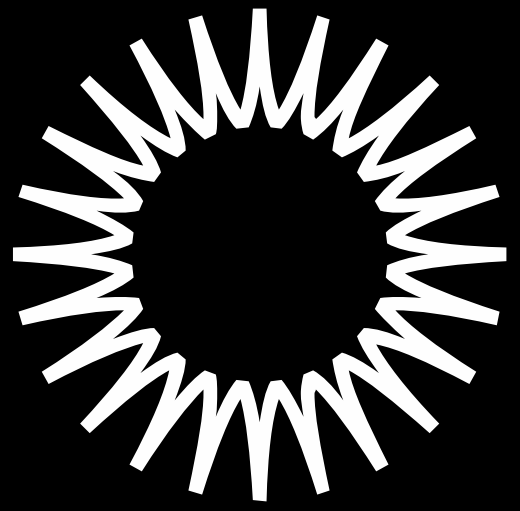

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Ideas + Action for a Better City

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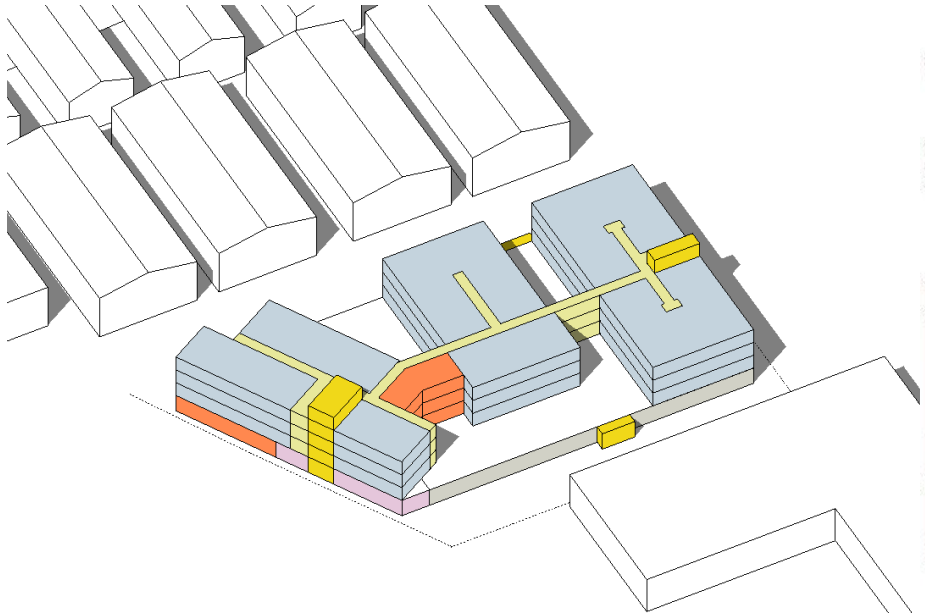
#BeyondLEED

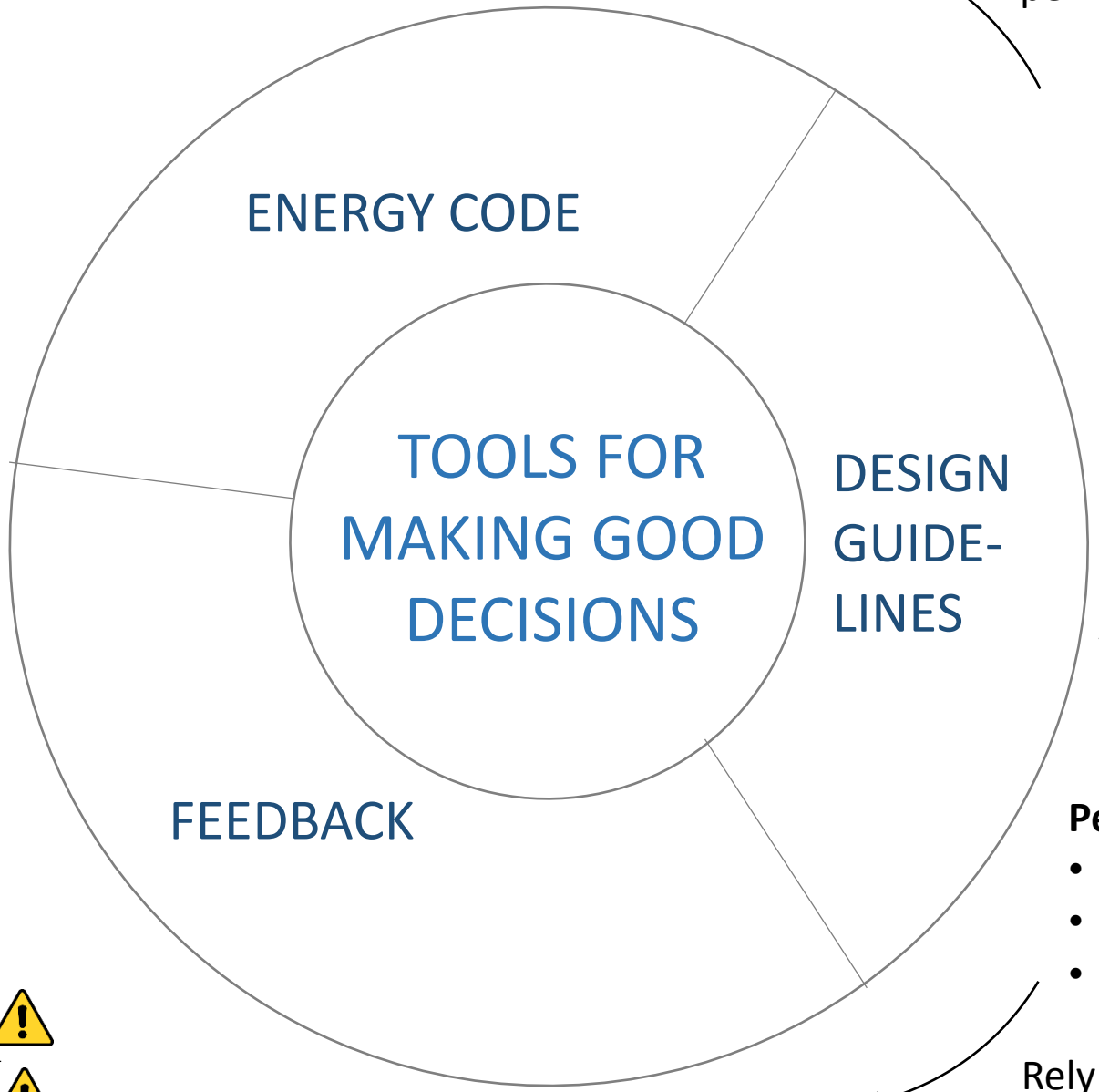

Sustainable Urban Housing Beyond LEED



65 UNITS
3 RESIDENTIAL FLOORS
100,000 SF

450 UNITS
FIVE RESIDENTIAL FLOORS
500,000 SF

Mid-rise Residential Energy Efficiency



CA Title 24 Part 6
- Low-Rise Residential
- High-Rise Residential

Rely on T24 performance

Option-Based Guidelines
- Incentive programs
- LEED for Homes Mid-rise
- GreenPoint Rated

Prescriptive Guidelines
- ENERGY STAR for Mid-Rise

Precedents + Technology Research

Energy Monitoring
- For Design Feedback
- For Benchmarking

Benchmarking Platforms
- 2030 Challenge
- Better Buildings Challenge
- Portfolio Manager
- Wegowise, Bright Power

Energy Use Intensity (EUI) $\frac{kbtu}{FT^2}$

Performance-Based Guidelines
- Passive House (PHI, PHIUS)
- Zero Net Energy Building
- Living Building Challenge

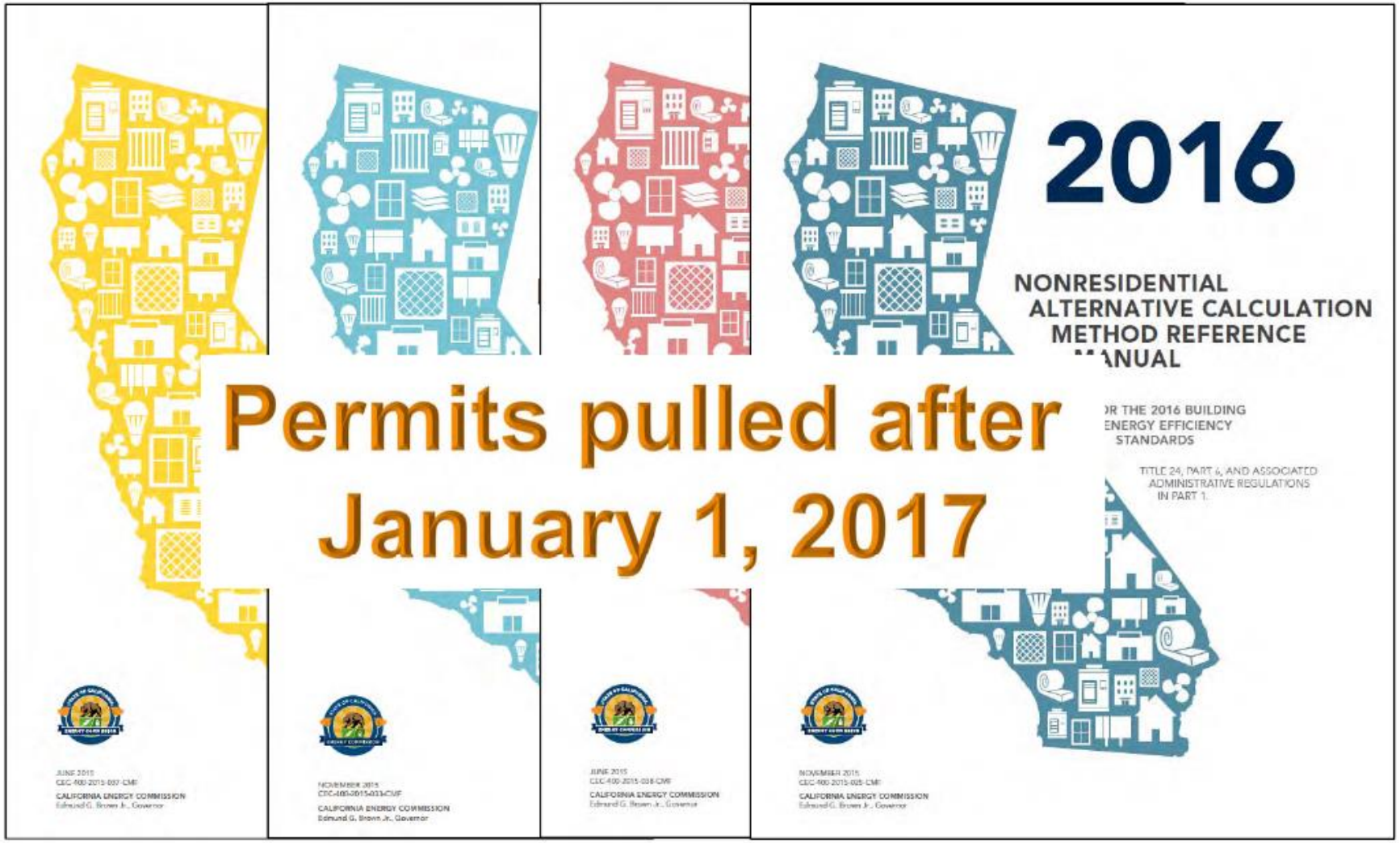
Rely on whole-building energy targets

Big Bold Energy Goals:
Zero Net Energy for Multifamily

Matt Christie, TRC

April 5, 2016

ZNE and Code

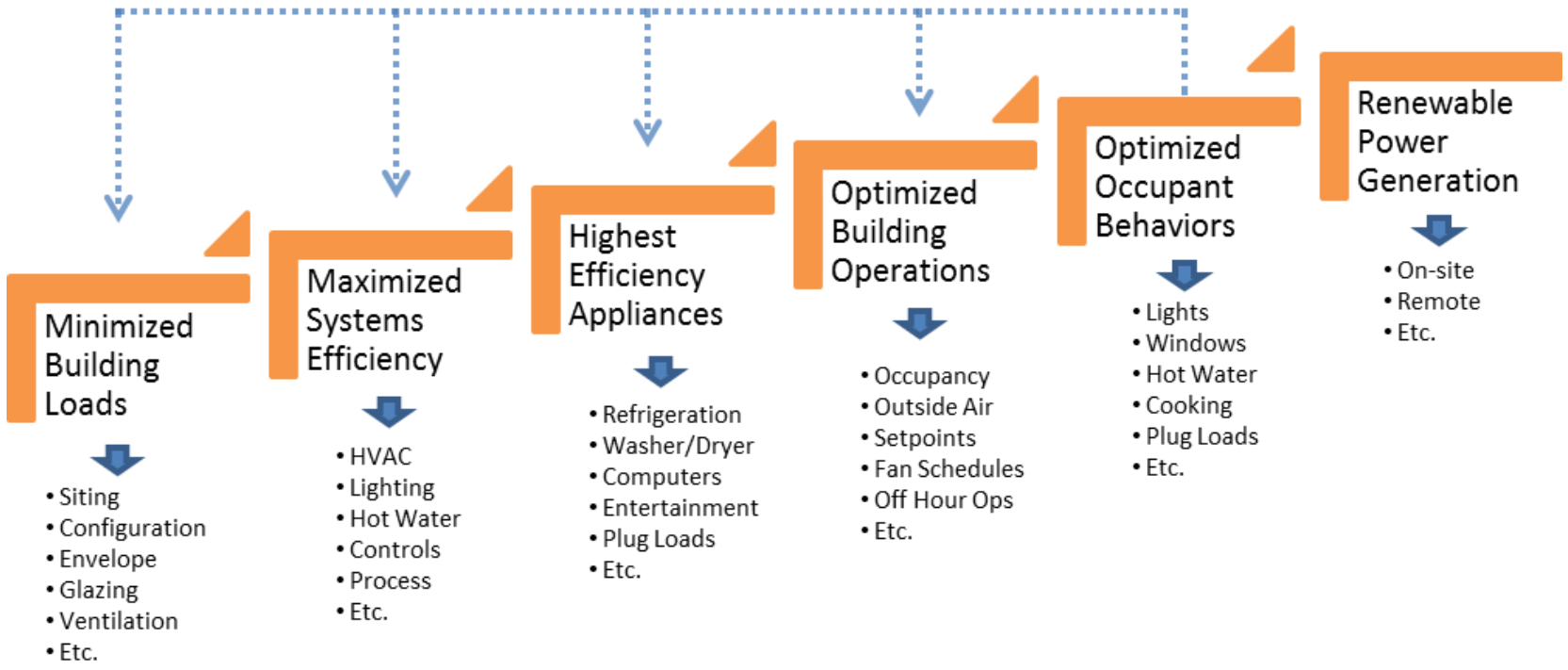


http://www.energy.ca.gov/title24/2016standards/index.html

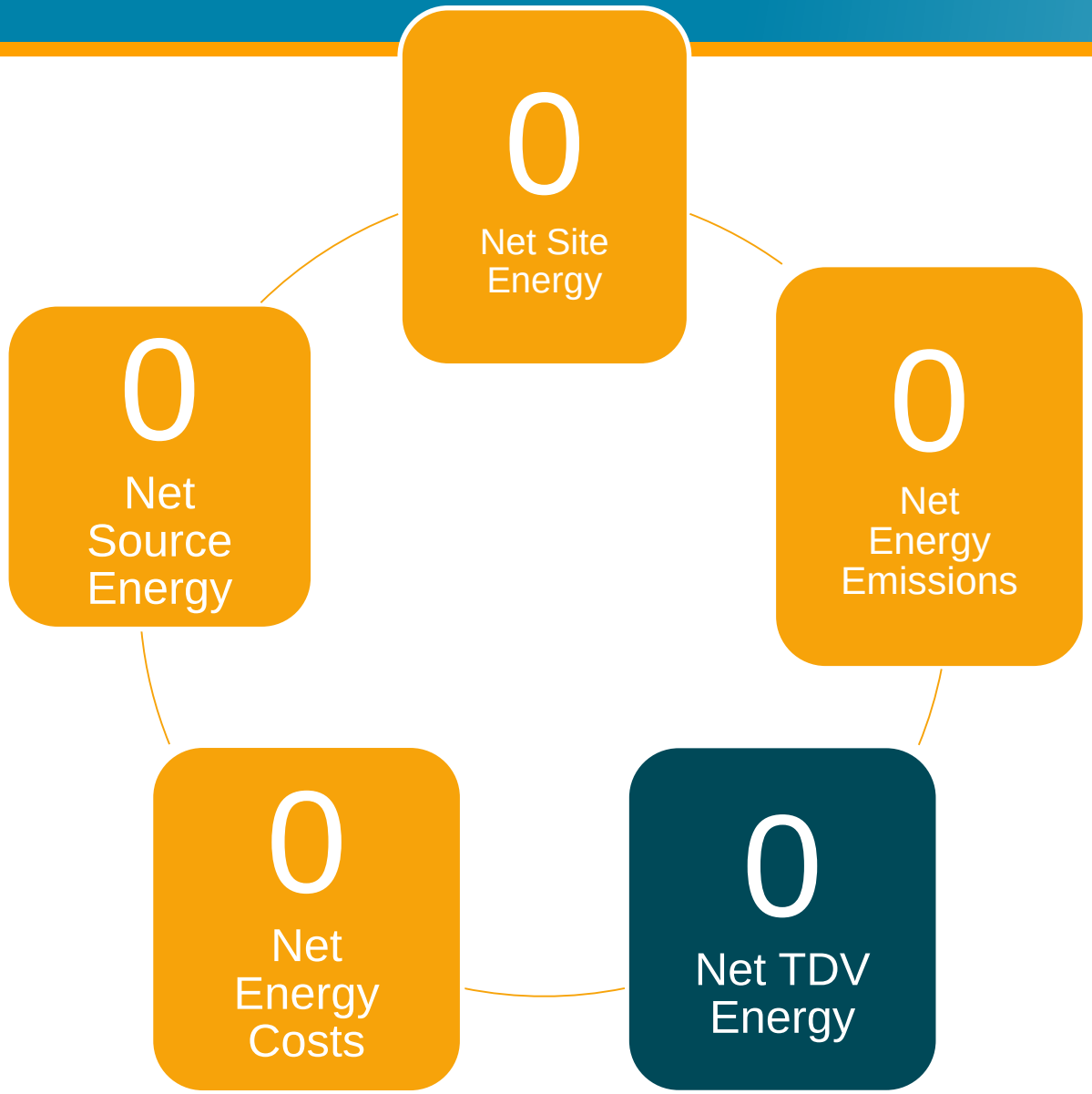
ZNE and Code

"All cost-effective energy efficiency"

Foundation of a ZNE metric

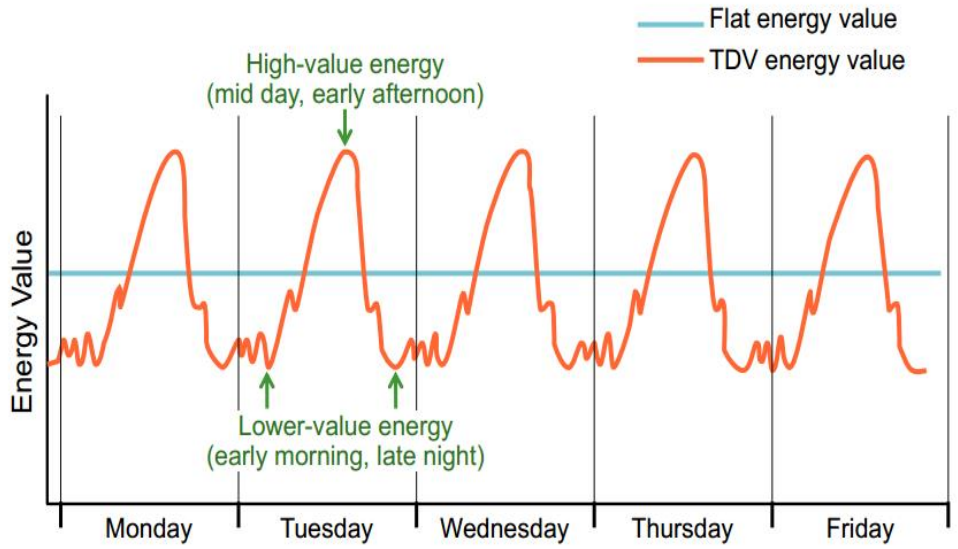


Code ZNE Definition



Time Dependent Valuation (TDV)

- Societal value of energy by time of day
- TDV multipliers vary by:
  - Energy type (electric vs. gas)
  - Date and hour
  - Climate zone
  - Building Type



Multi-family ZNE Complications

- **When does multifamily go ZNE?**
  - Low-Rise follows the residential code. Prescriptive features are typically based on single-family norms.
  - High-Rise follows the commercial code. Prescriptive features are based on commercial building norms.
  - Multi-family norms often do not receive direct attention

- High rise vs. low rise definition Introduced decades ago due to the fire code

- No centralized multifamily chapter in Title 24, Part 6
  - perhaps changing in 2019?
- Complicated and abundant HERS and T24 documentation requirements
- Building features/systems that can't be modeled
- Limited on-site PV area (esp. high-rise)

PG&E Multifamily Programs

- New Construction
  - California Multi-Family New Homes
  - www.cmfnh.com
- Rehab
  - Multifamily Upgrade Program
  - www.multifamilyupgrade.com

DEEP GREEN ENGINEERING

INTEGRAL GROUP

26 LEED Platinum Certified

80+ LEED Registered

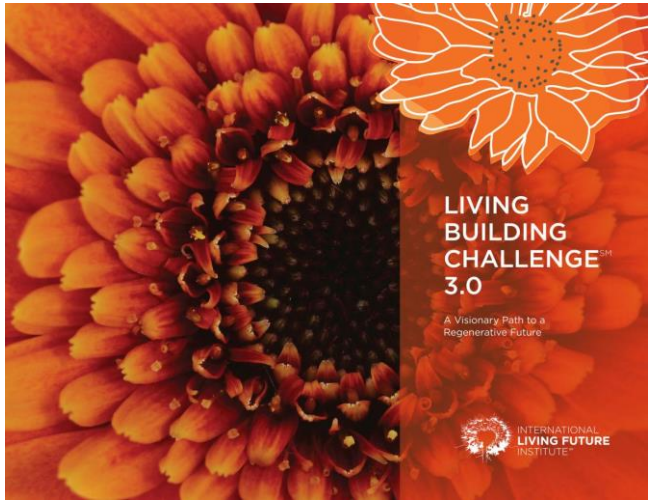
31 Net-Zero projects

6 Living Building Challenge

Sustainable Urban Housing Beyond LEED:
Metrics, Systems, and Road Blocks

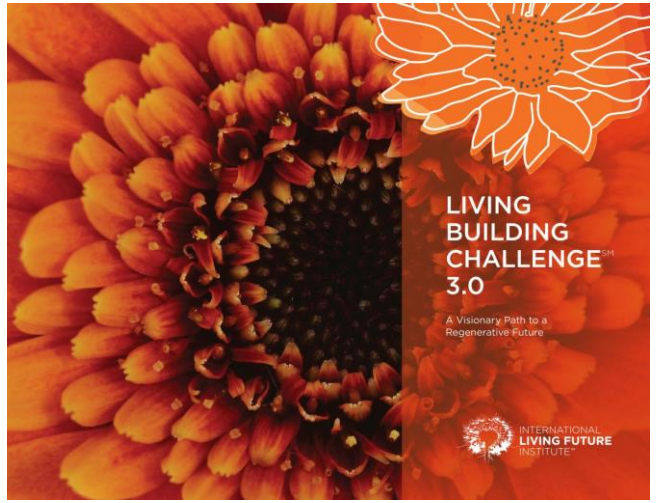
Stet Sanborn, AIA CPHC
Associate
Integral Group

New Standards; New Goals



Certified
Passive House
Passive House Institute

New Standards; New Goals

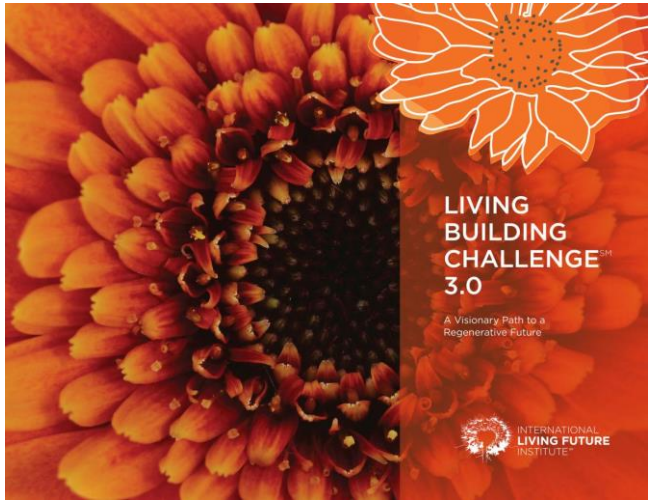


Net Zero Energy

Net Positive Energy

Certified
Passive House
Passive House Institute

New Standards; New Goals



Certified
Passive House
Passive House Institute

Health

Indoor Air Quality

Challenges in the Urban Context

Image courtesy DPR Construction

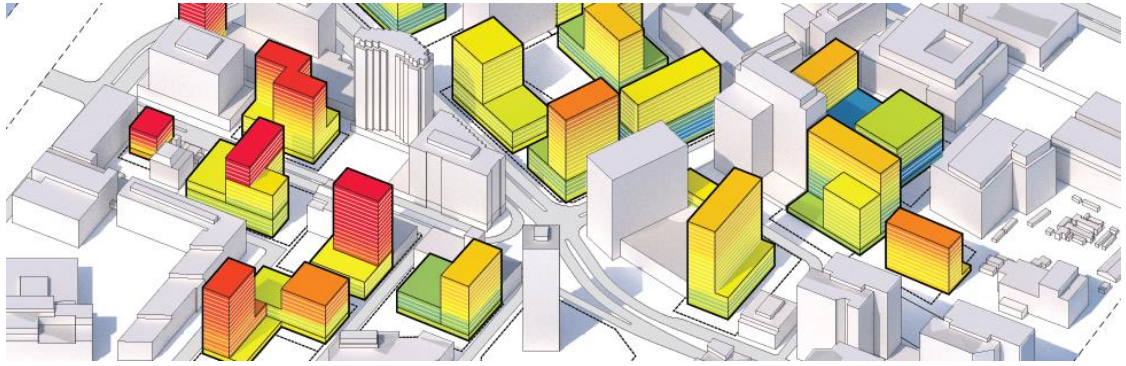
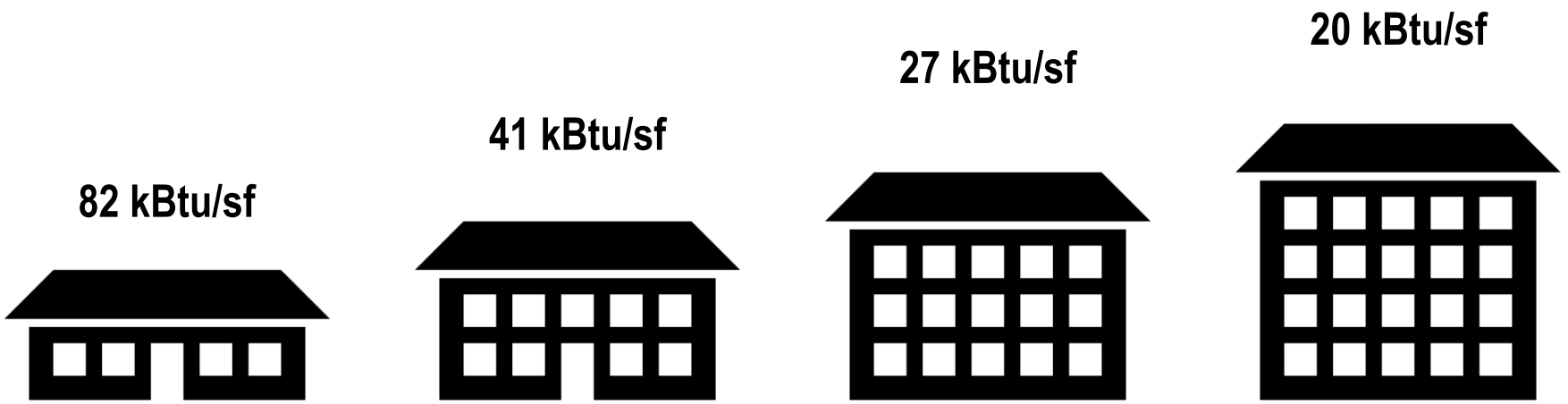


Image courtesy Archsim

Getting to Net Zero Energy
Oakland, CA

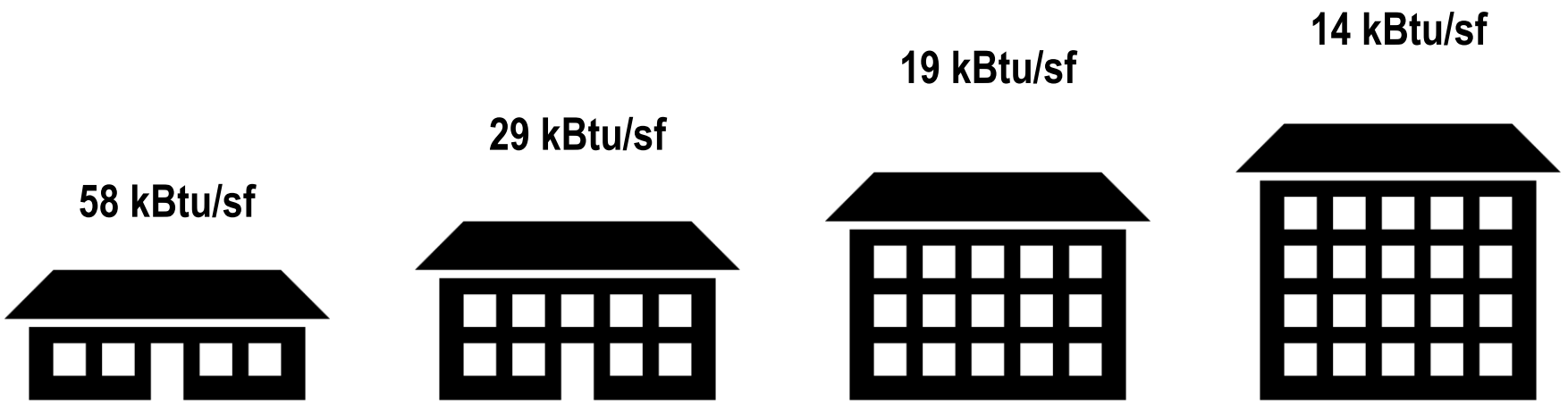
INTEGRAL GROUP



1. *Based on the Oakland, CA climate.*
2. *Based on high efficiency panels covering 90% of the roof.*
3. *Mounted flush on the roof.*

Getting to Net Zero Energy
Seattle, WA

INTEGRAL GROUP



1. *Based on the Seattle, WA climate.*
2. *Based on high efficiency panels covering 90% of the roof.*
3. *Mounted flush on the roof.*

Challenges in the Urban Context

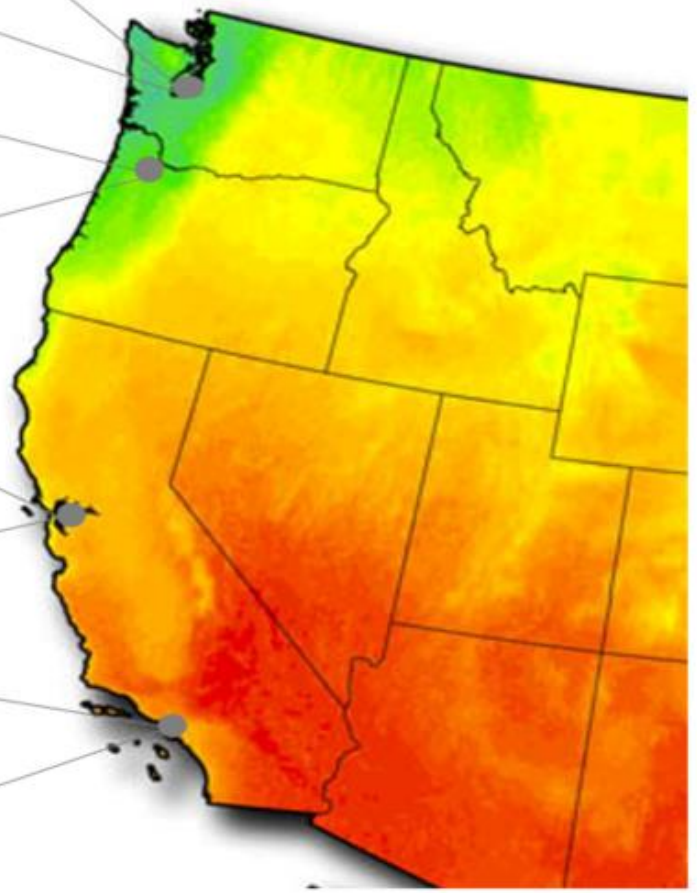
INTEGRAL GROUP

Seattle, WA	
Height	ZNE EUI
1-Story	58
2-Story	29
3-Story	19
4-Story	14

Portland, OR	
Height	ZNE EUI
1-Story	67
2-Story	34
3-Story	22
4-Story	17

Oakland, CA	
Height	ZNE EUI
1-Story	82
2-Story	41
3-Story	27
4-Story	20

Los Angeles, CA	
Height	ZNE EUI
1-Story	86
2-Story	43
3-Story	29
4-Story	21



Assumes High Efficiency Panels, Flat with 90% Roof Coverage

Getting to Net Zero Energy

Pathway to a Simple, Resilient, Net Zero Buildings

INTEGRAL GROUP

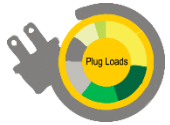
Maximizing Energy Budget On Site

Build a Thermos

Optimize Light and Fresh Air

Expand Thermal Comfort

De-Couple Ventilation with Conditioning

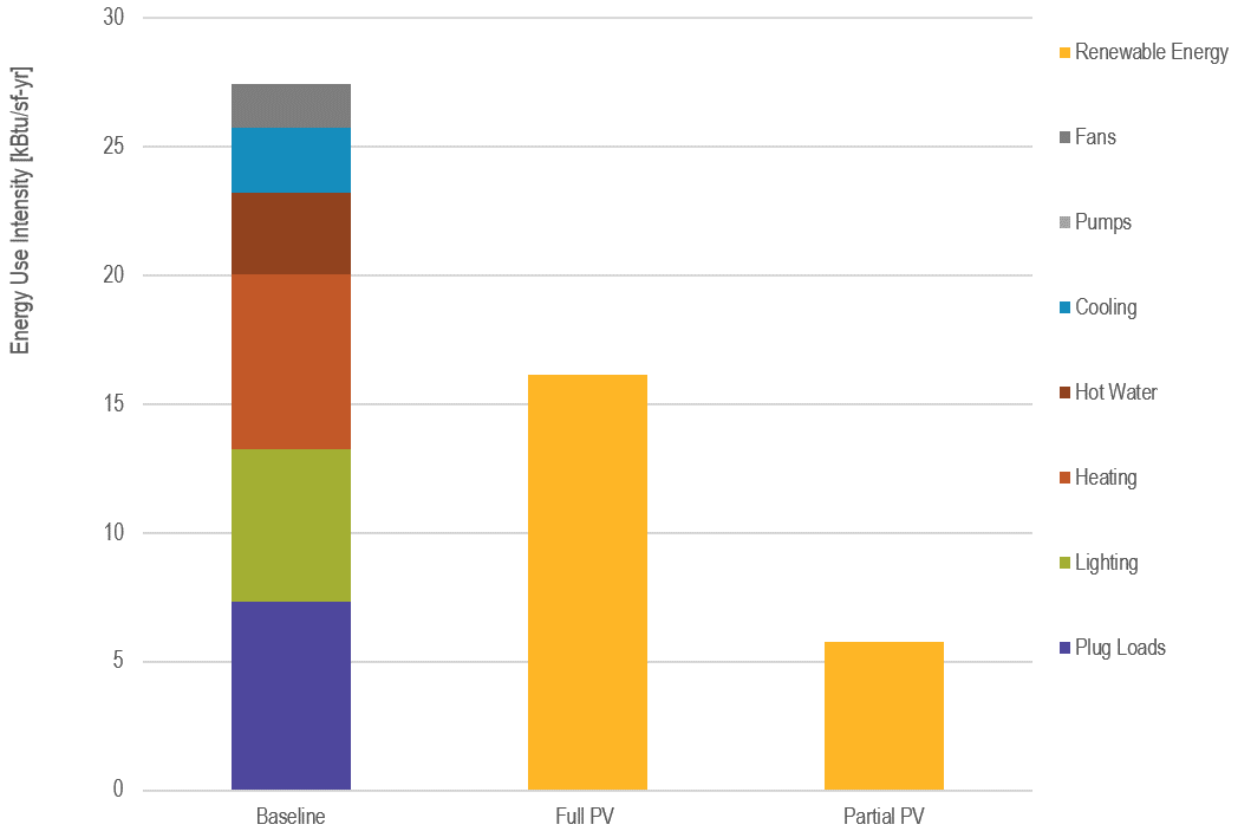


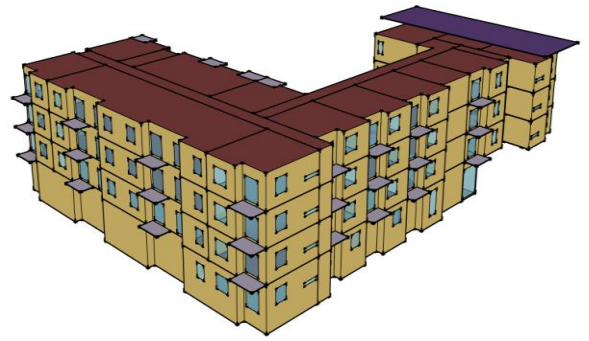
Effectively Manage Equipment Energy

Getting to Net Zero Energy

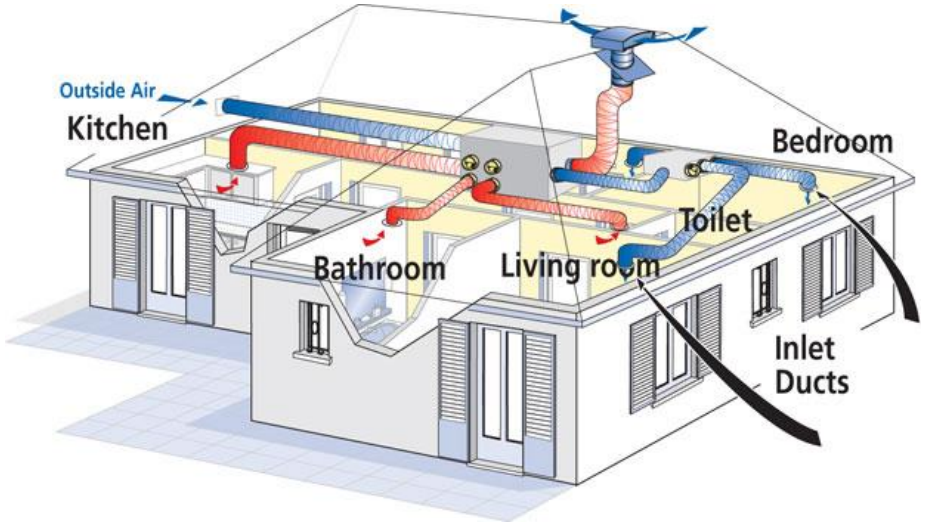
Pathway to a Simple, Resilient, Net Zero Buildings

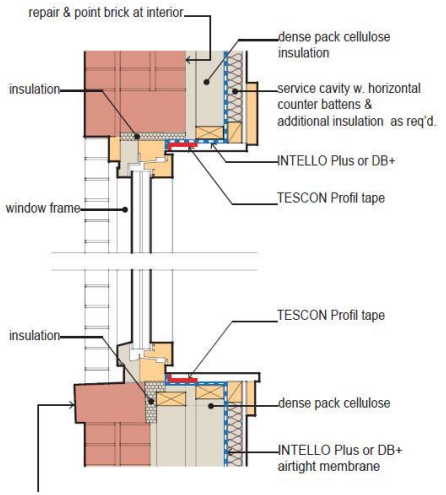
INTEGRAL GROUP





Challenges in the Urban Context





Assessing Energy Use & Improving Performance Feedback

Sustainable Urban Housing: Beyond LEED
SPUR, San Francisco, CA
April 5, 2016

Sasha Wisotsky

Oakland Housing Authority

Overview

- Asset Management and Portfolio Sustainability
- Improving Performance Feedback
- Assessing Energy Use

Asset Management & Portfolio Sustainability

Asset Management of affordable multifamily properties

- Focus on **financial**, **physical** and **operational** health of individual properties and portfolio

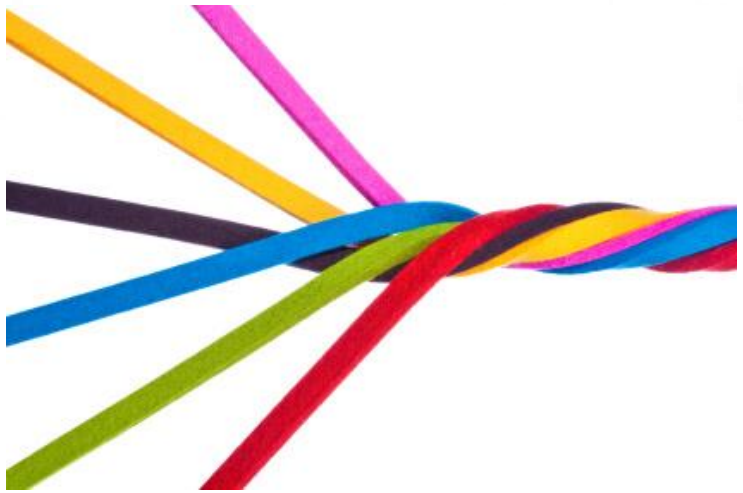
- Portfolio sustainability

Credit: EPA.gov

Asset Management & Portfolio Sustainability

Energy & Performance Feedback Portfolio Sustainability Approach

- Encourage **collaboration** with staff in Property Management, Resident Services and Development.
- Involve **communication** and partnership with external experts and industry groups.
- Identify **shared goals** for interdepartmental teams.



Credit: Bop Design

Improving Performance Feedback

Communication & Partnerships:

Helping Properties Perform Over Time

- Decide: Who or what best **facilitates** communication between end users (staff & residents) and designers?
- Ensure operations **align** with intent: Performance Specs, O&M docs
- Support & knowledge: **Connections**
  - Internal: Designer – Ops – Owner
  - External: NEWHAB, CHPC GREEN

Credit: LinkedIn

Improving Performance Feedback

Communication and Strategies for Each Phase

DESIGN AND BUILD

- How will the building perform?
  - *Request: Performance Specifications*
  - *Deliver: Energy Proforma*
- Full picture planning: Population, Program, Funding
  - *What does the building, owner, resident need/want?*
  - *What can the property support…*

    Operationally?

    Financially?

Credit: Progetto Aroma

EARLY OPERATIONS…

ONGOING OPERATIONS…

Improving Performance Feedback

Communication and Strategies for Each Phase

DESIGN AND BUILD…

EARLY OPERATIONS

- How should the building perform?
  - *Instruct: Initial Walk Through and Training*
  - *Guide: Operations & Maintenance Binders, Preventive Maintenance Plan*
- Support a strong start!
  - *What can staff & residents do to support energy goals?*
  - *What should vendors do to maintain building systems?*

ONGOING OPERATIONS…

Green Roof at Tassafaronga Village. Oakland, CA.
Credit: Oakland Housing Authority

Oakland Housing Authority

Improving Performance Feedback

Communication and Strategies for Each Phase

DESIGN AND BUILD…

EARLY OPERATIONS…

ONGOING OPERATIONS

- How is the building performing?
  - *Convene: Annual Check-In, Walk Through*
  - *Review: Utility Data, Unexpected System Expenses*
- Sustain communication
  - *Is the building performance meeting energy targets?*
  - *How can we get underperforming systems back on track?*
  - *What can we do to improve the next building?*

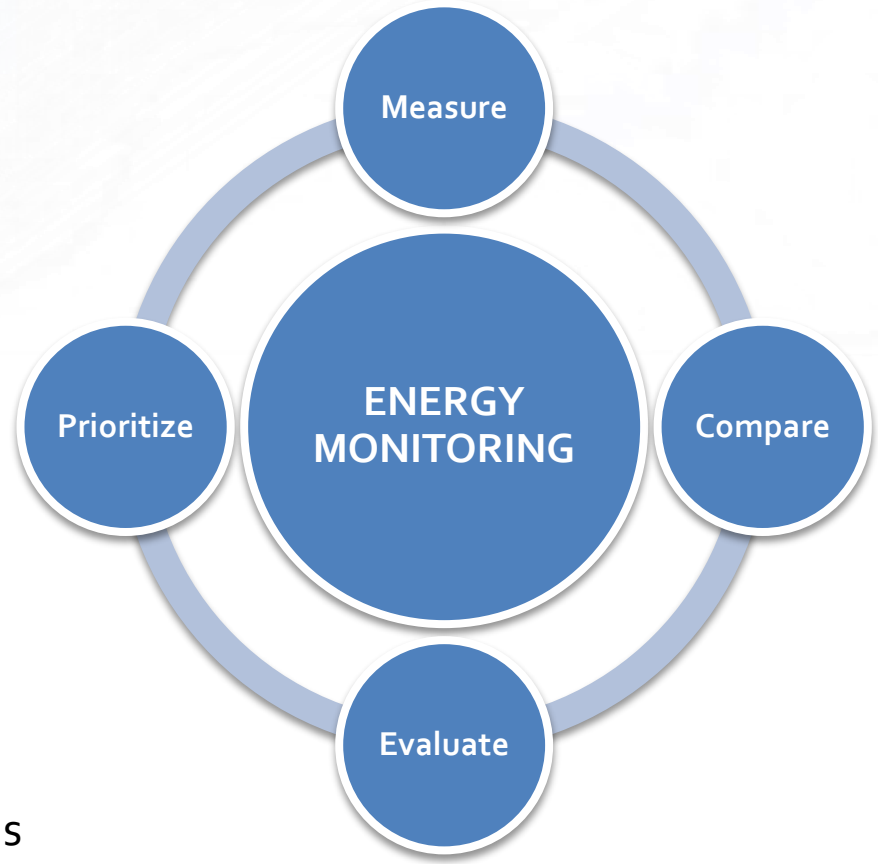
Credit: PARiM

Oakland Housing Authority

Assessing Energy Use

Why Energy Monitoring?

- Review all utility account data
- Measure building performance
- Quantify feedback on systems
- Analyze resident-paid utilities
- Prioritize energy retrofits
- Evaluate operations & maintenance
- Identify opportunities to improve
- Compare performance to other buildings



Oakland Housing Authority

Assessing Energy Use

Energy Data Collection

FREE

- Energy Star Portfolio Manager (ESPM)
- EZ Retrofit (SAHF)

PAID

- WegoWise
- Bright Power (EnergyScoreCards)
- EnergyCAP

ENERGY STAR® PortfolioManager®

SAHF THE BUSINESS OF MISSION

EnergyCAP.

wegowise

BRIGHT POWER

NEW SERVICES

- Customized analysis and reporting
- Resident utility monitoring

Oakland Housing Authority

Assessing Energy Use

Supporting Energy Monitoring at Each Phase

DESIGN AND BUILD

- **Document** all property data, building characteristics, measurements, systems details

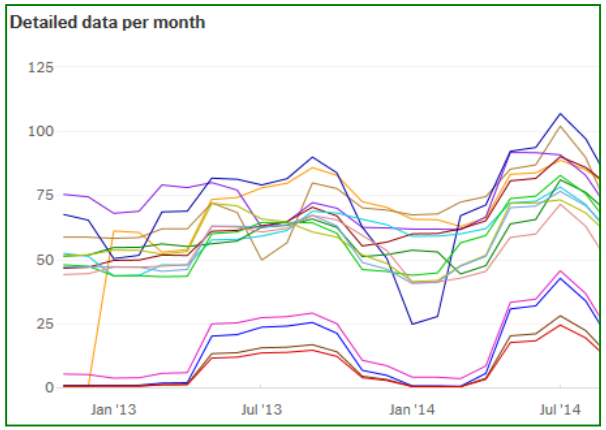
EARLY OPERATIONS

- **Customize** property data in monitoring software
- **Set** energy budget for each system/utility account

ONGOING OPERATIONS

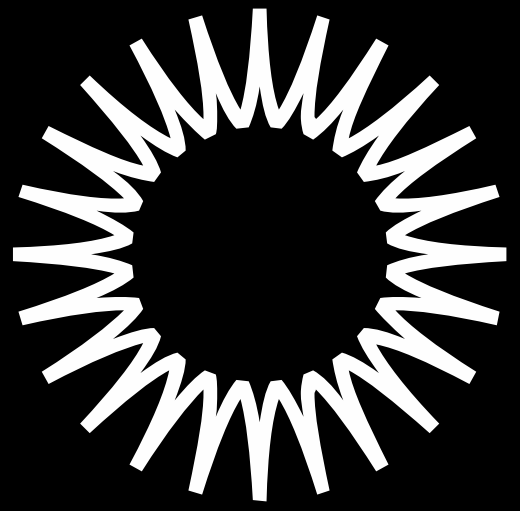
- **Evaluate** performance against energy budget
- **Rally** the team if performance gets off track

Credit: Emerson Climate



Credit: WegoWise

Oakland Housing Authority



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