U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Accelerate Performance

Seventhwave, National Renewable Energy Lab (NREL)

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Project Summary

Timeline:

Start date: August 1, 2015

Planned end date: January 31, 2019

Key Milestones

1. ✓ Launch pilot projects; 7/31/2016
2. ✓ Launch utility program; 7/31/2017
3. Document case studies and program successes; 1/31/2019
4. Extend to additional utilities and owner groups; 1/31/2019

Key Partners:

National Renewable Energy Lab	University of Chicago
Institute for Sustainable Energy	United Illuminating
Commonwealth Edison	Minn. Department of Commerce
Eversource	National Grid

Budget:

Total Project $ to Date:

- DOE: $ 599,479
- Cost Share: $ 768,252

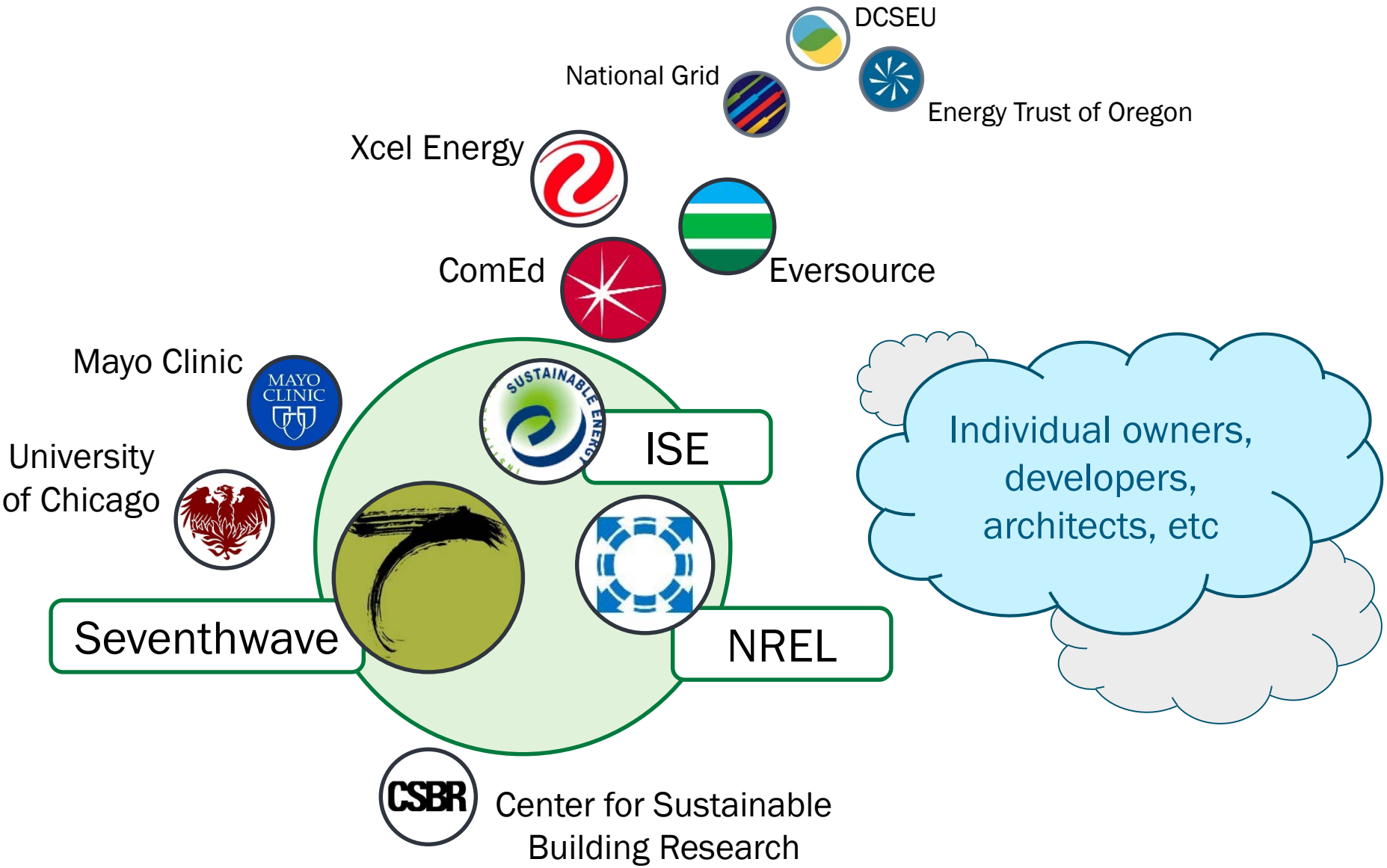
Total Project $:

- DOE: $ 824,567
- Cost Share: $1,012,275

Project Outcome:

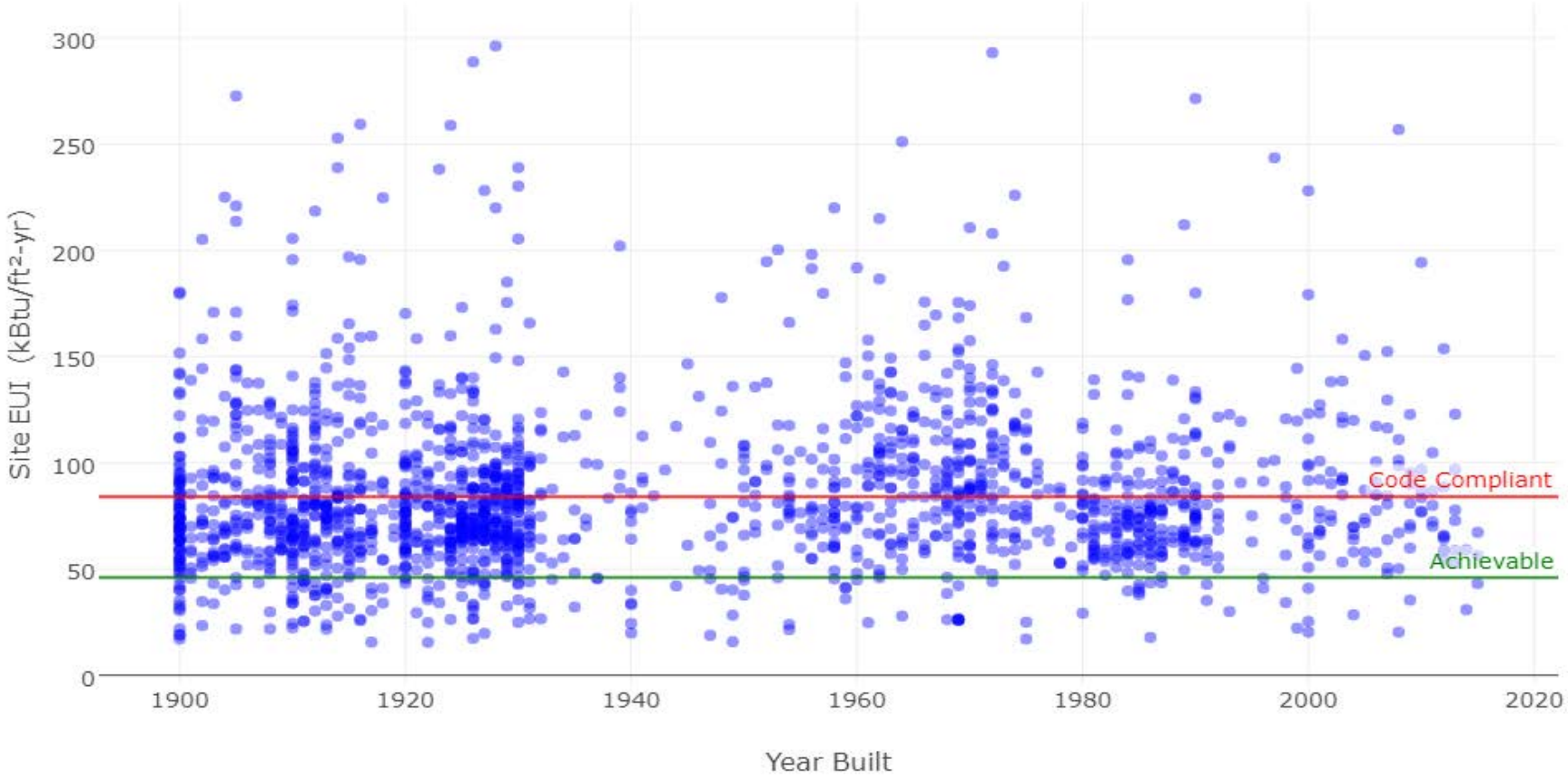
- Scale the DOE/NREL performance based procurement process in the commercial building market
- Develop strategies and tools to integrate into utility efficiency program offerings and portfolio building owner standard practice

Team


DCSEU
National Grid
Energy Trust of Oregon
Xcel Energy
ComEd
Eversource
Mayo Clinic
MAYO CLINIC
University of Chicago
SUSTAINABLE ENERGY
ISE
Seventhwave
NREL
Individual owners, developers, architects, etc
CSBR
Center for Sustainable Building Research

Challenge

Most new buildings are not reaching achievable efficiency levels despite improved materials and technology



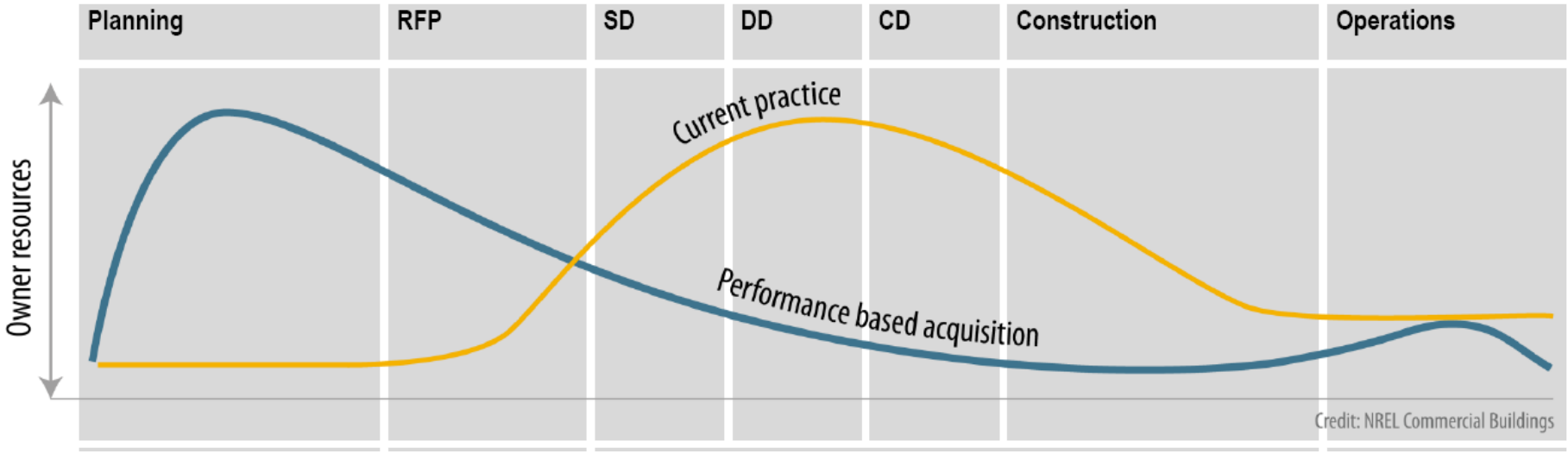
Citywide benchmarking data for Climate Zone 5 office buildings in Philadelphia, Chicago, Boston, New York City

Innovation: NREL's Research Support Facility

NREL created a successful performance-based procurement process to improve energy efficiency without added cost

- LEED Platinum
- Actual EUI performance of 33 kBtu/ft^2/yr
- Market average \$/ft^2
- Zero Energy, 220,000 ft^2 building

Innovation – NREL's process



Current practice treats energy efficiency as "widgets" added towards the end of design

- Results in higher cost and risk
- Increases job burden for owners, designers, contractors

Performance-based procurement drives wholistic and creative solutions

- Eliminates waste associated with complexity, change, and miscommunication

Challenge: scaling innovation

But this “utopian” approach is too disruptive for broad adoption

Owners:

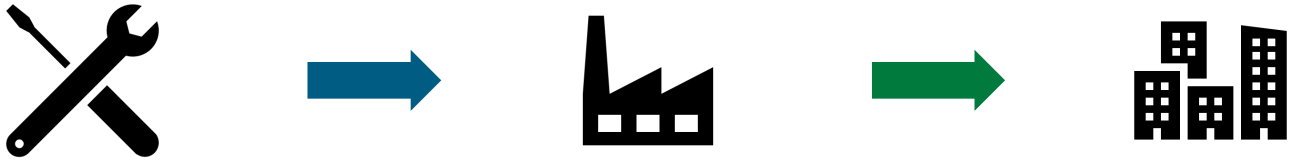
- Not willing or legally able to pursue design-build contracts
- May lack the budget to dictate a new contract approach to market
- Limited applicability to ubiquitous core and shell projects
- May feel unable to set goals
- Capital planning and facility management groups don’t communicate

Utilities:

- Each has unique goals, budgets, and regulatory environments
- Struggle to engage with customers early in the project planning process
- Feel existing cash incentives are too small to change behavior
- Traditional mindset that efficiency requires investment in additional capital equipment

Approach

Scale performance-based procurement through utility energy efficiency programs and portfolio owners



Develop tools

- Benchmarking
- Concept energy modeling
- Survey instruments
- RFP templates
- M&V plans

Engage utilities

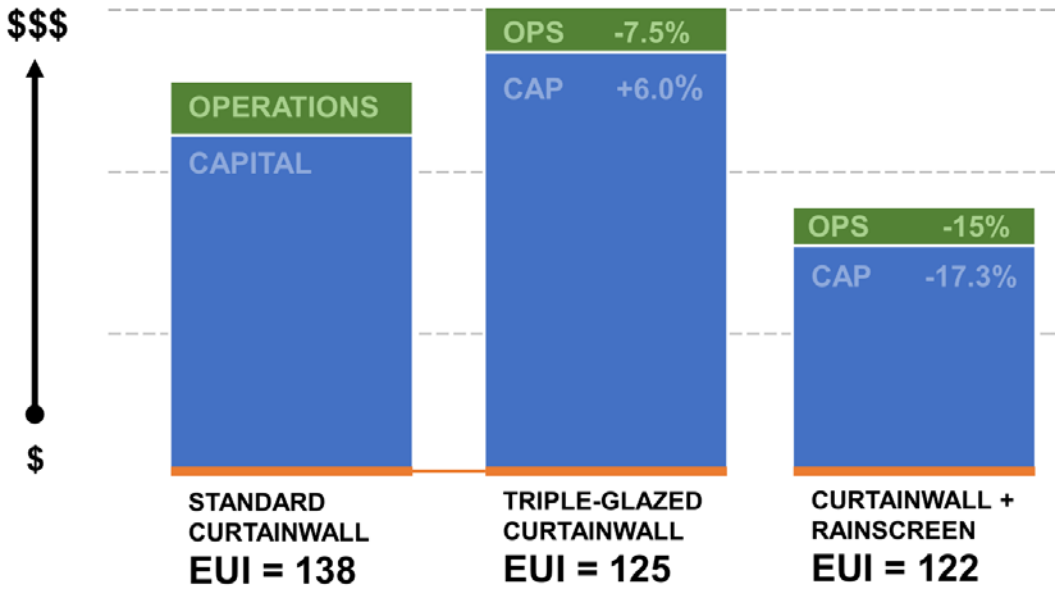
- Program design assistance
- Training
- Marketing and outreach assistance
- Technical assistance

Create demand

- Showcase ability of AP process to reduce workload and improve outcomes
- Build a business case for AP process

Impact

Case Study: Mayo Clinic Generose Expansion



Impact

Early engagement with owners leads to greater adoption of best practice energy efficiency measures (Advanced Energy Design Guides)

Building type	HVAC type	Gross area (ft^2)	Electric savings (kWh)	Gas savings (therms)	Equivalent savings	
					ΔkWhe	ΔkWhe/ft^2
School	VRF	60,000	194,335	-	194,335	3.2
School	VRF	100,000	314,688	-	314,688	3.1
Office	VAV	80,000	229,194	3,363	327,745	4.1
Multifamily	WSHP	120,000	228,791	(1,880)	173,697	1.4
University	VAV	200,000	641,663	9,255	912,912	4.6
TOTALS:		560,000	1,608,671	10,738	1,923,376	3.4

Theoretical saving from adoption of best practice energy efficiency measures compared to ASHRAE 90.1-2013 (Average)

Progress – project outcomes

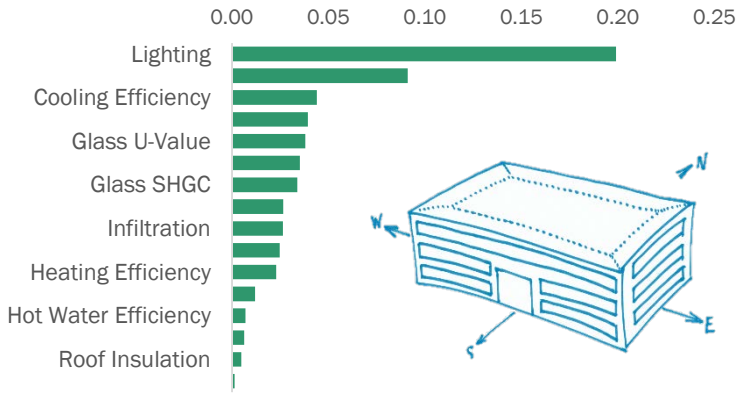
Streamlining Accelerate Performance

- Developed template documents and tools to facilitate the technical approach

Promoting Accelerate Performance

- Created a direct marketing and outreach strategy
- Tested and adapted for multiple markets and audiences

Concept Modeling



Templates

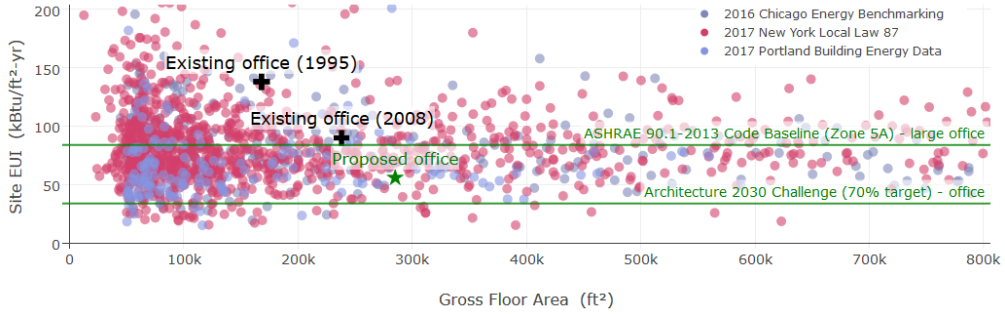
Mission Critical:

- Meet building program requirements
- Exceed ASHRAE Standard 55 comfort
- Energy performance of 100 kBtu/gsf annually
- Measurement and verification plan

Highly desirable:

- Energy performance of 85 kBtu/gsf annually
- Passive and biophilic design strategies
- Automatic fault detection and diagnostics
- Exceed LEED NC Silver certification

Benchmarking



Progress

Launched a permanent program

- ComEd (IL)

Initiated two pilot programs

- Xcel Energy (MN)
- Eversource / United Illuminating (CT)

Three additional pilots in negotiation

- National Grid / Eversource (MA & RI)
- Energy Trust of Oregon
- DCSEU (Washington, DC)

Stakeholder Engagement

Distilled NREL's successful approach

- Absolute energy targets
- Measurement and verification plans
- Robust RFPs and substantiation plans

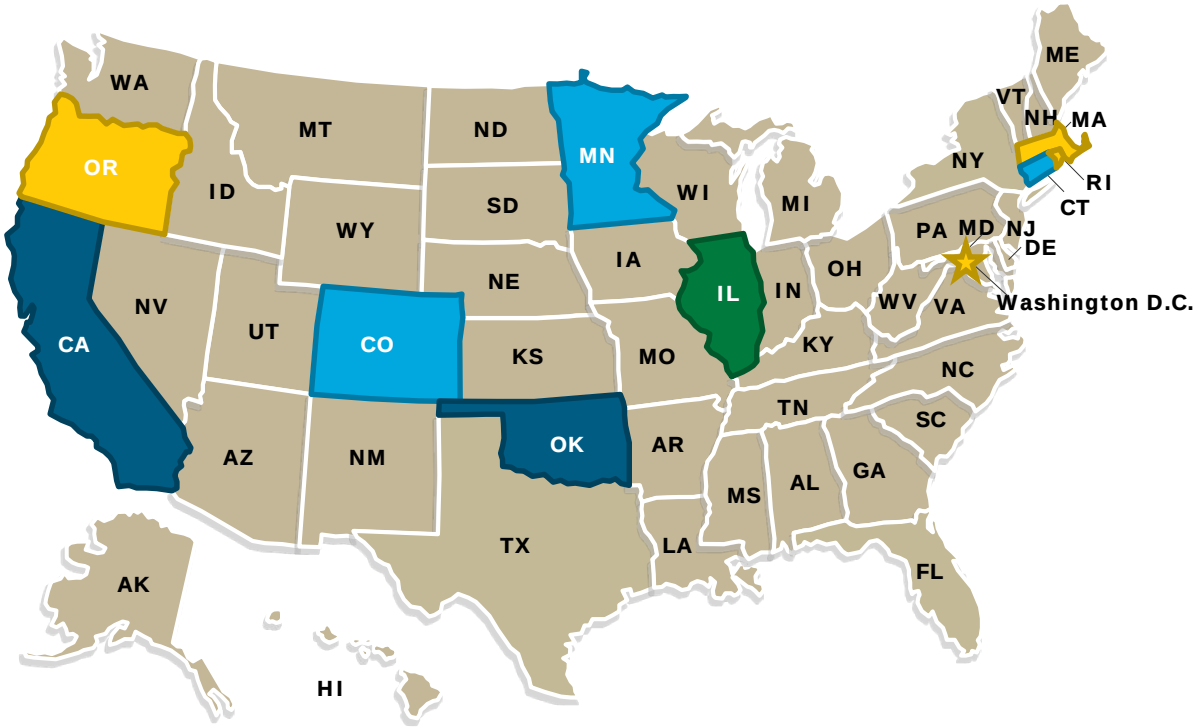
Scaled though utilities

- One permanent, self-sustaining program
- Three ongoing pilot programs
- Three pilot programs under contract negotiation

Adopted by institutional owners

- Mayo Clinic
- University of Chicago
- California Buildings and Facilities
- Various private developers
- Small owners

Remaining Project Work



- Permanent program
- Pilot projects
- Pilots under discussion
- Projects influenced

Next steps

- Additional outreach to owners
- Launching programs with new utilities
- Continued support and verification of active projects
- Publish tools, research, and papers

Thank You

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REFERENCE SLIDES

Project Budget

Project Budget: See below
Variances: None
Cost to Date: $599,479 – 73%
Additional Funding: Several partners are contributing funding that is included in cost share below

Budget History					
August 1, 2015 – FY 2017 (past)		FY 2018 (current)		FY 2019 – January 1, 2019 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$541,997	$701,457	$260,834	$286,909	$21,736	$23,909

Project Plan and Schedule

Project Schedule		
Project Start	**1-Aug-15**	
Project End	**31-Jan-19**	
Task Name		
Past work		
Budget Period 1		
1	Project Management Plan	
2.1	Establish performance metrics for new program offering	
2.2-2.3	Assess offering within program evaluation and regulatory constraints	
3.1	Identify key pilot projects	
3.2	Integrate performance based approach into RFP language	
Budget Period 2		
4.1	Launch pilot projects and finalize program offering	
5.1	Develop standardized interview approaches	
5.2	Integrate process for assessing energy target throughout project life	
6.1-6.2	Train utility efficiency program staff and owners.	
Active work		
Budget Period 3		
7.1	Continue support of primary utility offerings	
8.1	Map to additional utility programs	
8.2	Map to additional owner engagement	
End of Project