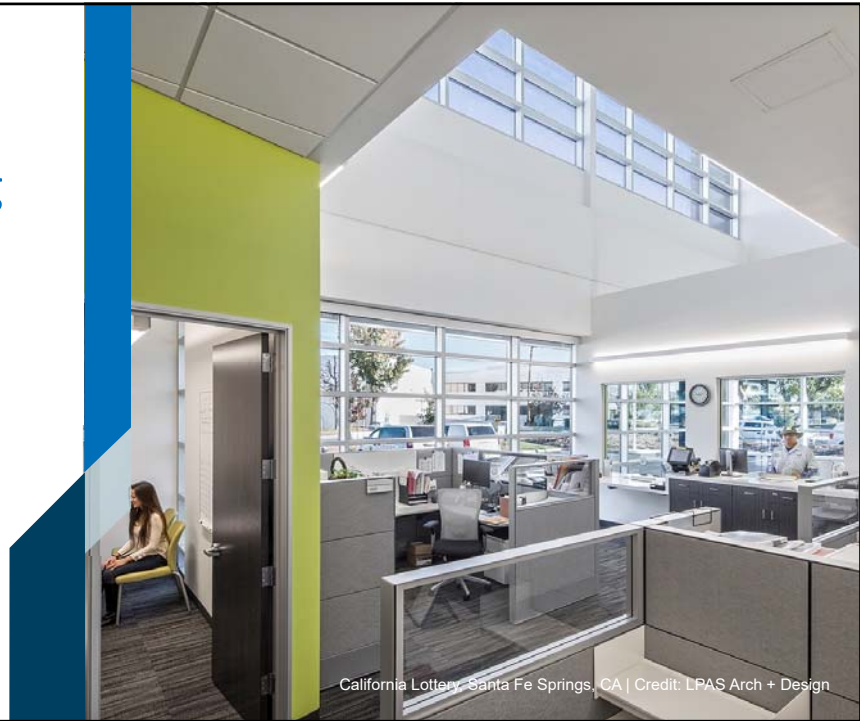


Why buildings?

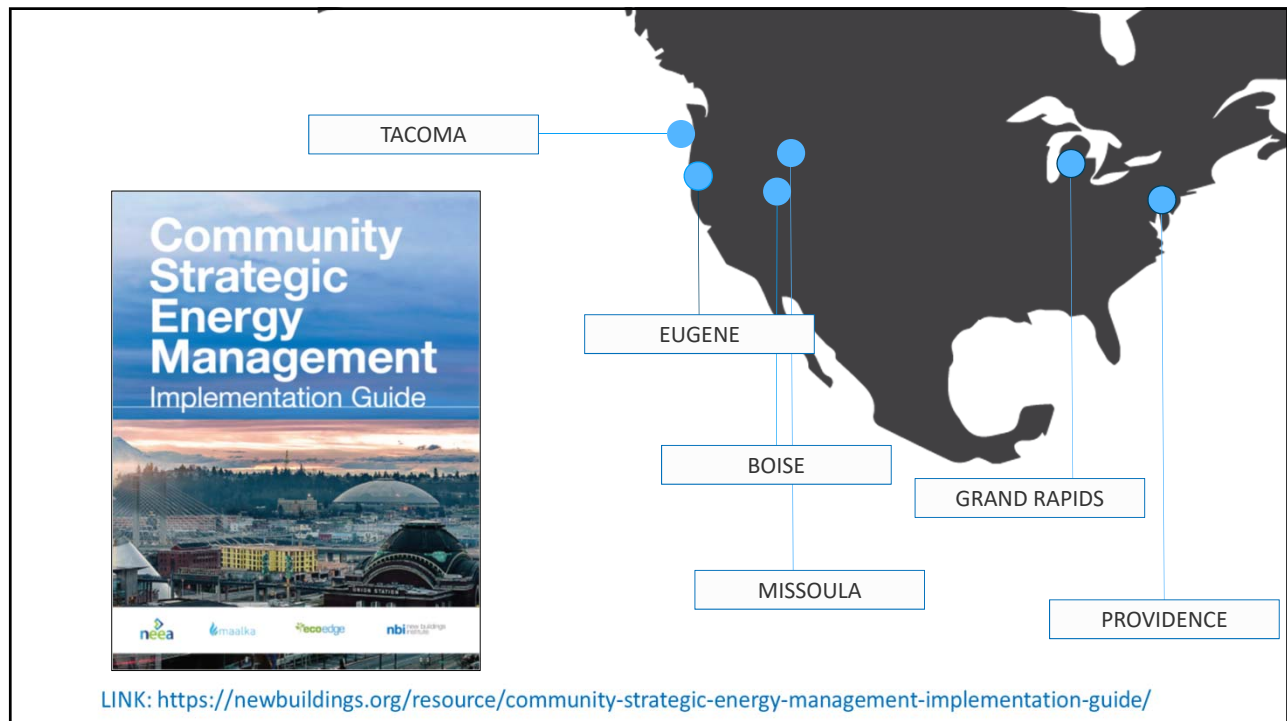


Public Buildings Portfolio Planning

A Replicable
Framework for
Municipal Strategic
Energy Planning



California Lottery, Santa Fe Springs, CA | Credit: LPAS Arch + Design

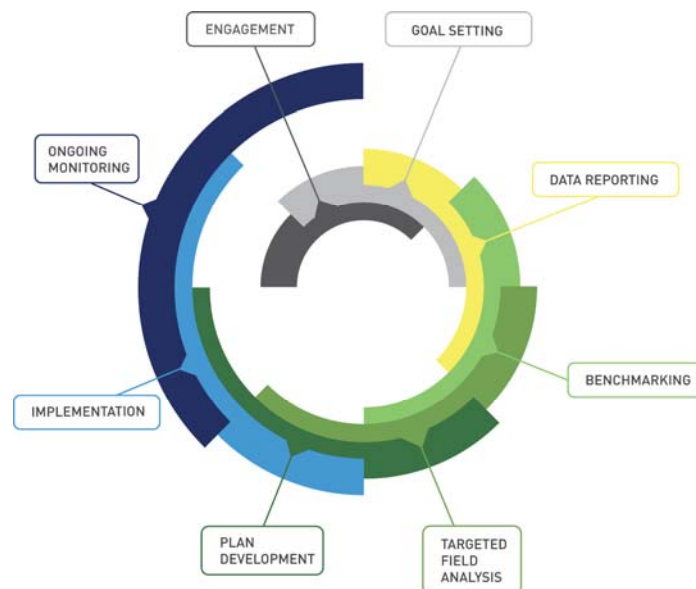


LINK: <https://newbuildings.org/resource/community-strategic-energy-management-implementation-guide/>

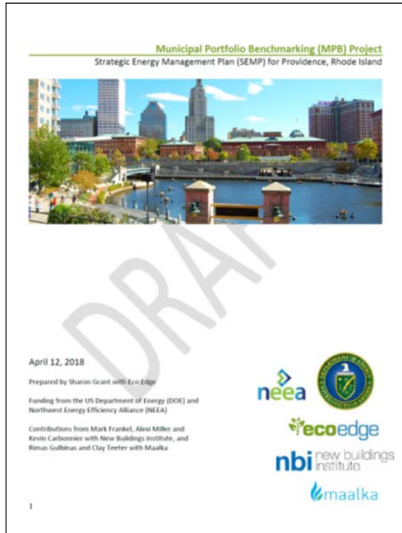
Typical City Struggles

- The path towards achieving carbon emission reduction goals is not clearly defined
- Departments tend to operate in silos
- Decision maker drivers are not well understood
- Data is scattered and not clean
- Presentation of data doesn't tell the story effectively
- Budgets are based on lowest first cost not ROI

The Solution for Cities



Define a Path



- Establish a clear baseline
- Define SMART goals
- Track performance
- Document in a SEMP

Engage the Right Team

- Empower the energy champion
- Ensure cross-departmental representation on an energy team
- View utilities as partners
- Meet regularly
- Present to City Council
- Consider a citizen advisory group



Understand Drivers

- Who established carbon emission reduction targets?
- What motivated them?
- Do they understand the significance of buildings?
- How can you create opportunities to educate them?



Explore New Financing Mechanisms

- Enable long-term energy planning with a sustainable funding stream
- Help achieve carbon emission reduction targets
- Reinvest savings to create a virtuous circle
- Empower those that know the most about their buildings to identify opportunities
- Expedite approval processes for energy upgrades – remove red tape



Developing an Energy Reinvestment Fund

- Start with seed funding
- Develop a strategy for sustained funding
- Determine how the fund will be managed
- Establish criteria for selecting projects
- Measure and track the results



[LINK: https://betterbuildingssolutioncenter.energy.gov/solution-roundup/green-revolving-funds](https://betterbuildingssolutioncenter.energy.gov/solution-roundup/green-revolving-funds)

Streamlining Data Collection & Cleansing



- Ensure there is a master facility list
- If automated, upload to PM, check for building name and address consistency
- If not automated, consider ways to consolidate data streams
- Run data through Maalka's "data cleansing" tool

Data Cleansing

Data Quality must be analyzed at various resolutions and should be continuously monitored.

- Data Quality for Individual Meters
 - e.g. Check for gaps in each electricity meter
 - Could be indicative billing errors or data entry errors
- Data Quality for Aggregated Fuel Types
 - e.g. Check for jumps in monthly whole building electricity
 - Could be indicative of billing errors
- Data Quality for Aggregate Energy
 - e.g. Check for missing months in whole building and/or portfolio energy

Field	Value	Status
Delivered Electricity Resource Value	Edit Data	<ul style="list-style-type: none"> ✓ Start Time Before End Time ✓ Exists For Each Month ✗ Jump From Last Year ✓ Data Gap
Natural Gas Resource Value	Edit Data	<ul style="list-style-type: none"> ✓ Start Time Before End Time ✓ Exists For Each Month ✗ Jump From Last Year ✓ Data Gap

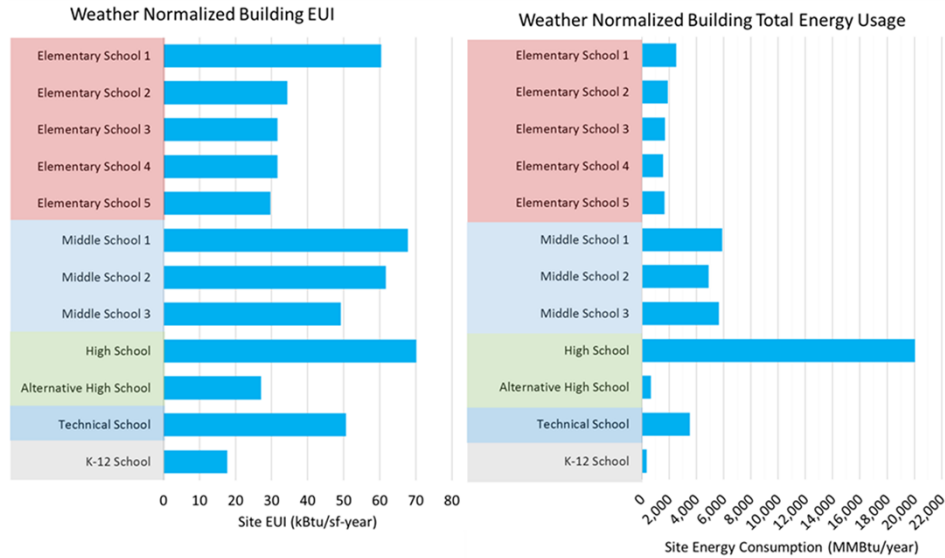
Tell the Story

The goal is “data-based decision making”

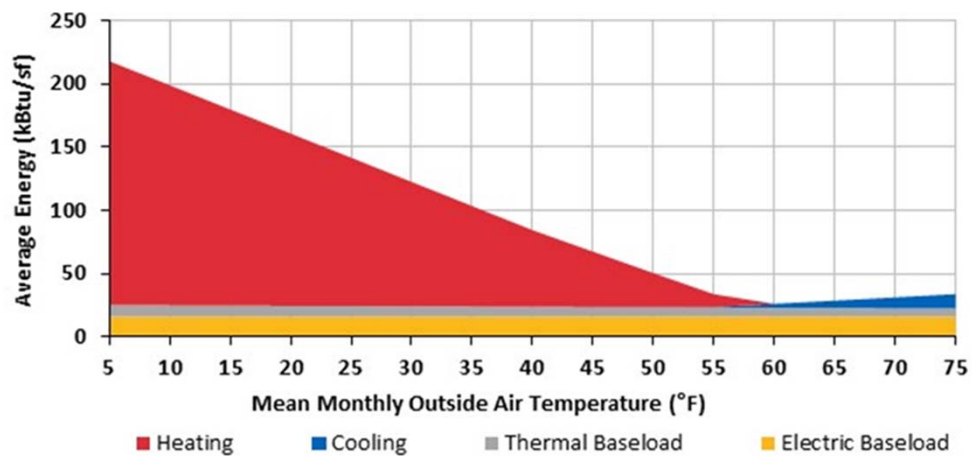
- Conduct virtual energy audits
- Make relevant comparisons
- Track the impact of energy upgrades
- Share success stories
- Show progress on a trajectory towards targets



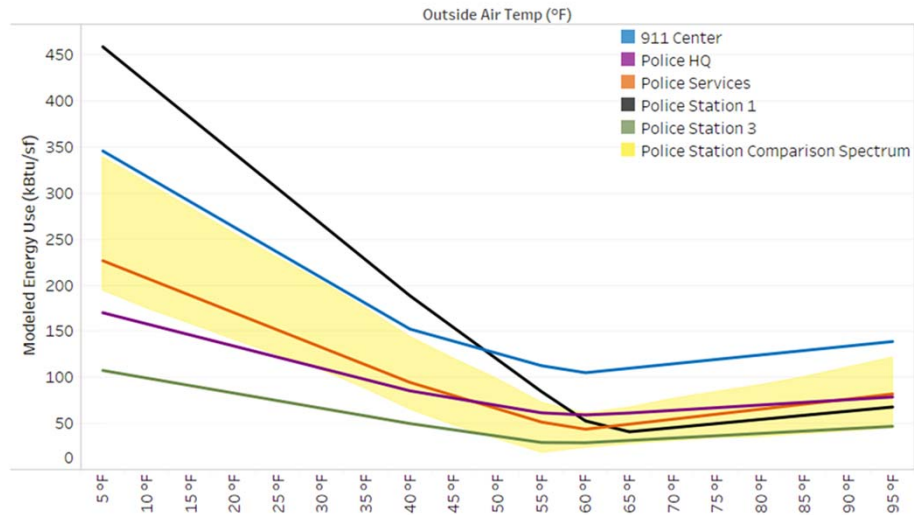
Energy Intensity and Consumption Comparisons



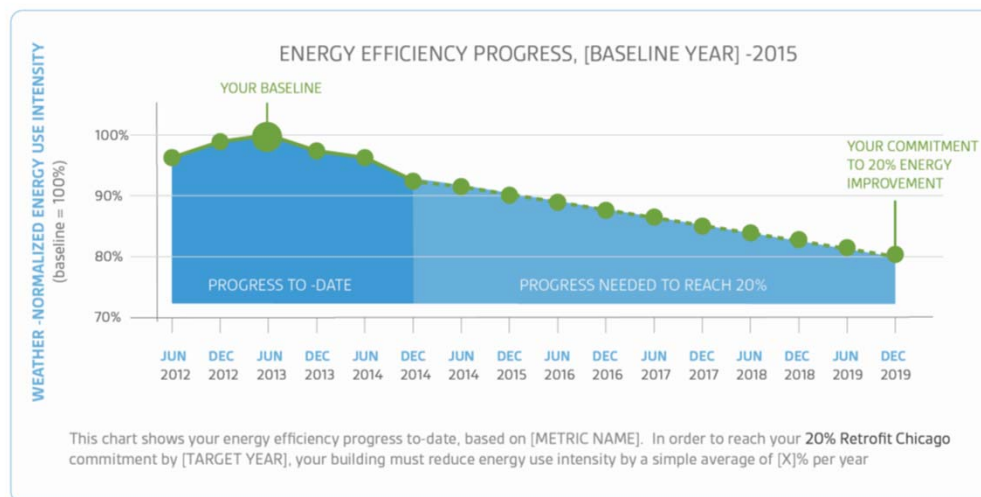
FirstView® Diagnostics



Comparison Spectrums of Similar Buildings



Progress on a Trajectory

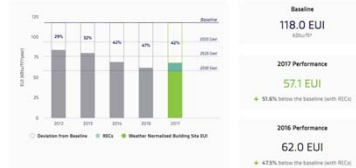


Correlate Goals to Performance Reporting

Assessing performance from the perspective of Long Term Strategic Goals and Building Operations

BNY MELLON CENTER ENERGY

Energy Report
The graph below summarizes weather-normalized energy performance compared to the Pittsburgh 2000 District goals. The first incremental step was a 10% reduction by 2015. Baseline is determined by national median average.



Office Buildings > 200,000 ft² Buildings: 2017 Energy Performance Savings
The chart below summarizes all FGI 2000 District committed Office properties. 2017 energy performance against baseline. 2007 Mellon Center is represented in blue.



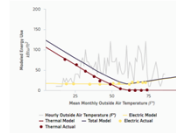
2030
DISTRICT™

2030 Districts Performance Tracking - ZeroTool

FirstView PROVIDENCE REPORT

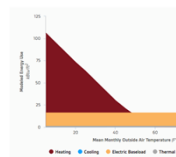
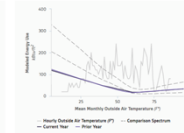
Energy Signature by Fuel

The Energy Signature by Fuel plot shows actual energy usage along with the FirstView modeled energy use, calibrated to the actual usage. Energy Signatures characterize energy use at various temperatures. The plotted points in this chart represent the building's electric and gas usage, while the solid line represents the FirstView model of the energy use. The orange line represents total energy use, or the sum of the modeled lines.



Trending Analysis and Energy Signature Comparison

In this graph, the building's energy signature history is compared to a spectrum of 100 national office buildings. This provides the opportunity for a comparison with building peers. The upper and lower dotted lines represent the 75th and 25th percentiles, respectively, of the buildings analyzed.



Consumption by End Use Energy Signature

The Consumption by End Use Energy Signature shows the total energy use split into heat and air conditioning, heating electric, gas, and/or electric cooling, electric base load, and/or gas, and/or electric base load. This plot shows cumulative energy use at a range of outside temperatures and can offer insights into building consumption patterns. Click here to learn more.

nbi new buildings
institute

New Buildings Institute – First View Analysis

Impact



San Diego. Credit: Fortune Builders

Impacts, Successes, Lessons Learned

- Mobilize a robust cross-departmental energy team and engage decision makers at a high level
- Facilitate greater alignment between facilities and RCM/EM
- Create SMART goals
- Produce regular performance reporting of successes
- Build net zero municipal building as an example to the community
- Add FTE
- Save Energy and \$

Resources



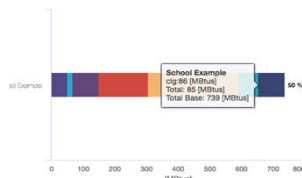
San Diego. Credit: Fortune Builders

Open Tools | Leverage Powerful Public Toolkit

CODES ASSESSMENT

PURPOSE: The Code Assessment Tool enables municipalities to understand how the adoption of various building energy codes and improvement strategies would impact the energy-use of buildings across their portfolio.

LINK: <https://codes.maalka.com>



DATA VALIDATION

PURPOSE: The Data Validation Tool allows users to easily import their EPA Portfolio Manager data and identify data anomalies across their building portfolio. Use the tool as first step to improving data quality before engaging in data analysis.

LINK: <https://dataquality.maalka.com/>

Results - Download CSV

Asset	Year	Electricity	Gas	Water	Steam	Other	CO2	CH4	N2O	Other GHGs	Renewable Energy
Office 1	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 2	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 3	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 4	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 5	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 6	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Office 7	2018	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

BUILDING LIFECYCLE

PURPOSE: The Building Life Cycle Tool guides users in the collection of the most important building systems and energy efficiency measures information in a standardized format. The data can be used to jumpstart building energy audits.

LINK: <https://lifecycle.maalka.com/>

Systems Measures

Form:

Source of heating energy for regeneration

Detail:

Comments:

DELETE ✕ ADD TO LIST ➔

Open Tools | Leverage Powerful Public Toolkit

EUI BENCHMARK

PURPOSE: The Zero Tool was built for Architecture2030 and is used to compare building energy-use intensity with similar building types across the country, based on location and building characteristics.

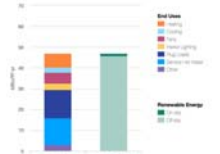
LINK: <https://zerotool.org/zerotool/>



NET ZERO CALCULATOR

PURPOSE: The Energy Calculator was built for Architecture2030. The Energy Calculator estimates the potential offset of on-site solar and RECs required for your building to achieve zero-net-carbon.

LINK: <https://zero-code.org/energy-calculator/>



TEMPERATURE SENSITIVITY

PURPOSE: The Temperature Sensitivity Tool helps users understand how their building energy-use varies with temperature, which can be used to normalize for weather and measure changes to energy-use over time.

LINK: <https://sensitivity.maalka.com/>



Maalka will continue to expand open toolkits for organizations

Some Links and Resources

NBI, EcoEdge, Maalka, NEEA: “Community SEM Implementation Guide”. <https://newbuildings.org/resource/community-strategic-energy-management-implementation-guide/>

Maalka: “Open Source Tools for Community SEM” . <https://maalka.com/tools>

Institute for Market Transformation: “City Energy Project”<https://www.cityenergyproject.org/>

Bloomberg: “American Cities”. <https://www.bloomberg.org/program/founders-projects/american-cities-initiative/>

2030 Districts: <https://www.2030districts.org/>

ACEEE: “Building Benchmarking, Rating, and Transparency”. <http://database.aceee.org/city/benchmarking-disclosure>

Department of Energy: “Better Buildings Challenge”. <https://betterbuildingssolutioncenter.energy.gov/alliance/about>



Discussion

Thank You!



www.buildingecoedge.com



www.maalka.com



Wayne Aspinall Federal Building & Courthouse, Grand Junction, CO