



West Berkeley Public Library, Berkeley, CA

nbi new buildings
institute

Aligning Municipal Policies and Actions with Energy and Carbon Goals



10th Annual Statewide Energy Efficiency Forum

June 26-27, 2019 | Long Beach, CA



LIBRARY

Today's Presenters



Cathy Higgins

New Buildings
Institute



Sharon Grant

EcoEdge



Mike Grimm

City of Carlsbad



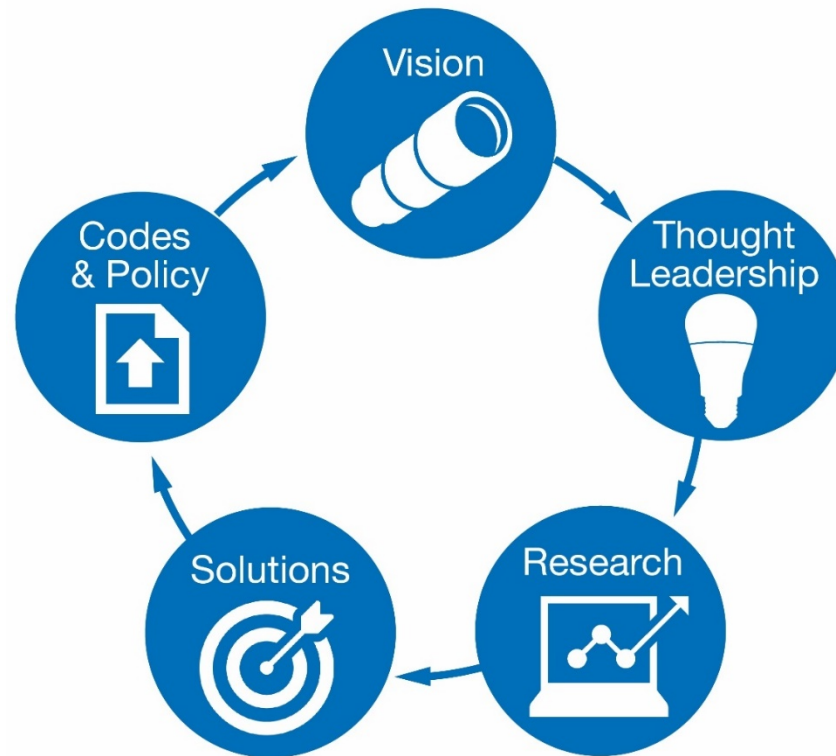
Susan Freed

County of
San Diego

Efficiency delivered.

NBI is responding to increasing urgency to reduce carbon emissions increased demand for improved energy performance of new and existing buildings.

NBI's
Theory of
Market
Change:



Our Program Areas

(1) Building & Program Innovation

(2) Zero Energy Leadership & Market Development

(3) Advancing Codes & Policy

VanDusen Botanical Gardens Visitor
Centre | Vancouver, BC
Source: Nic Lehoux

Today's Agenda

1. Making the Case for Alignment

- Cities in Leadership Role (Cathy Higgins)
- Overview of Current Cities Support (Sharon Grant)
- *Discussion*

2. Local Efforts and Outcomes

- City of Carlsbad Perspective (Mike Grimm)
- County of San Diego Perspective (Susan Freed)
- *Discussion*

1) Leading by Example

Local Governments: Energy and Climate Leaders

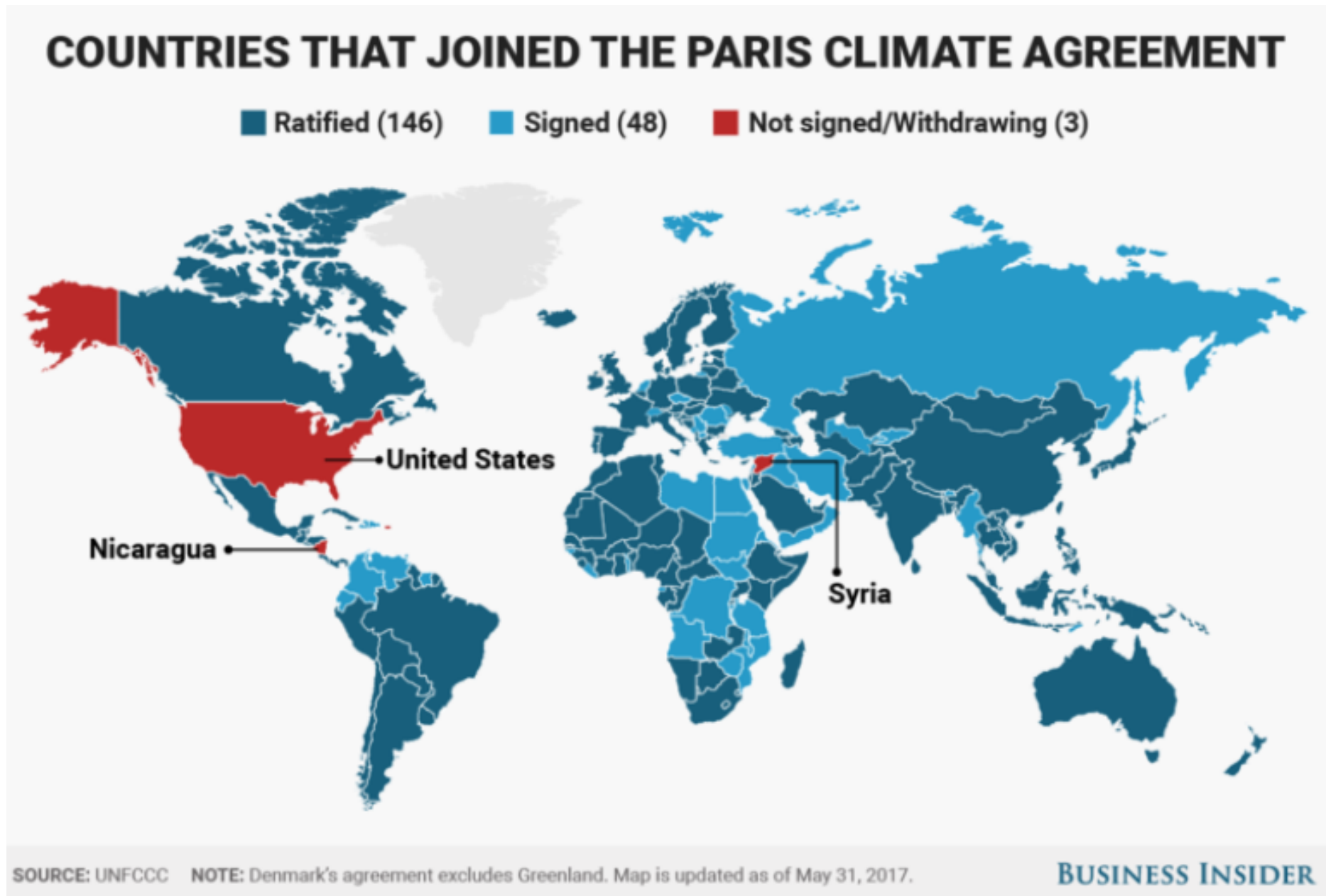
*Cathy Higgins
Research Director
NBI*



In 2015: Paris – an Unprecedented Agreement!



Now —
says
a lot



But there's a new 'Now' – still in!

WE ARE **3,788** LEADERS STRONG

REPRESENTING

155.0 MILLION

 PEOPLE

ACROSS

50



STATES

TOTALING \$\$\$

9.45 TRILLION

\$\$\$ \$ IN GDP



Entry to Bonn Germany UN
Climate Change Conference 2017

BUSINESSES &
INVESTORS



2,192

CITIES & COUNTIES



287

COLLEGES &
UNIVERSITIES



351

CULTURAL
INSTITUTIONS



59

HEALTH CARE
ORGANIZATIONS



28

FAITH GROUPS



44

STATES



10

TRIBES



10

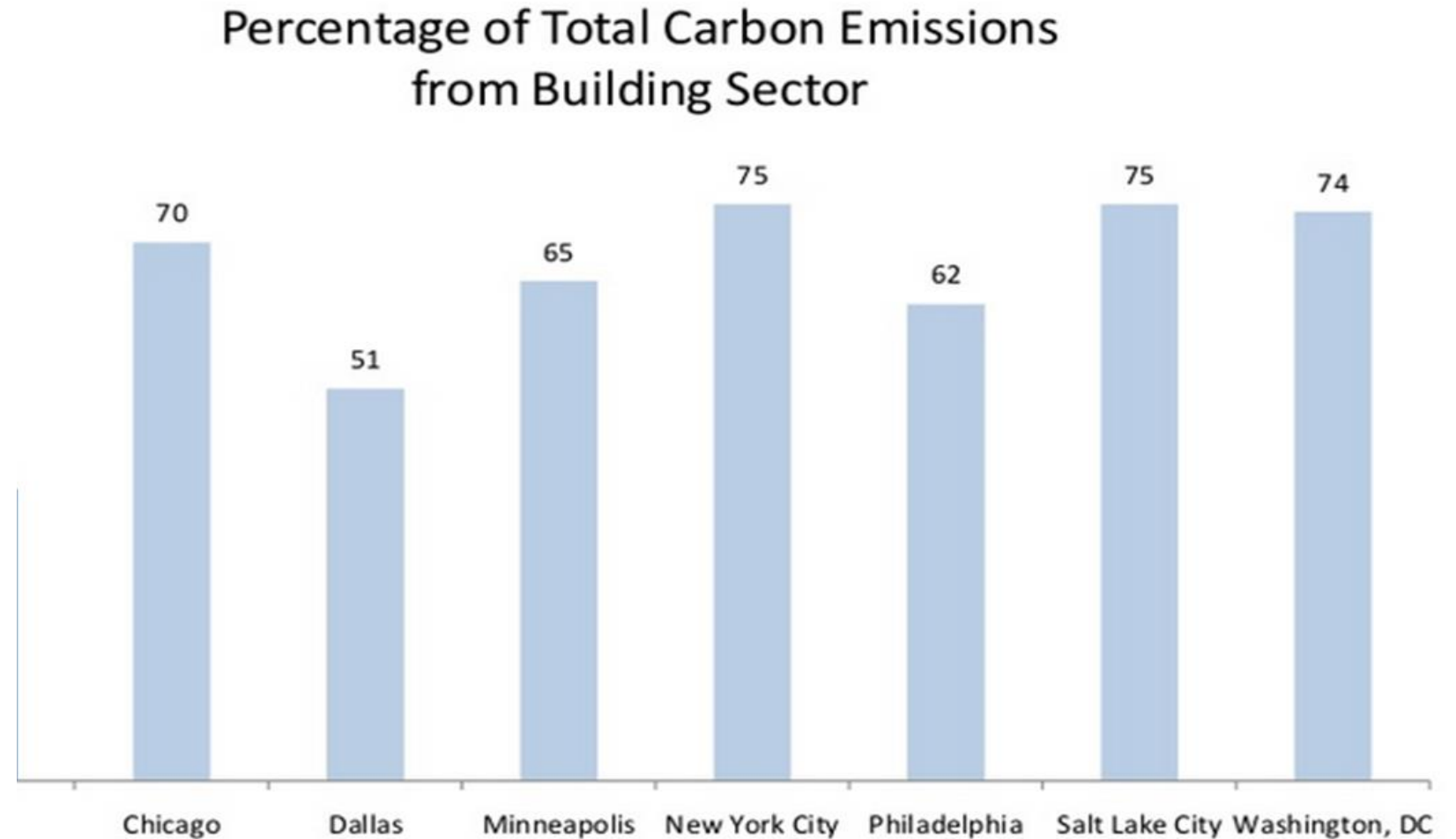
City Action

City's Direct Influence:

- Municipal Buildings
- Fleet Operations
- Transit
- Water and Waste Utilities
- Streetlights and Signals

City Efforts:

- Zero Cities
- 2030 Districts
- Eco-Districts
- C40 Cities
- Climate Action Plans



Source: IMT, 2015

CA Cities Action toward ZNE

City of Santa Monica NEWS

Posted on 10/27/2016

Santa Monica City Council Votes in the World's First Zero Net Energy Building Requirement; Implementation Begins in 2017



Other California Jurisdictions with ZNE Policies:

- Santa Barbara County – City of Palo Alto – City of Hayward
- City of Lancaster -

Cities and Counties Getting to Zero

Carbon Neutral Policies – 37 cities targeting carbon neutral

Zero Energy Buildings – 11 cities with zero ordinances and propositions

New York City, NY

Washington DC

Pima County, AZ

Santa Monica, CA

Austin, TX

Cambridge, MA

Lancaster, CA

Boulder, CO

Palo Alto, CA

Park City, UT

Hayward, CA

CCAs in CA

State	zEPI Jurisdictional Score	ZE Emerging	ZE Verified
CA	51.7	192	22
OR	59.5	22	2
NY	55.7	13	4
AZ	65.7	15	1
MA	51.7	13	2

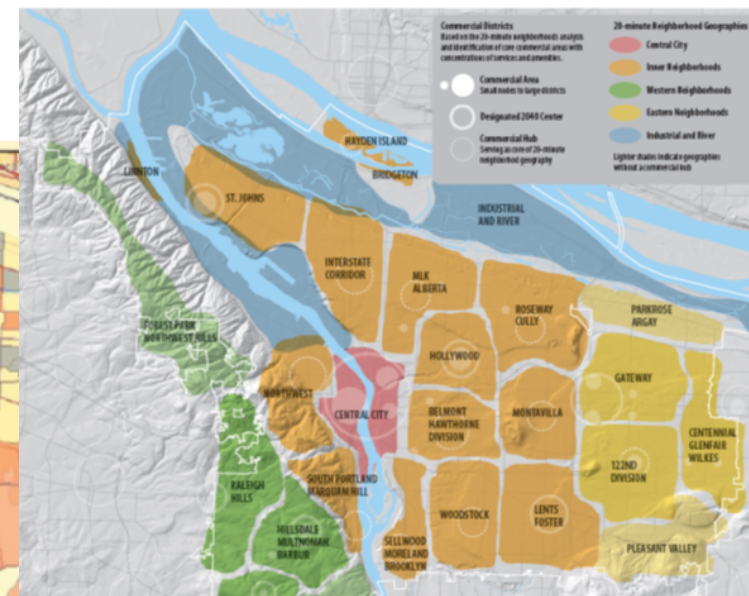
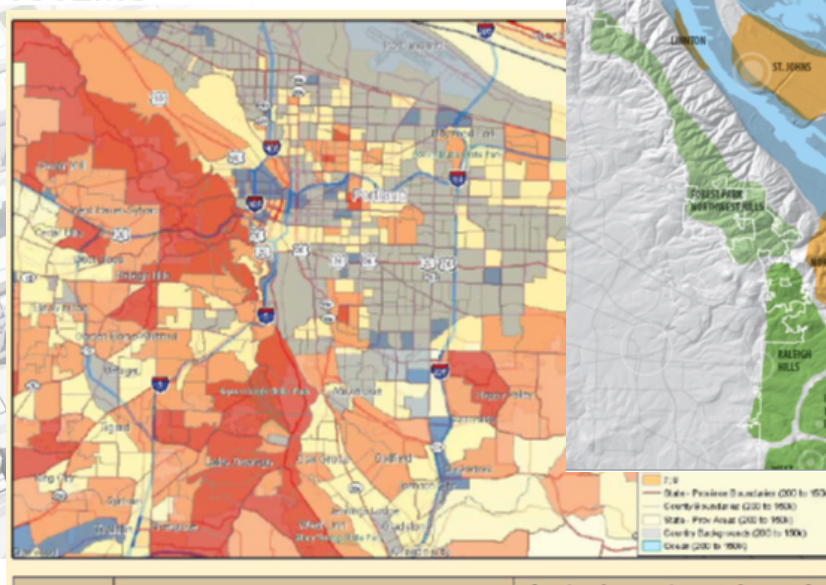
100% Renewables – > 90 cities, ten counties and two states have goals for energy to be supplied by 100% renewable energy but this is gaining traction as more cities look to adopt similar goals.

- *Six cities in the U.S. - Aspen, Burlington, Georgetown, Greensburg, Rock port, and Kodiak Island - have already hit their targets and now generate 100% of the energy used community-wide from clean, non-polluting and renewable sources.*

Source: <https://www.sierraclub.org/ready-for-100/commitments>

Trend - DISTRICTS: *Going Beyond the Building*

DISTRICT SCALE ENERGY SYSTEMS + WATER SYSTEMS



*districts, communities, grids, aggregation, resilience, storage, fuel
access & price, energy transactions, resources, scale, utility*

Market Action

Forbes

New Posts

Most Popular
Snapchat's Future

Lists
The 2014 30 Under 30

ENERGY | 6/05/2013 @ 5:36PM | 4,986 views

Building The Capacity To Increase Net Zero Construction

4 comments, 2 called-out

+ Comment Now + Follow Comments

The net zero building movement (where buildings produce as much or more energy than they consume) remains a nascent phenomenon. As of this time last year, the New Buildings Institute – the organization that tracks such things – had recognized only 21 buildings as net zero structures. Only two of these exceeded 15,000 square feet. The concept of net zero

Save the Date!

Windows Cutting, Grand Opening

Image: sanleandro

The New York Times


Commercial

WORLD U.S. N.Y. / REGION BUSINESS TECHNOLOGY SCIENCE HEALTH SPORTS OPINION

NEIGHBORHOODS GREAT HOMES AND DESTINATIONS COMMERCIAL

SQUARE FEET

Close to Its Home, Walgreen Tests Energy-Saving Ideas



Sunnyvale Net Zero Success Spurs a Second Act

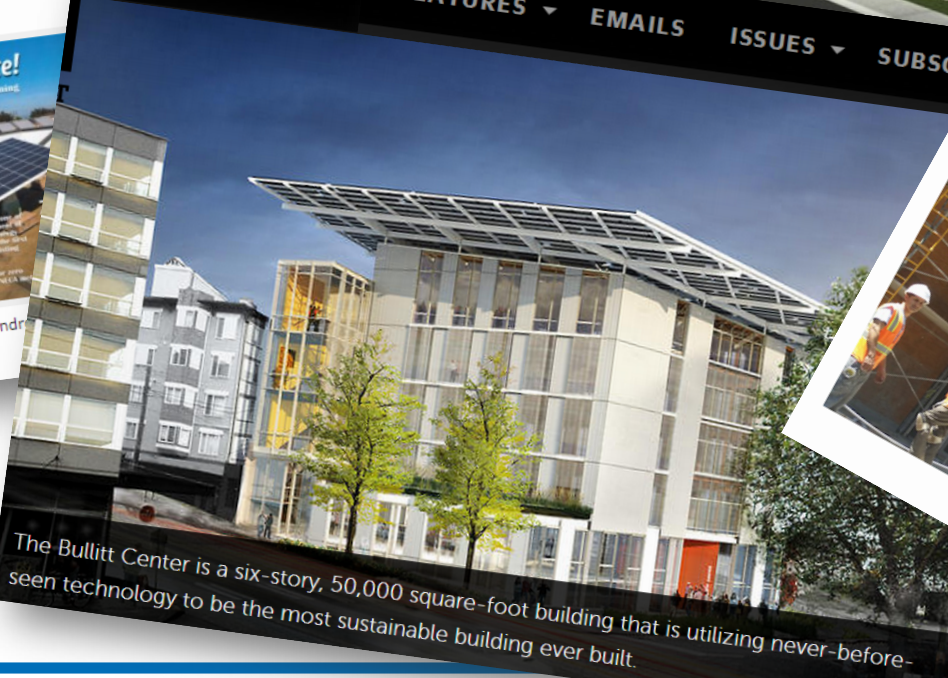
Posted on May 18, 2015 by publisher in Commercial, INDUSTRY news



Workers installing View's dynamic glass on the building

FAST COMPANY

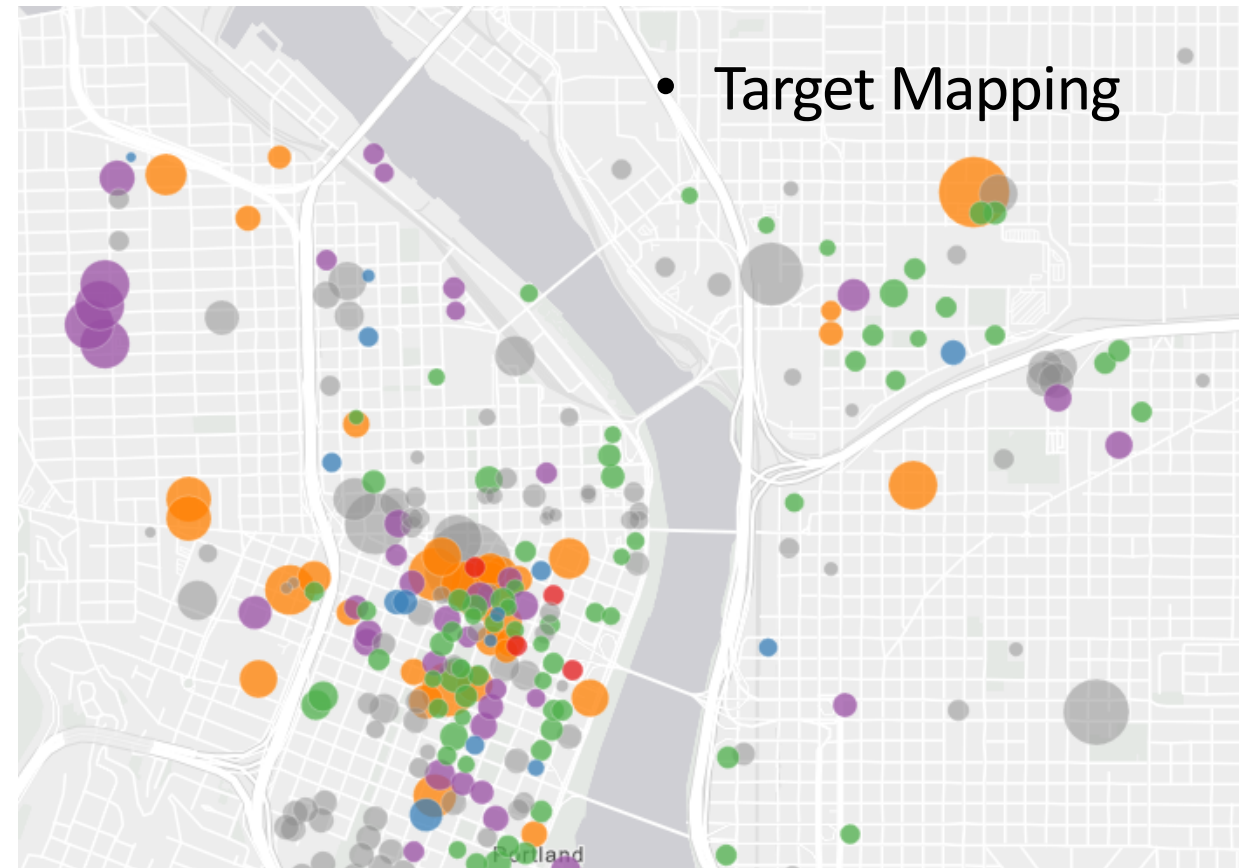
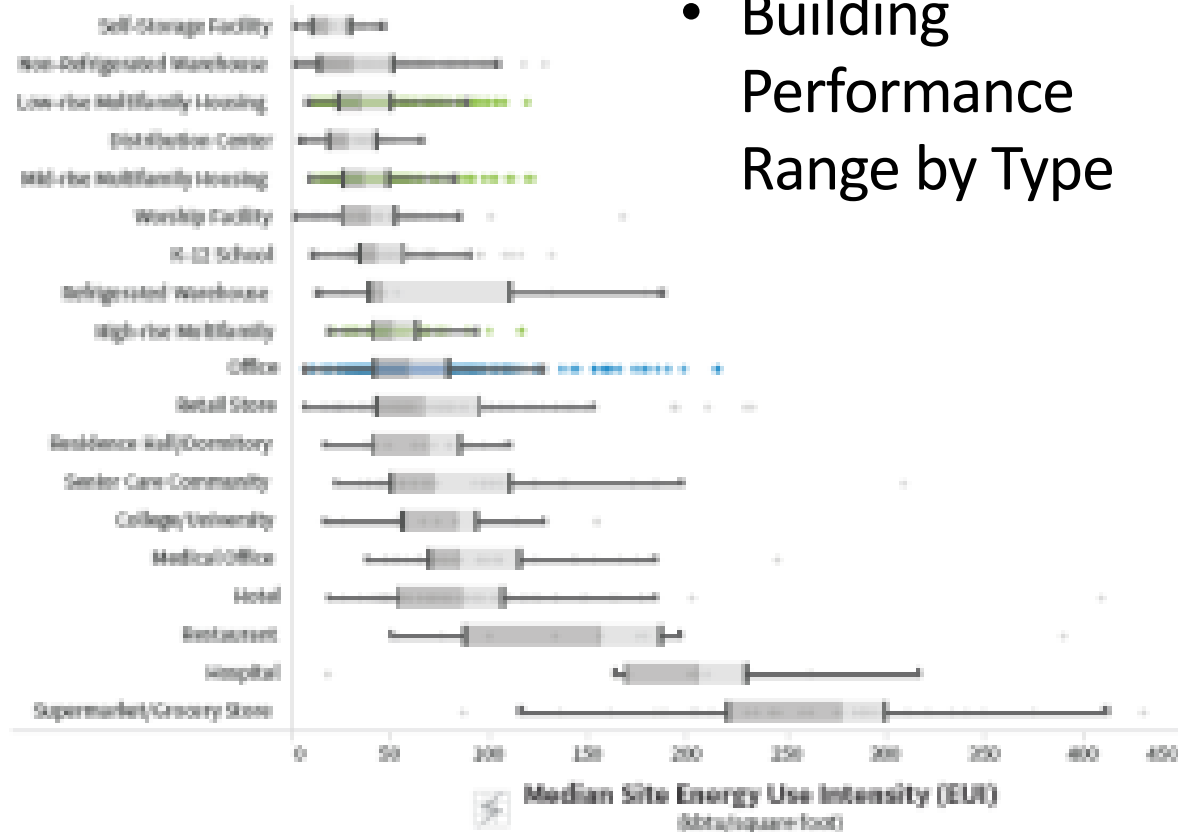
FEATURES EMAILS ISSUES SUBSCRIBE



The Bullitt Center is a six-story, 50,000 square-foot building that is utilizing never-before-seen technology to be the most sustainable building ever built.

Disclosure Ordinances

- Cities increasingly leveraging disclosure
- Data allows assessment of code impact and climate goal progress
- Targets Buildings for Programs



NBI Getting to Zero Buildings Database

Use the filters on the left to filter projects in the map, and/or select a bubble on the map to filter the table below.
Click on the **Analysis** tab above to see the big picture and create customized charts.

[Reset Filters](#)

ZE Status Count

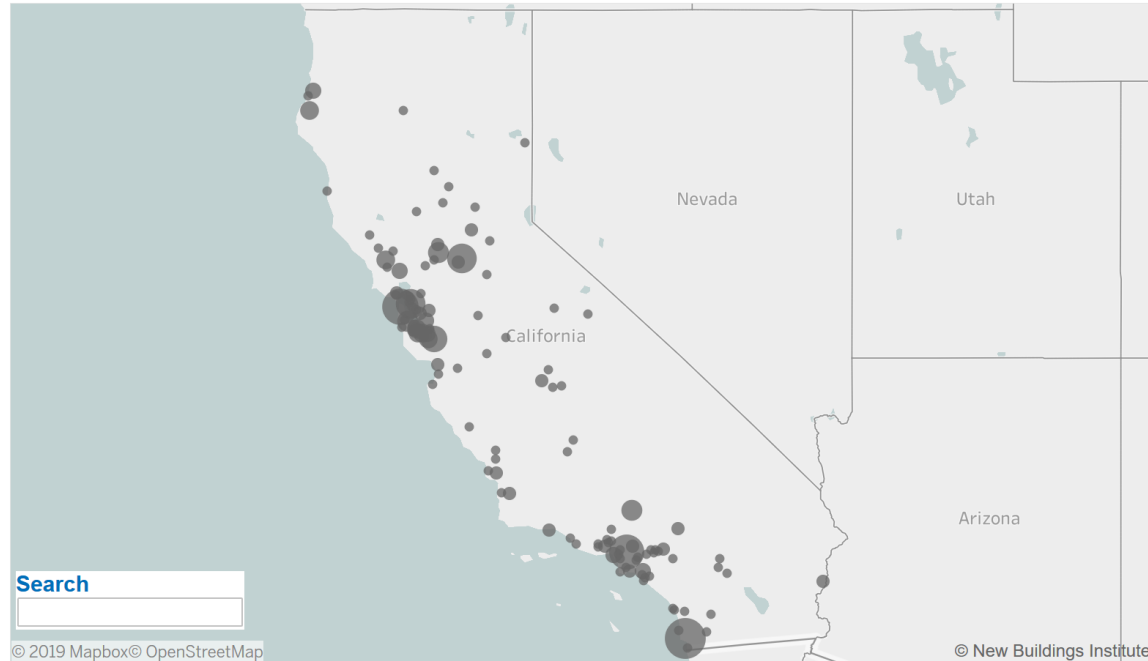
- ☒ Emerging 230
- ☒ Verified 26

State or Province

- ☐ (All)
- ☐ Alabama
- ☐ Alberta
- ☐ Arizona
- ☐ Arkansas
- ☐ British Columbia
- ☒ California
- ☐ Colorado
- ☐ Connecticut
- ☐ Delaware

Building Type

- ☒ (All)
- ☒ Education
- ☒ Food Sales
- ☒ Food Service
- ☒ Health Care (Inpatient)
- ☒ Health Care (Outpatient)
- ☒ Lodging
- ☒ Mercantile (Enclosed a...)
- ☒ Mercantile (Retail Other...)



ZE Status	State or Province	Name	Certifications	City	Building Type	Size (sf)	Total Site EU1	Net Site EU1
Verified	CA	435 Indio Ave	ILFI	Sunnyvale	Office	31,800	14	-15
Verified	CA	AP+I Design		Mountain View	Office	14,300	18	0
Verified	CA	Alpine Branch Library	LEED	Alpine	Public Assembly	12,681	29	-1
Verified	CA	Arch Nexus SAC Office	LEED	Sacramento	Office	8,200	36	-3
Verified	CA	Audubon Center at Debs Park (off grid)	LEED	Los Angeles	Other	5,020	17	0
Verified	CA	Bacon St. Offices	LEED	San Diego	Office	4,500	13	-10
Verified	CA	Bagatelos Architectural Glass Solutions		Sacramento	Other	63,000	12	0
Verified	CA	Bishop O'Dowd High School, Environmental Science ...	LEED, ILFI	Oakland	Education	3,275	18	-1
Verified	CA	CDPH Richmond Labs, Building P	LEED	Richmond	Office	205,000	25	-4
Verified	CA	Challengers Tennis Club		Los Angeles	Other	3,500	9	0

Resources, Guides and Events

- Getting to Zero National Forum
Oct. 9-11 in Oakland



JOIN US!

Join us at the premier global event dedicated to creating a zero energy, zero carbon future for the built environment.

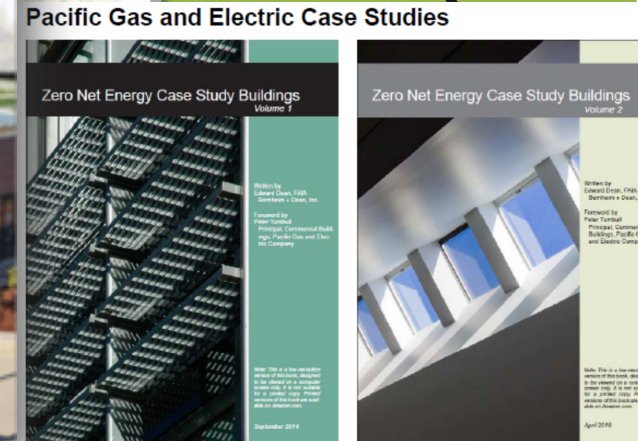
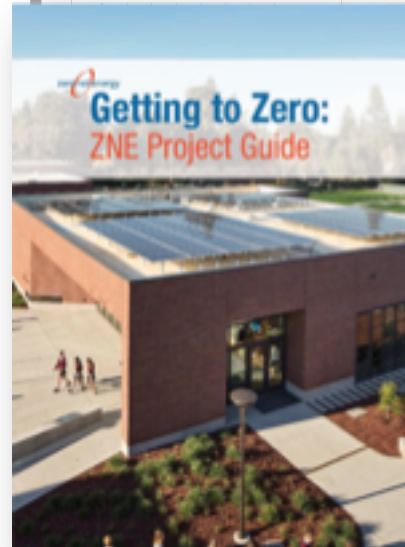
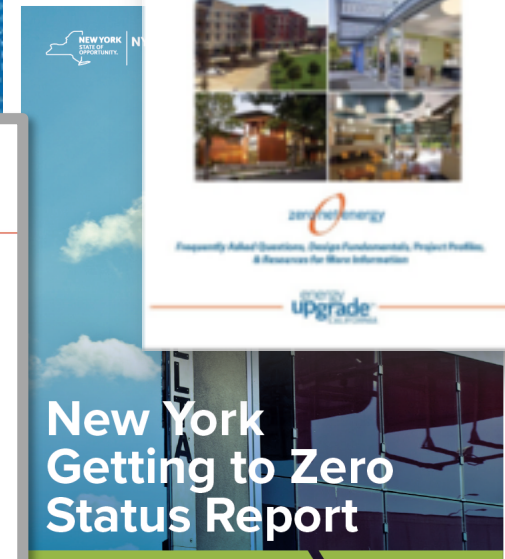
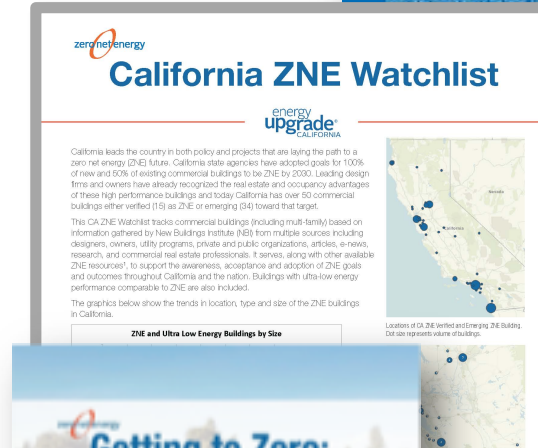
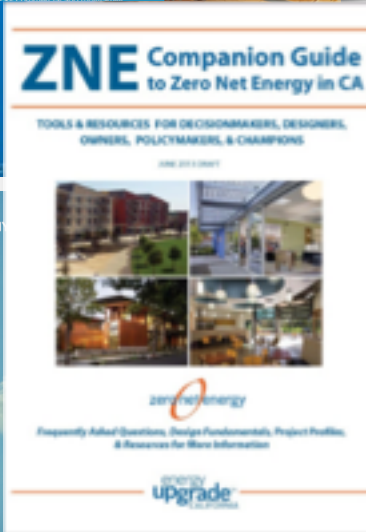
nbi new buildings institute

ROCKY MOUNTAIN INSTITUTE

GETTING TO zero FORUM 2019

October 9-11 OAKLAND MARRIOTT Oakland, CA

gettingtozeroforum.org



2) Public Buildings Portfolio Planning

A Replicable Framework for Municipal Strategic Energy Planning

Sharon Grant
Eco-Edge



Reference Cities

Boise, ID

Eugene, OR

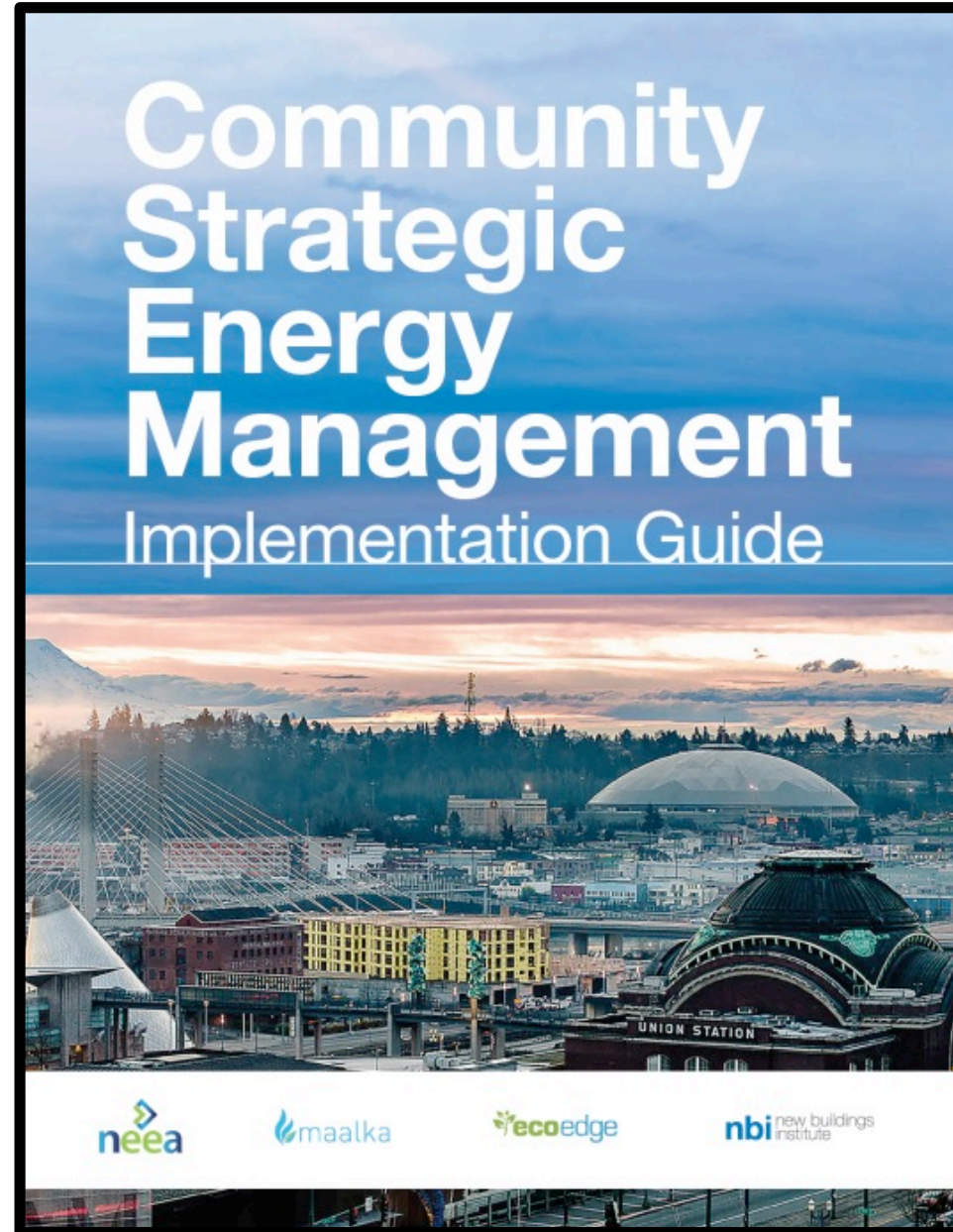
Missoula, MT

Tacoma, WA

Providence, RI

Grand Rapids, MI

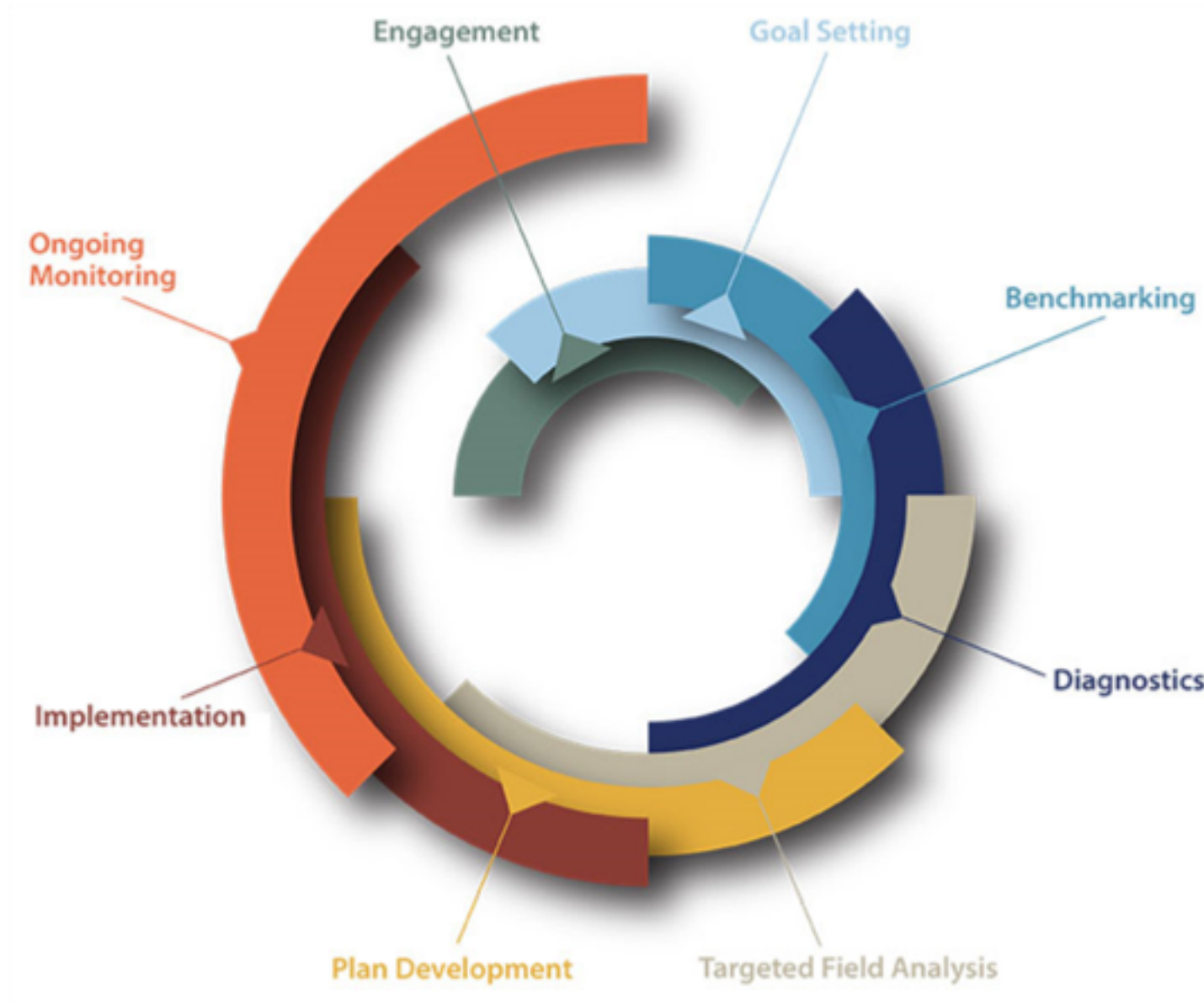
<https://newbuildings.org/resource/community-strategic-energy-management-implementation-guide/>



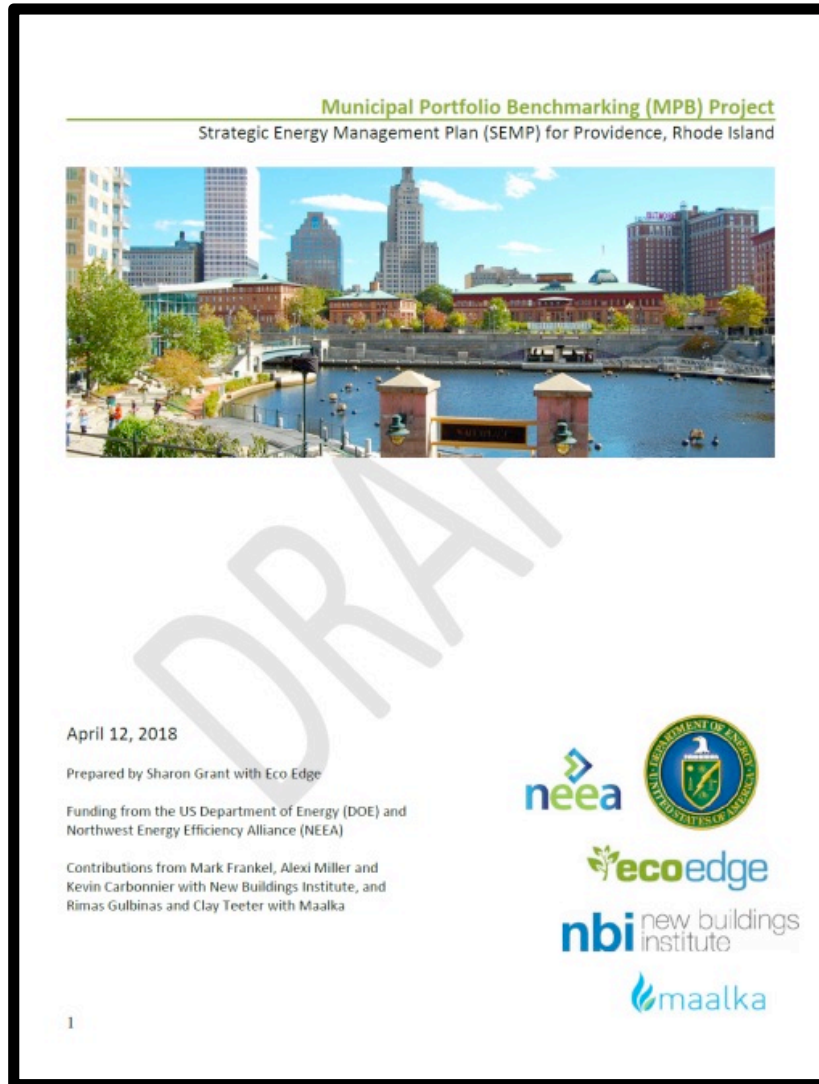
Typical City Struggles

- 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 the 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 Revolving 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



<https://betterbuildinginsolutioncenter.energy.gov/solution-roundup/green-revolving-funds>

Streamlining Data Collection and 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

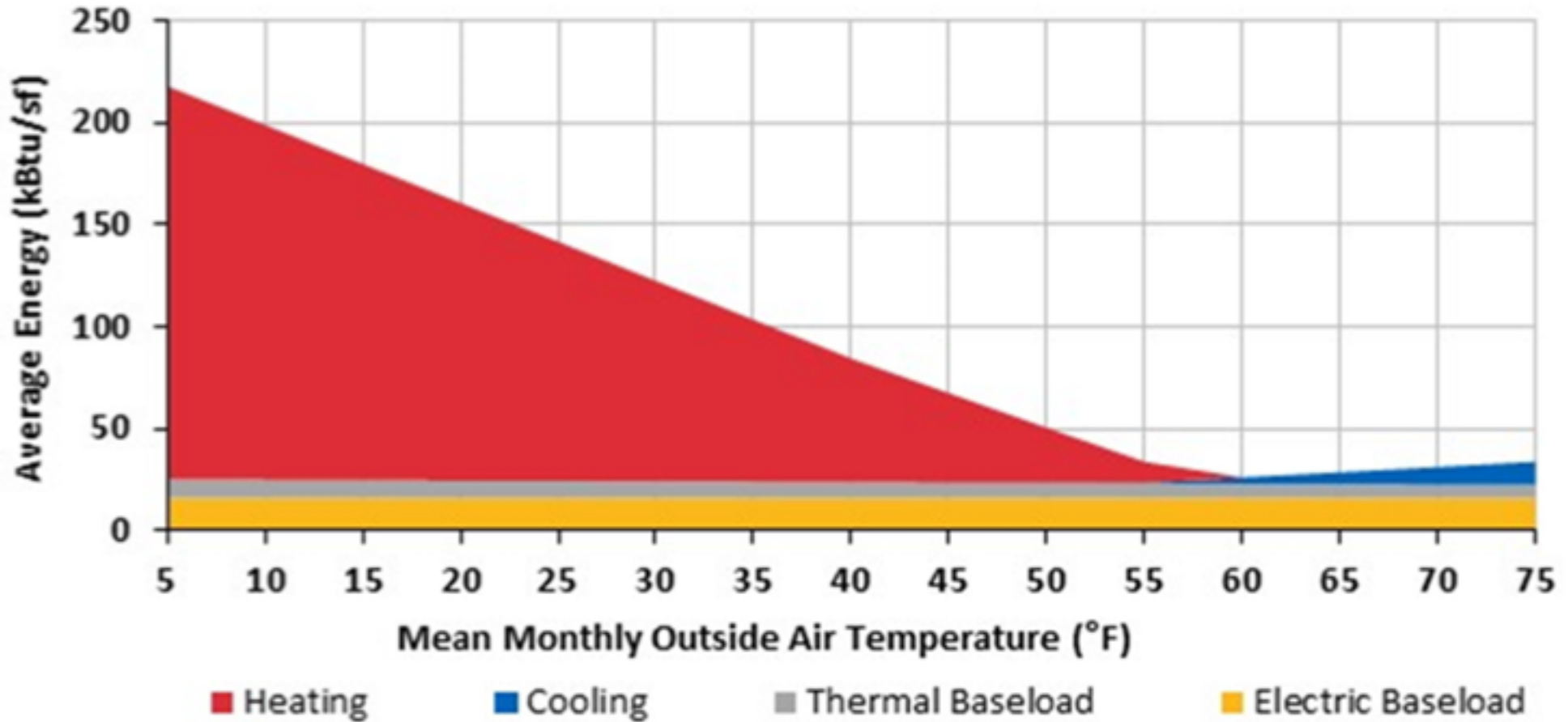


Create Visuals to tell the Story

The goal is “data-based decision making”

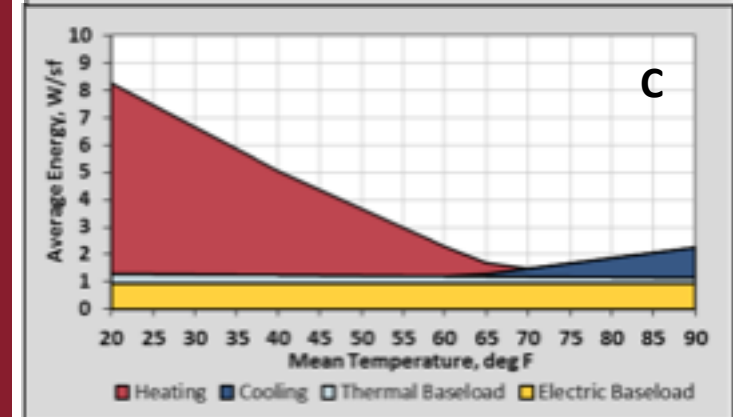
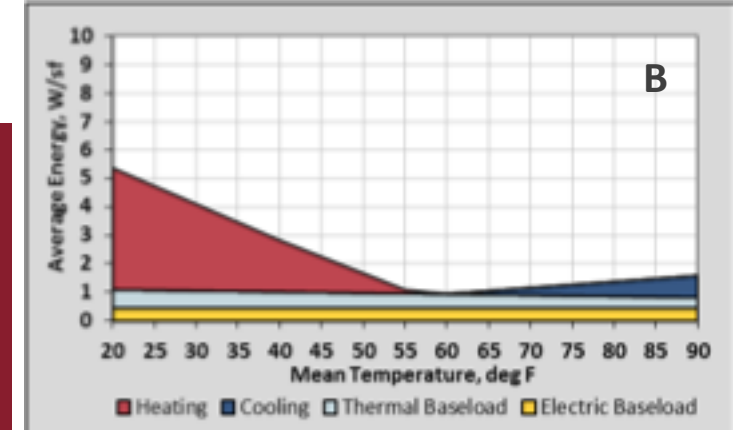
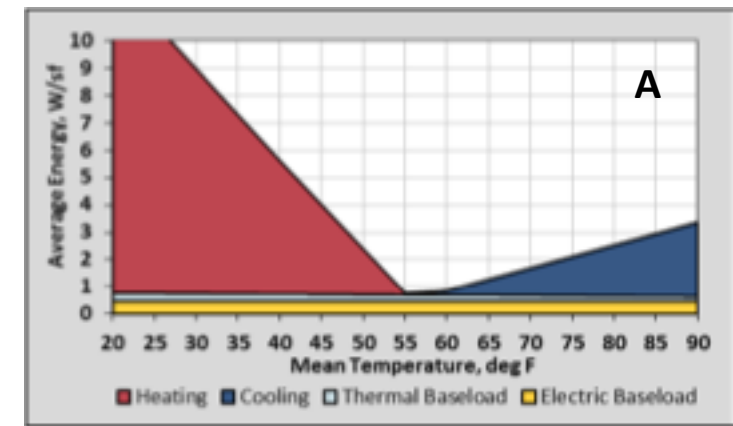
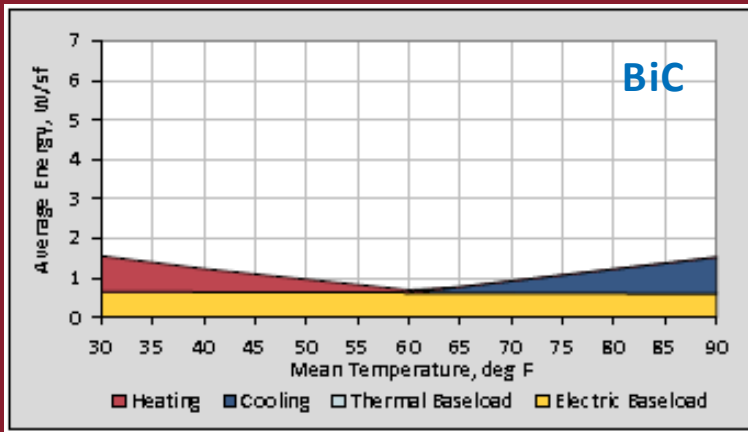
- Conduct virtual energy audits
- Make relevant comparisons
- Track the impact of energy upgrades
- Share success stories
- Show progress on a trajectory towards targets

FirstView Diagnostics

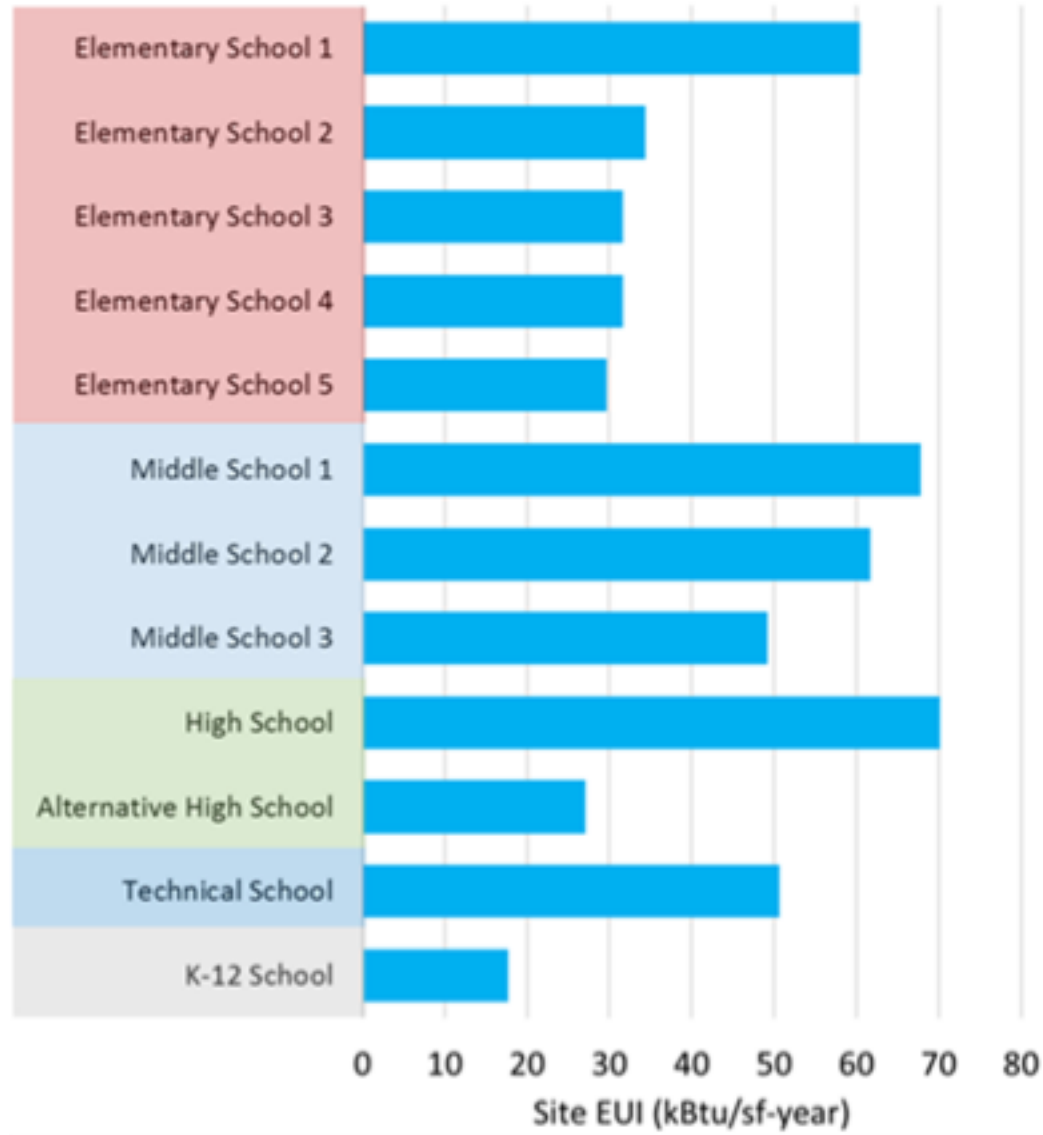


Building/Portfolio Context

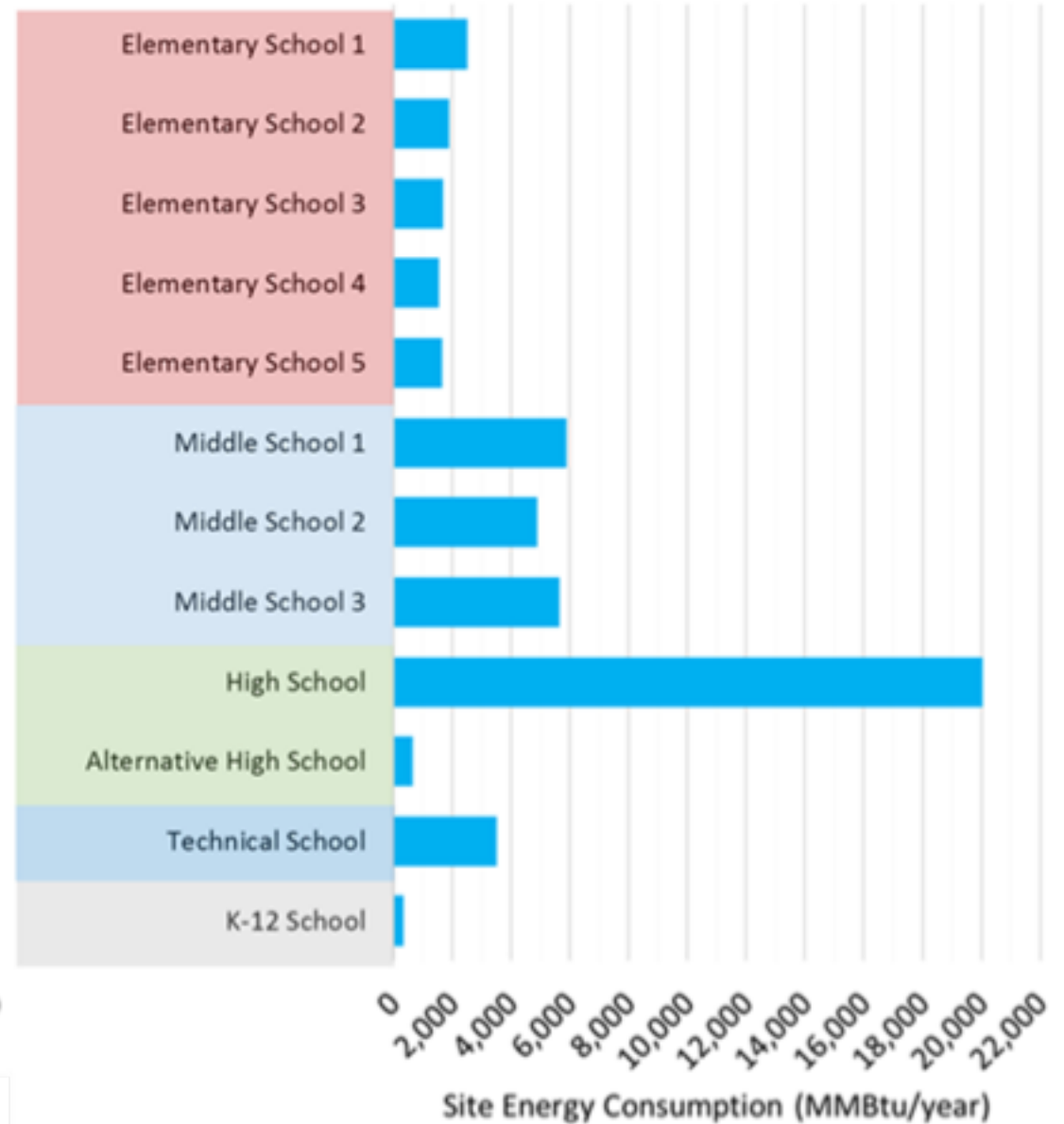
- Best practice context leads to change in procurement strategies



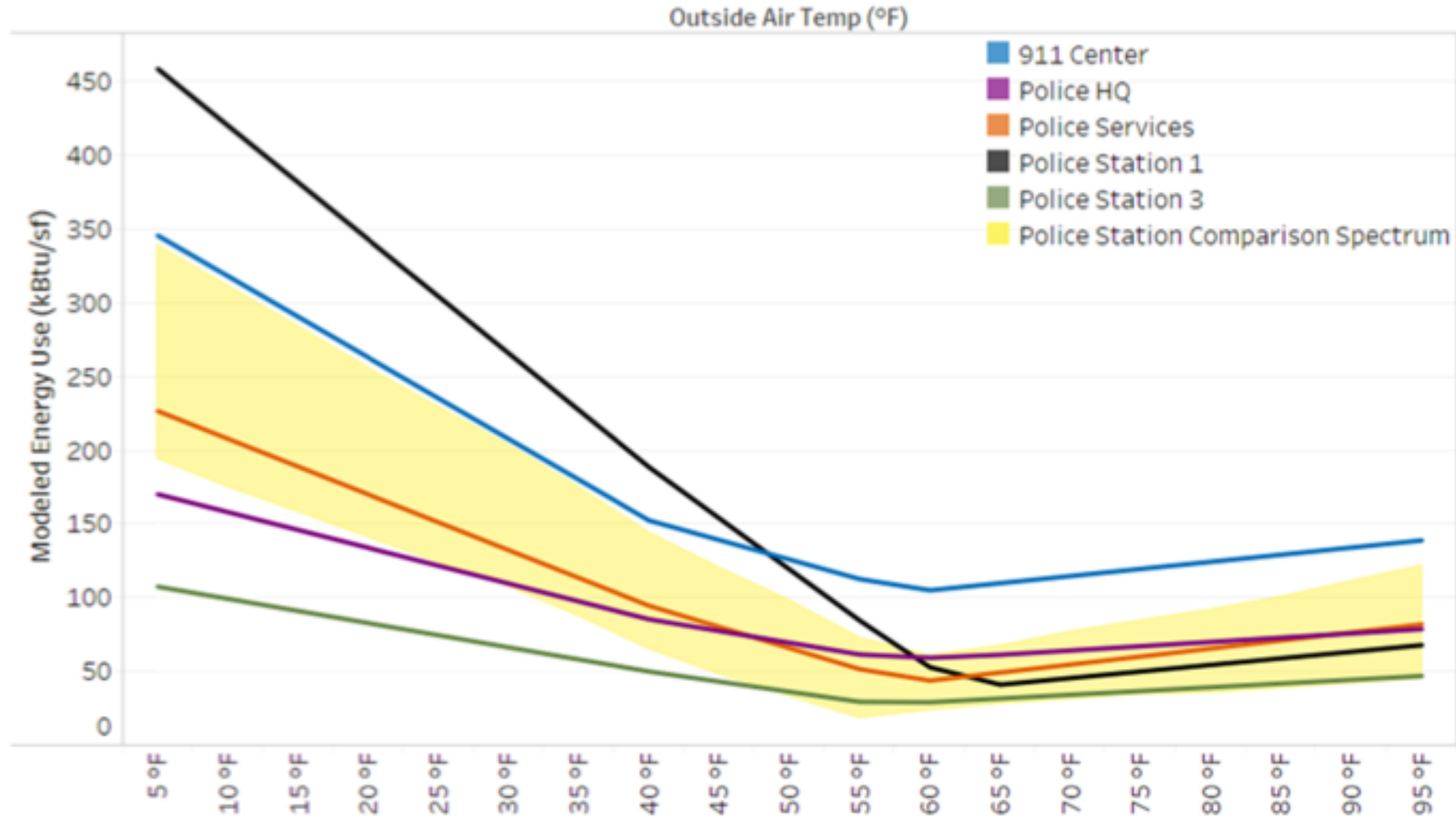
Weather Normalized Building EUI



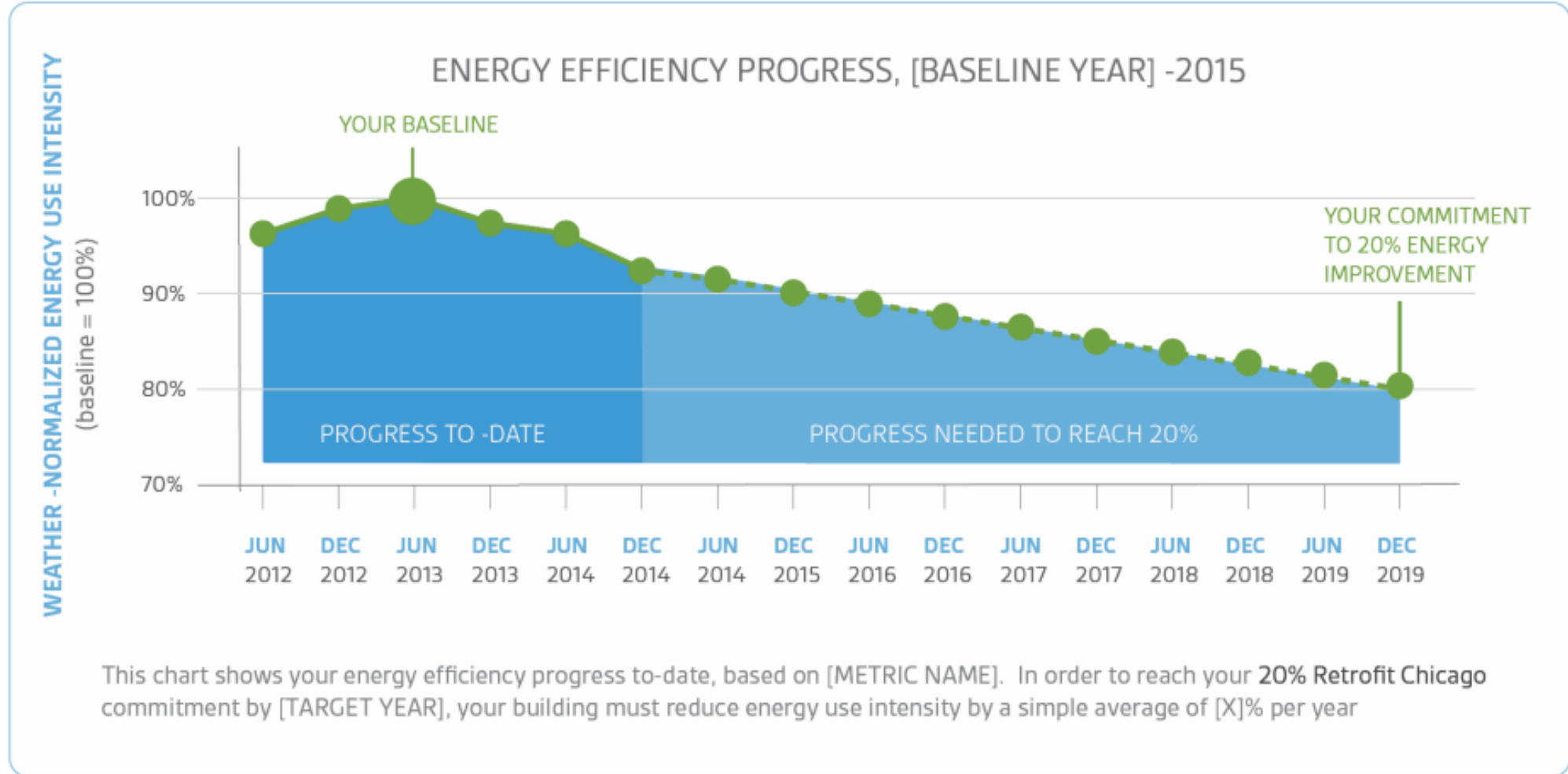
Weather Normalized Building Total Energy Usage



Comparison Spectrums on Like Buildings



Progress on a Trajectory





Energy Innovation Center, San Diego, CA | Credit: NBI

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Discussion

3) City of Carlsbad ZNE Challenges and Strategies

*Mike Grimm
Climate Action Plan
Administrator
City of Carlsbad*

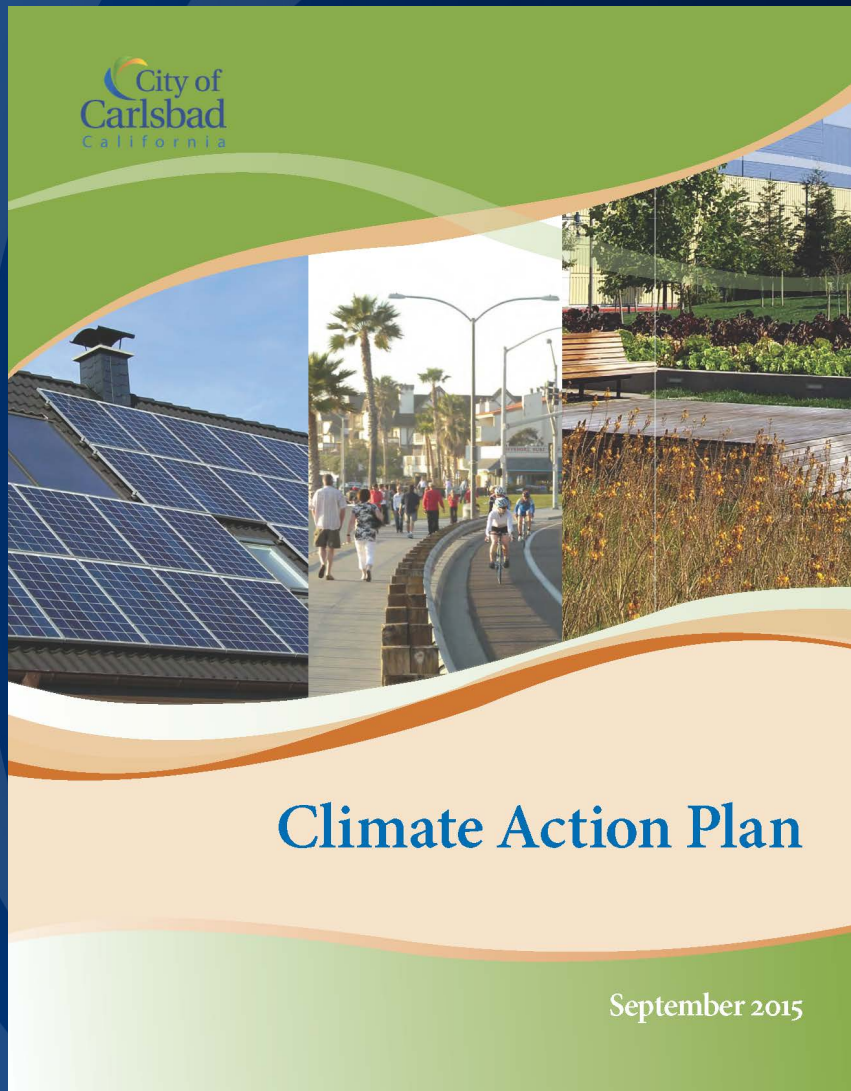


Carlsbad Community Vision



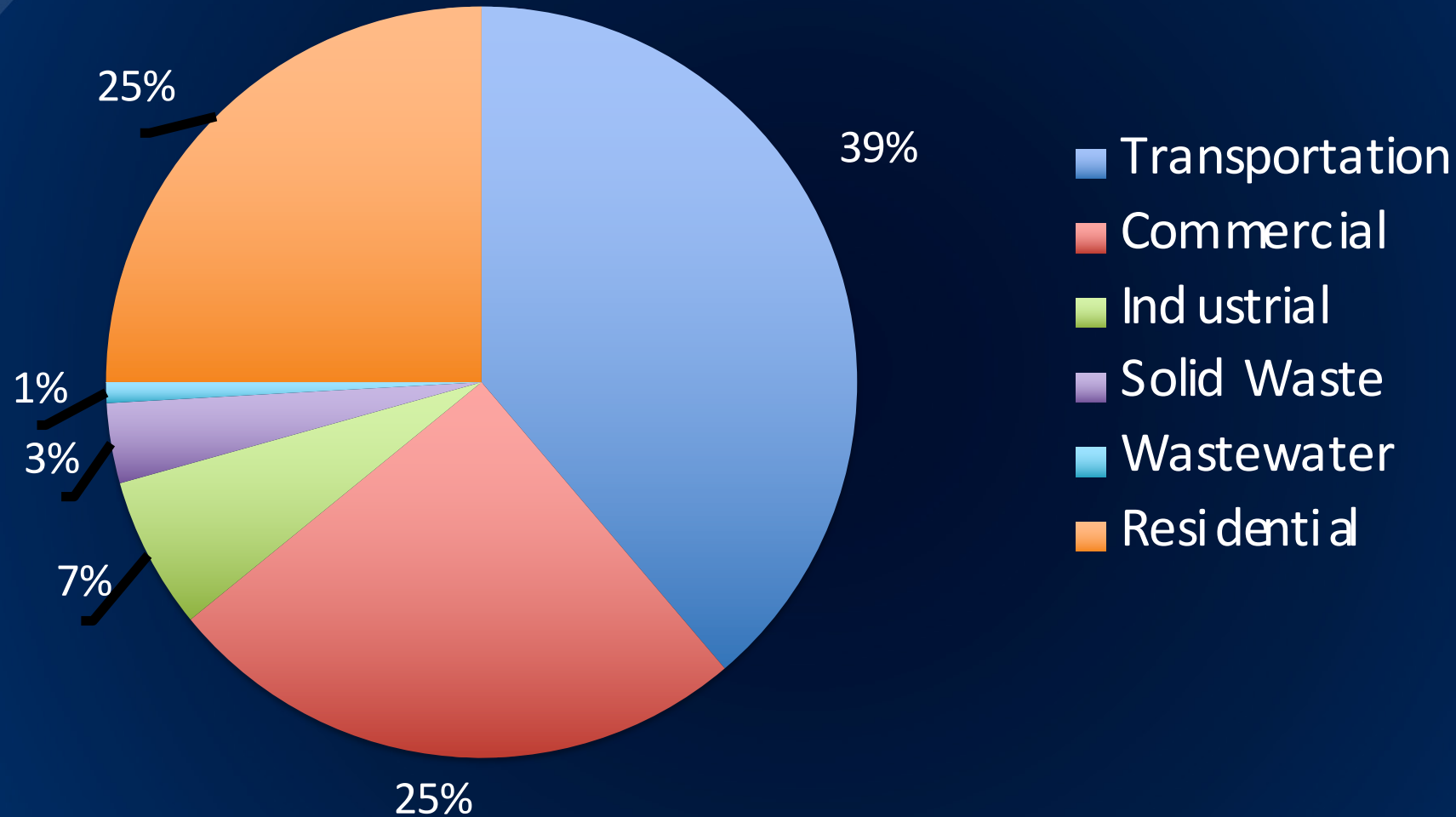
- Active, healthy lifestyles
- Walking, biking, public transit
- Sustainability
- Community design and livability

Climate Action Plan



- Approved with General Plan Update and Program EIR on Sept. 22, 2015
- Serves as CEQA tiering document
- 15 Measures with 41 Actions
- Annual monitoring and reporting

2011 Community Emissions



Note: Municipal operations represent only 1.2% of all emissions

CAP Strategy Areas

- Energy efficiency
- Renewable energy
- Transportation
- Water
- Public outreach and education



Actions Paths to Zero



New Buildings Institute developed five Action Paths for jurisdictions that provide “the most effective options for cities and states to systematically plan and make progress toward comprehensive ZNE policy”

California ZNE Communications Toolkit, May 2017

Carlsbad's Actions Paths to Zero



- Adopted ordinances:
 - Energy efficiency for all major renovations and new non-residential
 - Alternative water heating
 - PV on new and existing non-residential
 - EV infrastructure in all new construction and existing residential

Carlsbad's Actions Paths to Zero



Clean Power

- Designed microgrid at City's Safety and Service Center complex
- Studied PV solar array at city site to offset municipal electricity use
- Participated in North County CCA feasibility study

Challenges and Strategies

Challenge

- Finding microgrid project funding
- Restarting solar array capacity study
- Overcoming effect of CCA uncertainty

Strategy

- Piecemeal project in current CIP
- Use pending CCA to reengage leaders
- Highlight CAP measures and actions

Carlsbad's Actions Paths to Zero



**Municipal Building
Leadership**

- Designing new maintenance and operations center as ZNE and all-electric facility
- Benchmarking all city buildings
- Updating facilities infrastructure plan

Challenges and Strategies

Challenge

- City-related
 - CAP measures
 - Leadership changes
 - Funding
- Utility-related
 - Data portals
 - Incentive programs

Strategy

- City-related
 - Remind about CAP intent
 - Keep CAP in spotlight
 - Stress municipal leadership
- Utility-related
 - In-house energy monitoring
 - Constant communication

Key Strategies

- Separate municipal CAP measures and actions for higher visibility
- Perform costing studies early
- Identify roles and responsibilities
- Set interim milestones
- Maintain enthusiasm!

4) County of San Diego Perspective

*Susan Freed,
Project Manager,
Energy and
Sustainability Division*





Struggles and Solutions

The County of San Diego's Zero Net Energy Portfolio Plan



SEEC Forum 2019

Summary

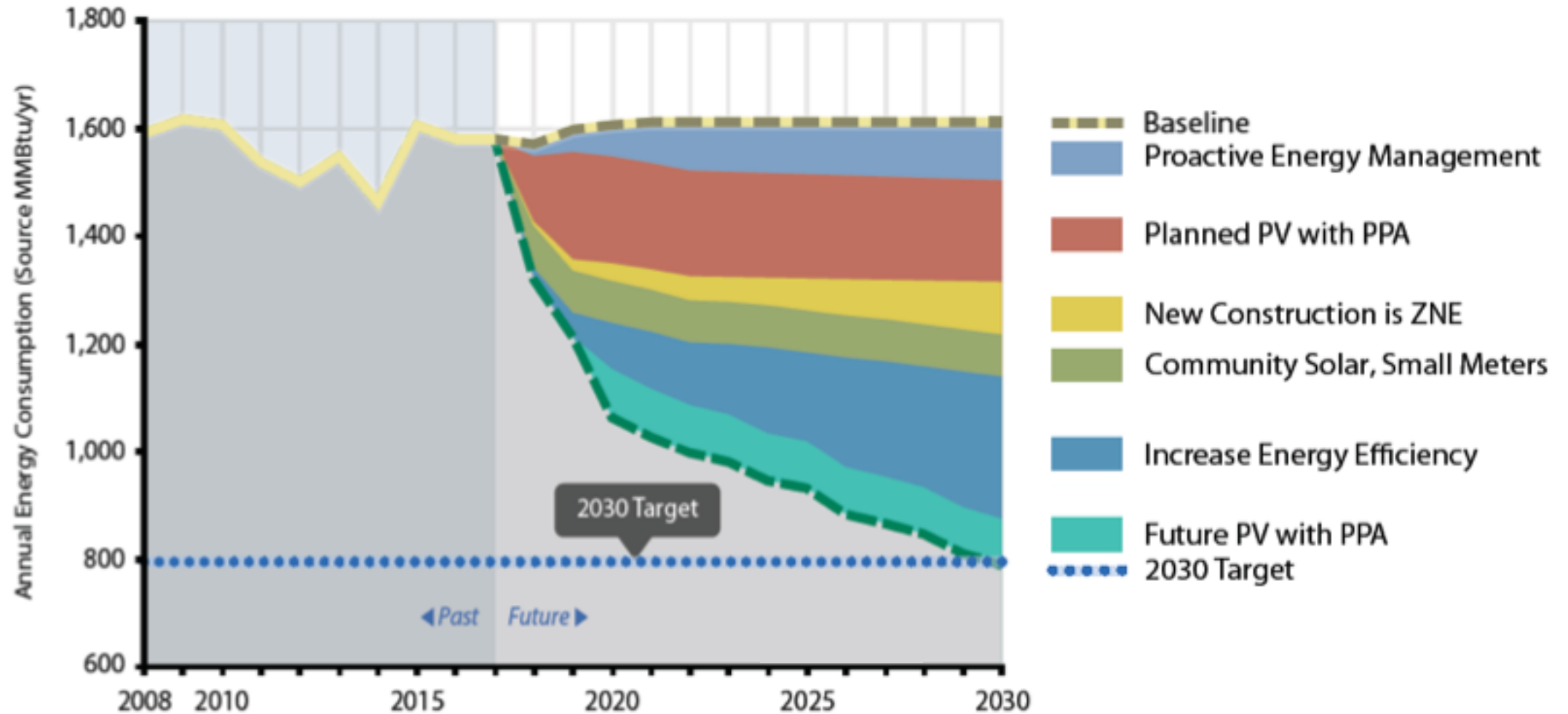
- 10,000,000 GSF
- 1,000 facilities
- How to reach 50% energy reduction goal by 2030



Slide 48

ZNE Portfolio Plan

Slide 49

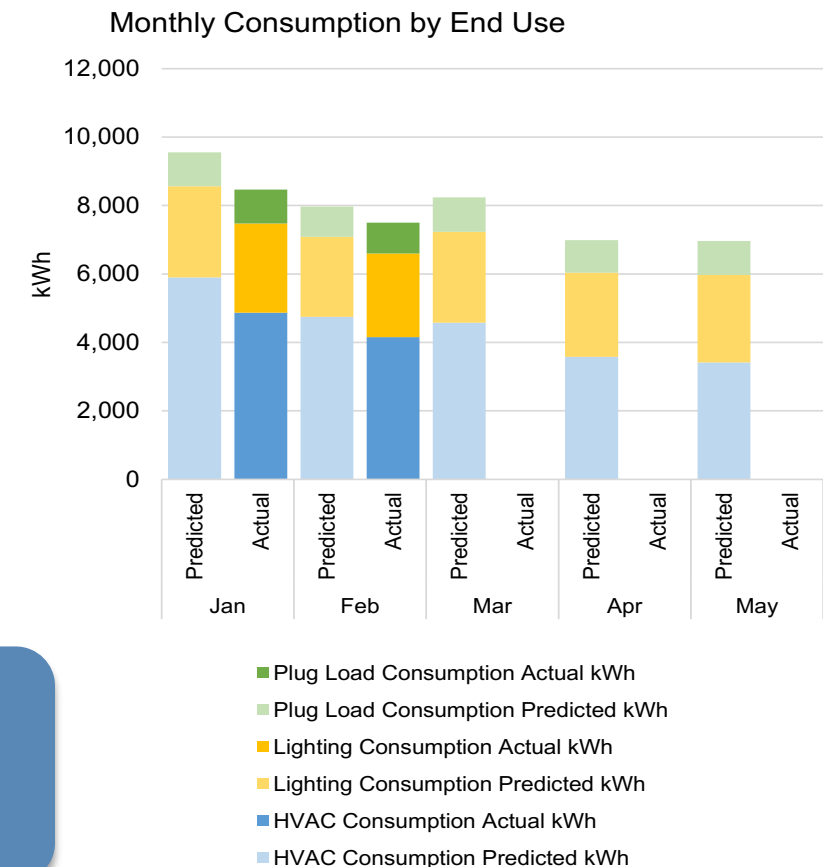


Implementation

Strategy #1 – Proactive Energy Management

- **Establish baselines for tracking energy use**
 - End use submeters
 - Energy model for baseline
 - BAS for tracking

Challenge: Submetering is very complicated and fraught with pain points



Implementation

Slide 51

Strategy #2 – PPA for renewable energy

- **7 contracts executed**
 - 1 completed in 2018
 - 3 will be completed in 2019
 - 3 will be completed in 2020

Challenge: PPA delivery reliability is subject to industry and economy variables, such as trade tariffs

Lifetime Energy Solar
Production

1,074,847 kWh



— Past 6 Months

Lifetime Environmental
Savings

1,633,982 lb co2e



— Past 6 Months

*Renewable Production at 1st Installation
(1.4MW array)*

Implementation

Strategy #3 – ZNE for new construction

- **Capital program best practice**

- 4 occupied
- 2 in construction
- 4 in solicitation/design

Challenge: Inexperienced AEC teams, budget shortfalls

- Occupied
- Construction
- Solicitation

I have budget issues.
Can't I just take out the ZNE part?



Implementation

Strategy #4 – Purchase community solar

- **Contracted for 300 accounts**
 - Completed in January 2018
 - 100% renewable with RECs
 - Net cost savings



Challenge: None! Easy, quick, cost effective

Implementation

Slide 54

Strategy #5 – Increase energy efficiency

- Received \$2M from general fund for EE projects
 - HVAC improvements
 - RCx
 - LED replacements

Projects totaling
\$600,000 annual
savings since 2018

Challenge: Purchasing/contracting, coordination, implementation



Energy Innovation Center, San Diego, CA | Credit: NBI

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Discussion

JOIN US IN OAKLAND!

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OAKLAND MARRIOTT
Oakland, CA
gettingtozeroforum.org

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Wayne Aspinall Federal Building & Courthouse, Grand Junction, CO

Thank You!

New Buildings Institute

Cathy Higgins, Research Director

higgins@newbuildings.org

Marin Country Day School

Photo Courtesy: EHDD Architects