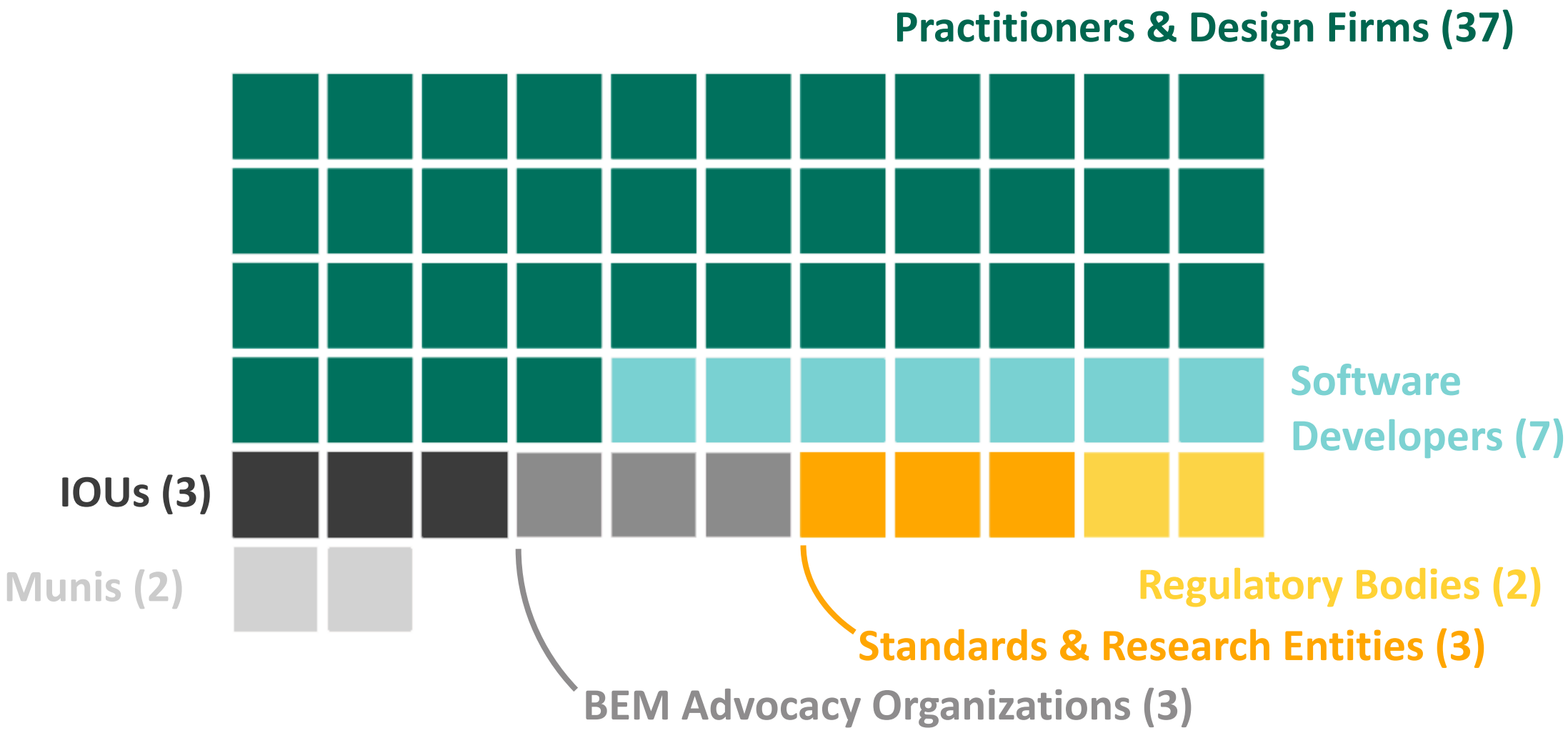
CalBEM 2019

California's 4th Annual Building Energy Modeling Symposium

SOUTHERN CALIFORNIA EDISON
Energy for What's Ahead℠

CalBEM Demographics



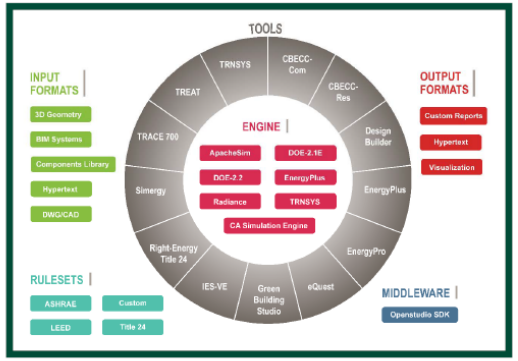
CalBEM Landscape

CalBEM

Emerging Products

SCE Building Energy Modeling Roadmap

ET14SCE7050



Prepared by:

Emerging Products
Customer Programs & Services
Southern California Edison

August, 2016

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Energy for What's Ahead®

FROM ZERO NET ENERGY (ZNE) TO ZERO NET CARBON (ZNC): DESIGNING NONRESIDENTIAL BUILDINGS IN CALIFORNIA

Date:
Wednesday, November 6, 2019

Time:
Registration: 8:00 a.m.
Training: 8:30 a.m. - 12:30 p.m

Location:
SCE Energy Education Center
6090 N. Irwindale Ave
Irwindale, CA 91702

Register:
sce.com/energycenters

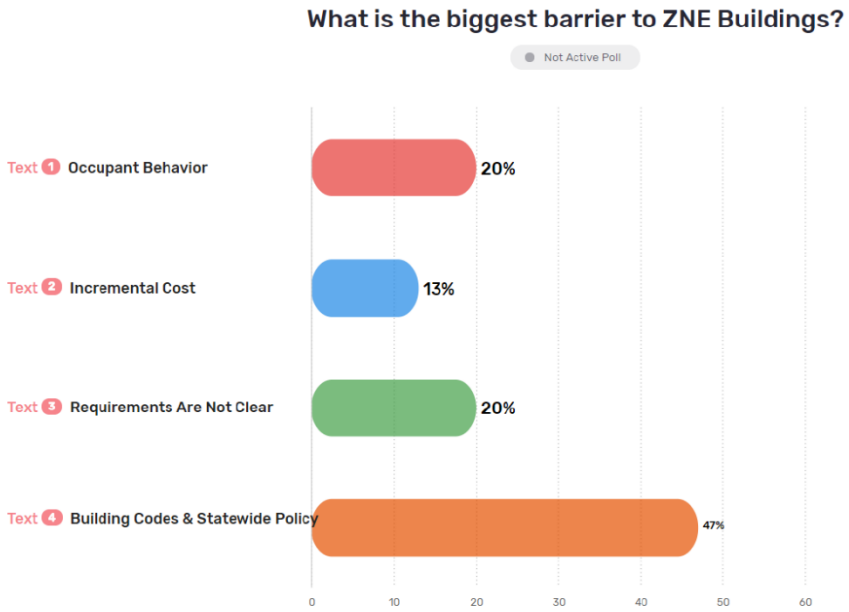
4 AIA Learning Units

Dive deeper into Zero Net Energy and Zero Net Carbon design for Nonresidential Buildings in California

Zero net energy (ZNE) has gained traction in the commercial industry and is now an attainable goal for nonresidential buildings. In 2007, the California Public Utilities Commission (CPUC) adopted goals to have all new commercial construction in California to be zero net energy by 2030. Lately tides have changed, and the conversation is shifting from kilowatts to carbon due to California's climate goals. There is a need to design, construct and operate buildings that use little or no energy on an annualized basis and emit little or no carbon emissions. This class will explore design strategies and sustainability frameworks that help achieve these goals in the commercial sector - such as building electrification - and also shed light on ZNE buildings' interaction with the utility grid.

Learning Outcomes:

- Understand definitions of ZNE and which definition to pick for your building
- Understand drivers of ZNE and zero net carbon (ZNC) in policy and their benefits to building owners and the greater population
- Learn in depth the five-step approach essential to zero design; target, reduce, recover, produce and offset
- Understand common design challenges faced on projects and how to overcome these
- Learn strategies and technologies to electrify buildings and mitigate impacts on the grid through battery storage and other strategies for grid harmonization
- Advanced topics (community scale ZNE)



CalBEM Live Audience Poll (Y/N/Not Sure)

1. BEM plays a critical role in reducing greenhouse gas emissions in CA's building sector.
2. BEM tools should be made easier to use and more accessible to those who are not considered experts.
3. Similar to licensed engineers and architects, BEM modelers should be held liable for their modeling work.
4. BEM tools should accurately predict building performance, regardless of how the building is operated.
5. To have a greater long term effect, energy metrics should be absolute (i.e. EUI) rather than relative (i.e. EDR).
6. CA building designers make design decisions using energy compliance software.
7. Building departments generally enforce CA's Energy Code requirements.
8. CA should continue to develop compliance software to support the Title-24 performance approach.
9. The complexity of CA's BEM landscape (also referred to as the "multiple models issue") is a significant barrier to urgent climate action and substantial reform should take place.
10. The people in this room have the ability to substantially reform CA's BEM landscape. ✓

Mission Statement – To be a global leader for climate action, by using Building Energy Modeling (BEM) to drive low-carbon building design and construction; without compromising the nation-leading advancements California has already made in energy efficiency and distributed generation.

Asset Target Setting

Model Selection:

Building Type: Office - Small

Code Vintage: CA Title-24 2016

Climate Zone: CZ12

Operation: Average

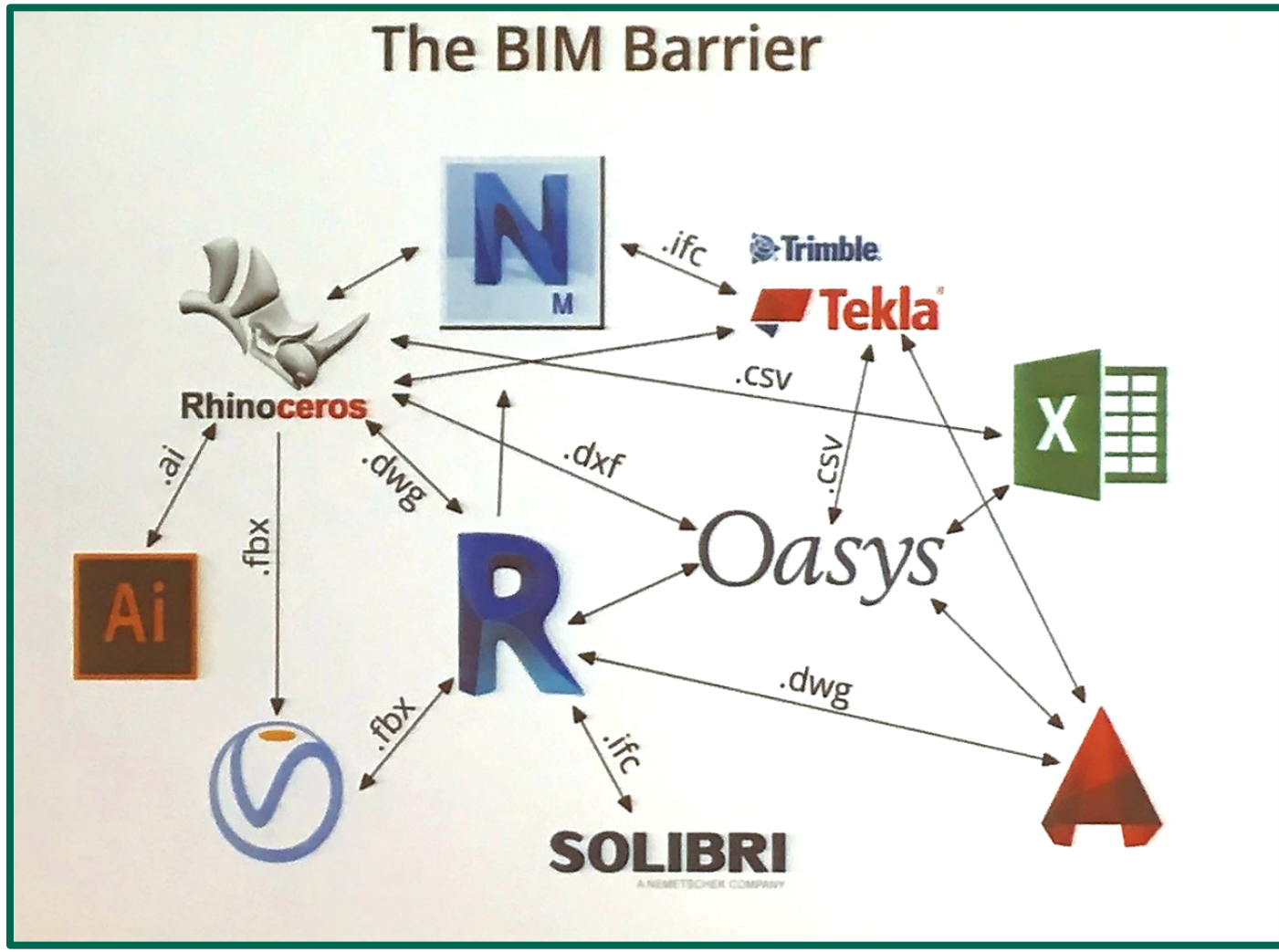
EXPORT HOURLY DATA

View Options:

Compare Across: Code Vintage

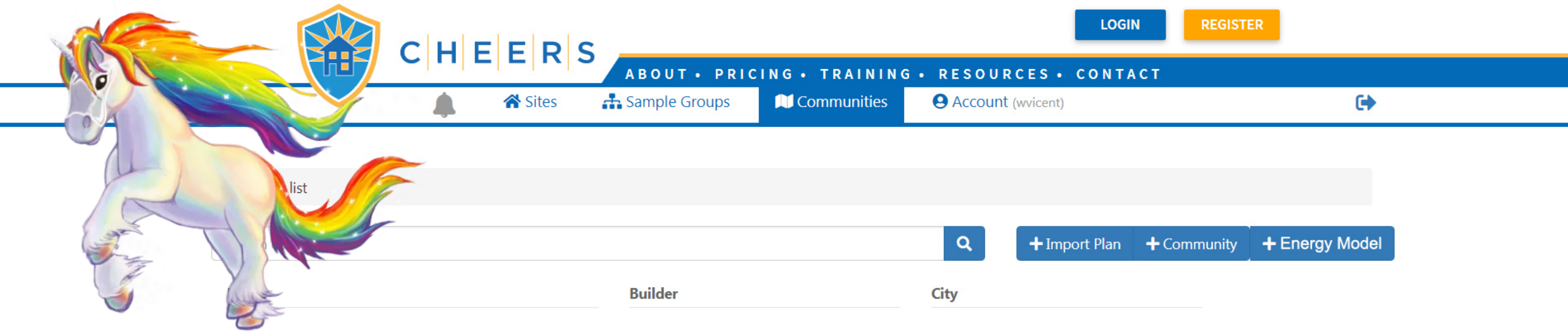
Stack By: End Use

Asset Design



Proposed ≤ Asset Rating?

Asset Compliance



+ Upload XML Office_Small.xml

- ✔ Valid File Type
- ✔ Valid Location & Weather File
- ✔ Valid Building Type & Size
- ✔ Valid Occupancy & Load Schedules
- ✔ Meets Minimum Envelope Requirements
- ✔ Meets Minimum Appliance Requirements
- ✔ Meets Minimum Lighting Requirements
- ✔ Meets Minimum PV Requirements

Model Complies

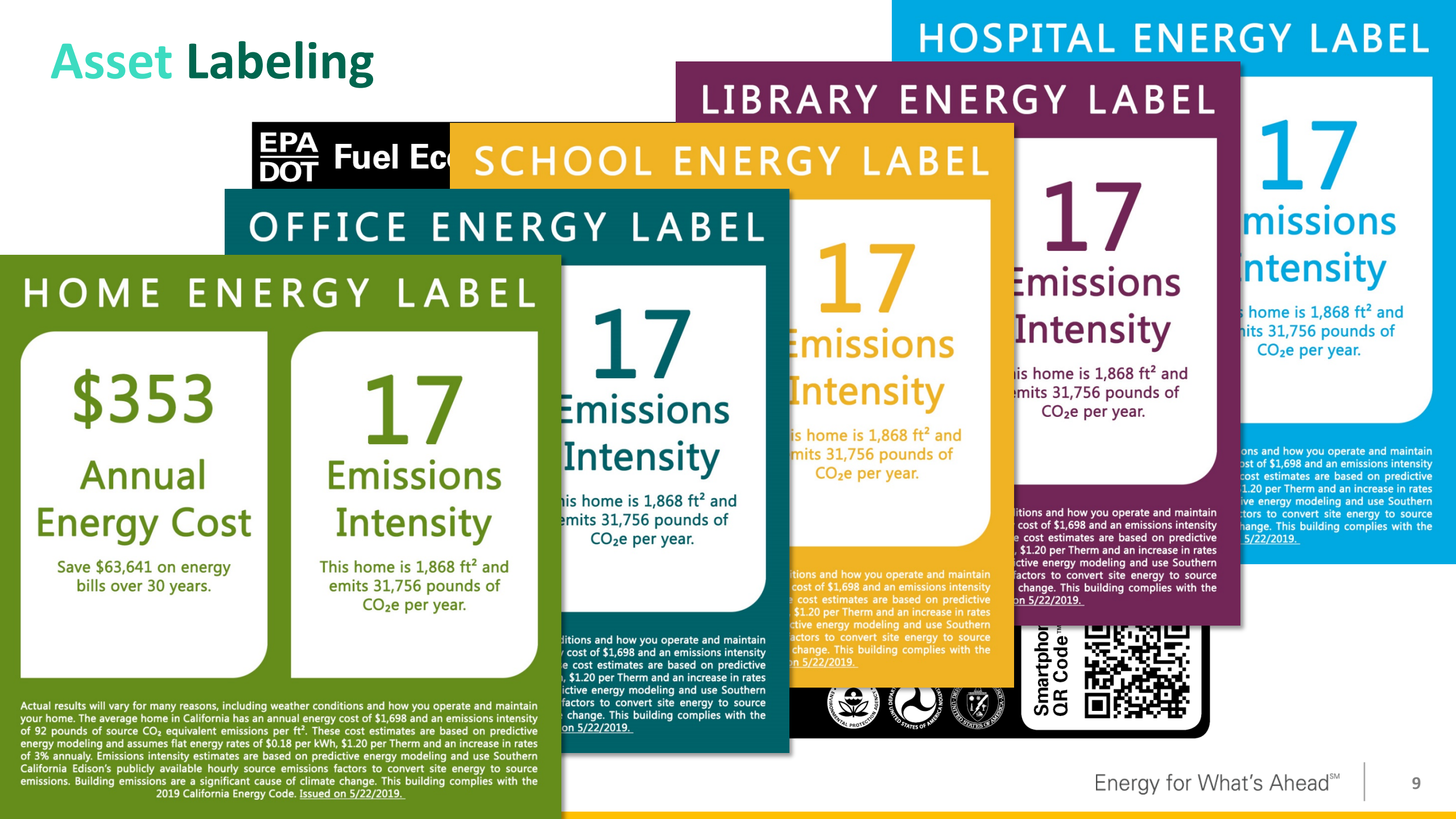
+ Upload Simulated Results Office_Small_Hourly.xlsx

- ✔ Valid File Type
- ✔ Meets Minimum Data Points
- ✔ Meets Range Requirements
- ✔ Meets Building Emissions Asset Rating

Model Results Comply

Generating Building Emissions Asset Rating (BEAR) Label and Field Verification Checklist...

Asset Labeling



IDeAs Office Building

Asset Incentives

Per Home 30-Year Emissions Savings of All-Electric Over Mixed Fuel ($ of Abated CO2e)

CA Climate Zone	Single Family (Low)	Single Family (High)	Multifamily (Low)	Multifamily (High)
1	$5,803	$6,875	$1,576	$1,867
2	$4,362	$5,168	$1,380	$1,636
3	$3,427	$4,061	$1,199	$1,421
4	$3,427	$4,061	$1,269	$1,503
5	$3,038	$3,599	$1,088	$1,289
6	$2,726	$3,230	$1,241	$1,470
7	$2,142	$2,538	$1,255	$1,487
8	$2,259	$2,676	$1,283	$1,520
9	$2,570	$3,045	$1,269	$1,503
10	$2,609	$3,092	$1,255	$1,487
11	$3,856	$4,568	$1,339	$1,586
12	$4,128	$4,891	$1,380	$1,636
13	$3,661	$4,338	$1,311	$1,553
14	$3,778	$4,476	$1,436	$1,702
15	$1,441	$1,707	$1,046	$1,239
16	$6,154	$7,291	$2,217	$2,627
Average	**$3,461**	**$4,101**	**$1,346**	**$1,595**

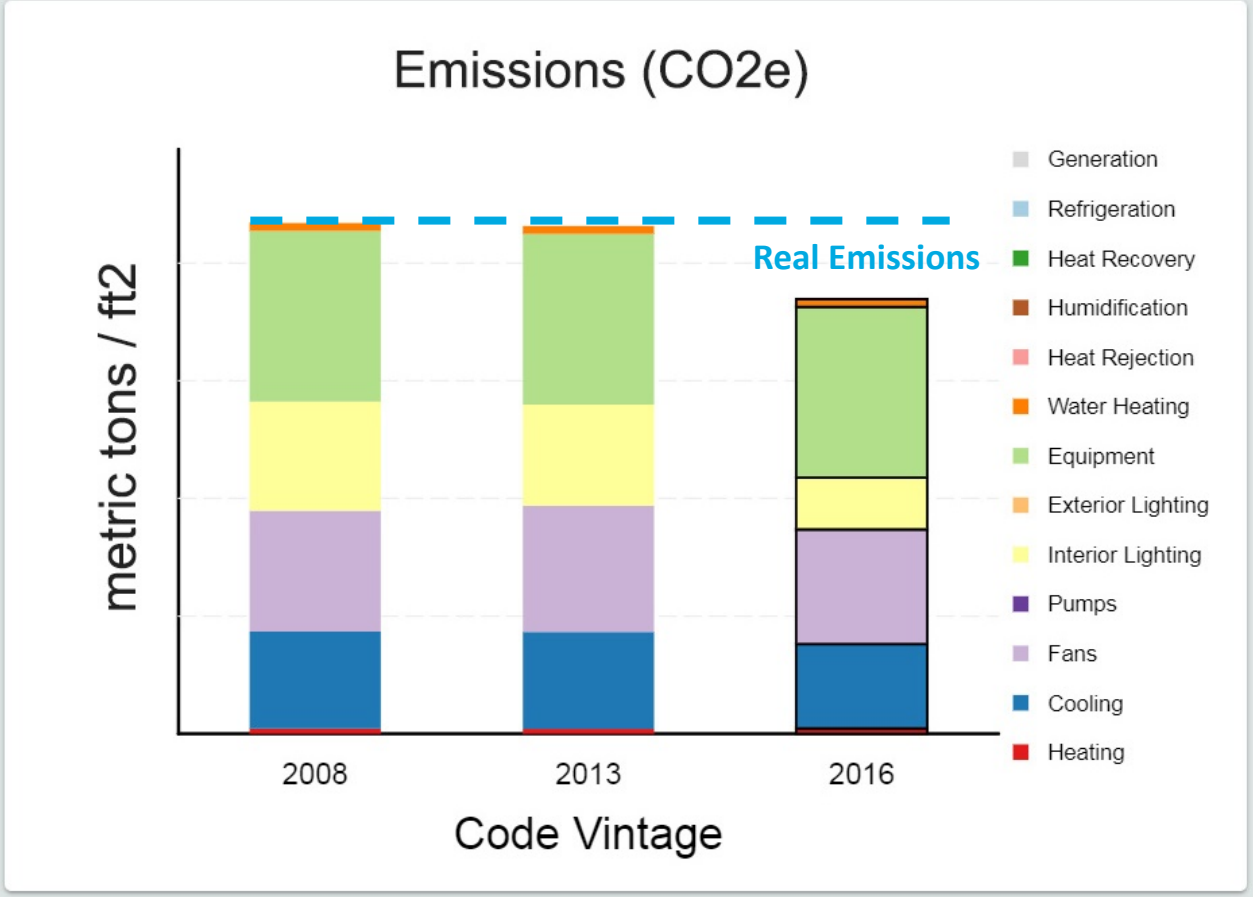
Operational (Re)sale

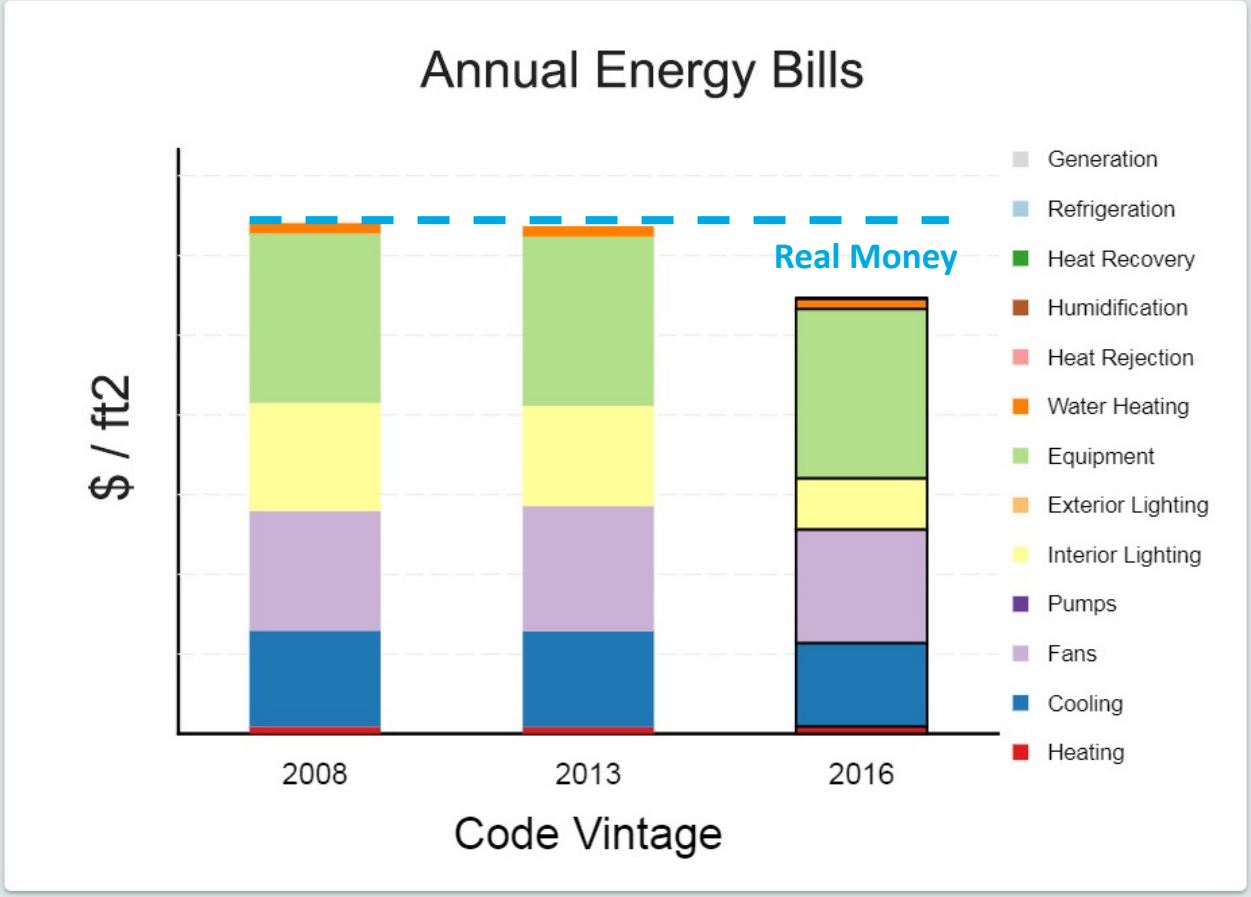
Model Selection:

Building Type: Office - Small
Code Vintage: CA Title-24 2016
Climate Zone: CZ12
Operation: Average
EXPORT HOURLY DATA

View Options:

Compare Across: Code Vintage
Stack By: End Use





Summary of Benefits

- Significantly expanded modeling capabilities for energy compliance modeling: advanced daylighting (such as raytracing), airflow analysis, natural ventilation, thermal comfort models, passive systems, etc.
- Drastically reduced complexity of code requirements – more modeling time dedicated to design rather than compliance
- Reduced burden on building departments and officials – in exchange for small percentage of field verification?
- Relaxed software development burden on regulatory
- Increased accountability on BEM professionals and field inspectors
- Reduced gaming (already a problem?)
- Consistency of energy metrics and value proposition throughout life cycle
- Reliable metrics for real estate valuation, sales and resales

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