Total Energy Outcome City Pilot

2014 Building Technologies Office Peer Review

Targeted Energy Outcomes

A New City Energy Policy for Buildings

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Project Summary

Timeline:

Start date: 09/01/2012

Planned end date: 08/31/2015

Key Milestones

1. Produce outcome based marketing collateral; 04/03/14
2. Quantify and define participating city actions; 04/03/14
3. Quantify ongoing DOE/NEEA contributions; 05/30/14
4. Recruit pilot cities; 06/10/14

Key Partners:

New Buildings Institute
Two to three NW cities

Budget:

Total DOE $ to date: $$100,000

Total future DOE $: $50,000

Project Goal:

Develop a strategy for small cities to address the energy performance of their whole building stock with a focus on improving the performance of the poorest performing buildings within the targeted cities.

Target Market/Audience:

Northwest Region Cities

Purpose and Objectives

Problem Statement: Energy codes define the major policy approach for energy efficiency for most cities. Energy codes leave a significant amount of savings on the table as they do not address all potential building efficiency measures and building types equally. This project address many of the code gaps in energy saving acquisition through quantification of a cities energy use, building by building, and identification of specific strategies for efficiency upgrades in the those highest energy users. The real issue is to create new policies that address building efficiency based on measured performance of existing stock.

Target Market and Audience: The audience is small to medium sized cities, those with populations less than 300,000 but large enough to have a significant number of commercial building stock in the 25 to 50,000 square foot range.

Purpose and Objectives

Planned Contribution to Energy Efficiency:

This is a pilot program to assist a few northwest cities in development and implementation of outcome based policies for existing buildings. It is anticipated that implementation of these policies will supplement and possibly greatly exceed energy savings that can be expected through current energy code implementation.

Results should include a working policy that requires; 1) benchmarking of all public and private buildings; 2) possibly disclosure of buildings' energy use; 3) implementation packages for improving the energy efficiency of top energy users; and, 4) incentives that will help to drive improvements.

The planned deliverable is the creation of a replicable process that leads to a working policy within jurisdictions which achieves direct change in the efficiency of existing buildings.

Purpose and Objectives

Planned Contribution to Energy Efficiency continued . . .

On a programmatic level the pilot outcome is creation and implementation of a working policy within a jurisdiction. Program success will be measured through measured energy reduction in affected buildings. Portfolio Manager will most likely form the database for measurement.

Calendar year 2014 will focus on pilot city recruitment and policy development.

In the one to three-year timeline pilot cities should be working with industry on program implementation and refinement.

In three years time we should see pilot cities in full implementation mode.

Beyond three years we would expect to see voluntary adoption by more cities, or, even better, developed policies for outcome based codes promulgated on a national scale.

Approach

Approach:

The approach is to first develop the marketing/messaging that will draw interest and get pilot cities engaged in a pilot. Program support for engagement, anything from facilitation of city/industry meetings, education and training on the use of Portfolio Manager, data analysis, etc., is going to be a critical mechanism for implementation.

Key Issues:

Convincing city leaders to take on a pilot.

Convincing building owners of the benefits of participation.

Development of a working/flexible support structure.

Identification of incentives that pull the program.

Distinctive Characteristics:

The pilot will produce working policies that achieve large savings from existing building stock.

Progress and Accomplishments

Discoveries:
These will need to wait for implementation.

Accomplishments:
We have a draft plan, marketing and communication material, and work in progress on the development package.

Project Contribution to Energy Efficiency : The potential for energy savings is estimated at three times that of a 20% code improvement.

Awards/Recognition:
None to date.

Project Integration and Collaboration

Project Integration:
This is a work in progress.

Partners, Subcontractors, and Collaborators:
NEEA has contracted with the New Buildings Institute to lead development of the program.

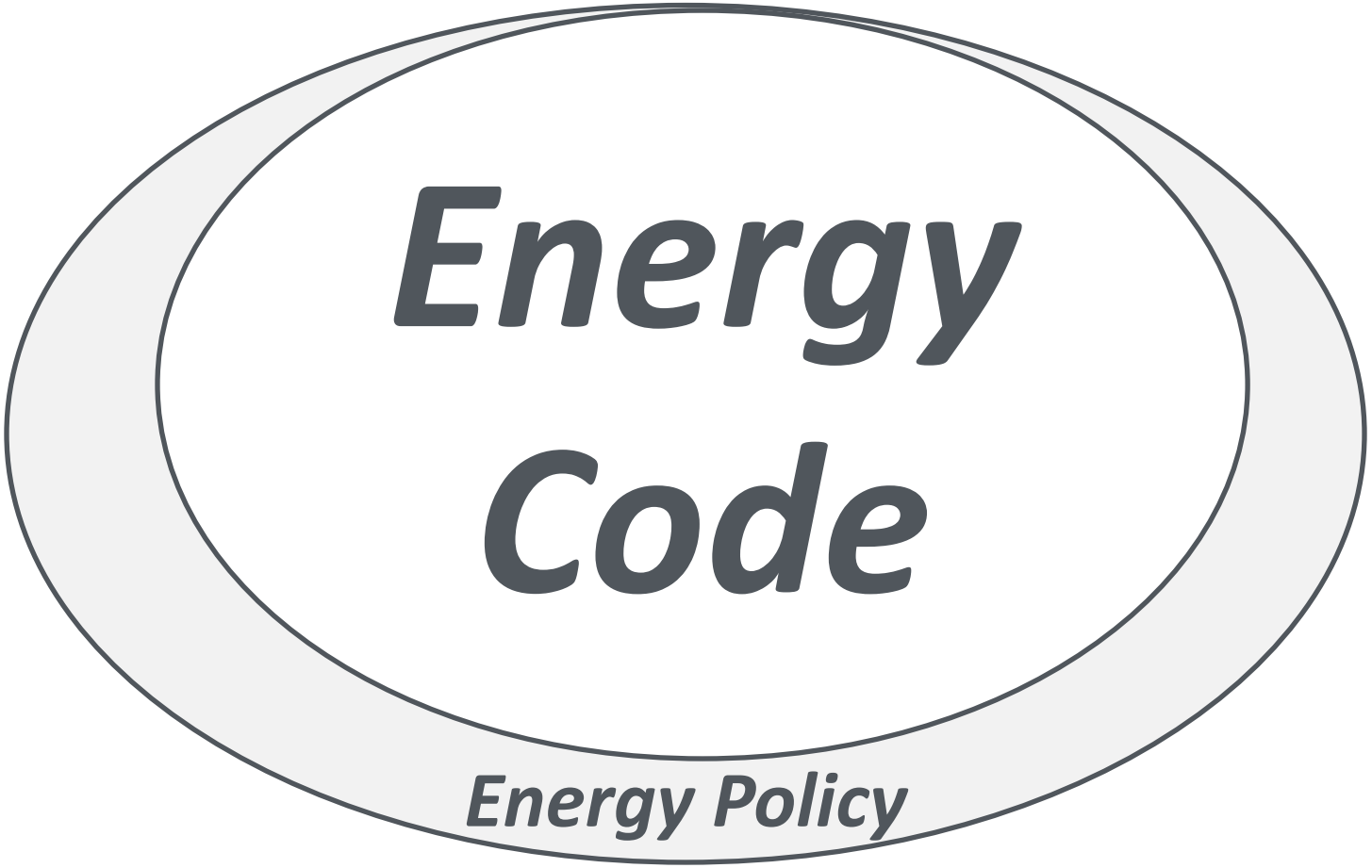
Communications:
The first presentation of the pilot to cities will be in June, 2014 at the Association of Idaho Cities annual conference in Boise Idaho.

Next Steps and Future Plans

Next Steps and Future Plans:

1. Finalize messaging and recruiting collateral.
2. Finalize a support package for pilot jurisdictions
3. Engage one to three jurisdictions in a pilot

In most Cities, the Energy Code is the primary, or even only, energy policy for buildings.



Glazing performance – building orientation – cooling efficiency – infiltration – operating hours – climate – weather – occupant density – heating efficiency – duct design – fan size – window area – HVAC control sophistication – building mass – interior shading – occupant habits – data centers – kitchen equipment – lighting power density – filter condition – wall color – lighting controls - furniture configuration – exterior vegetation - operable window use – insolation- glazing orientation – wall insulation – ventilation rate - exposed interior surface characteristics - domestic hot water use – number of computers – copiers and printers – elevators – exterior lighting - occupant gender ratio – elevation – photovoltaics - development density – register location – cooling distribution system – roof insulation – lighting management – number of buildings on property – ratio – building use type – janitorial services – metering strategies – commissioning – structural system – acoustic treatment – slab edge detailing – night setback temperature – ground water temperature – humidity – occupant dress code – lamp replacement strategy – roof slope – daylight controls – sensor calibration – corporate culture – lease terms – utility meter characteristics – parking garage ventilation – HVAC system capacity – number of separate tenants – retail space – age of equipment – ceiling height – heating fuel – transformer capacity – window mullion pattern – terms of maintenance contract – wall thickness – building height – lighting fixture layout – overhangs – thermostat location – exit lighting – private offices – refrigerators – solar hot water – utility meter – load diversity

And even in new buildings, if these are all the factors that contribute to building energy performance…

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Then these are the factors that designers can control...

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But just these are regulated by code….

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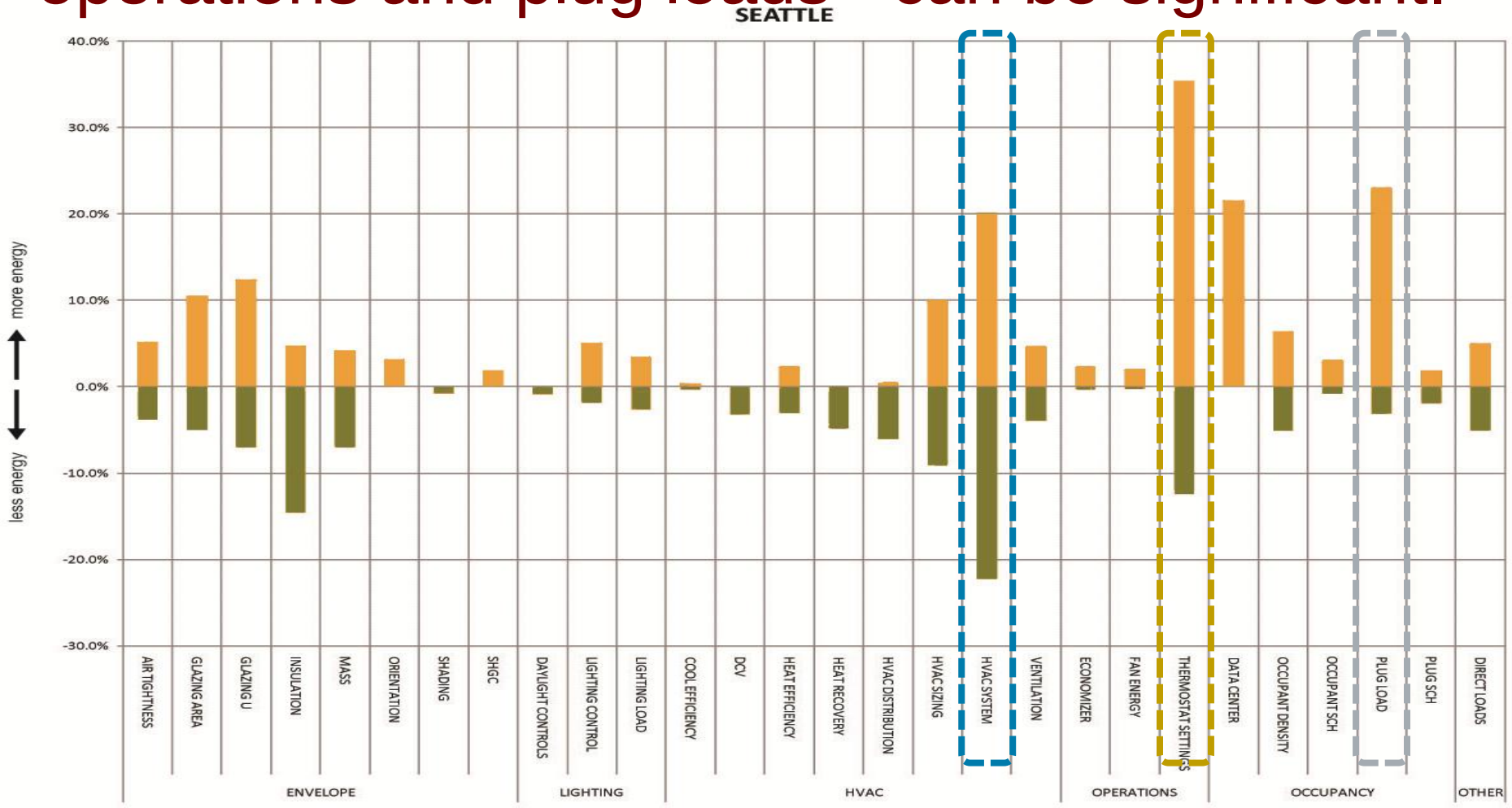
And some of these unregulated elements - like HVAC system selection, HVAC control operations and plug loads - can be significant.



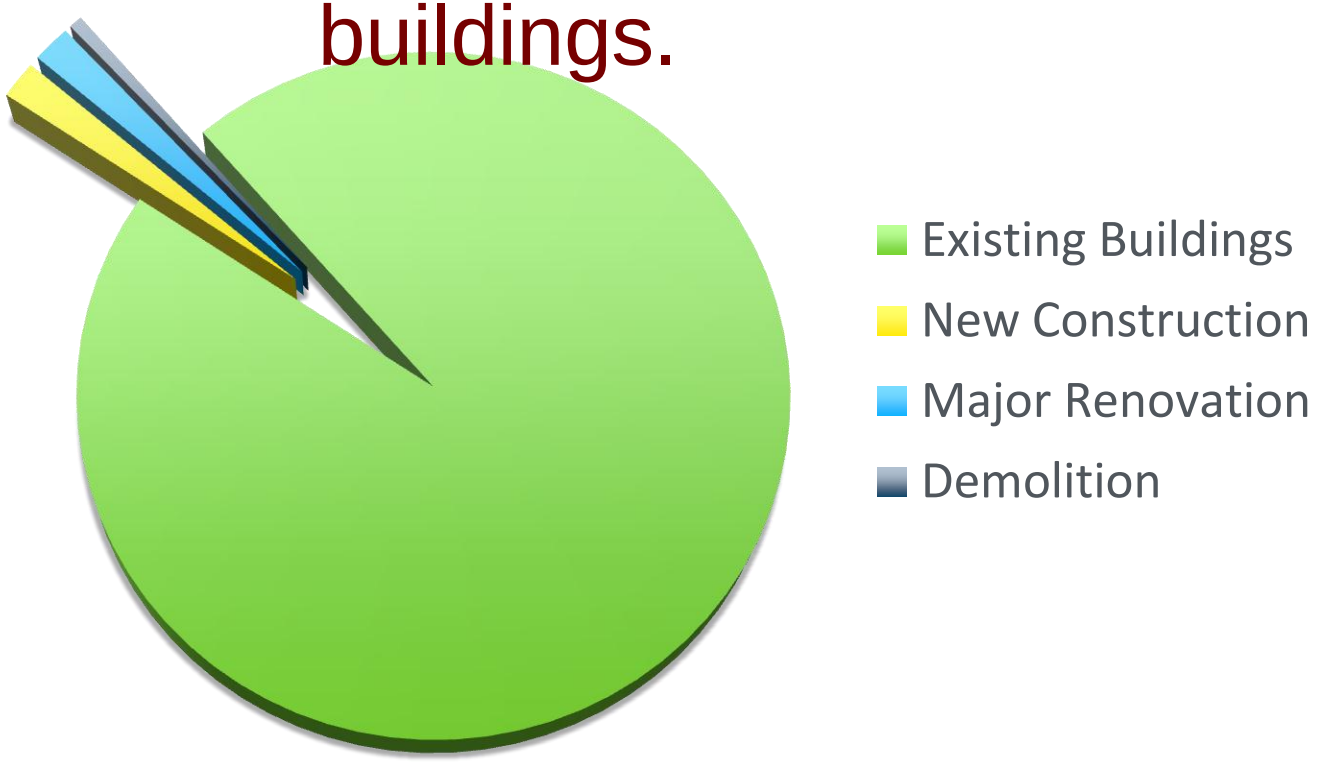
The code can also ignore significant differences between buildings. Under the IECC-'09, these two buildings are equally code compliant.

40% Windows

=?

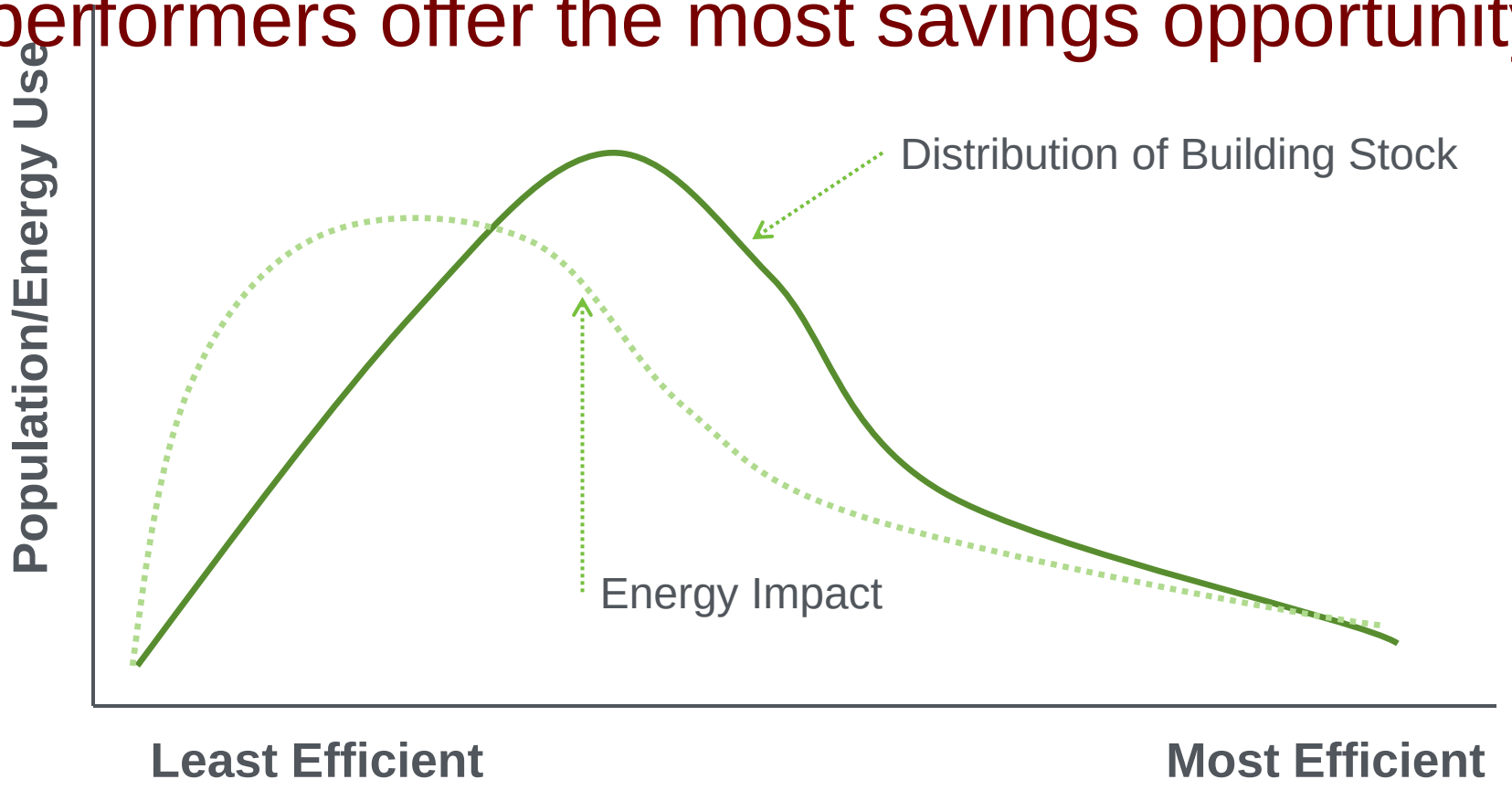
0% Windows

Energy Codes only address construction events, while each year the lion's share of the building stock is composed of existing buildings.



Source: US Energy Information Association

Because of the Energy Code, new buildings are generally more efficient, but the poor performers offer the most savings opportunity.



BBL	Street Number	Street Name	Site EUI (kBtu/ft^2)	ENERGY STAR Score	Total GHG Emissions (MtCO$_2$e)	Property Floor Area (ft^2)	Primary Property Type
1001440040	56	HUDSON STREET	308.4	N/A	1568.64	54168	Office
1001440040	56	HUDSON STREET	711.2	N/A	4543.15	68036	Office
1001490033	277	BROADWAY	70.6	N/A	603.97	104017	Office
1001500031	299	BROADWAY	50.7	93	1185.47	270564	Office
1001500038	291	BROADWAY	72.6	98	741.27	128940	Office
1001510032	305	BROADWAY	73.3	84	844.9	132600	Office
1001757501	377	BROADWAY	115	41	758.38	80149	Office
1001950017	91	WALKER STREET	57.6	N/A	279.96	59449	Office
1001960005	408	BROADWAY	96.9	32	440.58	54968	Office
1001970007	101	LAFAYETTE STREET	34.1	N/A	157.29	56345	Office
1002000012	202	CANAL STREET	102	29	434.9	49101	Office
1002147502	145	HUDSON STREET	92.7	N/A	807.52	104018	Office
1002160001	235	WEST STREET	395.7	41	27997.57	764915	Office
1002200031	174	HUDSON STREET	45	82	218.78	51750	Office

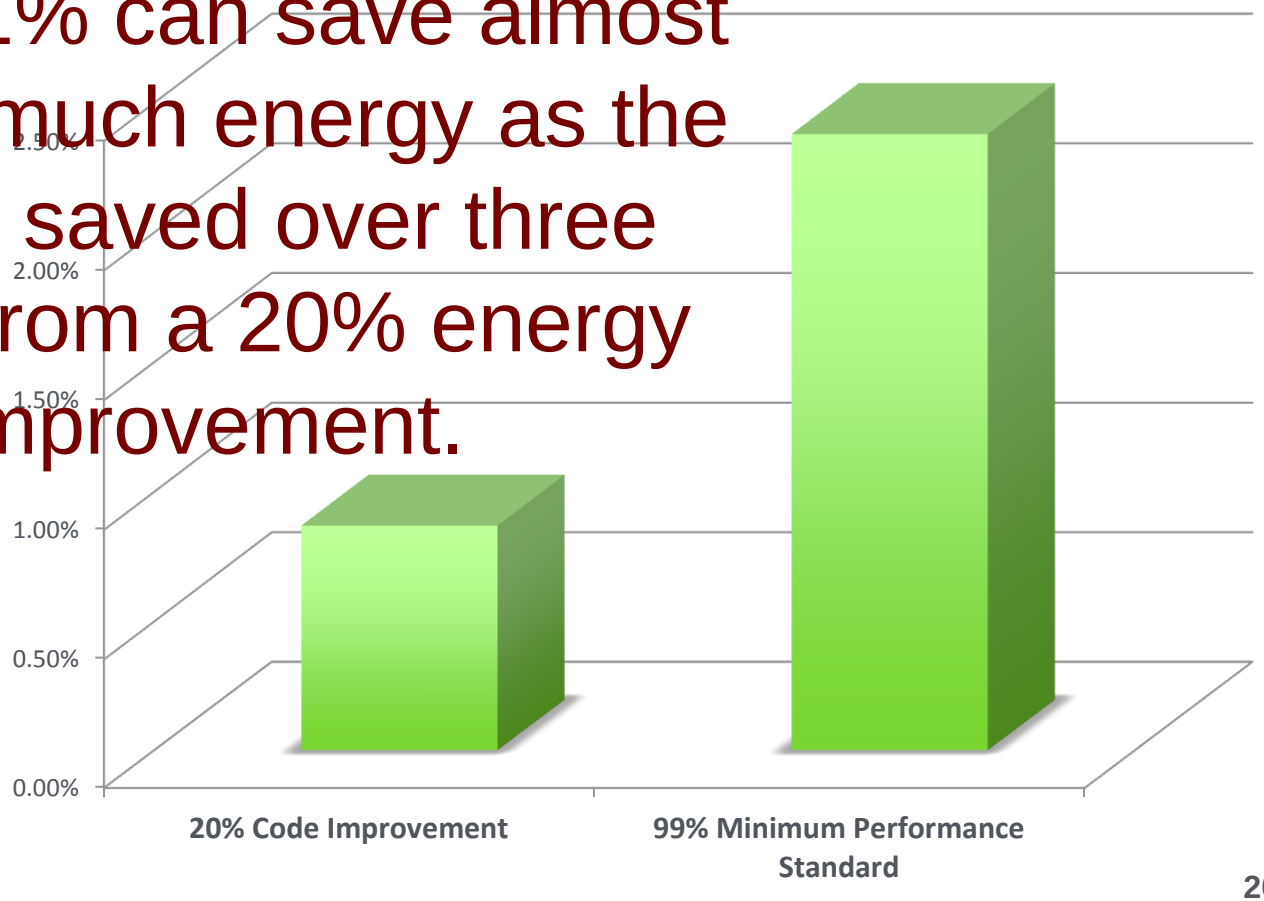
The solution is to leverage actual building data to identify the worst performers in the building stock.

2013 New York City Disclosure Data

And leverage better performance with Incentive and/or Penalty policy mechanisms

INCENTIVES	PENALTIES
Recognition	"Name and Shame"
Utility Program Tie-In	Code Citations
Property Tax Credit	Mandatory RCx
Revolving Loan Fund	Mandatory Efficiency Upgrade
"Green" Utility Rate	Energy Hog Tax / Energy Rate

A policy that targets the worst 1% can save almost 3X as much energy as the energy saved over three years from a 20% energy code improvement.



2003 CBECS Office Dat

Project Budget

Project Budget: The bulk of this project budget, all but $6,526, has gone toward development of an outcome based code program.
Variances: Approximately $6,526 of the budget went to Washington State University for attendance at national meetings on training and education. The remainder of the dollars are specifically focused on an outcome based code program which is a city policy approach to energy saving acquisition.
Cost to Date: $66,870 has been expended to date.
Additional Funding: No other funding has been utilized

Budget History

09/01/12– FY2013 (past)		FY2014 (current)		FY2015 – 08/31/15 (planned)	
DOE	Cost-share	DOE	Cost-share	DOE	Cost-share
$30,000	00	$70,000		$50,000	

Project Plan and Schedule

The project is currently set to begin marketing/recruiting city pilot programs beginning in June 2014. Once one city is recruited, policy development strategies will engage along with supporting activities such as education and training.