



Benchmarking to Bricks – Turning Data into Action

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Washington, DC
May 10, 2016

The “Stick” Approach



Department of Commerce

Policies and Leadership Driving State Building Efficiency Upgrades

Chuck Murray

2016

Background

Washington State ESPC program:

- Since its inception in 1986, the Washington program has been involved in over \$1 billion in total energy construction projects, resulting in \$40 million in annual utility cost reductions to public facilities
- Low cost lending available to all public entities through the State Treasurer

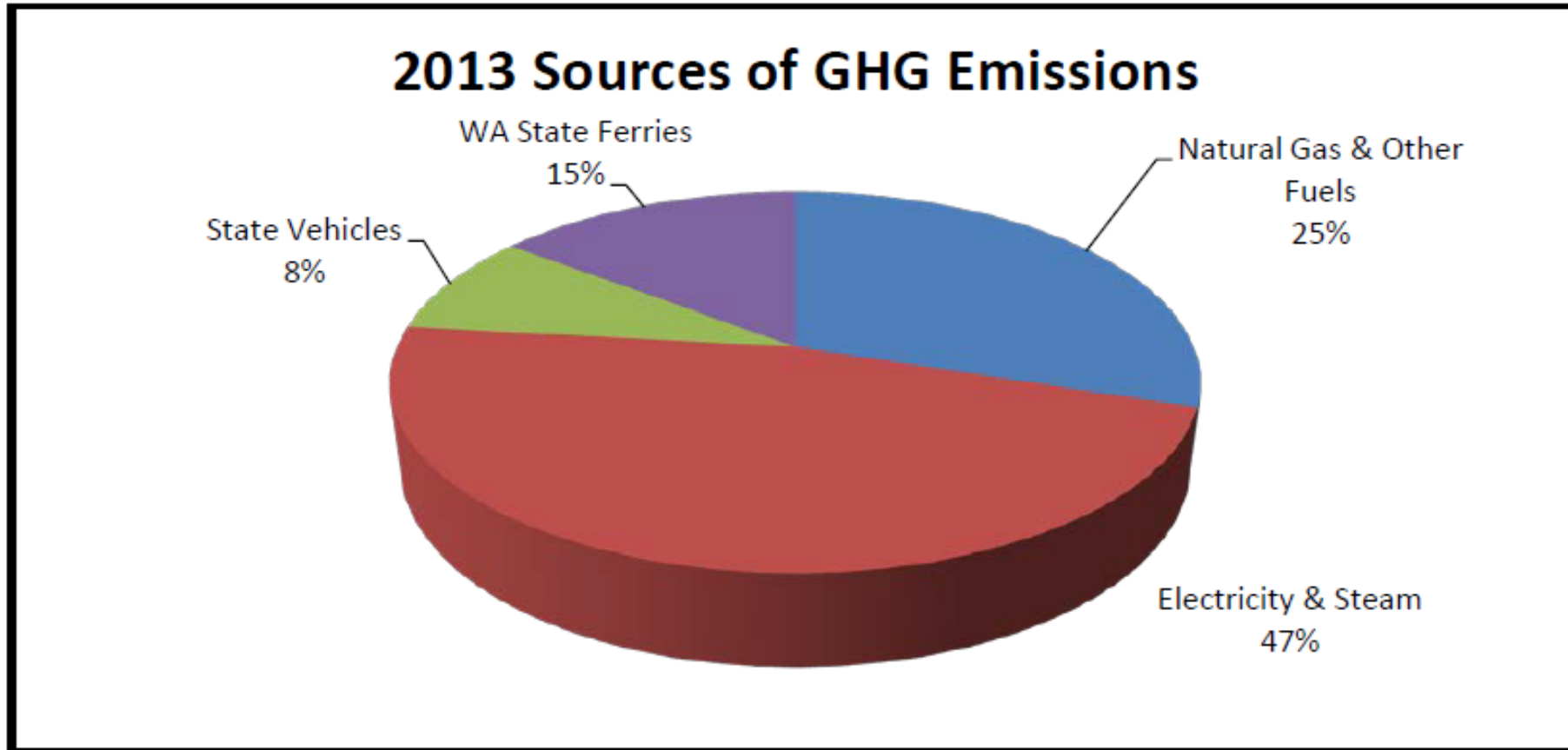


So what's the problem?

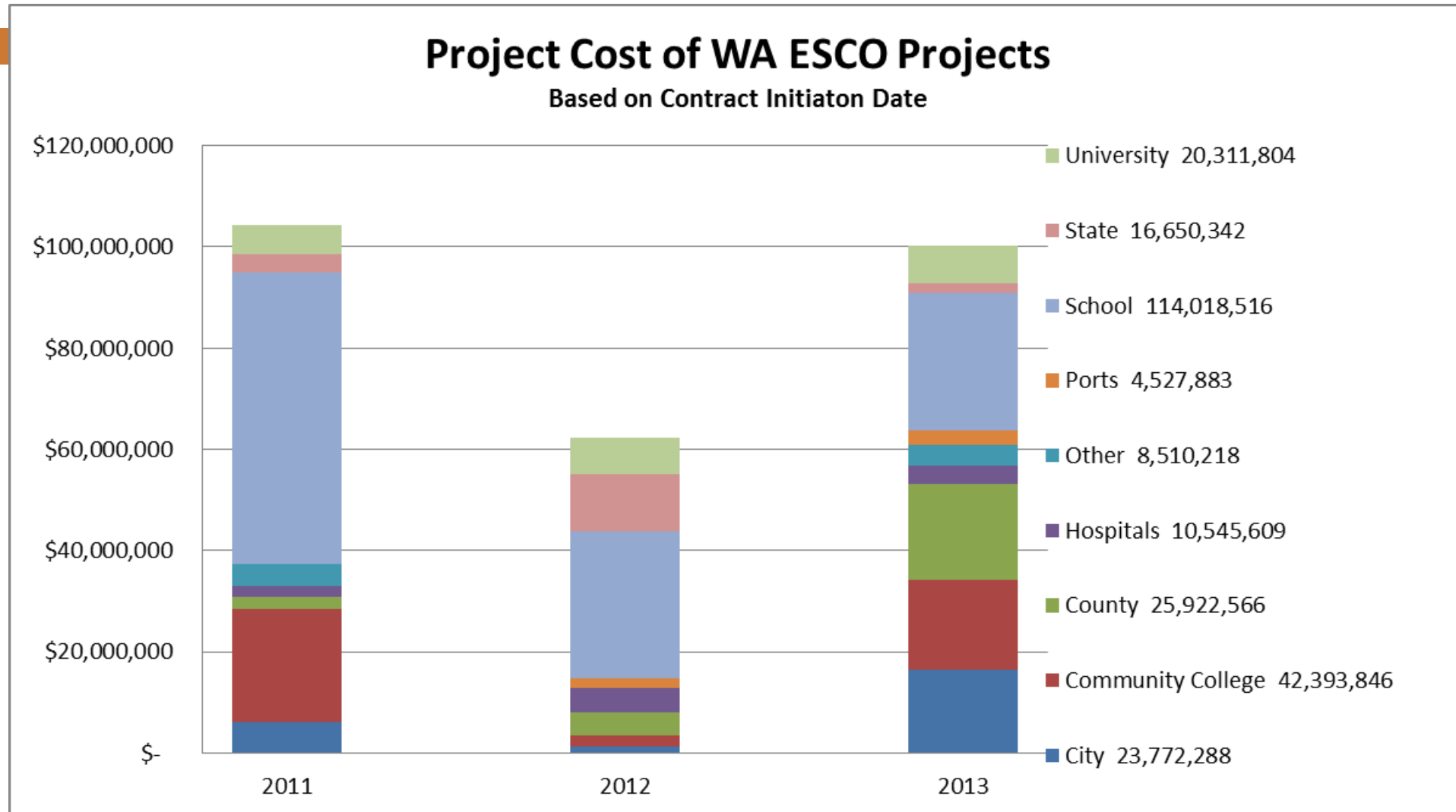
- State policy directs state agencies to reduce carbon emissions by 20% (2006-2015)
- State agencies are least likely public entity to participate in ESPC
- State agencies prefer capital allocations and are reluctant to use state treasury loans
- Most State agencies think they have already done what they can




For most State Agencies, it's the buildings.....



State Projects = 6% of ESPC Projects

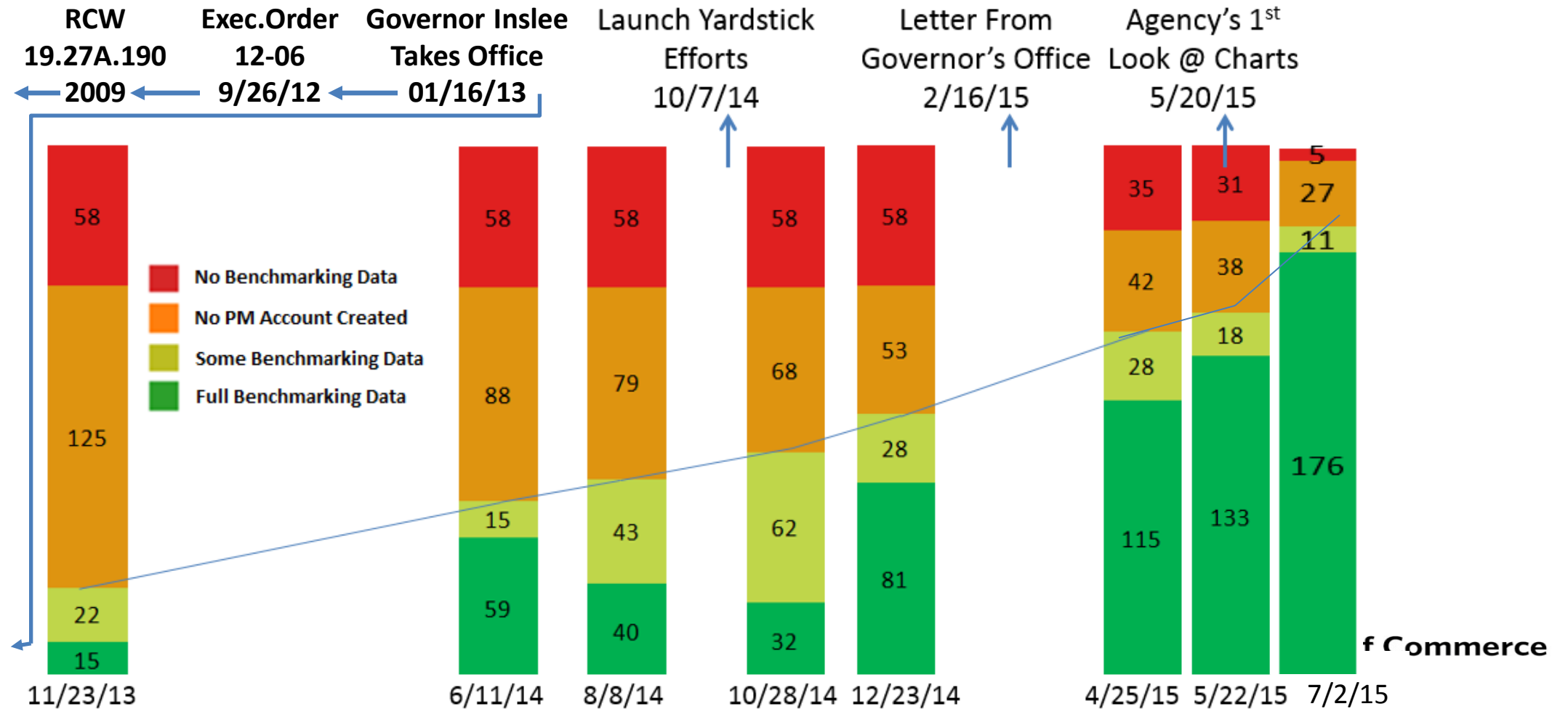


Proposed Policy

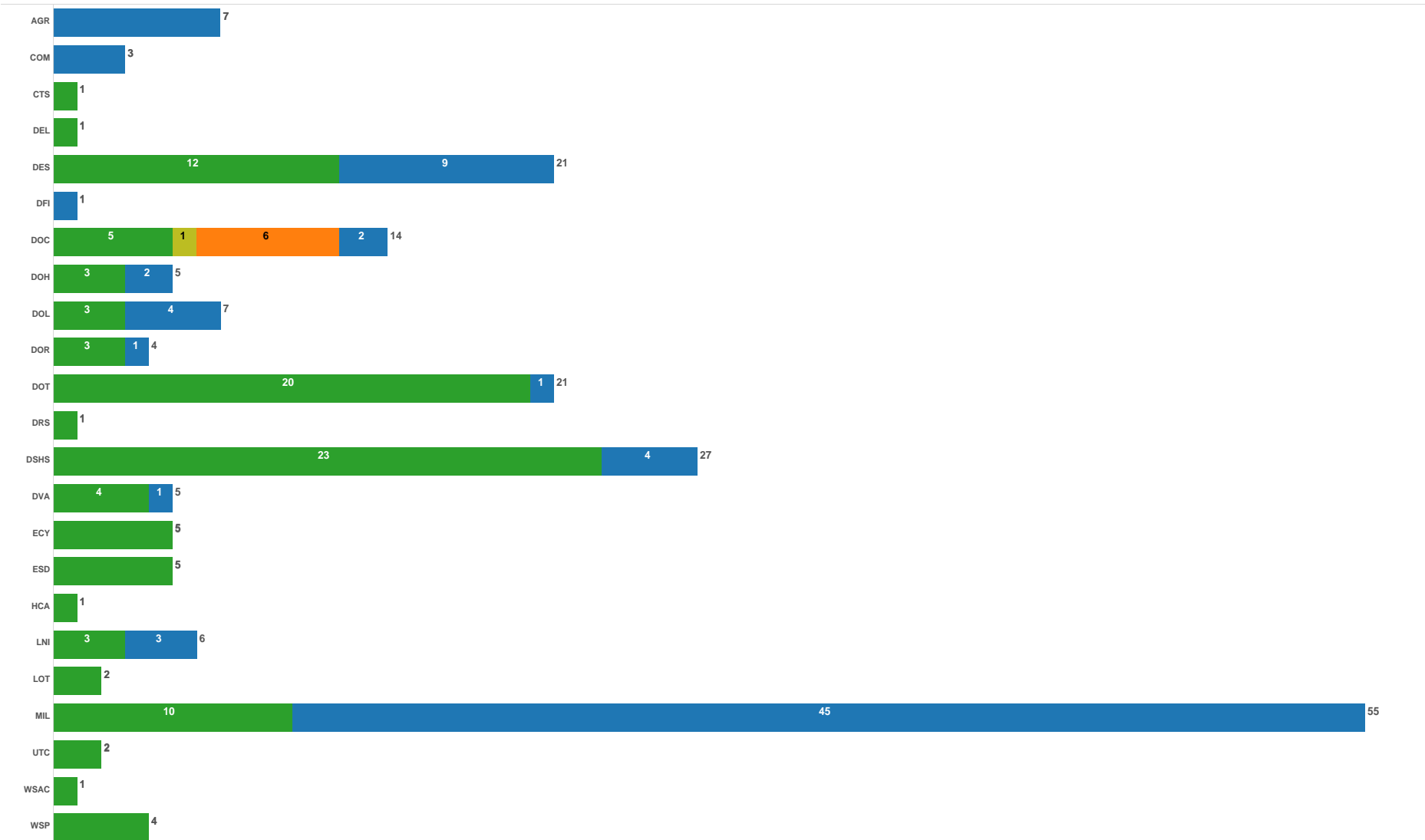
- 
- Implement EnergyStar Portfolio building energy benchmarking as a first step in assessing State building retrofit potential
 - Based on energy star scores or EUI, mandate preliminary audits through the ESPC program
 - When investment grade audits demonstrate cost effective opportunities, they must be implemented
 - Agencies directed to use State Treasurer funds rather than waiting for capital allocations



Benchmarking Executive Leadership, and Results

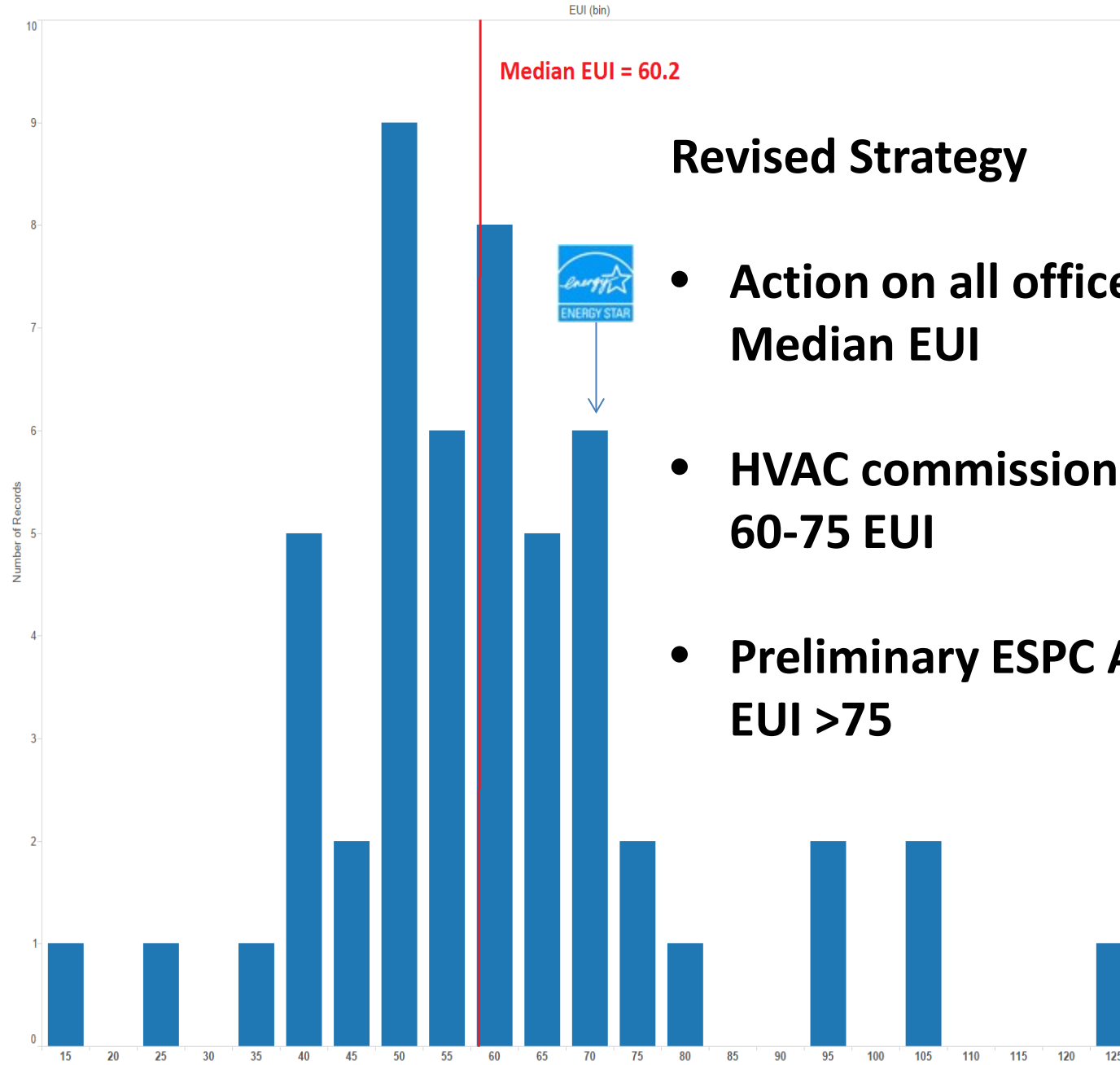


Benchmarking Compliance Monitoring

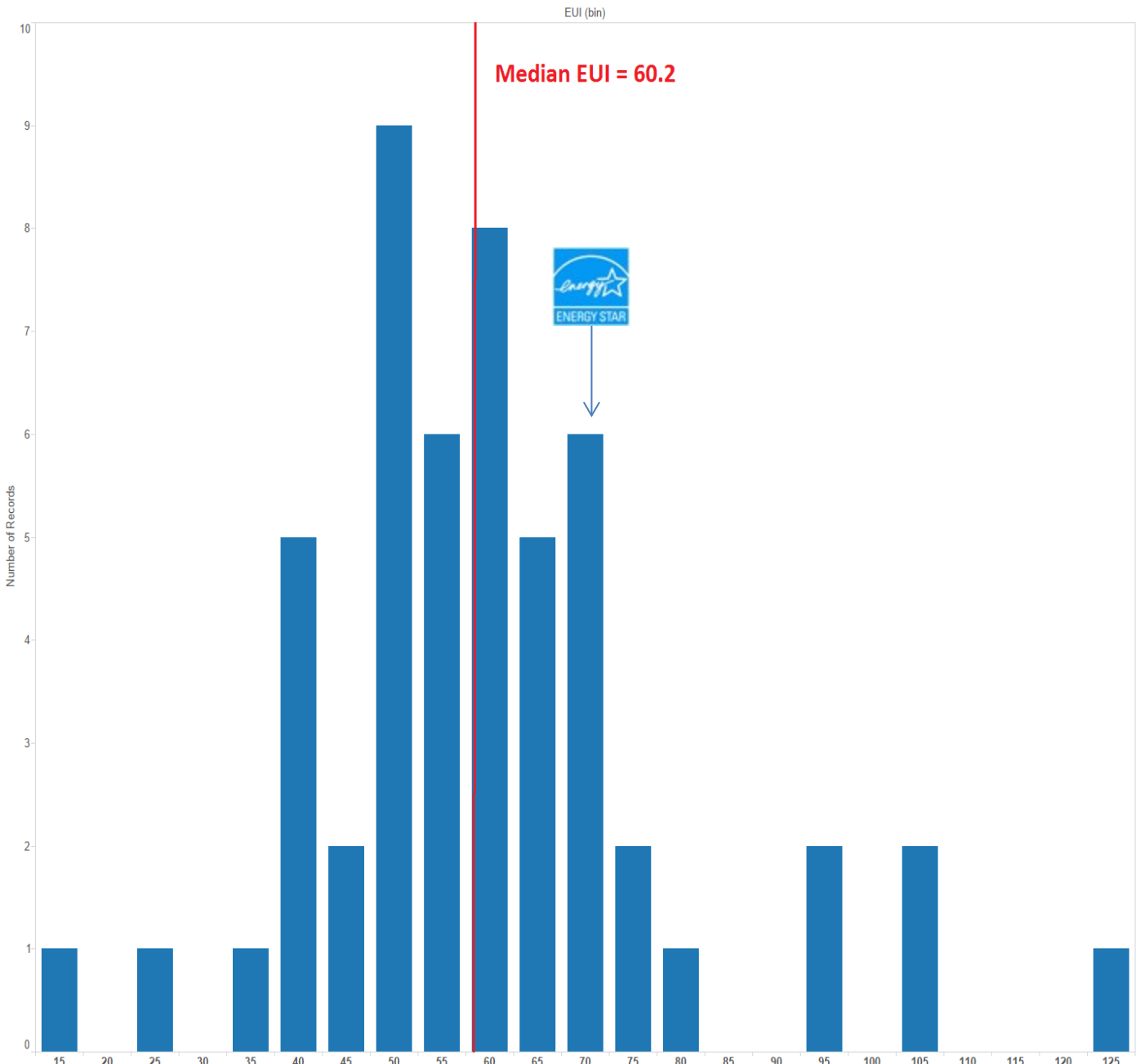


Commerce

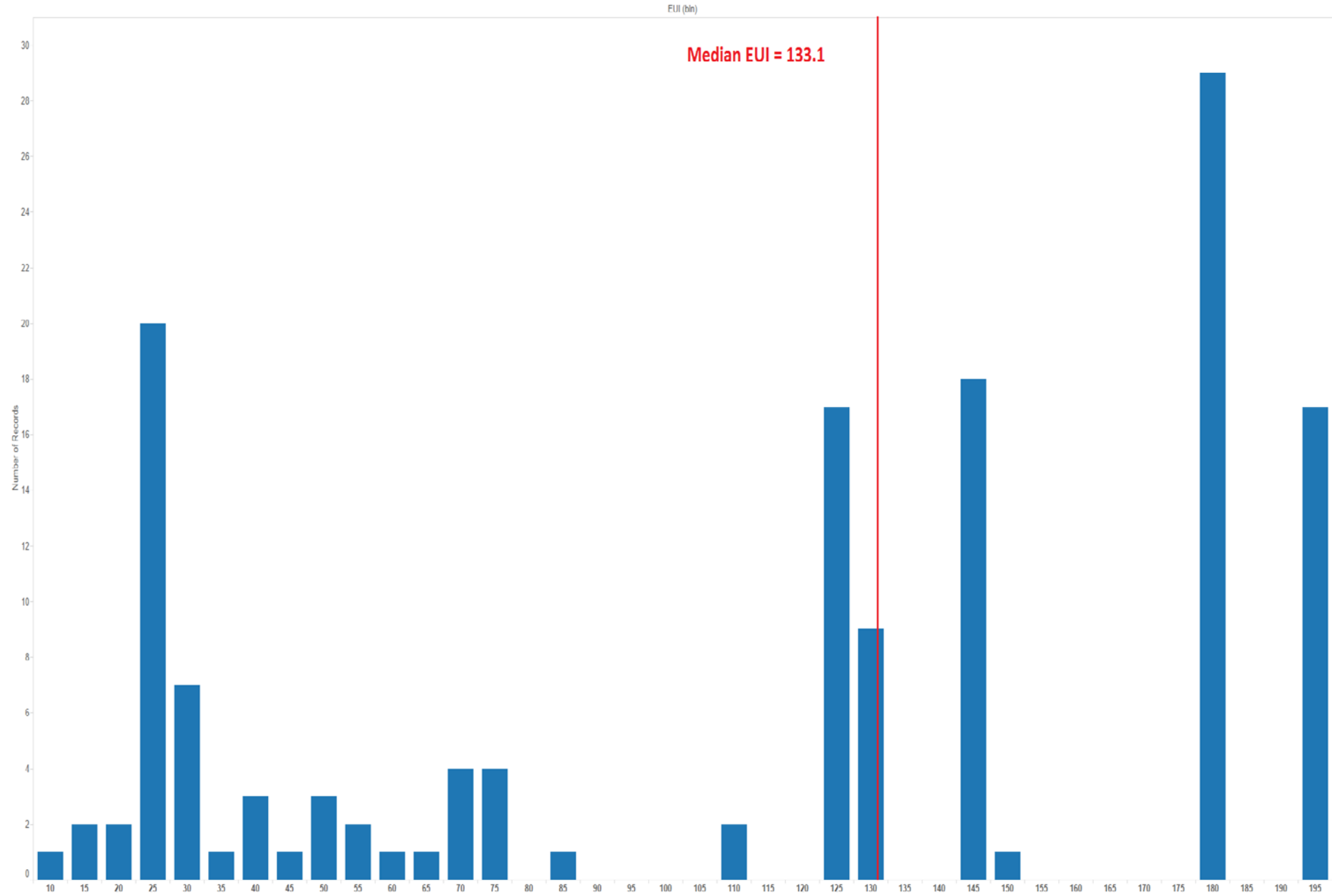
2. Washington State Office Buildings (Upper and Lower Outliers removed)



2. Washington State Office Buildings (Upper and Lower Outliers removed)



4. Washington State Other Buildings (Upper and Lower Outliers removed)



A few additional notes

A few Carrots

- Benchmarking Assistance
- Competitive Public Buildings Grant Fund

Additional Leadership

- Multi-Agency Work Group
- Governor creates a high level executive position to lead agency action



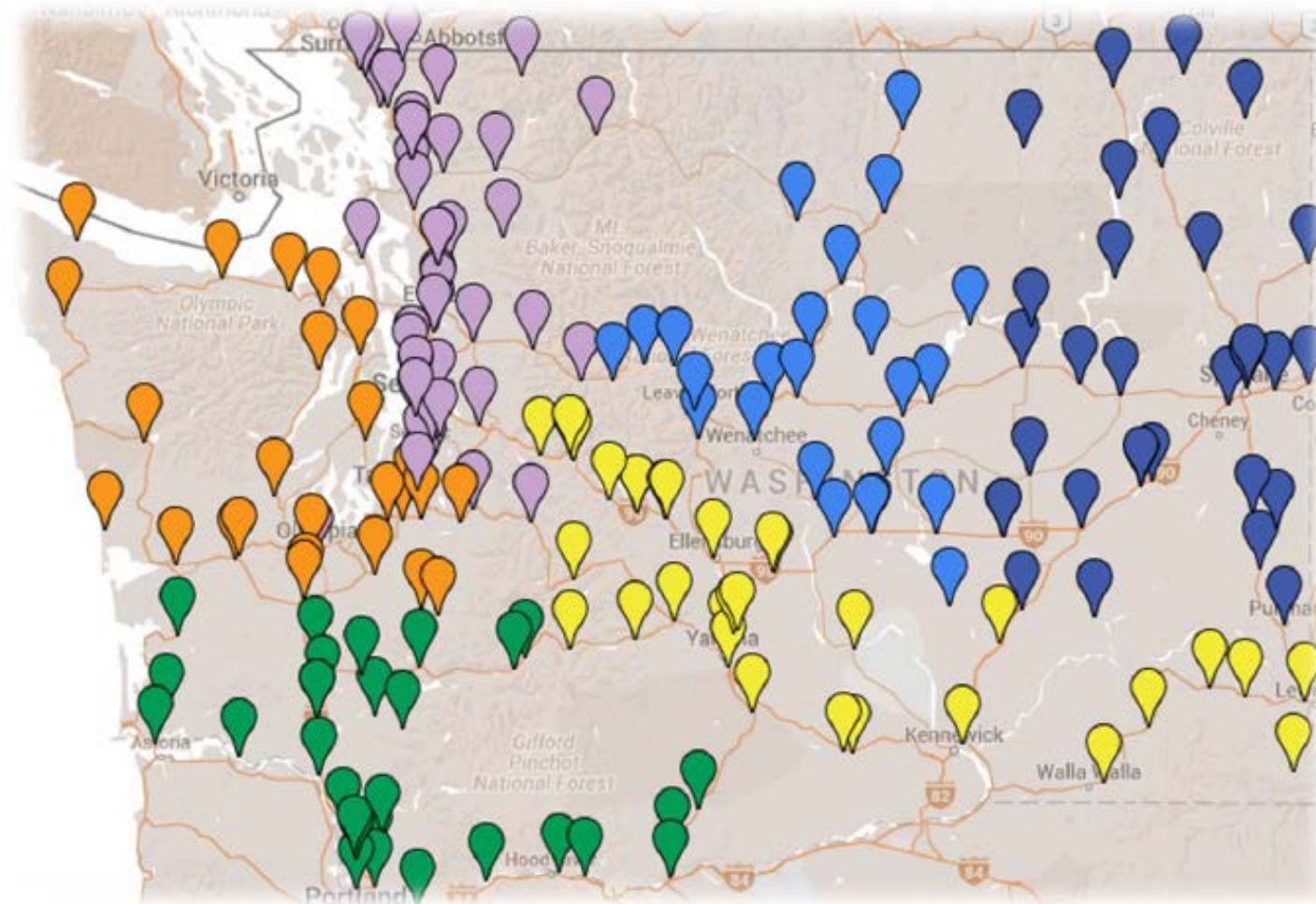
Executive Leadership and Projects

- 100% compliance with benchmarking
- Increased Agency Participation in ESPC
 - 5 projects \$18 Million Total
 - \$14 million, treasury funds
 - \$1.5 million, utility funds
 - \$1 million state grants
 - Balance: Agency Operating Budget



DOT Statewide Project Scope

This is the result of executive leadership and creative project scope





This project would not have been possible
without support from DOE

Thank You





Department of Commerce

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The “Carrot” Approach



Better Buildings Challenge

May 9 - 12, 2016

*Department of Environmental Quality
Utility Savings Initiative*



How the Utility Savings Initiative Uses Data

Len Hoey, PEM
Engineering Manager



USI Program at a Glance

- Program initiated in July 2002 for State Agencies and UNC Institutions
- Now serves:
 - 21 UNC Institutions (schools and affiliates)
 - 14 State Agencies
 - 58 Community Colleges
 - 100 Counties
 - 115 Public School Systems
 - 548 Local Governments
- State Agencies, UNC Institutions and Community Colleges required to report annual consumption and cost data
- State Agencies and UNC Institutions required to reduce Btu/gsf/yr by 30% from a 2002-2003 baseline



Collecting Utility Data

name	year	total utility \$	total energy \$	total btu	kwh	kwh \$	ng therms	ng \$	2oil gals	2oil \$	6 oil gals	6oil \$	propane gals	propane \$	coal tons	coal \$	wood tons	wood \$	steam klbs	steam \$	chw tons	chw \$	kgal water	water sewer \$	gsf	construct ion gsf	renovate d A/C gsf	
All Sectors	2002-03	\$162,072,765	\$149,129,798	11,828,141,916,696	1,420,398,104	\$79,913,254	36,161,985	\$23,337,040	5,033,602	\$4,557,566	2,853,824	\$2,597,853	590,069	\$592,232	0	\$0	4,448	\$123,012	1,310,507	\$28,563,585	97,874,465	\$9,445,256	3,964,632	\$12,942,968	72,315,533	111,630	0	
All Sectors	2003-04	\$209,950,839	\$186,049,615	14,127,413,952,689	1,826,680,471	\$104,141,514	43,473,275	\$32,971,738	6,789,538	\$6,376,223	1,048,293	\$929,618	3,300,724	\$3,054,176	0	\$0	9,104	\$143,220	1,227,629	\$28,427,707	100,677,839	\$10,005,419	4,777,799	\$23,901,224	98,979,627	149,465	174,782	
All Sectors	2004-05	\$232,279,108	\$206,330,788	14,851,275,039,759	1,900,362,574	\$110,467,691	49,286,072	\$44,023,795	3,659,412	\$4,672,101	3,142,984	\$3,065,598	3,403,207	\$3,699,293	0	\$0	5,033	\$102,648	1,277,223	\$29,621,916	102,511,212	\$10,677,747	5,314,692	\$25,948,319	104,071,703	427,727	389,060	
All Sectors	2005-06	\$277,227,089	\$250,142,548	15,545,464,153,442	2,048,530,232	\$127,814,200	51,689,378	\$62,589,449	3,633,229	\$6,141,446	2,961,687	\$3,797,387	3,716,837	\$4,920,181	0	\$0	2,226	\$51,772	1,239,886	\$32,195,497	117,768,665	\$12,632,616	5,359,492	\$27,084,541	111,475,605	2,817,577	844,381	
All Sectors	2006-07	\$284,377,356	\$253,270,166	16,059,003,301,921	2,151,970,833	\$135,370,678	59,108,466	\$55,976,130	1,745,728	\$3,114,162	937,388	\$1,298,715	3,299,808	\$5,295,537	0	\$0	0	\$0	1,318,814	\$36,963,667	111,853,055	\$15,251,277	4,865,786	\$31,107,191	119,264,609	3,731,935	1,652,474	
All Sectors	2007-08	\$340,809,920	\$305,798,007	17,435,377,384,497	2,453,462,384	\$164,519,524	63,782,059	\$69,009,079	2,008,318	\$5,522,216	468,181	\$1,067,139	4,051,417	\$8,766,059	0	\$0	0	\$0	1,217,702	\$39,615,567	114,906,882	\$17,298,424	10,132,498	\$35,011,913	138,665,094	2,510,140	1,724,965	
All Sectors	2008-09	\$363,445,365	\$325,990,999	18,282,585,527,715	2,466,919,837	\$177,993,356	67,323,295	\$67,194,821	3,990,957	\$6,501,494	203,155	\$410,285	4,850,620	\$7,027,706	0	\$0	0	\$0	1,322,736	\$47,293,253	125,252,204	\$19,570,083	9,911,156	\$37,454,366	142,603,609	1,920,202	1,359,859	
All Sectors	2009-10	\$368,199,952	\$327,079,888	18,321,283,725,023	2,506,532,919	\$190,246,199	70,277,161	\$53,626,963	1,939,227	\$4,223,940	738,951	\$1,740,694	4,952,855	\$7,589,139	0	\$0	0	\$0	1,225,199	\$50,809,085	111,592,444	\$18,843,868	12,352,183	\$41,120,064	145,331,029	3,703,282	1,306,162	
All Sectors	2010-11	\$372,172,234	\$327,041,912	18,170,351,414,319	2,547,933,858	\$193,075,903	68,745,358	\$48,405,614	2,319,324	\$6,593,513	205,002	\$524,397	4,848,965	\$7,859,397	0	\$0	0	\$0	1,166,831	\$50,225,273	112,861,460	\$20,357,815	10,171,552	\$45,130,322	149,999,770	2,950,839	711,254	
All Sectors	2011-12	\$369,818,413	\$321,496,522	17,261,147,462,149	2,535,115,529	\$197,651,053	64,830,526	\$42,044,789	1,469,053	\$4,781,157	200	\$484	3,819,315	\$6,278,066	0	\$0	1	\$0	1,014,275	\$49,116,997	111,291,562	\$21,623,976	13,757,374	\$48,321,891	155,844,358	2,470,455	732,989	
All Sectors	2012-13	\$373,262,192	\$325,719,724	17,320,578,348,656	2,419,989,128	\$195,819,329	73,236,835	\$45,746,710	2,002,480	\$6,476,615	10,261	\$31,456	4,143,346	\$6,178,800	0	\$0	0	\$0	1,111,065	\$50,388,003	94,403,635	\$21,078,810	12,310,075	\$47,542,468	160,218,796	975,933	3,949,975	
All Sectors	2013-14	\$391,264,700	\$341,869,446	17,893,148,003,183	2,458,005,158	\$199,284,589	75,706,312	\$52,089,090	3,142,241	\$9,335,977	149,783	\$381,101	4,170,249	\$7,357,294	0	\$0	0	\$0	1,150,026	\$51,596,243	96,296,903	\$21,825,151	12,997,228	\$49,395,254	163,936,909	3,078,780	2,461,977	
All Sectors	2014-15	\$378,125,839	\$327,586,523	17,476,705,043,144	2,407,499,037	\$198,970,955	74,196,783	\$44,285,036	2,569,049	\$5,530,198	224,583	\$305,146	3,875,604	\$3,651,908	0	\$0	8	\$0	1,186,721	\$52,453,892	102,235,316	\$22,389,388	5,103,572	\$50,539,316	166,373,433	1,583,875	819,673	
All Sectors	2015-16	\$0	\$0	0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	\$0	0	0	0	0



Collecting Utility Data

Year	energy evaluation						water/sewer evaluation					
	total utility \$ avoided	energy \$ avoided	energy \$/gsf	\$/mmbtu	\$/mmbtu %change	btu/sf	btu/sf %change	water \$ avoided	\$/kgal	\$/kgal %change	gal/sf	gal/sf %change
2002-03			\$2.07	\$12.59		164,581			\$3.25		55.26	
2003-04	\$29,724,228	\$26,642,463	\$1.89	\$13.14	4%	143,726	-13%	\$3,081,765	\$4.99	53%	48.90	-11%
2004-05	\$29,991,704	\$28,382,474	\$2.00	\$13.85	10%	144,423	-12%	\$1,609,230	\$4.88	50%	52.01	-6%
2005-06	\$43,305,144	\$40,047,391	\$2.27	\$16.04	27%	141,445	-14%	\$3,257,753	\$5.03	55%	49.26	-11%
2006-07	\$52,559,942	\$43,958,079	\$2.19	\$15.70	25%	139,307	-15%	\$8,601,863	\$6.35	95%	43.03	-22%
2007-08	\$71,102,269	\$60,381,093	\$2.34	\$17.35	38%	134,617	-18%	\$10,721,176	\$6.72	106%	41.51	-25%
2008-09	\$69,345,536	\$55,874,279	\$2.43	\$17.62	40%	137,956	-16%	\$13,471,257	\$7.32	125%	39.80	-28%
2009-10	\$77,789,098	\$61,837,867	\$2.39	\$17.63	40%	135,635	-18%	\$15,951,230	\$8.09	148%	38.97	-29%
2010-11	\$94,906,334	\$77,341,898	\$2.32	\$17.86	42%	129,839	-21%	\$17,564,436	\$8.64	166%	38.95	-30%
2011-12	\$128,376,923	\$108,182,405	\$2.20	\$18.44	46%	119,257	-28%	\$20,194,518	\$9.13	180%	38.16	-31%
2012-13	\$143,427,488	\$120,449,899	\$2.16	\$18.64	48%	116,002	-30%	\$22,977,589	\$9.15	181%	36.38	-34%
2013-14	\$148,857,378	\$122,128,275	\$2.22	\$18.92	50%	117,057	-29%	\$26,729,103	\$9.72	199%	35.00	-37%
2014-15	\$166,641,723	\$132,789,755	\$2.09	\$18.52	47%	112,657	-32%	\$33,851,968	\$10.61	226%	32.15	-42%
2015-16	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2016-17	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2017-18	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2018-19	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2019-20	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2020-21	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2021-22	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2022-23	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2023-24	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
2024-25	\$0	\$0	\$0.00	\$0.00	0%	0	0%	\$0	\$0.00	0%	0.00	0%
	\$1,056,027,768	\$878,015,880						\$178,011,888				



Statewide Utilities at a Glance

Metric	Baseline 2002-2003	Current 2014-2015	% change
Gross square feet	71,562,179	138,117,715	93%
Btu per square foot per year	164,581	112,657	-32%
Cost per million Btu	\$12.59	\$18.52	47%
Avoided Energy Costs		\$878,015,880	
Water gallons per gsf	55.26	32.15	-42%
Water cost per kgal	\$3.25	\$10.61	226%
Avoided Water costs		\$178,011,888	
Total Cumulative Avoided Cost		\$1,056,027,768	



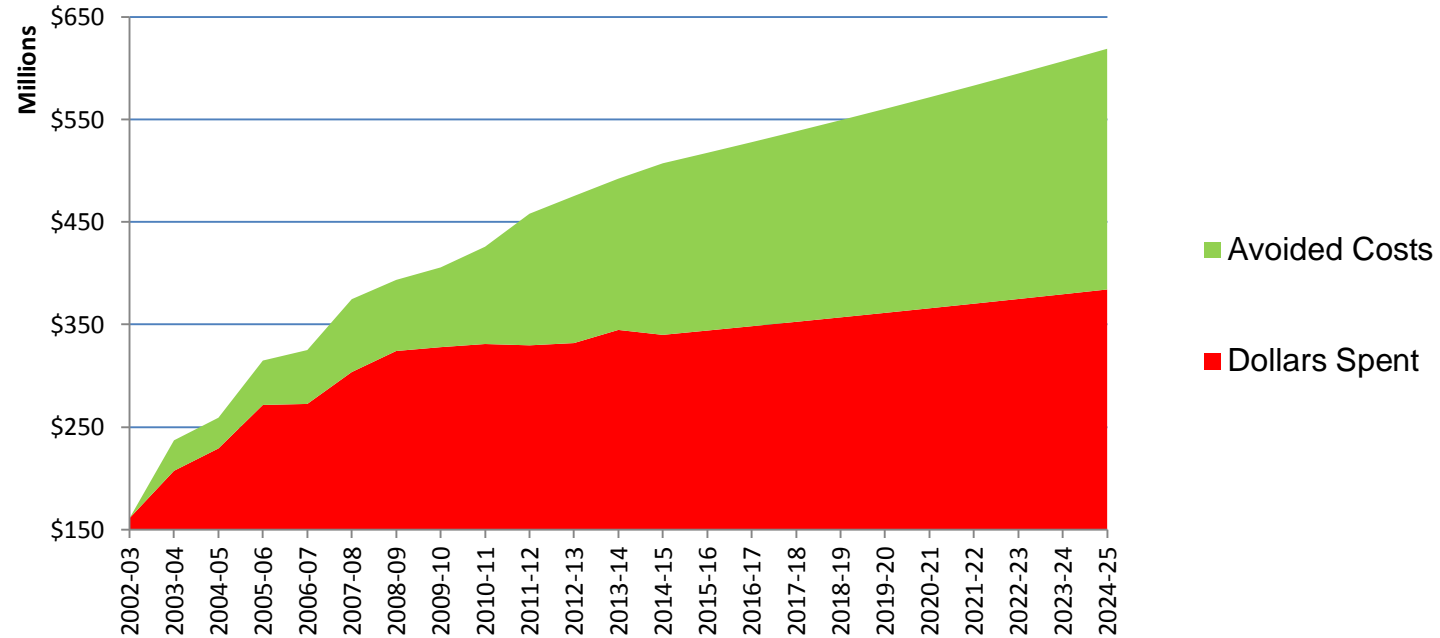
Community Colleges Utilities at a Glance

Metric	Baseline 2007-2008	Current 2014-2015	% change
Gross square feet	22,521,889	28,255,718	25%
Btu per square foot per year	79,943	67,839	-15%
Cost per million Btu	\$19.18	\$20.60	7%
Avoided Energy Costs		\$25,882,295	
Water gallons per gsf	23.58	23.47	0%
Water cost per kgal	\$4.97	\$5.19	4%
Avoided Water costs		-\$2,169,144	
Total Cumulative Avoided Cost		\$23,713,151	

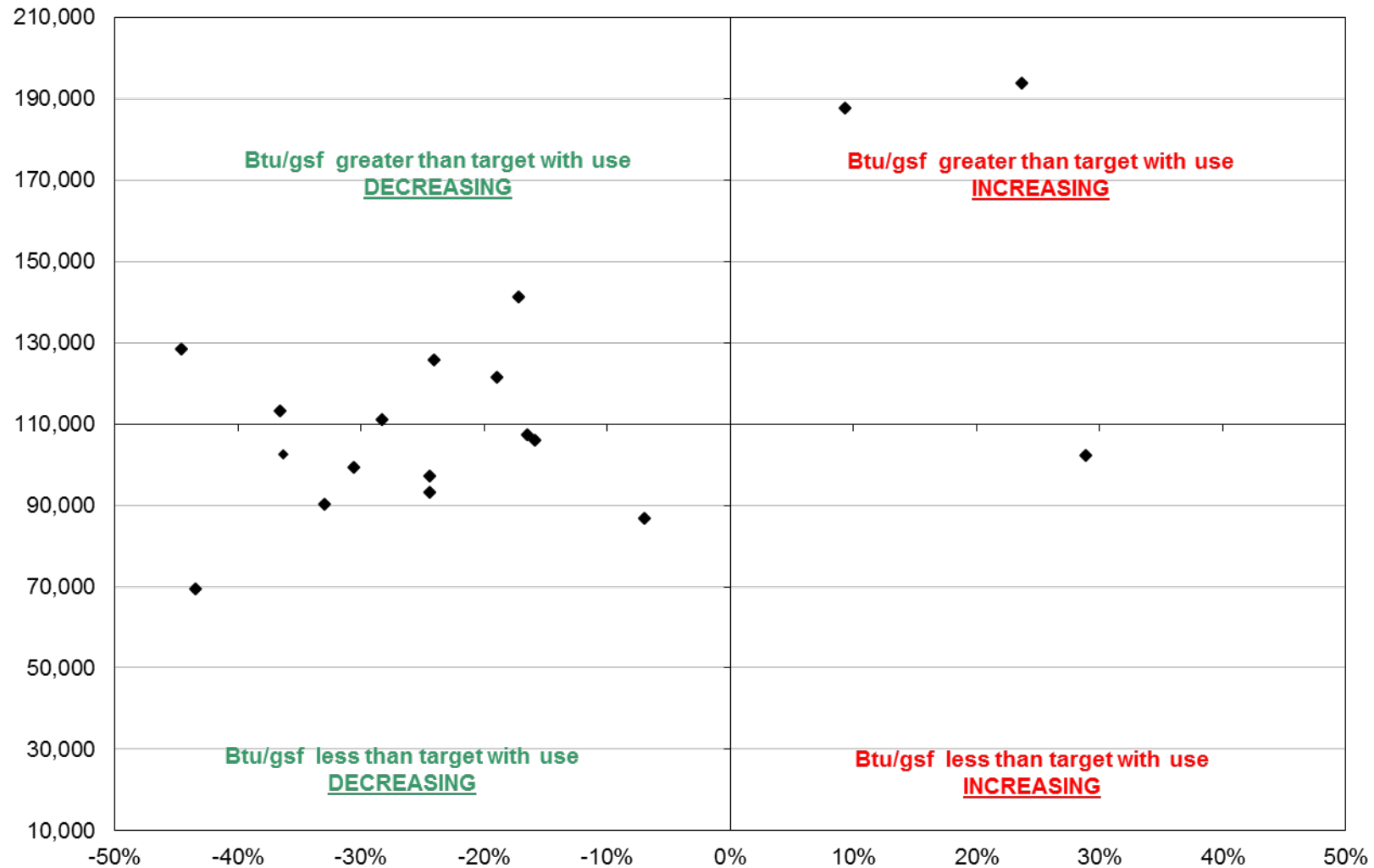


Projected Utilities

Avoided Utility Costs Through 2025



Btu/gsf and % Reduction



Remember

“Continuous improvement is better than delayed perfection.”

Mark Twain



A Final Thought

**SOMETIMES THE THOUGHTS
IN MY HEAD GET SO BORED
THEY GO OUT FOR A STROLL
THROUGH MY MOUTH.**

**THIS IS RARELY A GOOD
THING.**

--- Scott Westerfield



The “People” Approach



***IMPLEMENTATION – It takes PEOPLE
with the DESIRE to make it happen***

**Fred Schoeneborn,
FCS Consulting Services, Inc.**

**Benchmarking to Bricks –
Turning Data into Action**

Washington – May 10, 2016



WII – FM



Human-Nature Radio Station



Fred Schoeneborn, CEM

- **President, FCS Consulting Services, Inc.**
- **38-year career with Mobil Oil – Global Energy Manager – Reported to 2 CEOs**
- **Worked in Mobil Oil Headquarters**
- **Mobil Energy Program Won 1 DOE & 3 EPA Awards**
- **Consults for major corporations**
- **Member of the Industrial Energy Technology Conference Advisory Board**



Why Companies start EE programs

- **Companies focus on \$ generation, always the next quarter (their reason for being)**
 - **EE not at the table.**
 - **It takes a wake-up call to see the EE message.**
- **Mobil – Business Week benchmarking showed cost per employee, compared to Oil Majors**



Core Corporate Axiom of an Energy Program

Energy Costs are Controllable

They should be managed with the same expertise and passion used to manage other parts of the business

IT TAKES MOTIVATED PEOPLE



ArcelorMittal

Energy Efficiency Axiom

“The most important element in the effort to get projects done may not be \$ or resources,

*IT IS THE **Desire** to make it happen”*



Senior Management- WII-FM –

- **Network with other Senior Peers in industry**
- **Visionary- Leader image.**
- **R&D opportunities, not found at companies**
- **Recognition and awards, PR opportunities**
- **Sustainability, Cost Control Strategy**



Energy Managers – WII-FM

- A network of peers in the energy field
- Career Development---”Just in case”
- “Real-world” energy training
- “New” Learnings
- Recognition Opportunities



Energy Managers – WII-FM

- **Exposure to many company- operations**
- **Energy Reduction is APOLITICAL – Safe Move**
- **Opportunity to see senior management in action**
- **Exposure to non technical areas**
- **Project the EE message in the company**



Implementation

The Discipline of getting things DONE

***“Everything depends on Execution.
Having just a Vision is no Solution”***





Thank you

