The Power of Numbers:
Big Data & Portfolio Performance

TH304

Thursday June 21, 2018 8:45-9:45 a.m.

1 LU | HSW GBCI RIBA

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Acknowledgements/Credits

HOK; our Clients & Consultants

US General Services Administration

Speakers List

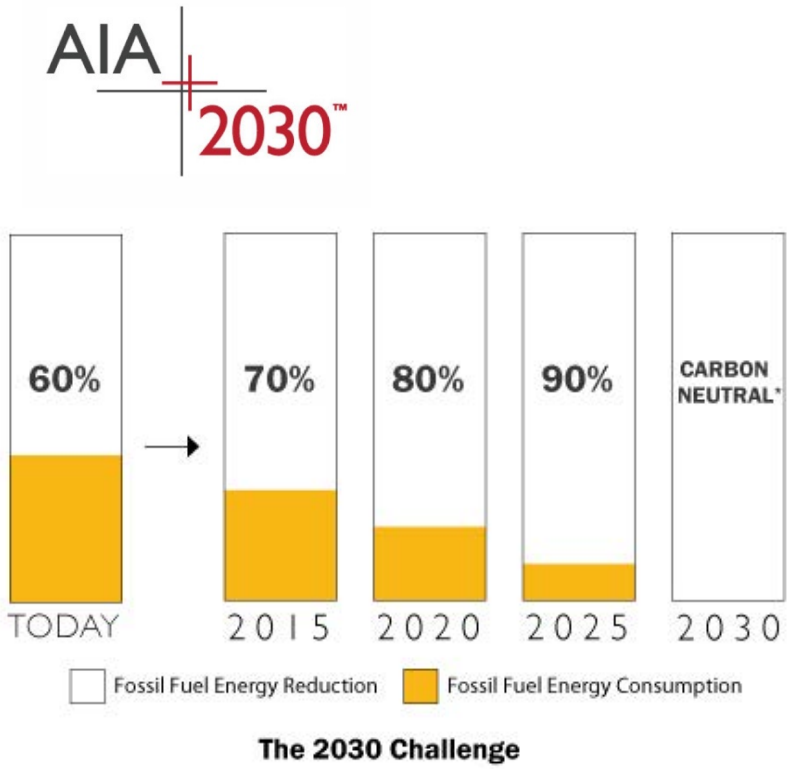
- Anica Landreneau – Senior Principal, Global Director of Sustainable Design, HOK
- Donald Horn, FAIA – Deputy Director, Office of Federal High-Performance Buildings, U.S. General Services Administration

Course / Learning Objectives

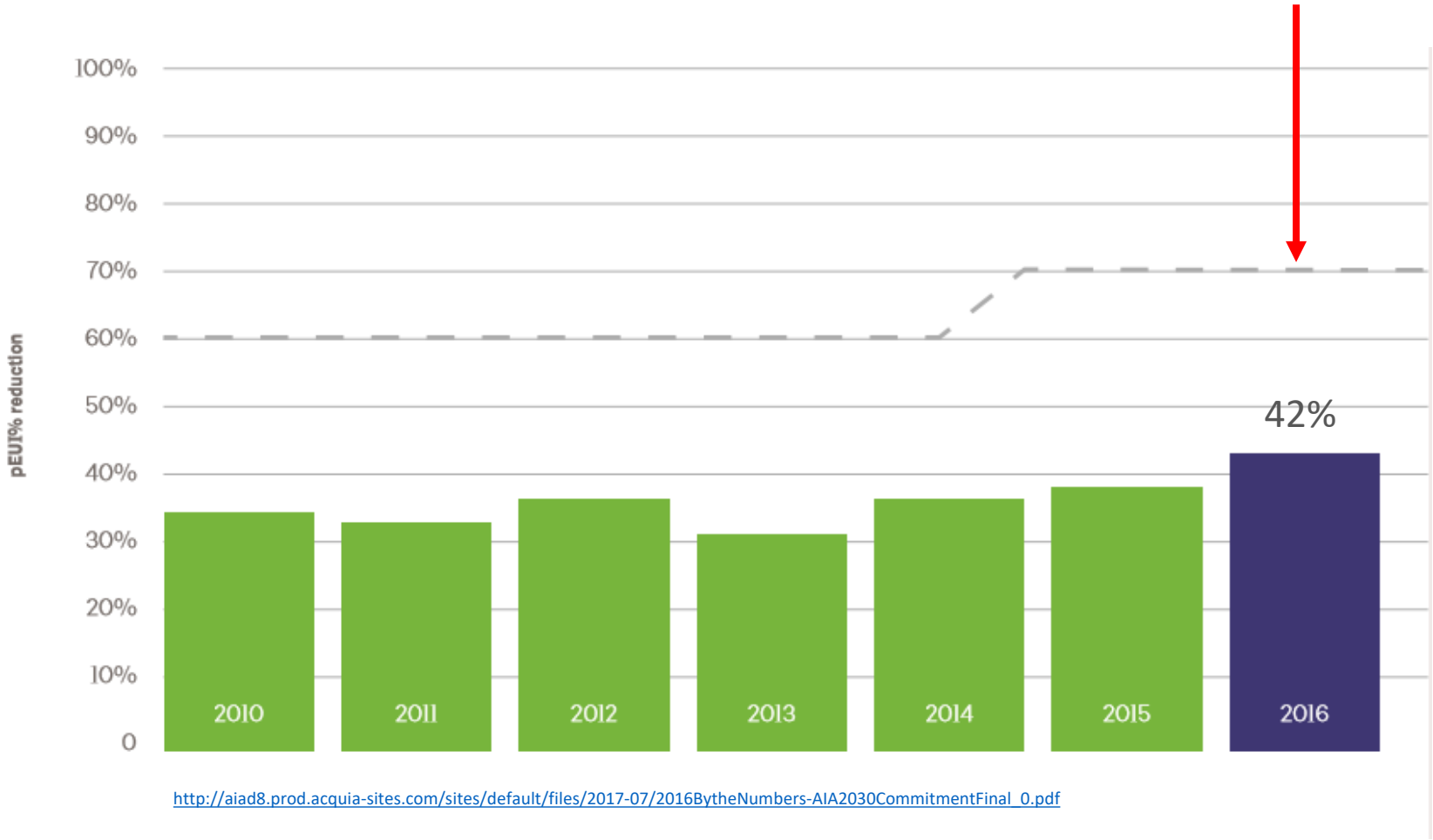
- Find out which points of data are critical to gather, aggregate, and analyze for targeted and continuous improvement on a portfolio, region, building type, or individual property basis.
- Learn how to identify who within a design firm, project team, owner organization, or property management team should be responsible for collecting data.
- Gain insight into the most efficient frequency of data collection and dissemination for improving projects within a design practice or owner's portfolio.
- Identify goals, critical action items, and dissemination strategies for analyzing data for both design and owned portfolios.

Design

The AIA 2030 Plan

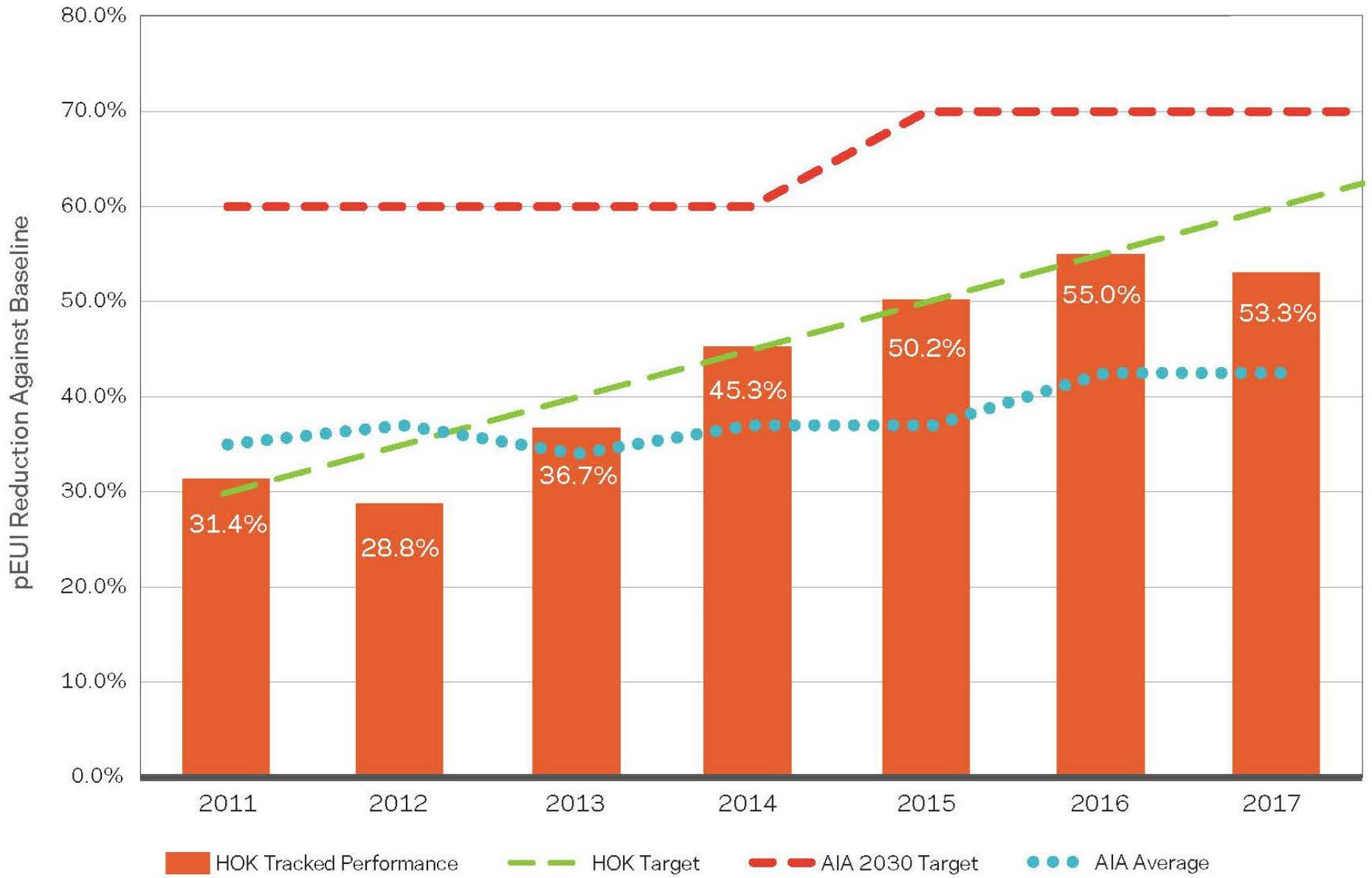


The AIA 2030 Reality



http://aiad8.prod.acquia-sites.com/sites/default/files/2017-07/2016BytheNumbers-AIA2030CommitmentFinal_0.pdf

Firm X Predicted Energy Use Intensity Reduction

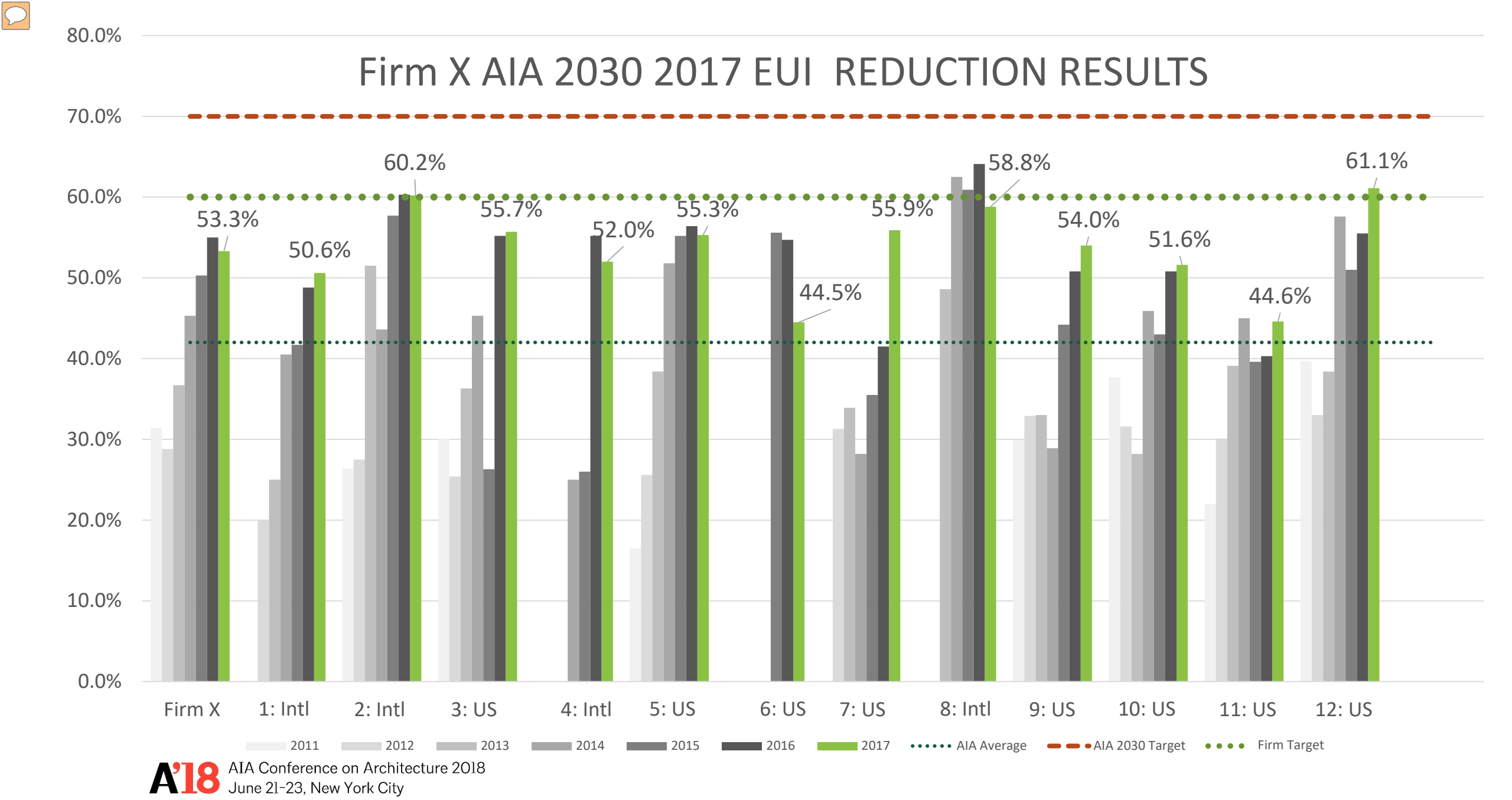


163

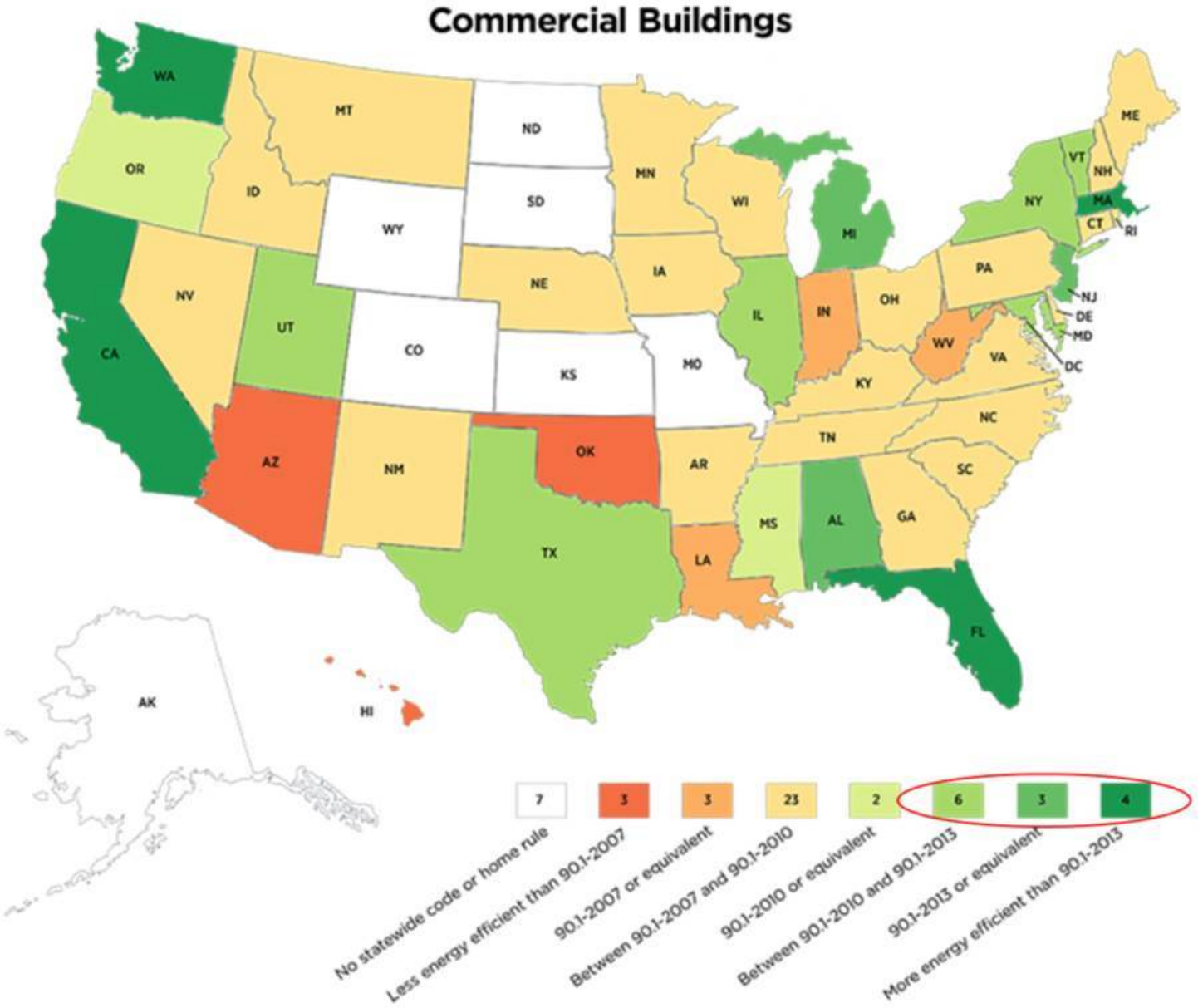
Project EUI reported

71.7

mil GSF EUI reported



A'18 AIA Conference on Architecture 2018
June 21-23, New York City



Alabama
California**
District of Columbia
Florida
Hawaii*
Illinois*
Maryland*
Massachusetts
Michigan
New Jersey*
New York
Texas*
Utah
Vermont*
Washington

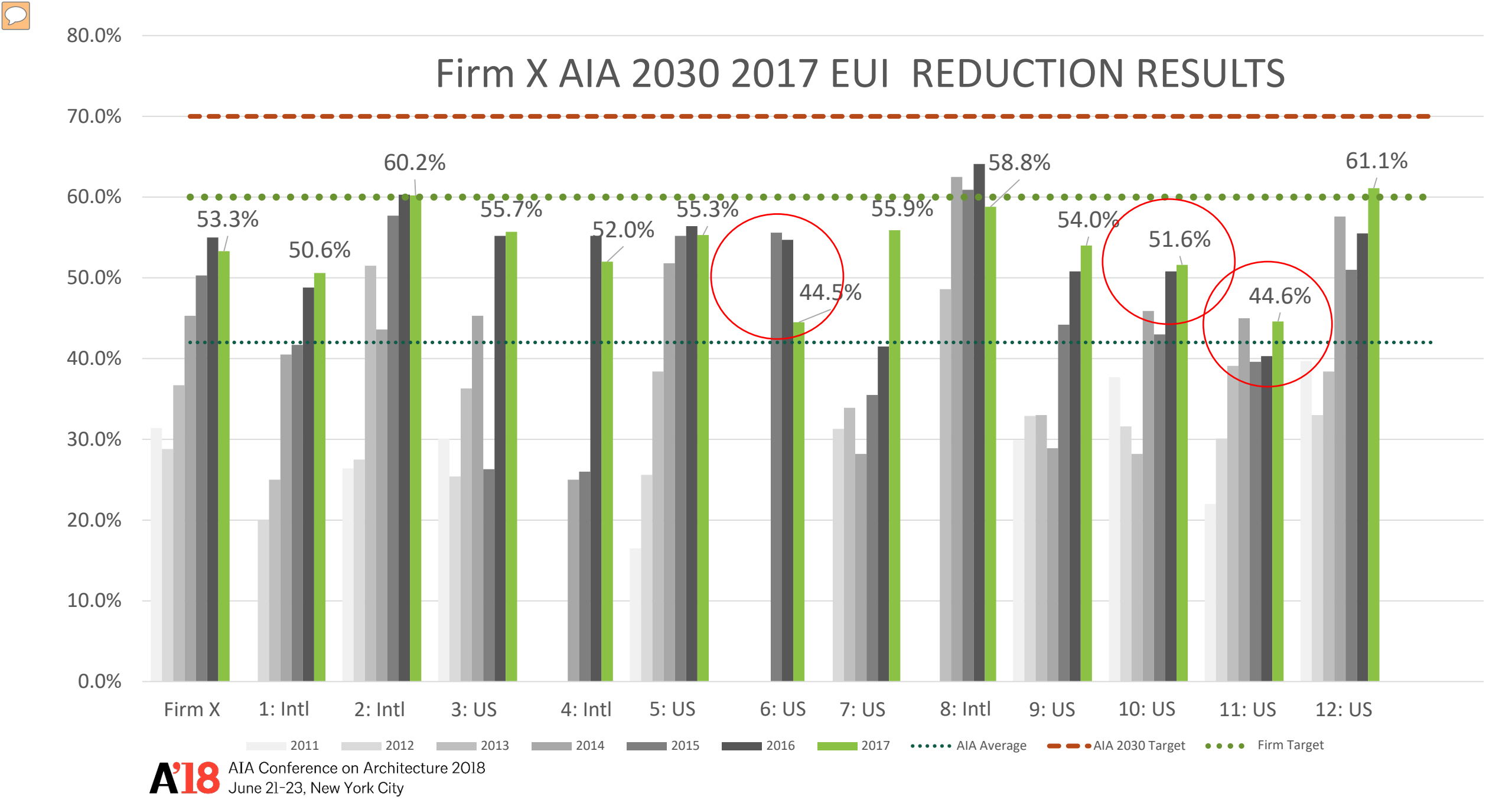
*IECC 2015
**Title 24

Title 24-16	53% <CBECS
90.1-2016	50% <CBECS
IECC 2015	46% <CBECS
90.1-2013	46% <CBECS
IECC 2012	42% <CBECS
90.1-2010	42% <CBECS

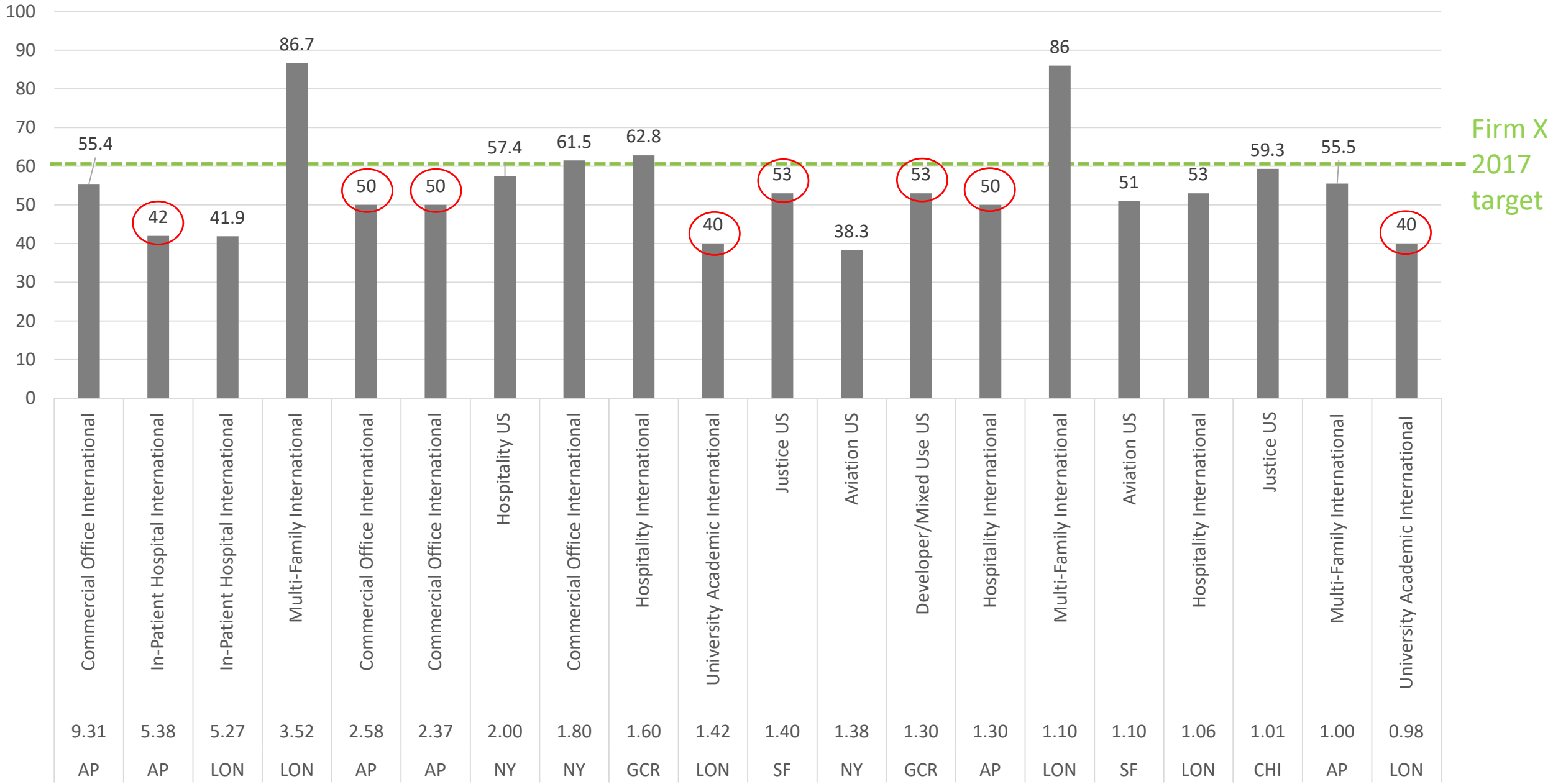
AIA avg pEUI reduction 2016

Current Energy Codes

		Code equivalent reduction from CBECS	RBU average reduction from CBECS
• West Coast 1	Title 24-2016	53%	51.6%
• West Coast 2	Title 24-2016	53%	55.9%
• Central 1	IECC 2015	46%	55.7%
• East Coast 1	IECC 2015/90.1-2013	46%	54%
• Gulf Coast	IECC 2015/90.1-2013	46%	55.3%
• International 1	90.1-2013	46%	60.2%
• International 2	90.1-2013 (equiv)	46%	58.8%
• East Coast 2	90.1-2010/IECC 2012	42%	61.5%
• Central 2	IECC 2012	42%	44.5%
• Central 3	IECC 2009-2015	31-46%	44.6%
• International 3	IECC 2009 (equiv)	31%	50.6%
• International 4	ASHRAE 90.1-2007	31%	52%


Firm X AIA 2030 2017 EUI REDUCTION RESULTS
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
10.0%
0.0%
53.3%
50.6%
60.2%
55.7%
52.0%
55.3%
44.5%
55.9%
58.8%
54.0%
51.6%
44.6%
61.1%
Firm X
1: Intl
2: Intl
3: US
4: Intl
5: US
6: US
7: US
8: Intl
9: US
10: US
11: US
12: US
2011
2012
2013
2014
2015
2016
2017
AIA Average
AIA 2030 Target
Firm Target
A'18
AIA Conference on Architecture 2018
June 21-23, New York City

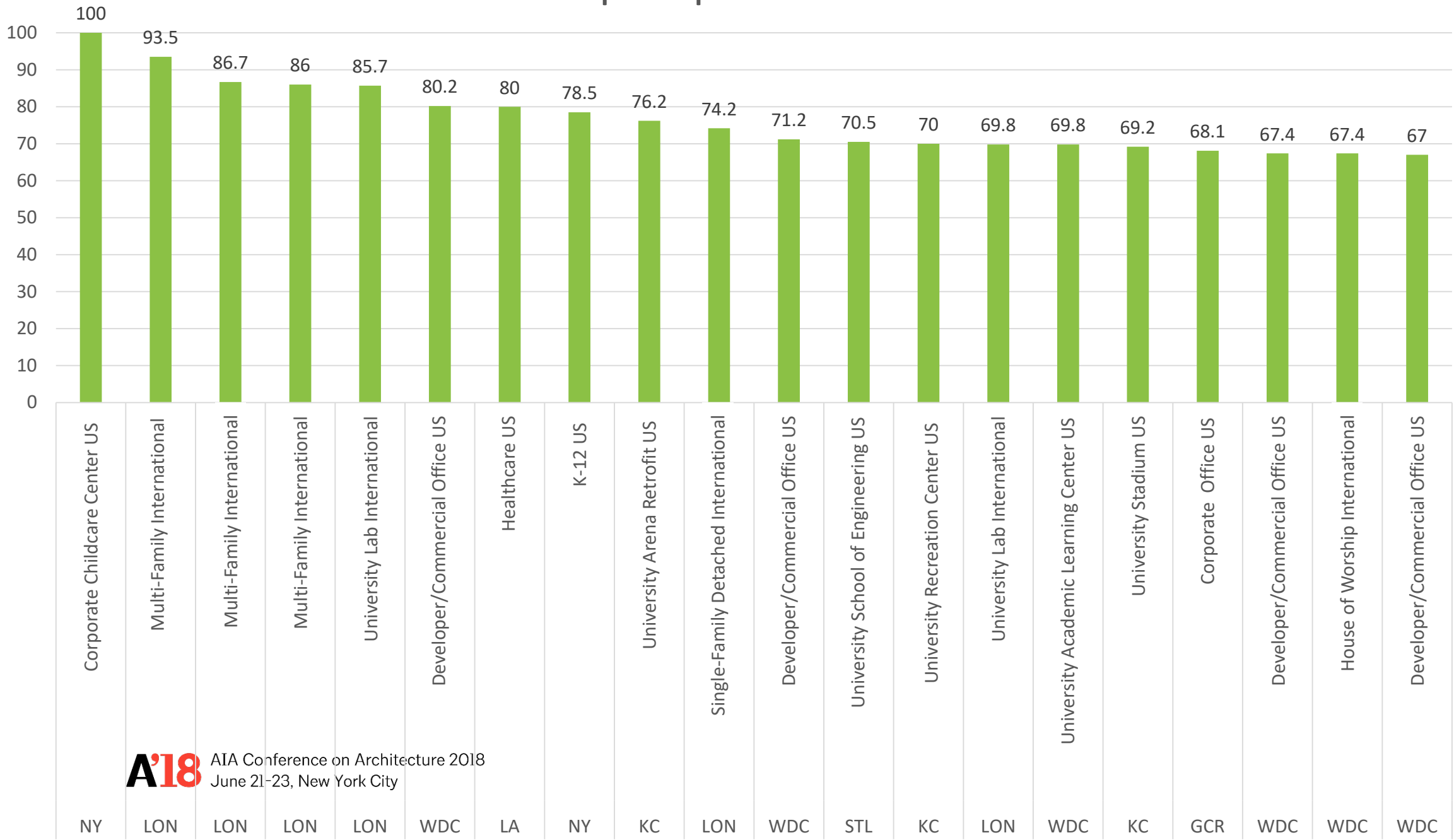
AIA 2030 Top 20 Largest Projects (in Million SF) pEUI Reduction 2017



20 largest projects represent 66% of total GSF reported.

8 of 20 largest projects don’t have an energy model yet.

AIA 2030 Top 20 pEUI Reduction 2017



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42 projects achieved target 60% or better reduction in pEUI, representing 23% of total projects by GSF reported for 2017.

Hospitality International

60%

Healthcare International

62.6%

Healthcare US

80%

University Lab International

86%

University Lab International

70%

K-12 School US

79%

Commercial Office US

66%

Commercial Office US

63.1%

Commercial Office US

71.2%

Lessons Learned: Set Targets

1. We *lead* the design team – it is our responsibility - as architects + designers - to *set targets*, not ask consultants how well they think we can do. It brings the sustainable design conversation *forward*

2. Setting EUI targets focuses the design + usually result in *higher project performance without adding cost**

3. We can leverage multiple years of data to identify appropriate targets + strategies by project type, location

Lessons Learned: Model Early & Often

1. In the same way that it is ineffective to only check on project *financial performance* at the end of the year…

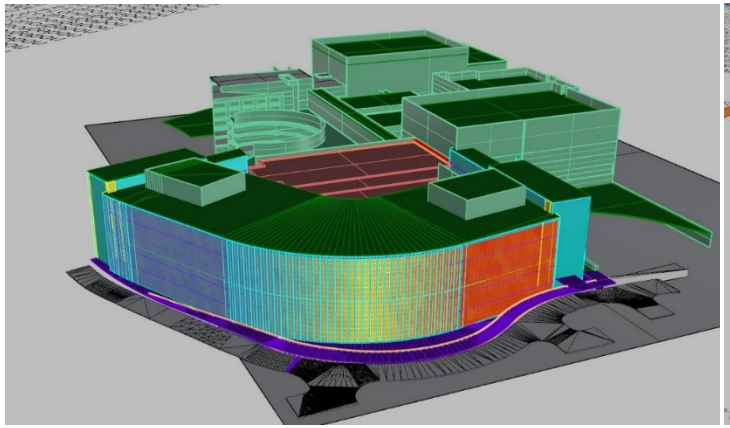
….it also ineffective to wait until the end of the year to check in on project *energy performance*

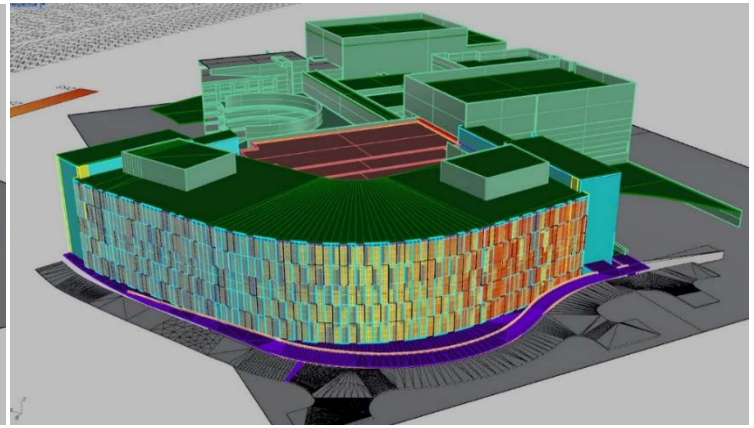
2. Energy modeling *usually pays for itself* in first cost tradeoffs or within 1-3 months* of operational savings

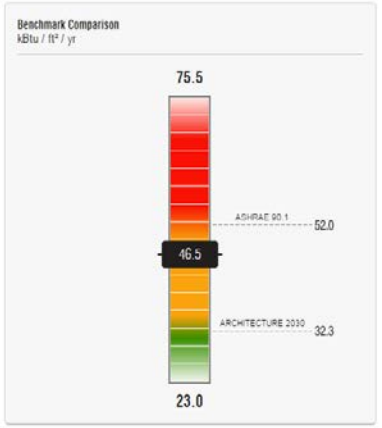
Lessons Learned: Model Large Projects

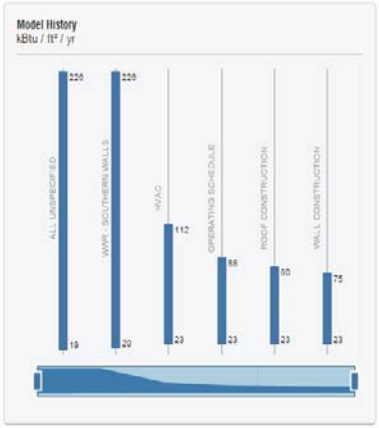
1. We need to be performing some level of energy analysis + modeling on *all* projects, but *especially our largest projects*

2. New Policy: all projects > $300k have *minimum fee* automatically set aside for *sustainable design & optimization*









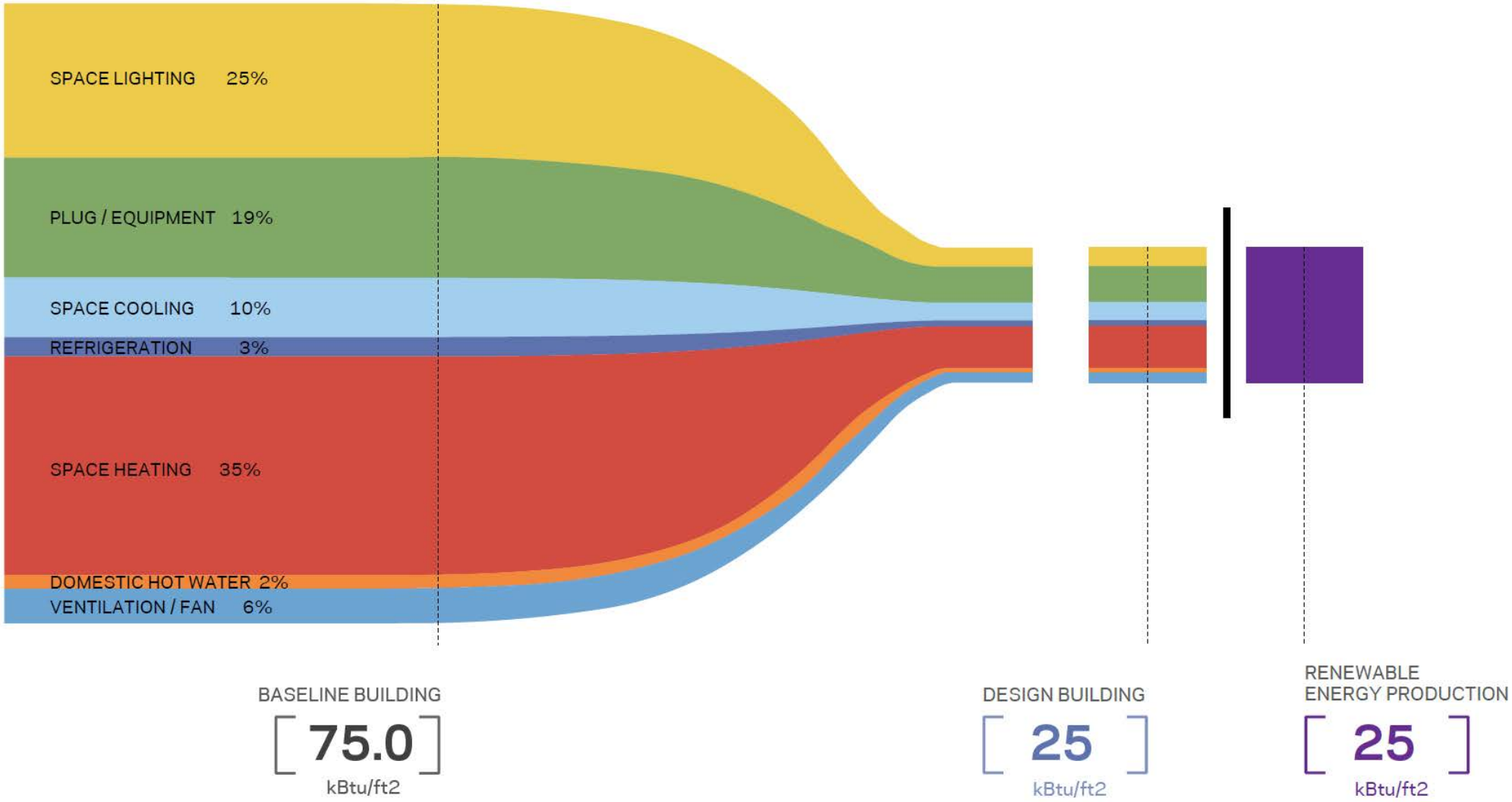
Lessons Learned: Accountability

1. Action plan includes annual escalation of targets, firmwide mid-year gut check + dialogue with Managing Principals, Design Principals

2. Some studios now *reporting monthly* to increase awareness + change habits

3. AIA 2030 performance is reported to the BOD, included in *annual performance evaluation* for project team members + senior leadership

Lessons Learned: AIA 2030 -> Net Zero



Leverage the AIA 2030 Commitment to *improve your practice*.

Performance

U.S. General Services Administration

Mission: Deliver value and savings in real estate, acquisition, technology, and other mission-support services across Government.








U.S. General Services Administration

- Portfolio of over 8,600 assets
  - 1,600+ owned assets (180+ million square feet)
  - 7,000+ leased assets (180+ million square feet)
- 487 historic buildings

- House 1.1 million federal employees
- Landlord for over 400 different federal agencies, bureaus and commissions

Morse U.S. Courthouse
Eugene, OR

NPS
Omaha, NE

U.S. Census Bureau
Suitland, MD

U.S. Courthouse
Bakersfield, CA

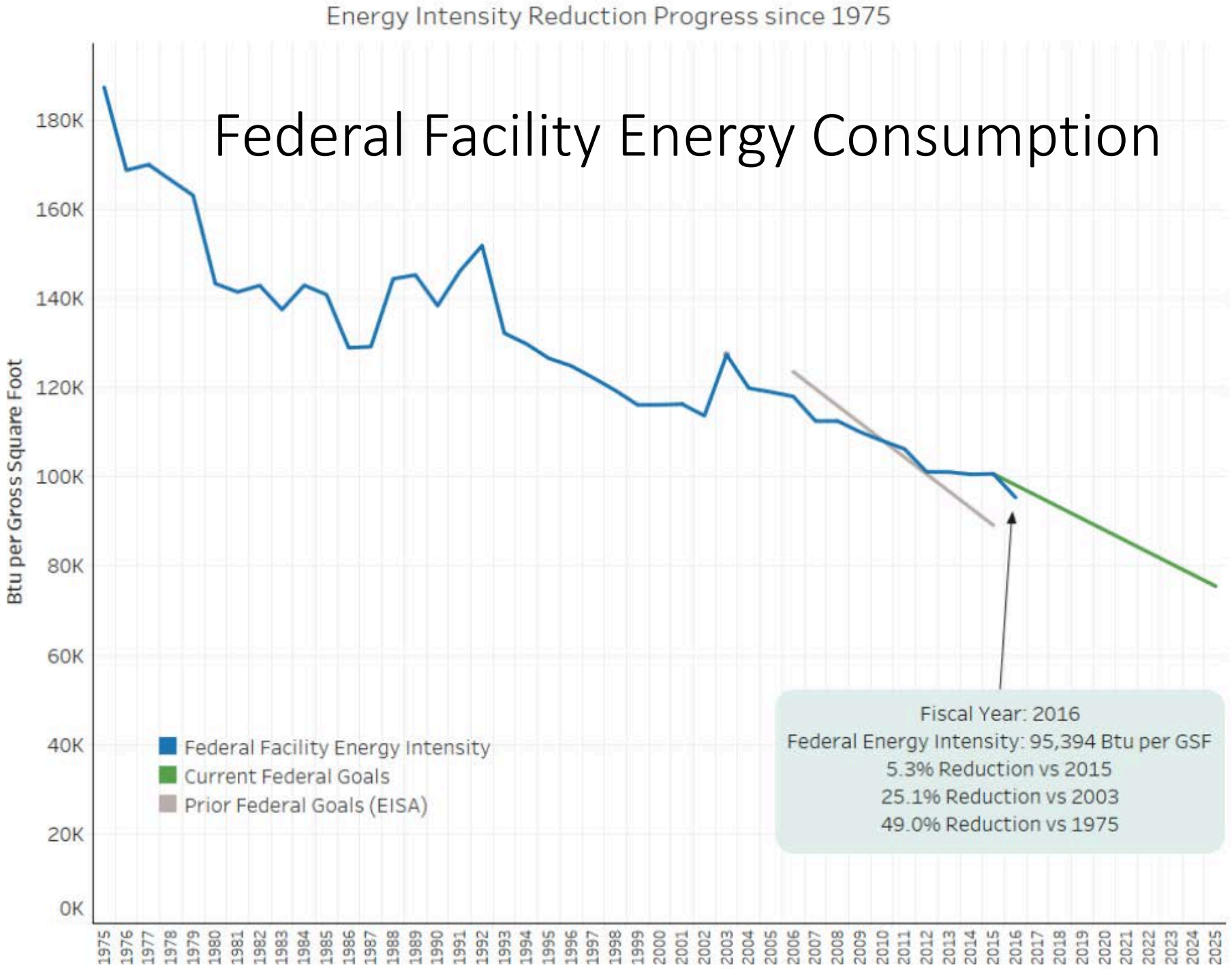
Garcia U.S. Courthouse
San Antonio, TX

Federal Targets for Sustainability

Projects must meet energy efficiency and sustainable design targets included in:

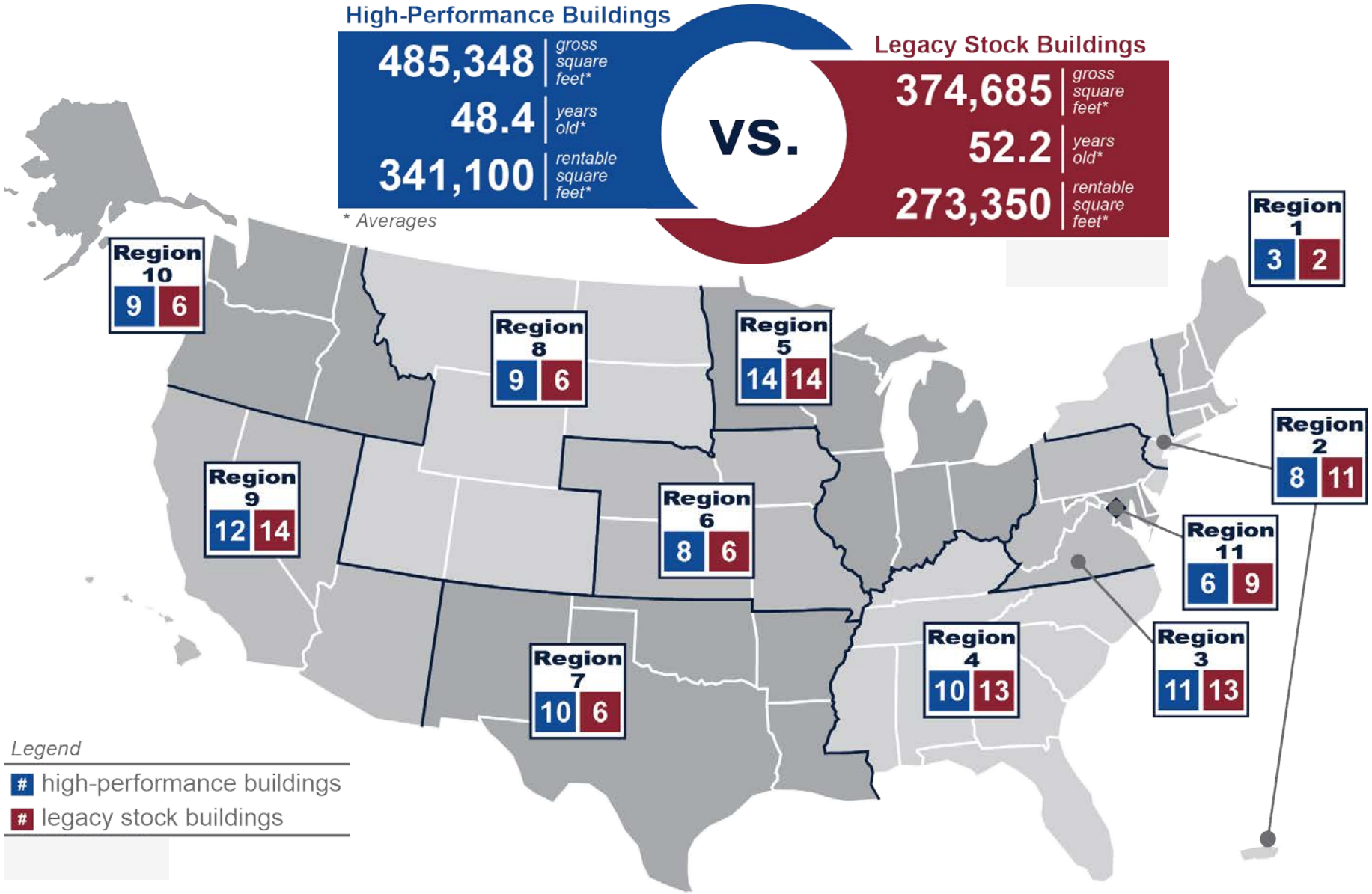
- Energy Policy Act of 2005
- Energy Independence and Security Act of 2007
- Executive Order 13834:
  Efficient Federal Operations (2018)
  - Guiding Principles for Sustainable Federal Buildings (2016)

Federal Facility Energy Consumption



The Impact of High-Performance Buildings

U.S. General Services Administration


High-Performance Buildings
485,348 gross square feet*
48.4 years old*
341,100 rentable square feet*
* Averages
vs.
Legacy Stock Buildings
374,685 gross square feet*
52.2 years old*
273,350 rentable square feet*
Region 10 9 6
Region 8 9 6
Region 5 14 14
Region 1 3 2
Region 9 12 14
Region 6 8 6
Region 2 8 11
Region 11 6 9
Region 7 10 6
Region 4 10 13
Region 3 11 13
Legend
high-performance buildings
legacy stock buildings

Performance Metrics

	**Energy Efficiency**	*Annual energy consumption and costs*
	**Water Efficiency**	*Annual water consumption and costs*
	**Building Operating Expenses**	*Annual building operating expenses including O&M, janitorial, and utility costs*
	**Solid Waste Generation & Diversion**	*Annual waste and recycling amounts*
	**Tenant Satisfaction**	*Occupant satisfaction ratings for air quality, noise, temperature, cleanliness, light, and overall satisfaction*

key findings

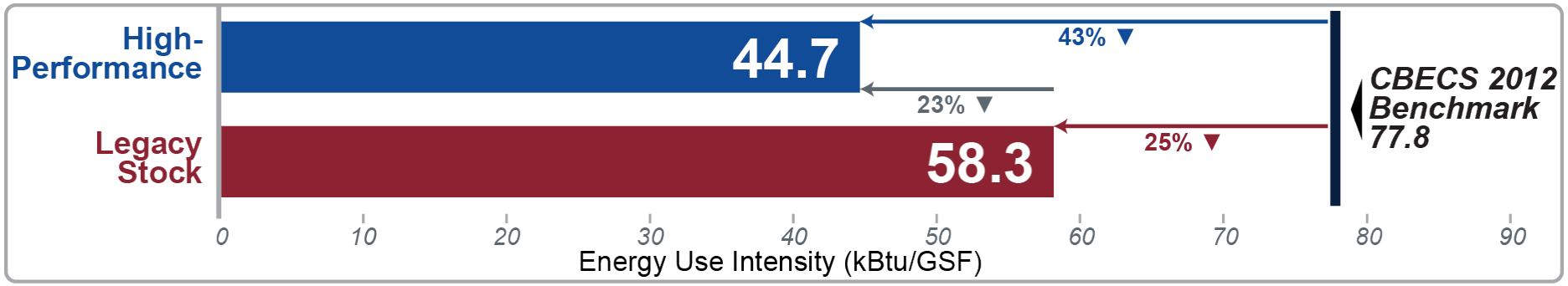
Compared to legacy stock buildings, GSA's high-performance buildings show:

- **23%** ↓ *energy use*
- **28%** ↓ *water use*
- **23%** ↓ *building operating expenses*
- **9%** ↓ *waste landfilled*
- **2%** ↑ *tenant overall satisfaction*

key findings

Compared to legacy stock buildings, GSA's high-performance buildings show:		Compared to industry benchmarks, GSA's high-performance buildings show:
23% ↓	energy use	↓ 43%
28% ↓	water use	↓ 35%
23% ↓	building operating expenses	↓ 10%
9% ↓	waste landfilled	not tracked
2% ↑	tenant overall satisfaction	↑ 1%

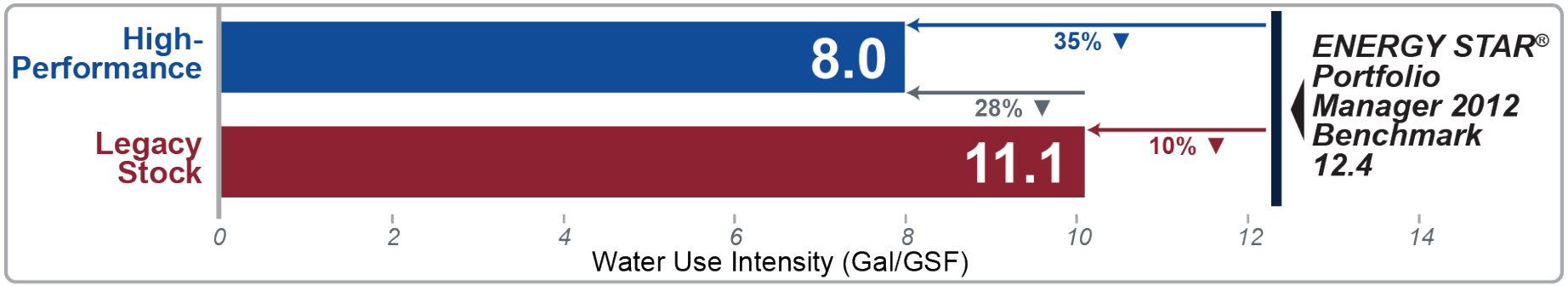
Energy Efficiency



Wayne Aspinall Federal Building & Courthouse
Grand Junction, CO

- 1918 building renovated in 2013
  - variable refrigerant flow HVAC
  - LED lights w/ sensors & dimmers
  - thermally-enhanced envelope
  - geothermal heat pump
  - rooftop photovoltaic system
- EUI is 15 kBtu/GSF

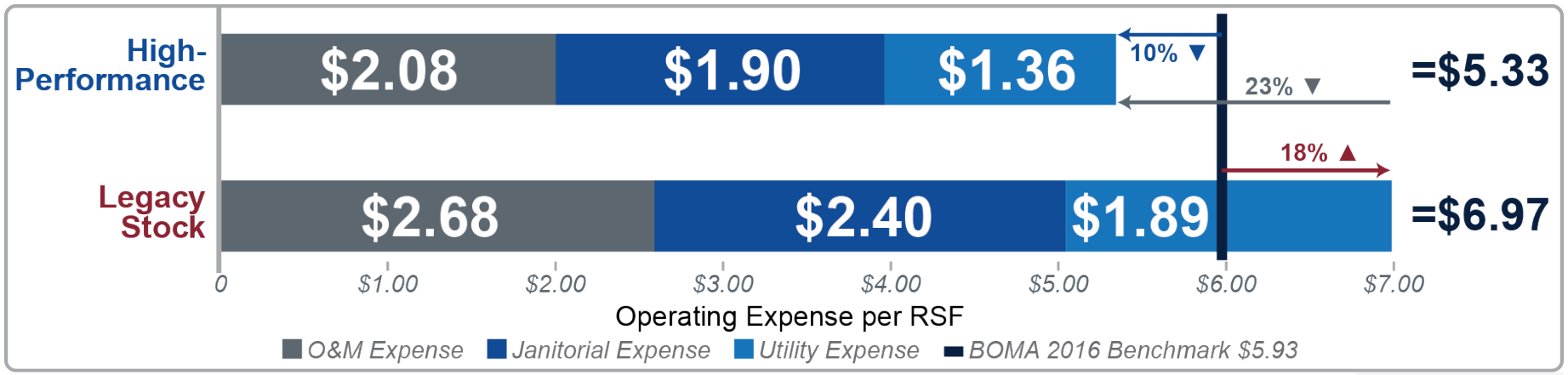
Water Efficiency



Federal Center South
Seattle, WA

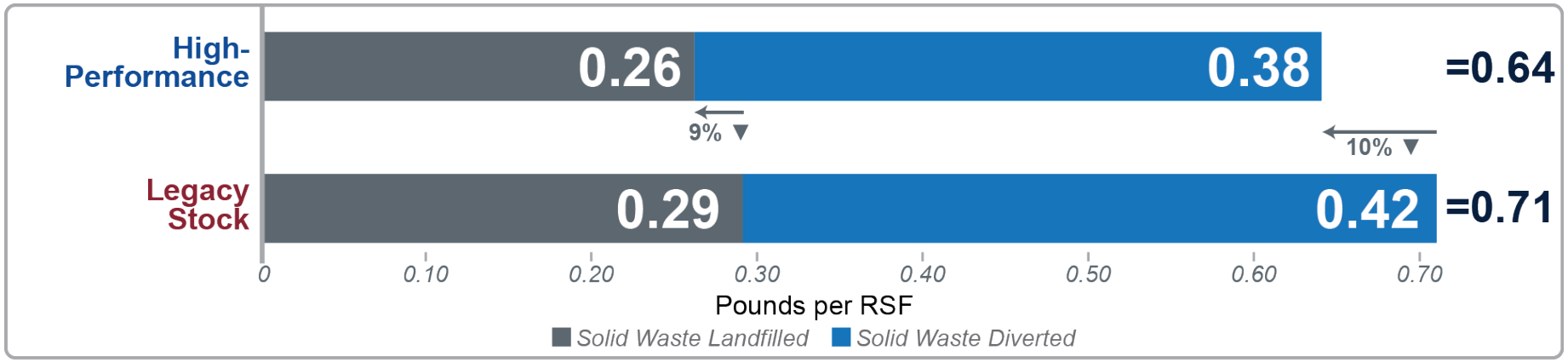
- Rainwater capture in a 25,000 gallon cistern
  - used for toilet water, process water, and irrigation
- High-efficiency bathroom fixtures
- WUI is 5.1 gallons per GSF

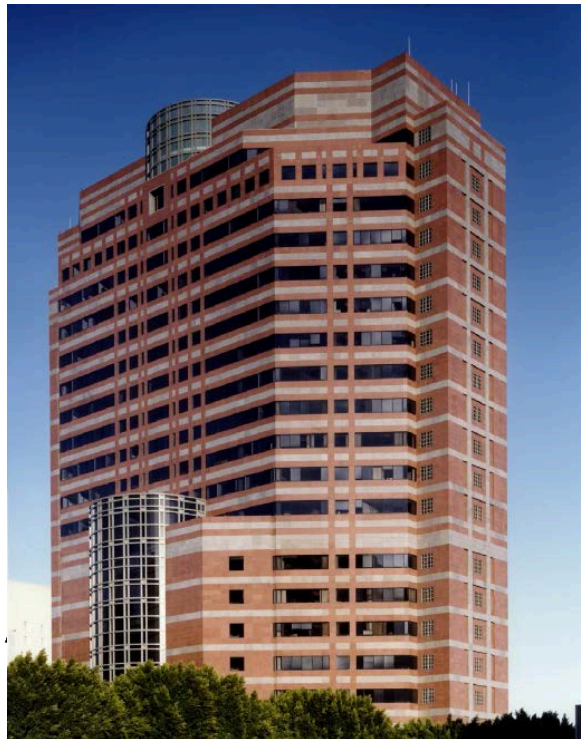
Building Operating Expenses



High-performance buildings cost
$0.60 less/RSF in O&M expenses,
$0.50 less/RSF in janitorial expenses
$0.53 less/RSF in utility expenses
compared to legacy stock buildings

Solid Waste Generation & Diversion

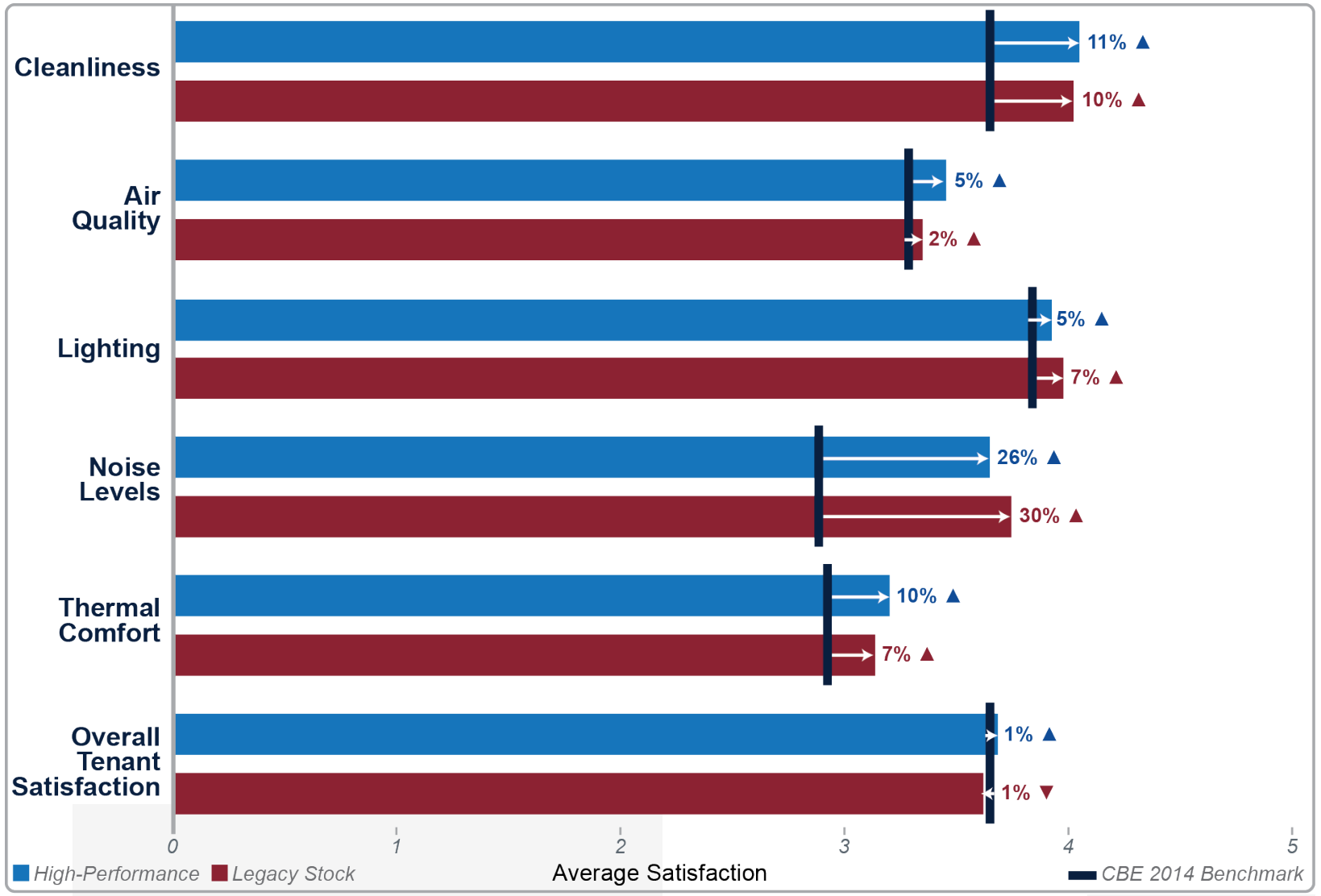


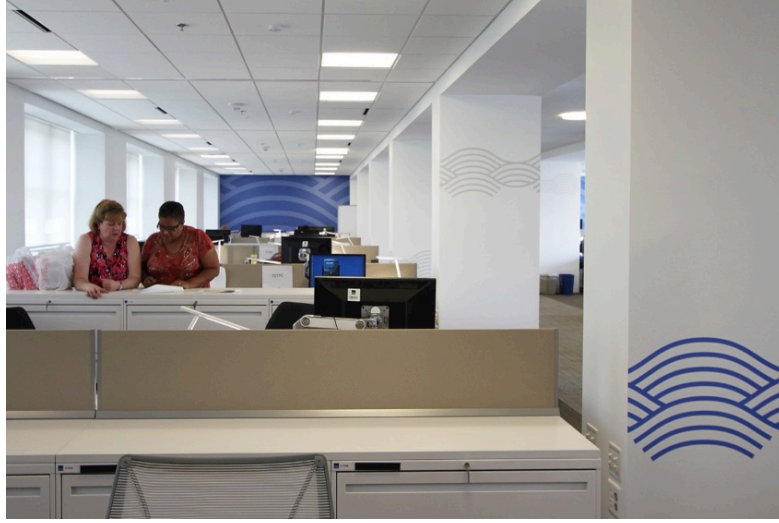


Edward Roybal Federal Building
Los Angeles, CA

- Increased waste diversion rate from 31% to 80% in 5 years
  - implemented a food waste and organics composting program
- Generates revenue from recycling supports tenant agency programs
- Diverted 80% of total solid waste in FY16

Tenant Satisfaction





GSA Headquarters
Washington, DC

- 1917 building renovated in 2013
- Glazing glare control
- Occupant thermal comfort systems
- Individually controlled thermal zones
- Daylight harvesting control system
- Operable windows linked to room-specific ventilation systems

High-Performance Buildings Save Money

Performance Metric	Curent Actual Cost *(200 buildings)*[10]	Projected Cost if All 200 Buildings were High-Performance[11]	Additional Savings in Legacy Stock Buildings
Energy	$105,206,021	$92,304,650	$12,901,371
Water	$10,090,138	$8,626,759	$1,463,379
Building Operating Expenses	$287,876,172	$257,624,529	$30,251,644
Solid Waste	$440,341	$422,359	$17,982
Total	***$403,612,962***	***$358,978,297***	***$44,634,376***

Recommendations

- Optimize portfolio performance through analyzing building performance data
- Identify opportunities for improvement
- Maintain a portfolio-wide approach to reduce excess costs of lower performing buildings
- Prioritize investment opportunities for improvement considering a range of costs, savings, and income
- Leverage external financing wherever possible

Contact Information

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Thank you!