Securing Your Investment in Sustainability

University of Chicago New Construction Procurement Case Study

Presenters

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Agenda

- The University of Chicago story
- Incorporating a new procurement approach
- Setting your EUI target
- RFP and contract language
- DOE agreement—Accelerate Performance
- Q&A

Can we create a better contract?

- ✓ Secure our investment in sustainability
- ✓ Meet campus carbon reduction goals
- ✓ Minimize increased demand on utility usage and costs
- ✓ Bridge planning and operations teams

Can we create a better contract?

- ✓ Share risk with contractor and design team
- ✓ Minimize value engineering and change orders
- ✓ Include energy performance criteria or EUI cap on future new construction projects
- ✓ Ensure project performs as expected!

Performance based procurement

- U.S. Department of Energy tool developed by NREL to support owners with a new procurement approach for superior energy performance
- Owner establishes a measurable energy performance (or EUI) requirement in RFP and/or contract
- Applicable to new construction and major renovation
- Projects must be in the pre-planning phase (before the design team is under contract)
- Supports path to net zero buildings
- ***Intuitional projects are ideal!***

University of Chicago

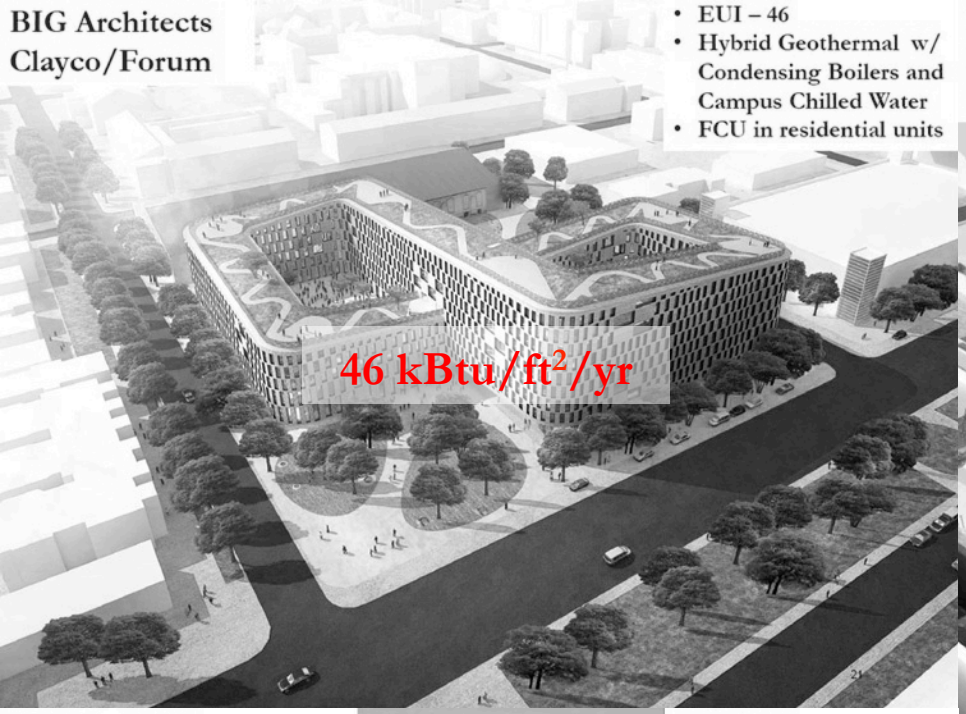
- Performance based procurement for 390,000 sq ft residence hall and 150,000 sq ft international forum
- Set goals and budget in pre-planning phase
- Teams competed for best solutions

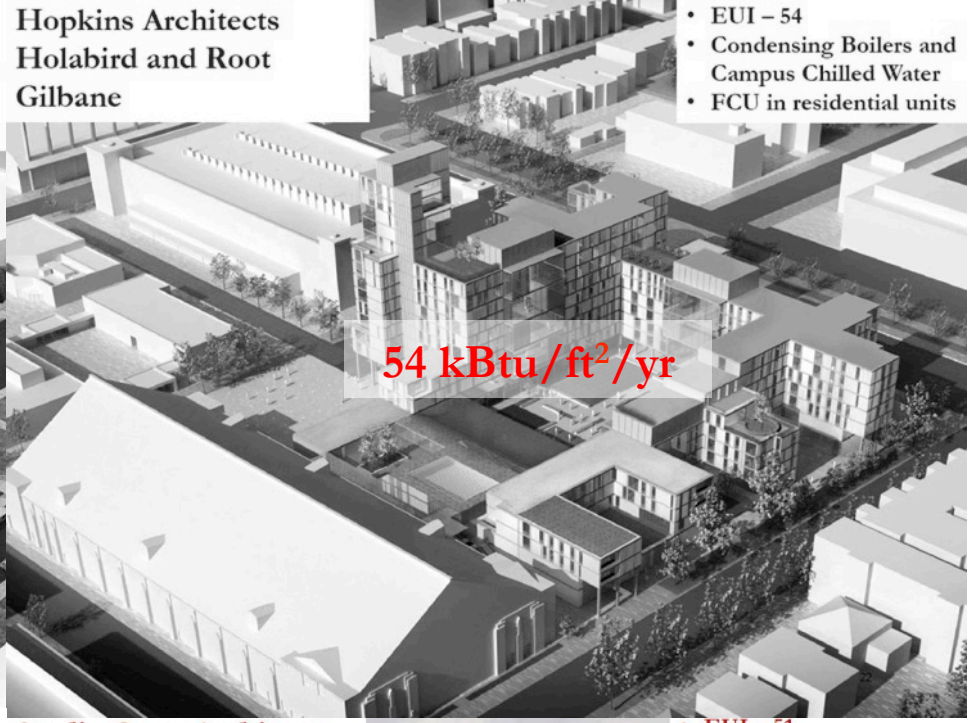

BIG Architects
Clayco/Forum
• EUI – 46
• Hybrid Geothermal w/ Condensing Boilers and Campus Chilled Water
• FCU in residential units


Hopkins Architects
Holabird and Root
Gilbane
• EUI – 54
• Condensing Boilers and Campus Chilled Water
• FCU in residential units


Perkins + Will
Pepper Construction
• EUI – 52
• Hybrid Geothermal w/ Condensing Boilers and Campus Chilled Water
• Radiant panels with DOAS


Studio Gang Architects
Mortenson Construction
• EUI – 51
• Condensing Boilers and Campus Chilled Water
• Radiant Slab with DOAS


BIG Architects
Clayco/Forum
• EUI – 46
• Hybrid Geothermal w/ Condensing Boilers and Campus Chilled Water
• FCU in residential units
46 kBtu/ft²/yr


Hopkins Architects
Holabird and Root
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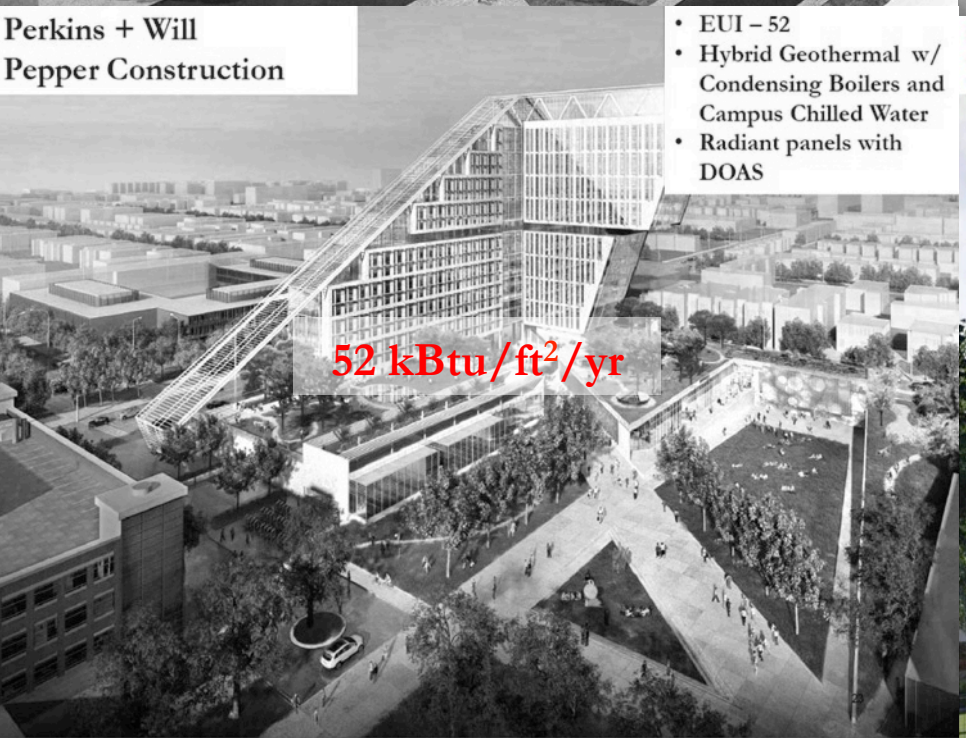
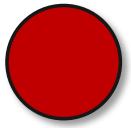
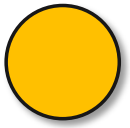
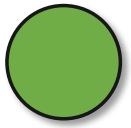
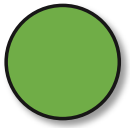
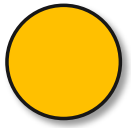
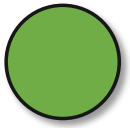
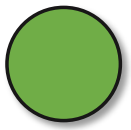
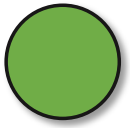
• FCU in residential units
54 kBtu/ft²/yr


Perkins + Will
Pepper Construction
• EUI – 52
• Hybrid Geothermal w/ Condensing Boilers and Campus Chilled Water
• Radiant panels with DOAS
52 kBtu/ft²/yr


Studio Gang Architects
Mortenson Construction
• EUI – 51
• Condensing Boilers and Campus Chilled Water
• Radiant Slab with DOAS
51 kBtu/ft²/yr

Evaluate submittals

Team	Risk – Confidence performance meets intent	Energy Target	Daylight, Views, Connection to Nature	Comfort and HVAC Response	Maintainability	Innovation
A						
B						
C						
D						

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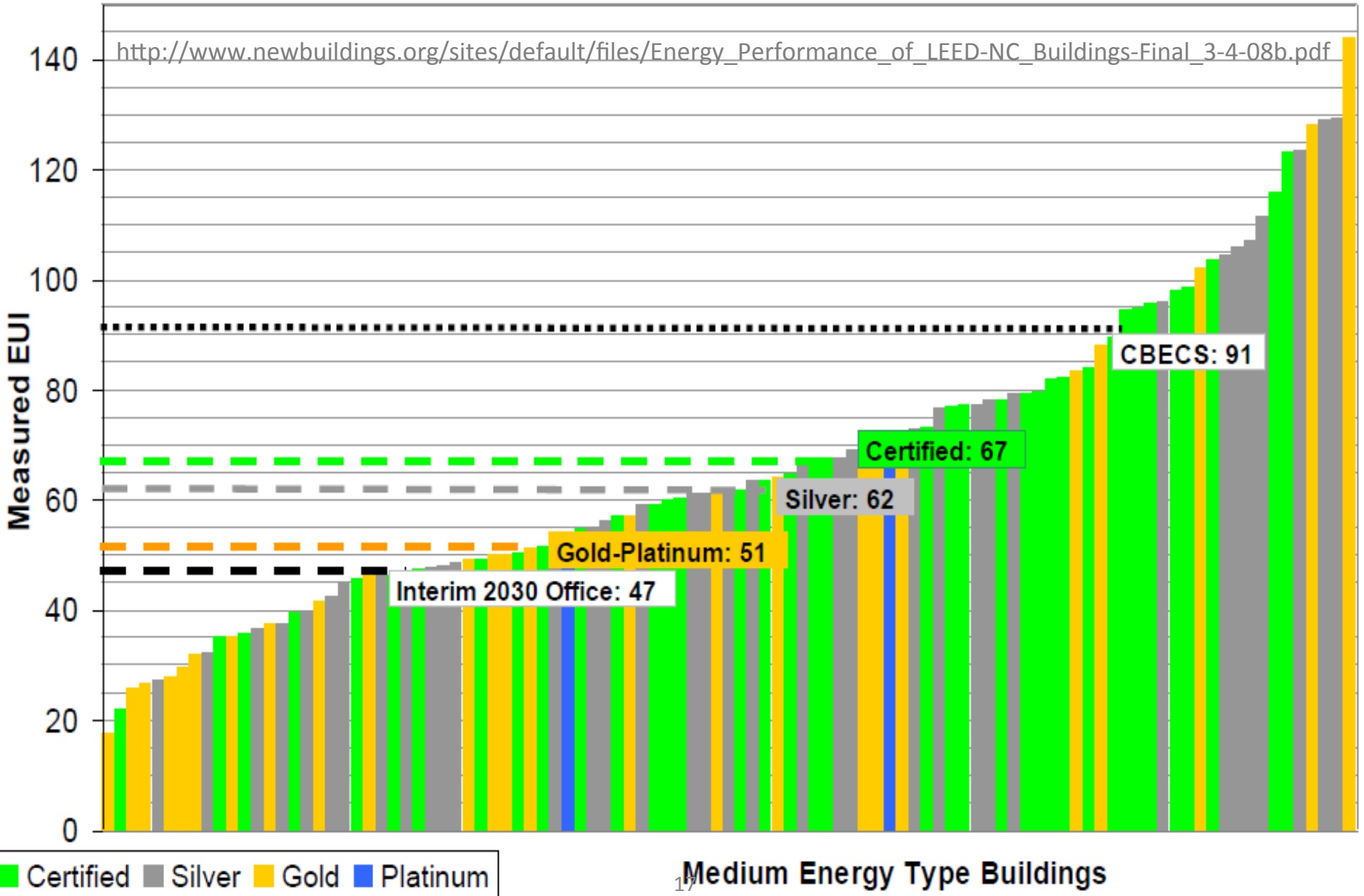
Setting your EUI Target

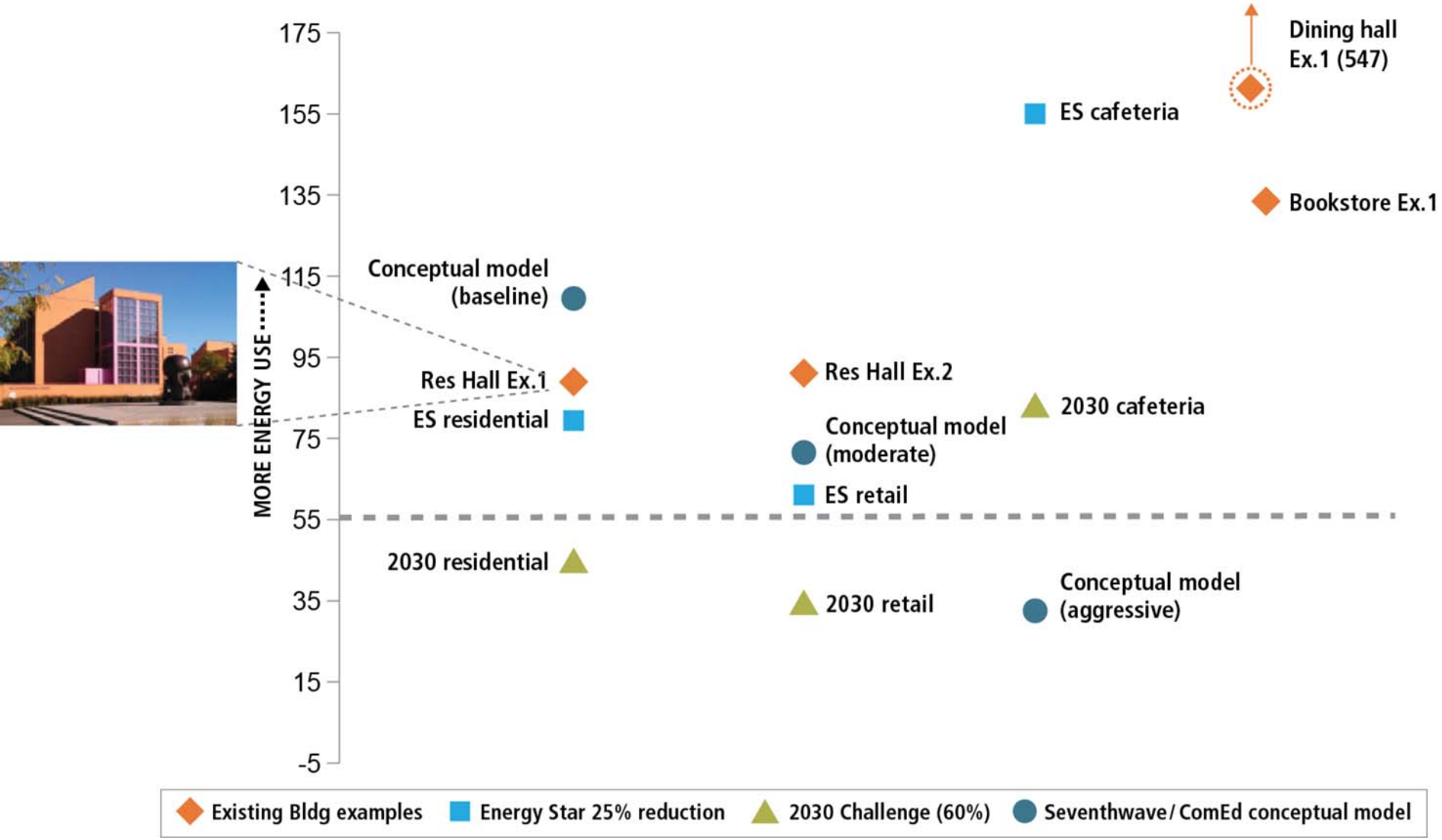
Owner Sets Energy Target



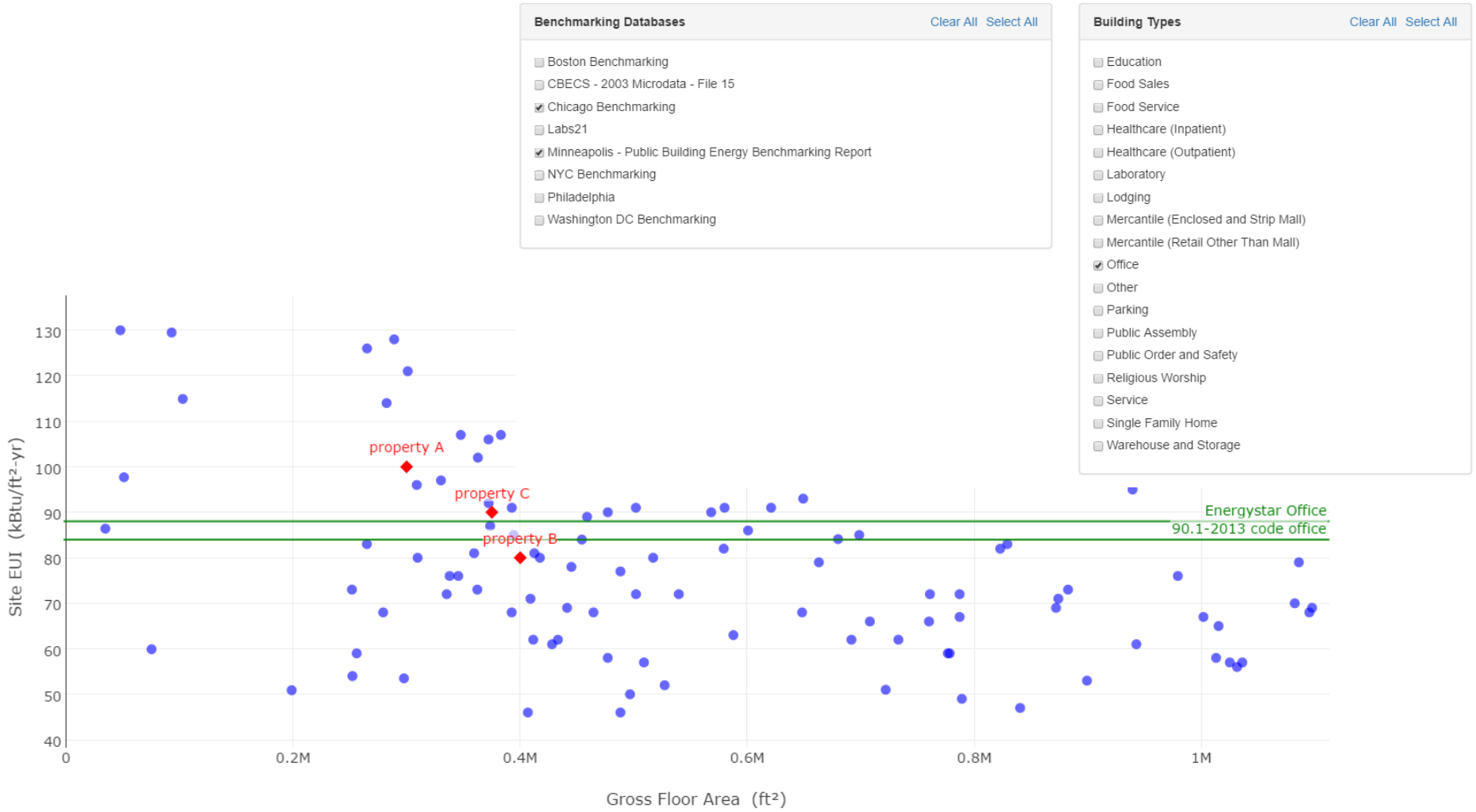
Define the energy requirement

Project energy goals			
Good	Sustainable building	Lack of clarity with unbounded interpretation. Rating schemes help resolve this but do not drive a certain metric.	Same budget
Better	30% savings over energy code	Often this is a comparison between simulated results. There is very little opportunity to verify actual savings.	Same budget
Best	An annual energy use intensity (EUI) of 45 kBtu/sq ft/year	This is a measurable target; requires upfront research to establish a realistic benchmark.	**Same budget**

Set your EUI target before team is selected

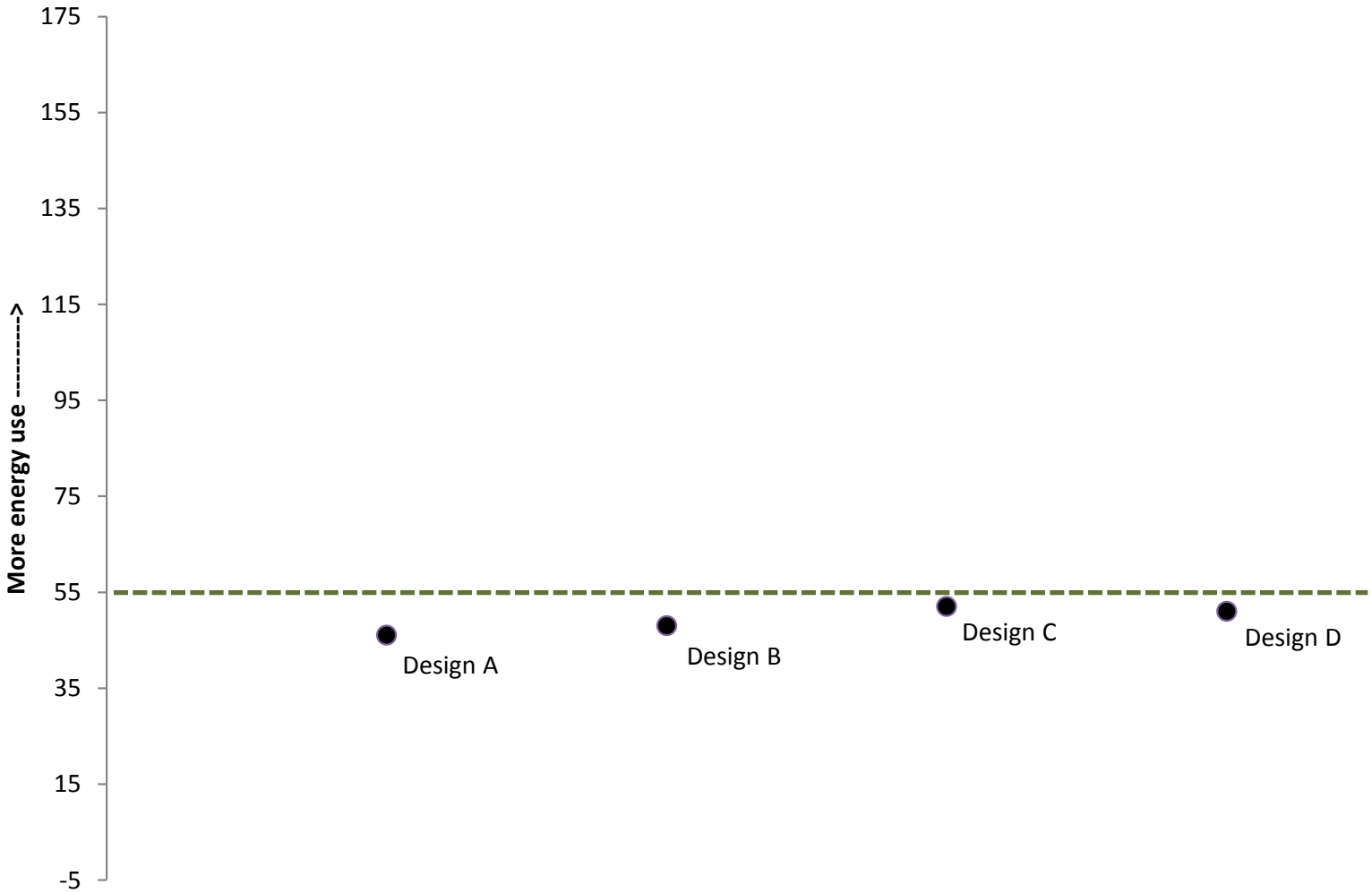


EUI Analyzer Tool



www.seventhwave.org/accelerateperformance/eui

Final Competition Designs – EUI



RFP and Contract Language

Owner Defines Desires

- Creating a list of what the building could accomplish.

  - Critical: Project success hinges on this element
  - Highly Desirable: What the owner wants
  - If Possible: The wish list

$64M fixed price

MISSION CRITICAL

- Attain safe work performance
- **LEED Platinum**
- ENERGY STAR “Plus”

HIGHLY DESIRABLE

- 800 staff capacity
- **25 kBtu/sf/year**
- Architectural integrity
- Honor future staff needs
- Measurable ASHRAE 90.1
- Support culture and amenities
- Expandable building
- Ergonomics
- Flexible workspace
- Support future technologies
- Documentation to produce a “How to” manual
- “PR” campaign implemented in real-time
- Allow secure collaboration with outsiders
- Building information modeling
- Substantial Completion by 2010

IF POSSIBLE

- **Net zero energy**
- Most energy efficient building in the world
- **LEED Platinum Plus**
- **ASHRAE 90.1 + 50%**
- Visual displays of current energy efficiency
- Support public tours
- Achieve national and global recognition and awards
- Support personnel turnover

RFP and contract language

PROJECT GOAL LIST: Project goals help design teams prioritize their focus on the MEP and building performance design. Goals are categorized in three main sections:

Mission critical goals—required by contract and critical to success

Highly desirable goals—not required by contract and have influence on the recommended design

If possible goals—influence recommended design and are considered highly beneficial if included in the solution

MISSION CRITICAL

- Maximum energy target of 45 KBTU/gsf annually; lower is preferred
- LEED NC version 4, Silver Certification
- Superior occupant comfort
- 100% of occupied spaces physically or visually connected to nature

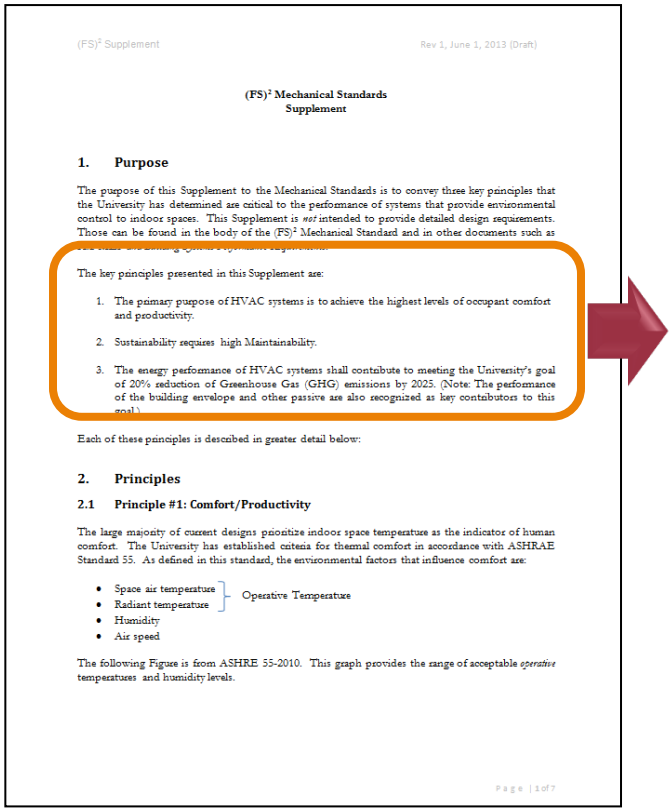
HIGHLY DESIRABLE

- Maximum energy target of 35 kBtu/gsf annually; lower is preferred
- Passive design strategies (i.e. daylighting, passive solar heating, etc.)
- Low recycled air content
- Strong HVAC response to quickly changing occupancy (limit precooling with air)
- Usable daylight in all occupied spaces
- Exceed LEED NC version 4, Silver Certification

IF POSSIBLE

- Living Building full certification
- Net Zero Energy Design

University of Chicago added a supplement to its standards.



(FS)² Supplement Rev 1, June 1, 2013 (Draft)

(FS)² Mechanical Standards Supplement

1. Purpose

The puepose of this Supplement to the Mechanical Standards is to convey three key principles that the University has determined are critical to the performance of systems that provide environmental control to indoor spaces. This Supplement is *not* intended to provide detailed design requirements. Those can be found in the body of the (FS)² Mechanical Standard and in other documents such as

The key principles presented in this Supplement are:

1. The primary puepose of HVAC systems is to achieve the highest levels of occupant comfort and productivity.
2. Sustainability requires high Maintainability.
3. The energy performance of HVAC systems shall contribute to meeting the University's goal of 20% reduction of Greenhouse Gas (GHG) emissions by 2025. (Note: The performance of the building envelope and other passive are also recognized as key contributors to this goal.)

Each of these principles is described in greater detail below:

2. Principles

2.1 Principle #1: Comfort/Productivity

The large majority of current designs prioritize indoor space temperature as the indicator of human comfort. The University has established criteria for thermal comfort in accordance with ASHRAE Standard 55. As defined in this standard, the environmental factors that influence comfort are:

- Space air temperature
- Radiant temperature
- Humidity
- Air speed

Operative Temperature

The following Figure is from ASHRE 55-2010. This graph provides the range of acceptable *operative* temperatures and humidity levels.

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DOE project
Accelerate Performance

100 buildings three years

Department of Energy initiative to scale performance based procurement

TEAM

Seventhwave **(AASHE member)**

National Renewable Energy Laboratory

Institute for Sustainable Energy—Eastern Connecticut State University **(AASHE member)**

UTILITY PARTNERS

ComEd

Eversource

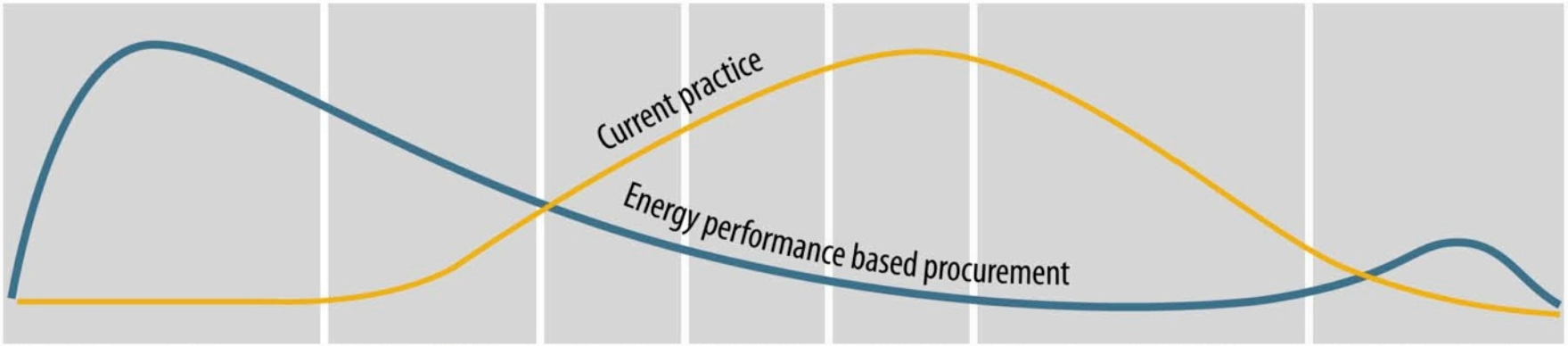
United Illuminating

OWNER PARTNERS

University of Chicago

Lend Lease

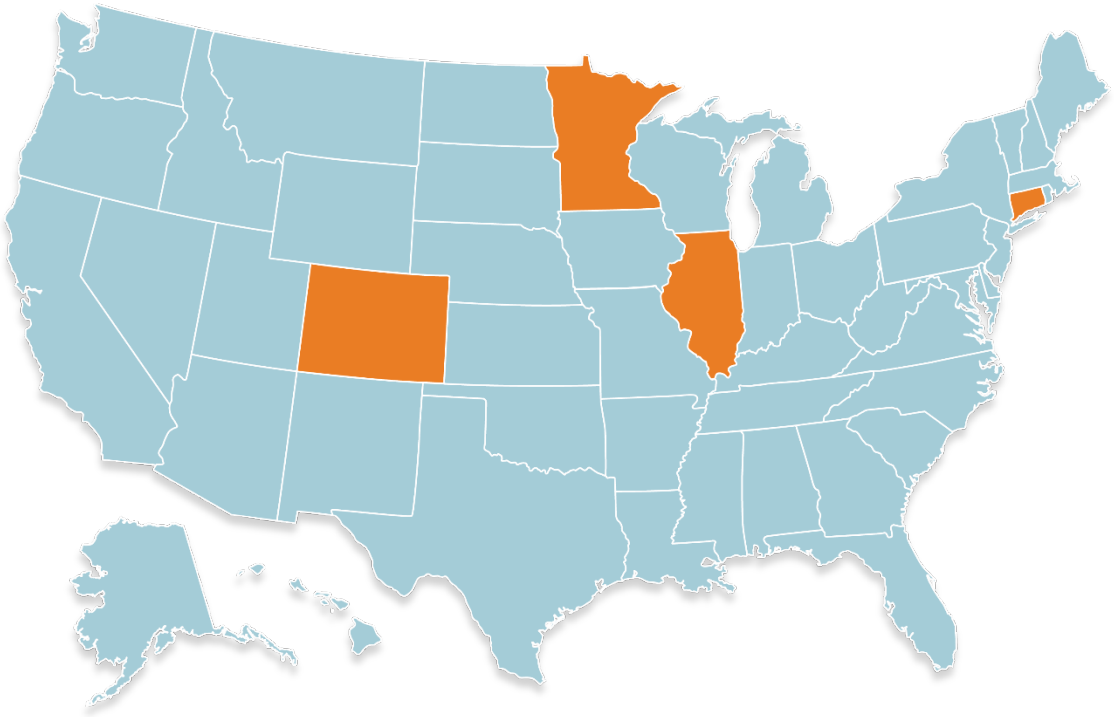
Photos courtesy of University of Chicago

Planning	RFP	SD	DD	CD	Construction	Operations
						
Define an aggressive, measureable energy performance target Develop RFQ/RFP language that prioritizes the energy performance target with other building performance goals Engage an owner's integrated project team to support the process	Select a design and construction team based on their commitment to achieve the energy performance target	Evaluate substantiation documents for each performance element of the contract				Ensure the energy performance is measured and verified relative to the target Maintain an ongoing performance tracking plan

About DOE Grant—Accelerate Performance

- **U.S. Department of Energy initiative** to support building owners with a new procurement approach for superior energy performance
- **Pilot and scale** the approach through utility new construction programs and portfolio owners such as **college and university campuses**
- **Provide technical support to building owner** to include a measurable energy performance (or EUI) requirement in RFP and contract

Eligibility requirements for Accelerate Performance



- **Applicable to new construction and major renovation**
- **Commercial, industrial or multifamily buildings**
- **Projects must be in the pre-planning phase to participate (before the design team is under contract)**
- **35-70% energy reduction goals**

Questions?

773.834.8508

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Thank you

www.seventhwave.org/accelerateperformance

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