ENERGY EFFICIENCY AS A UTILITY SYSTEM RESOURCE:

SOME THOUGHTS ON BEST PRACTICES FOR IRP, EM&V AND REGULATORY POLICY

Presentation to Indiana IRP Contemporary Issues Conference

October 23, 2014

by

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American Council for an Energy-Efficient Economy

The American Council for an Energy-Efficient Economy (ACEEE)

- Nonprofit 501(c)(3) dedicated to advancing energy efficiency through research, communications, and conferences. Founded in 1980.
- ~40 staff in Washington DC, + field offices in DE, MI, and WI.
- Focus on End-Use Efficiency in Industry, Buildings, Utilities, and Transportation; and State & National Policy
- Funding: Foundations (34%), Federal & State Grants (7%), Contract work (21%) Conferences and Publications (34%), Contributions and Other (4%)

Martin Kushler, Ph.D. (Senior Fellow, ACEEE)

- 30 years conducting research in the utility industry, including:
- 10 years as Director of the ACEEE Utilities Program
- 10 years as the Supervisor of the Evaluation section at the Michigan PSC
- Have assisted over a dozen states with utility EE policies

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TOPICS

- Energy efficiency as a utility system resource
  - Concepts
  - Data
- Detailed examination of the nation's best example
- Barriers and the need for public policy
- Best practices for IRP and Evaluation
- Some recommendations and conclusions for Indiana

Energy Efficiency as a utility system resource

RATIONALE FOR ENERGY EFFICIENCY AS A UTILITY SYSTEM RESOURCE

SIMPLY STATED:

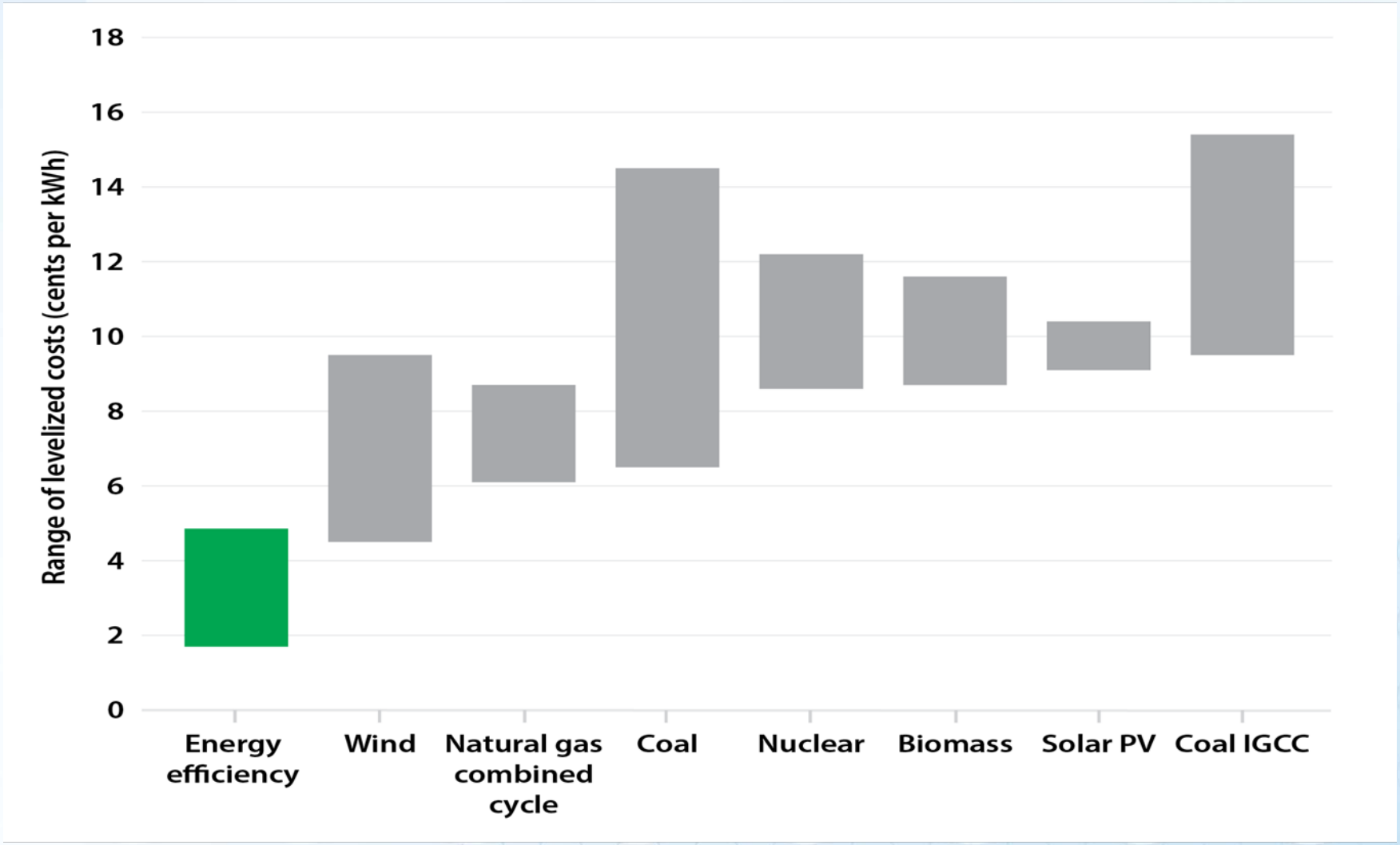
- Utility systems need to have adequate supply resources to meet customer demand
- To keep the system in balance, you can add supply resources, reduce customer demand, or a combination of the two
- In virtually all cases today, it is much cheaper to reduce customer demand than to acquire new supply resources

KEY POINT #1

It is much cheaper to save energy than it is to produce it.

[We can save electricity for about one-third the cost of producing it through a new power plant …. With no carbon (CO_2) emissions]

Levelized electricity resource costs



Source: Lazard 2013.

ACEEE NATIONAL STUDIES ON EE COST-EFFECTIVENESS

In a 2009 ACEEE analysis*, we reviewed the reported results from 14 states with large-scale utility funded energy efficiency programs:

- **The average cost per kWh saved was 2.5 cents**

In a new 2014 ACEEE analysis**, we reviewed the reported results from 20 states:

- **The average cost per kWh saved was 2.8 cents**

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* *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs,* ACEEE, Sept. 2009 http://www.aceee.org/research-report/u092

** The Best Value for America's Energy Dollar: *A National Review of the Cost of Utility Energy Efficiency Programs*, ACEEE, March 2014 http://www.aceee.org/research-report/u1402

DATA FROM THE MICHIGAN PUBLIC SERVICE COMMISSION*

Cost of different electricity resources

- Energy Efficiency: **2.0** cents/kWh**
- New gas combined cycle plant: **6.6** cents/kWh
- New coal-fired power plant: **11.1** Cents/kWh
- Current weighted average of power supply costs in Michigan, including purchased power: **6.4** Cents/kWh (excluding transmission costs)***

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* *2012 Report on the implementation of P.A. 295 Utility Energy Optimization Programs*, November 30, 2012

** Statewide average levelized cost of energy savings from Energy Optimization programs

*** *Report on the implementation of the PA 295 Renewable Energy Standard and the Cost-Effectiveness of the Energy Standards*, MPSC 2013

ENERGY EFFICIENCY ON A "POWER PLANT" SCALE

- Some leading state examples
  - ❖Minnesota has saved over 2,300 MW since 1990
  - ❖The Pacific Northwest has saved over 5,500 MW since 1980, 2000 MW just since 2005
  - ❖California has saved over 1,500 MW in just the last 5 years
- Over a dozen states have EE programs on a scale large enough to displace power plants (i.e., save 1% of load or more each year)
  - AZ, CA, CT, IA, IL, MA, MI, MN, NY, OR, RI, VT, WA, WI

THE PACIFIC NORTHWEST (ID, MT, OR, WA)

- Best electric resource planning process in the U.S.
- 30 years of energy efficiency program experience
- The 2005 plan was to meet all new electricity resource needs through 2013, and two-thirds of new needs thru 2025, with energy efficiency

….And all at a levelized cost of 2.4 cents/kWh

The Fifth Northwest Electric Power and Conservation Plan

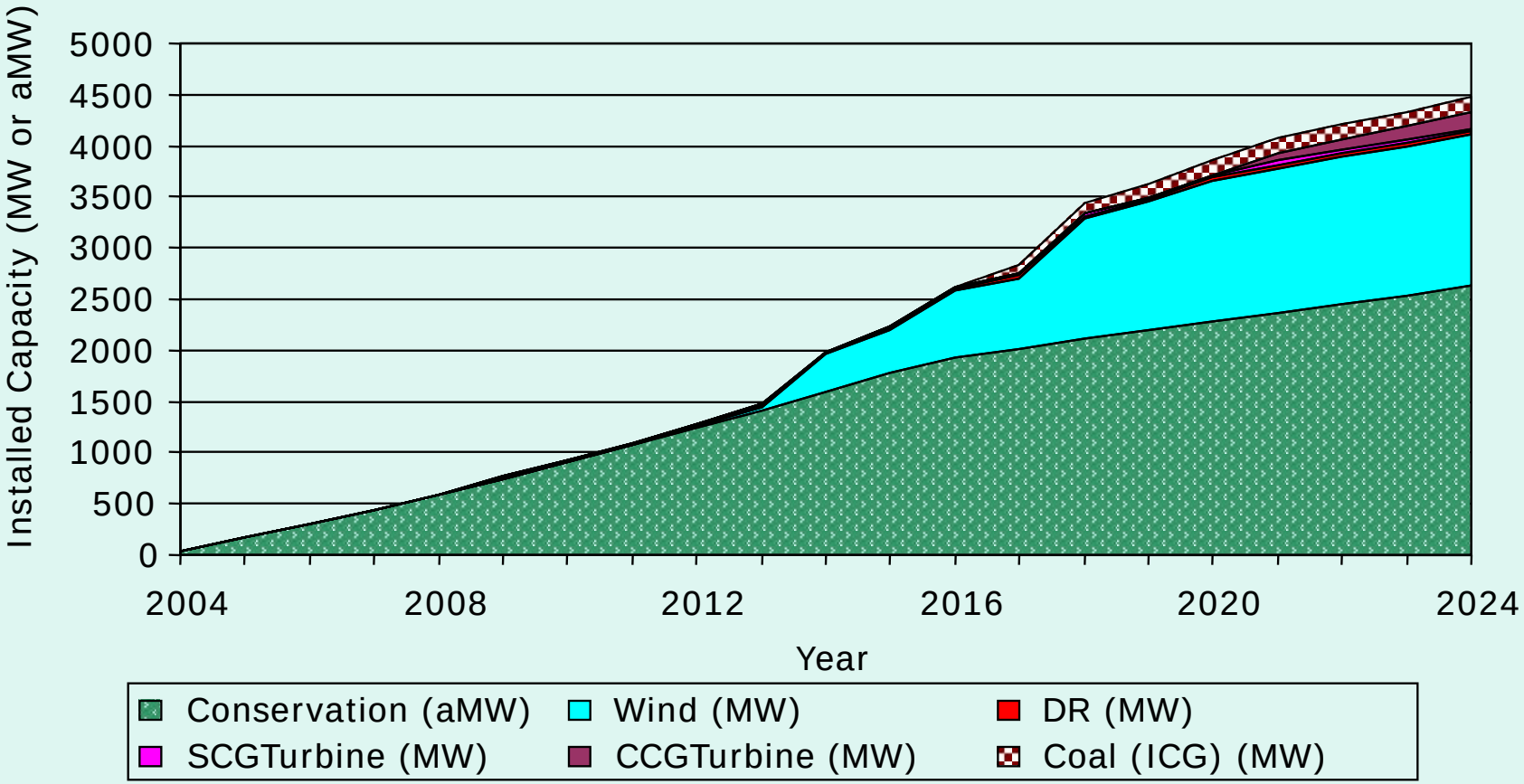
Northwest Power and Conservation Council, May 2005.

[http://www.nwcouncil.org/energy/powerplan/plan/]

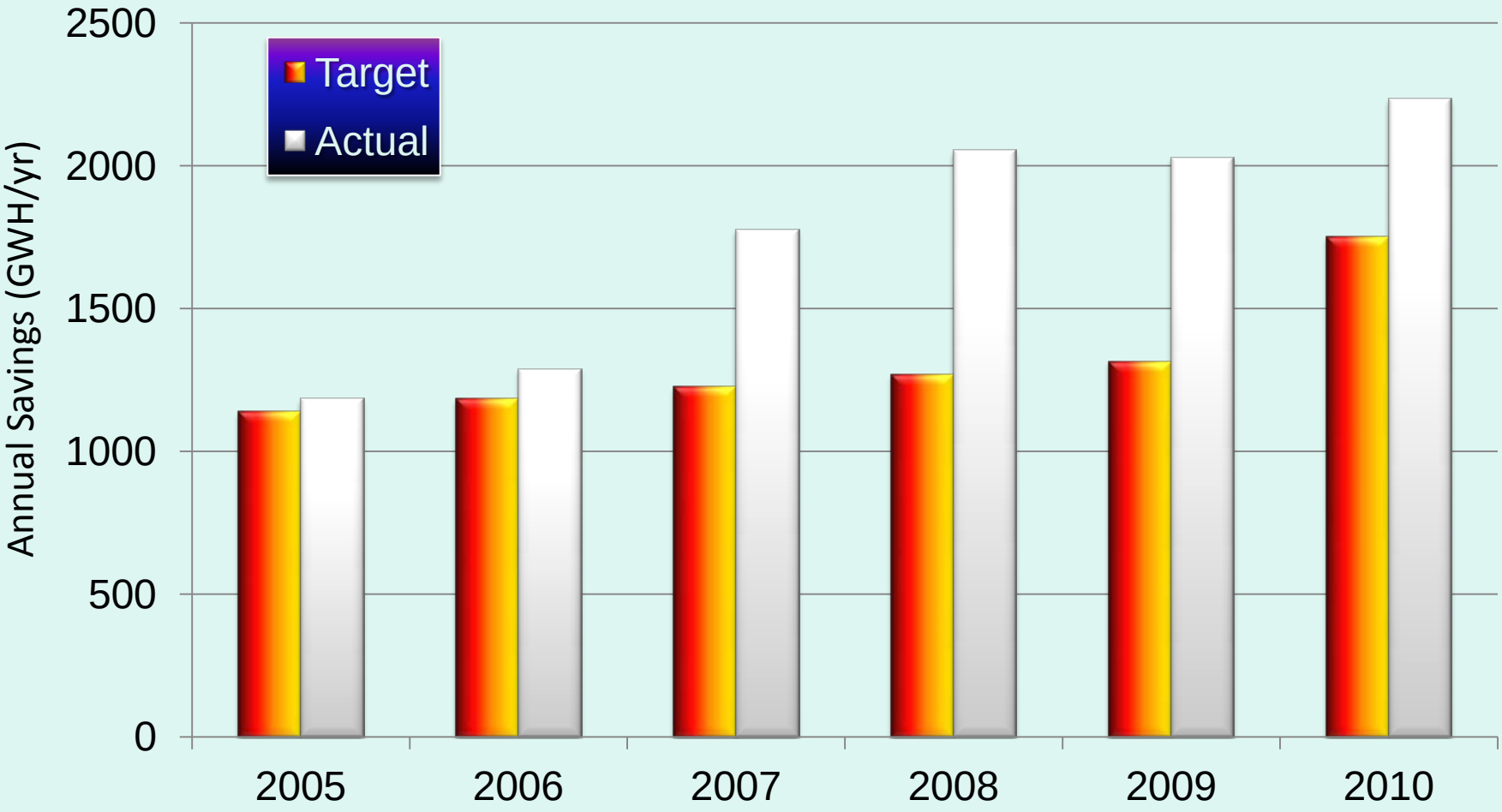
Additional Source: *Treating Energy Efficiency As A Resource Results of Three Decades of Northwest Experience*, by

Tom Eckman Manager, Conservation Resources, Northwest Power and Conservation Council, at *ACEEE Energy Efficiency As A Resource Conference*, Nashville, TN September 23, 2013

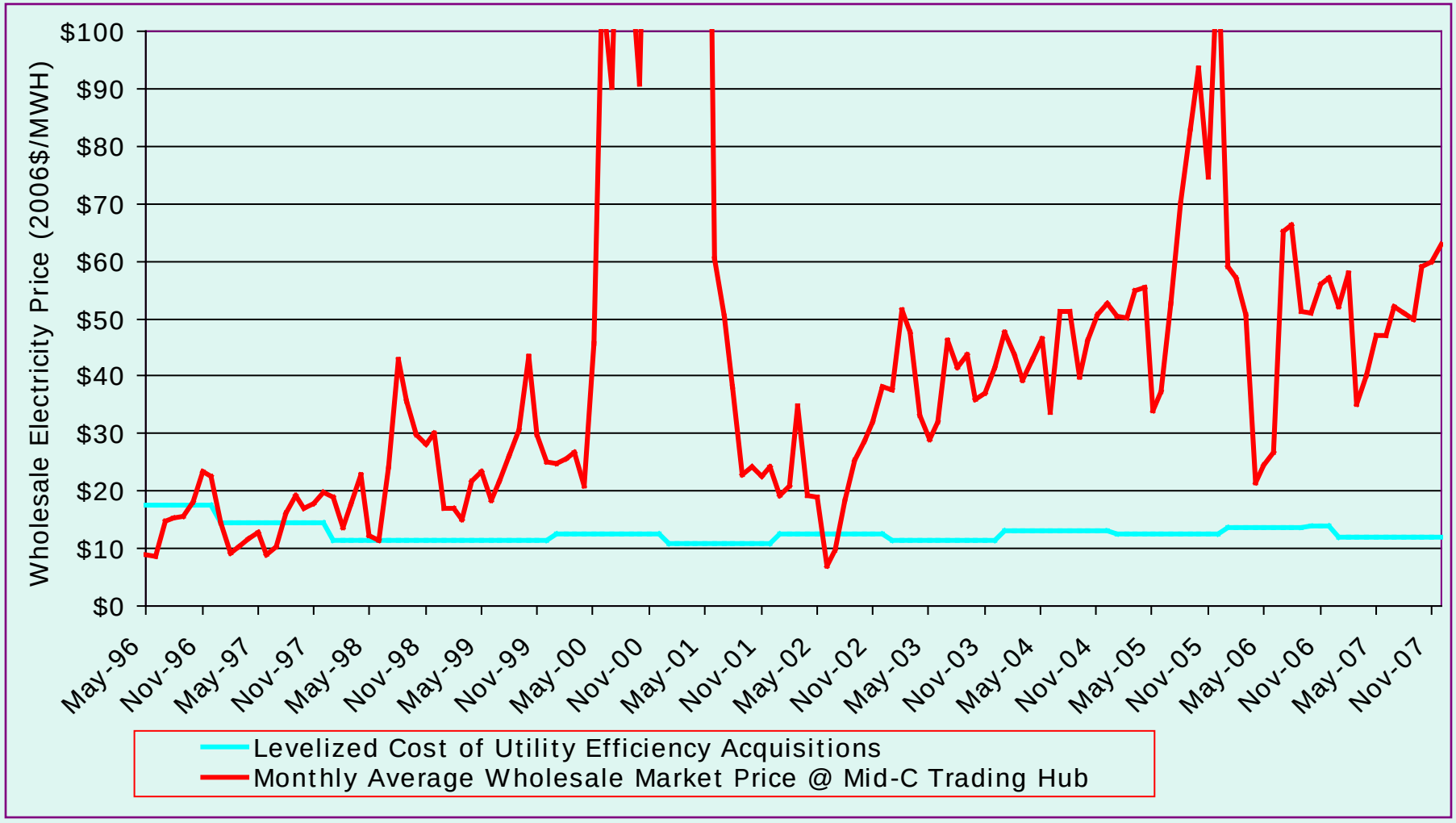
5th NW Plan Relied on Conservation and Renewable Resources to Meet All Load Growth Thru 2016



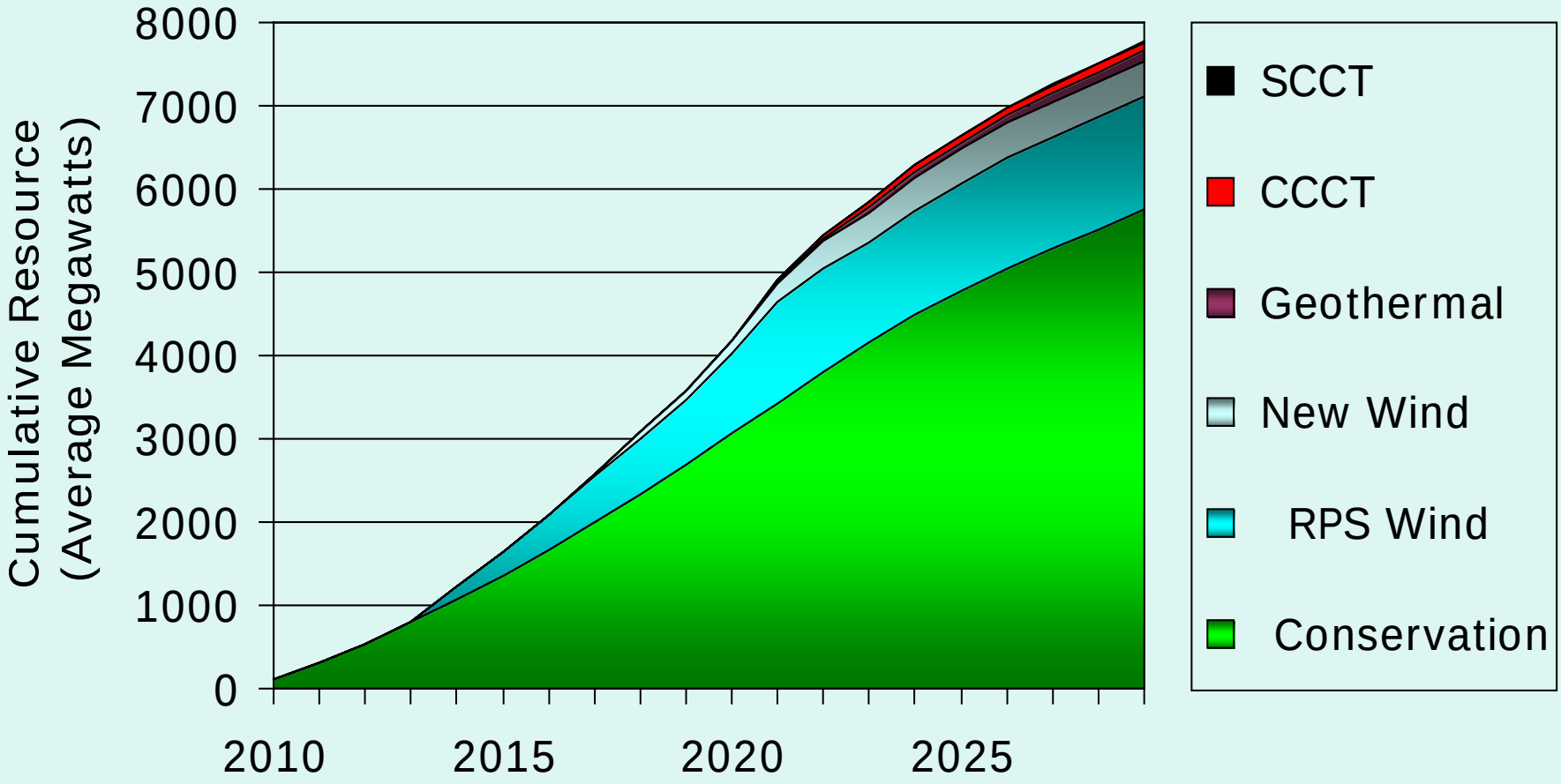
Accomplishments Exceeded Plan Targets Every Year



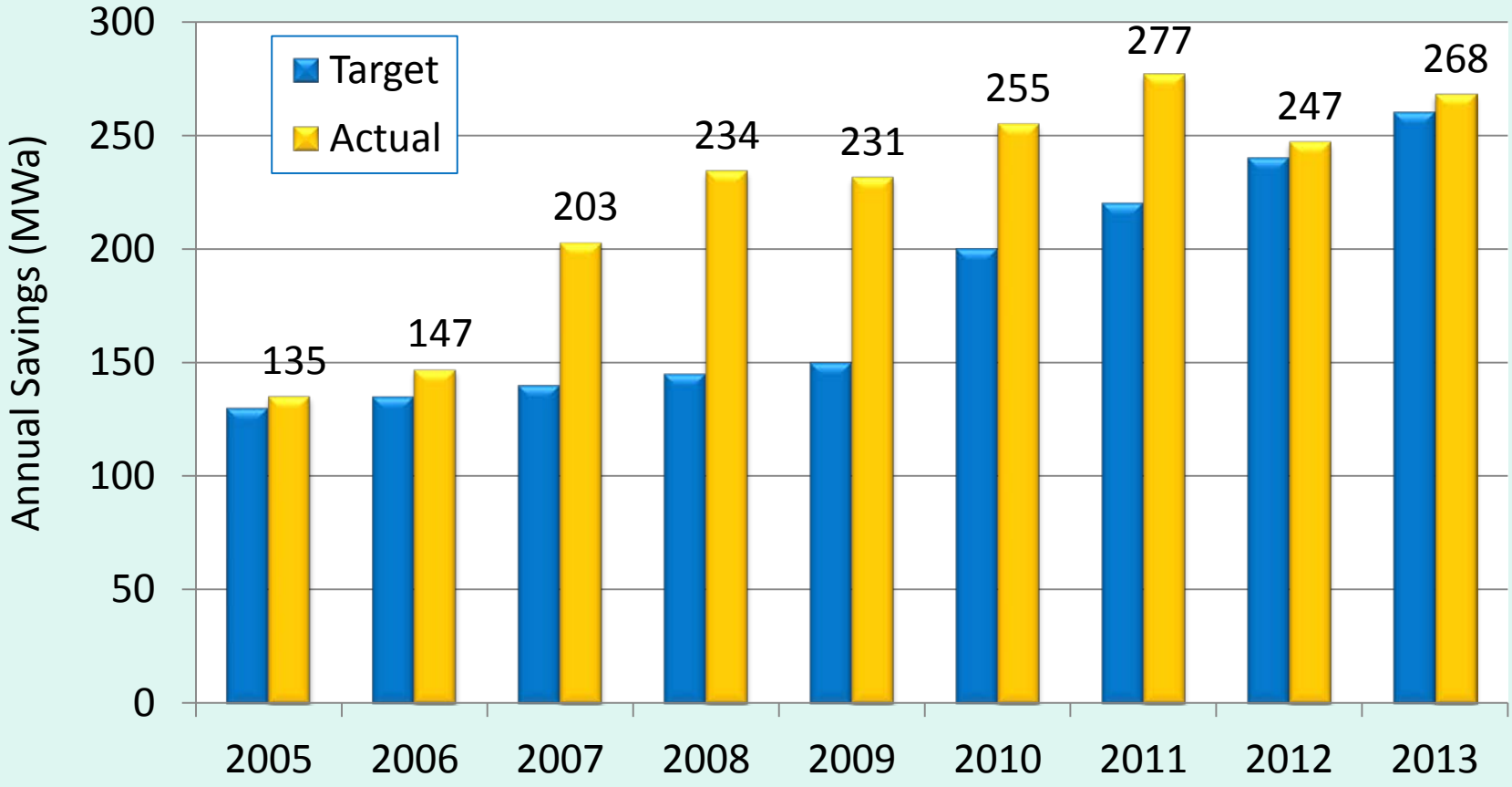
Utility Acquired Energy Efficiency Has Been A *BARGAIN!*



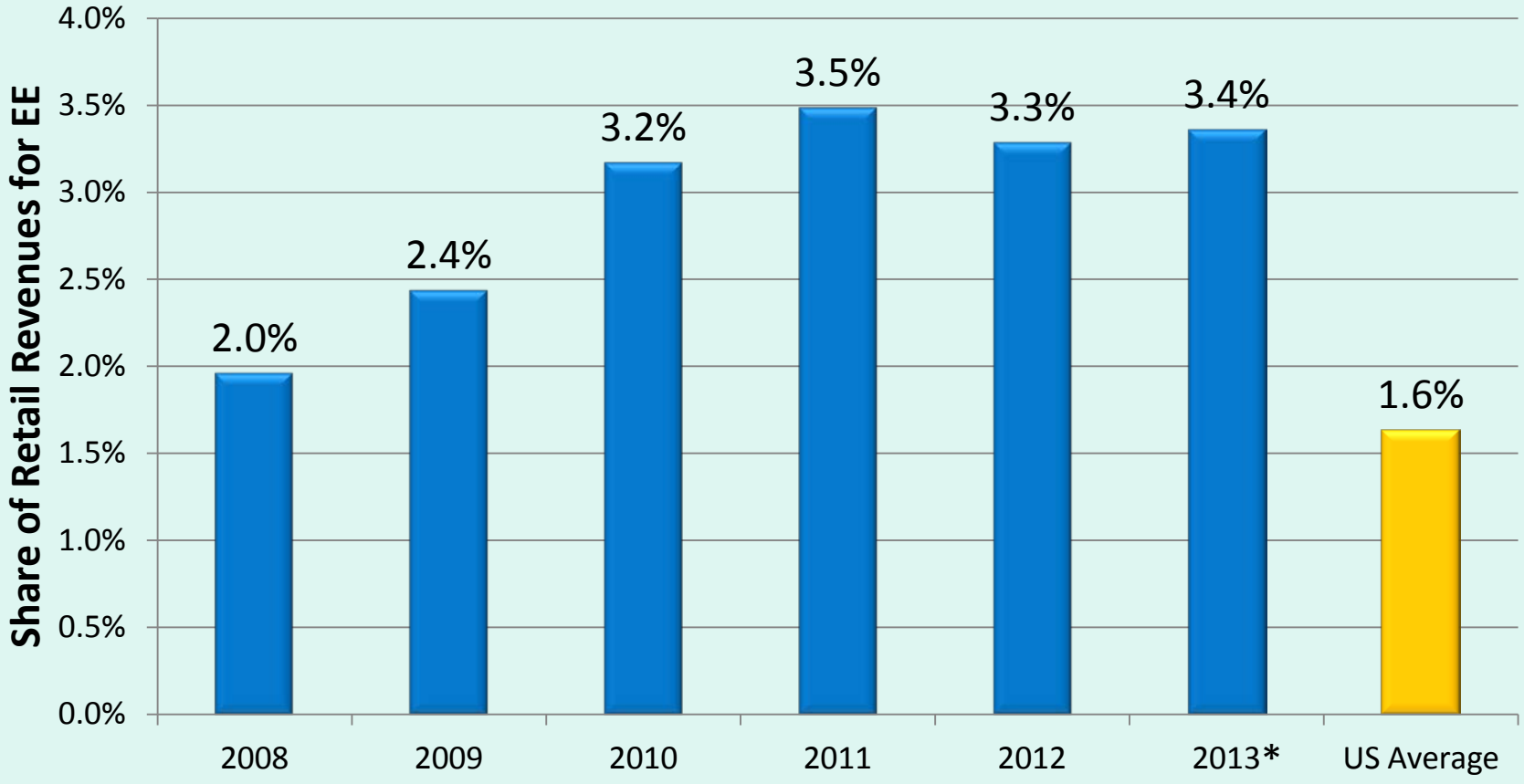
Pacific NW 6th Plan Resource Portfolio (2010)



Energy Efficiency Accomplishments have Exceeded Plan Targets Every Year Since 2005



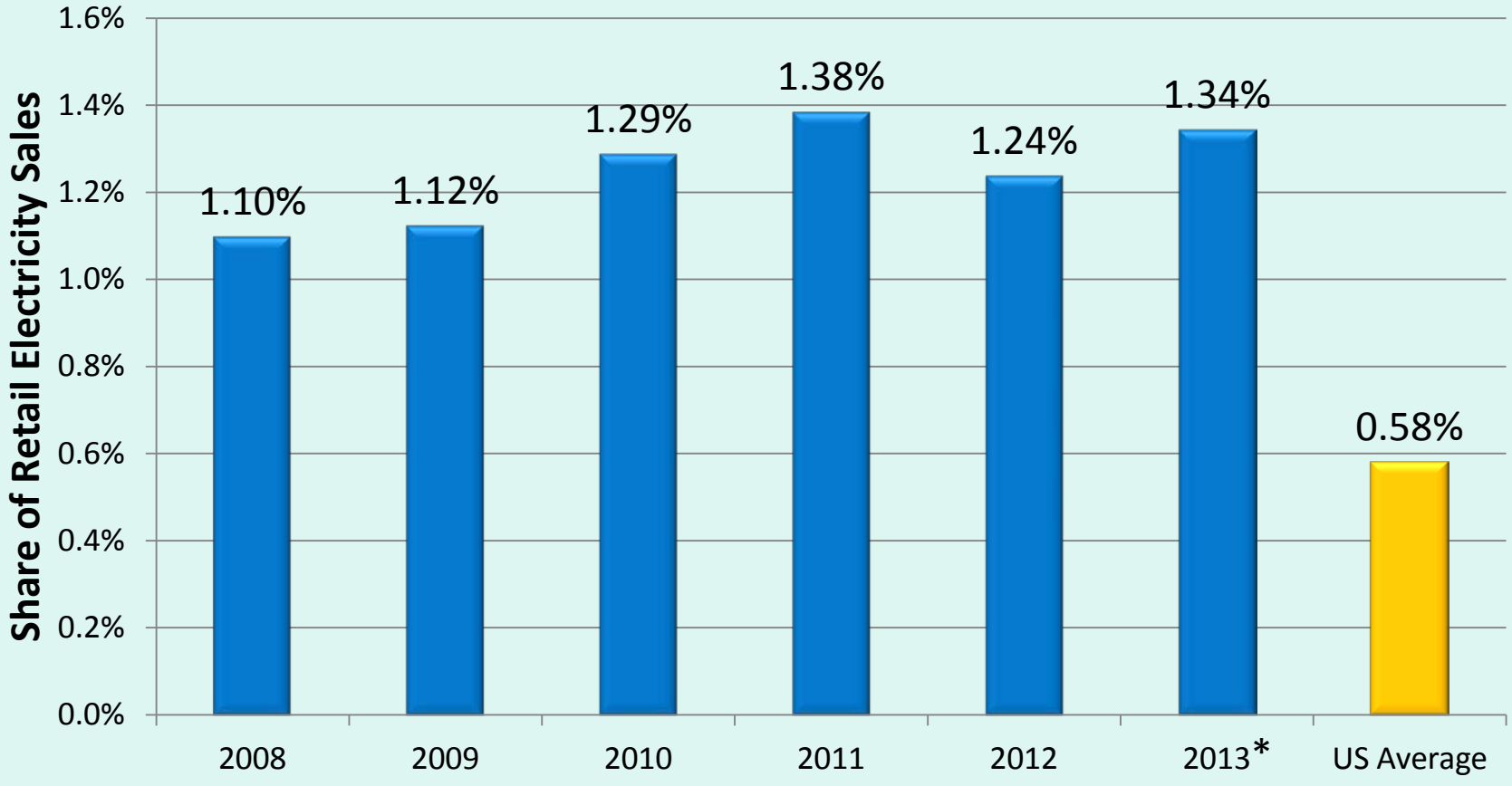
Level of Investment in EE Programs in the Region (% of Retail Electric Revenues Spent on EE)



* 2013 is based on 2012 revenues data from EIA. 2013 data is expected in October/November 2014

Average Utility Levelized Cost of Conservation Remains Low

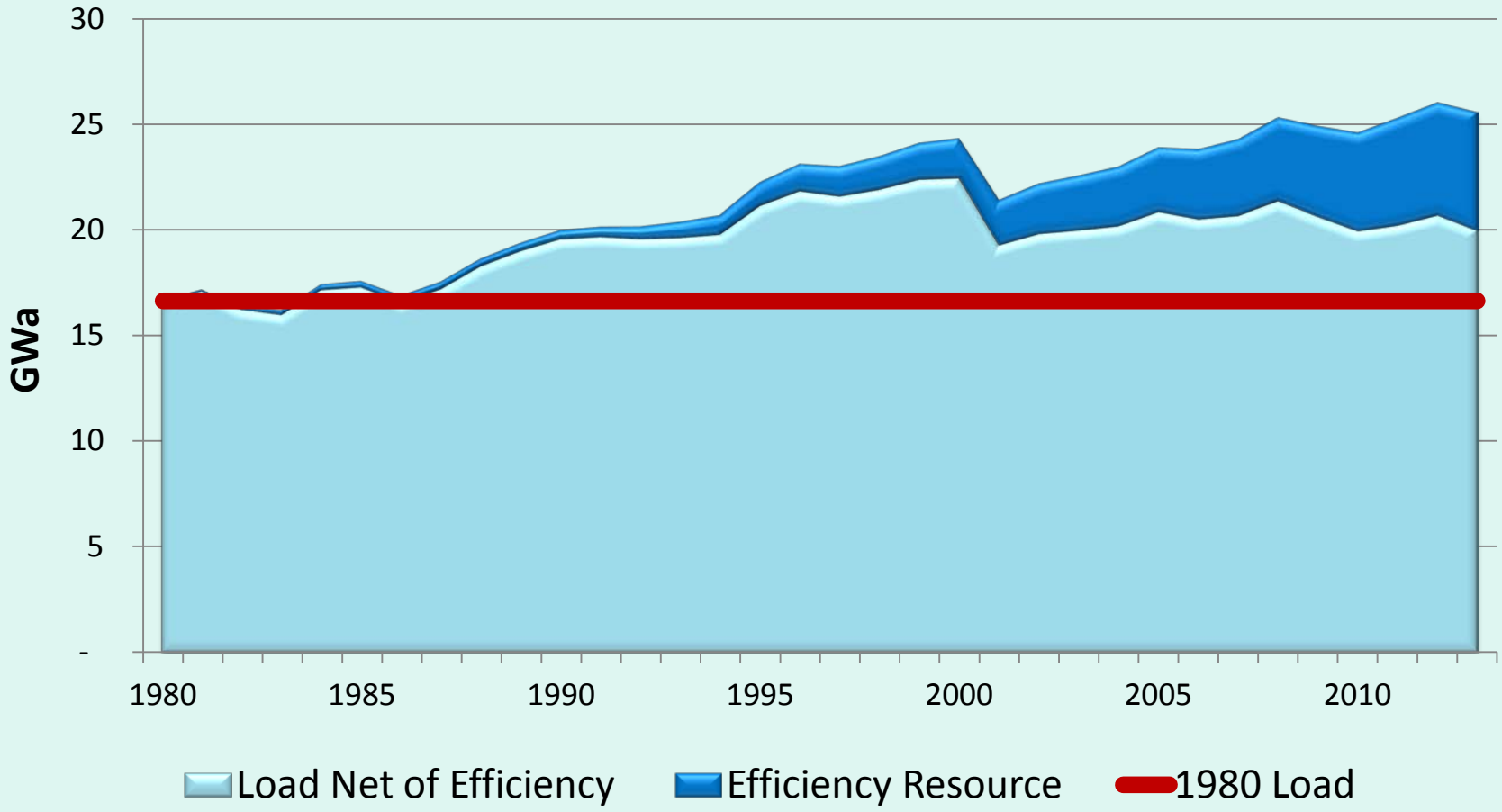
Utility/SBC-Funded Savings Equaled 1.3% of Regional Electricity Sales in 2013 More Than Double the US Average



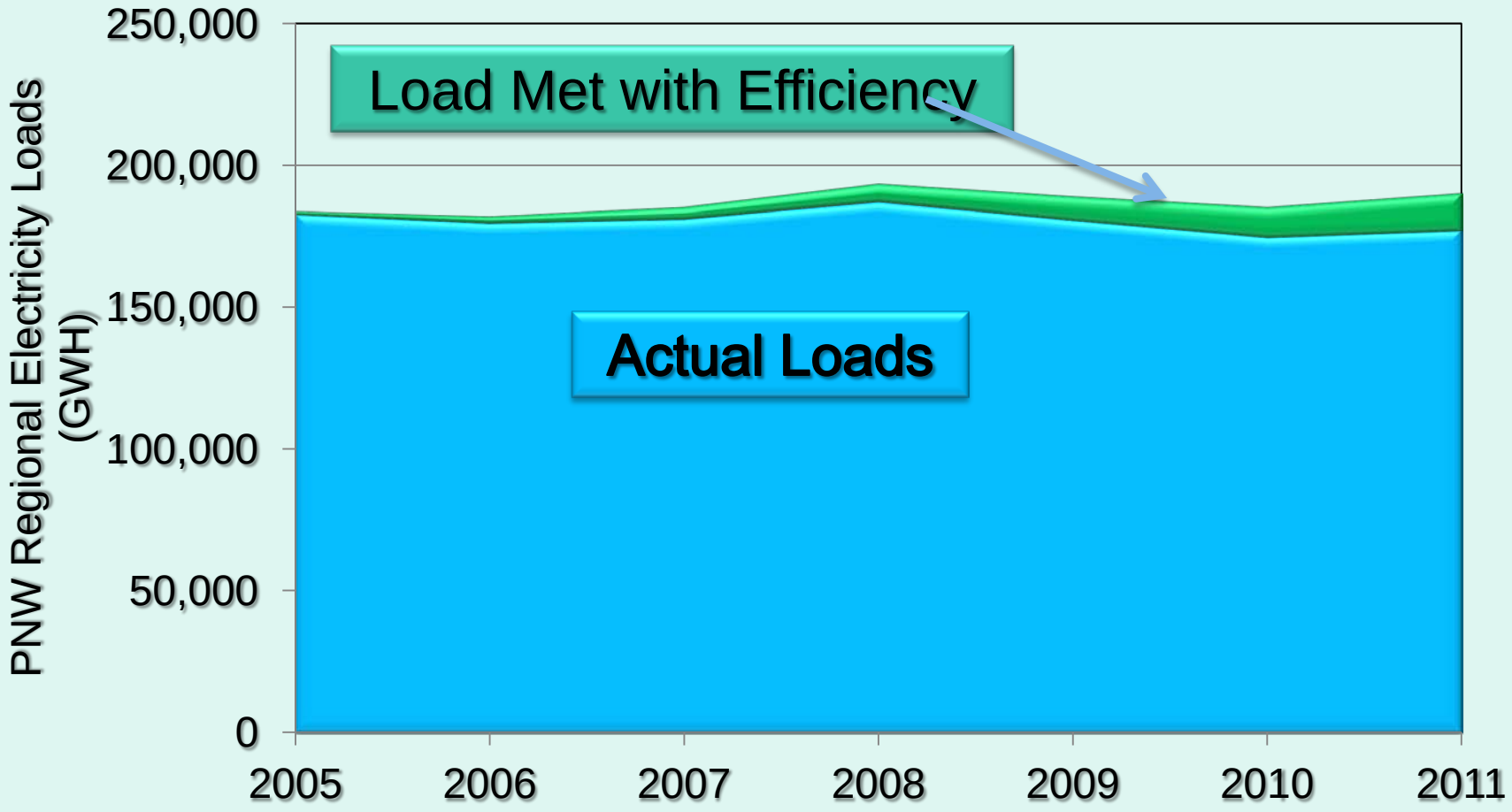
* 2013 is based on 2012 loads data from EIA. 2013 data is expected in October/November 2014

Efficiency Has Met Nearly 62% of PNW Load Growth Since 1980

[**Since 2005, EE has met 100% of load growth**]



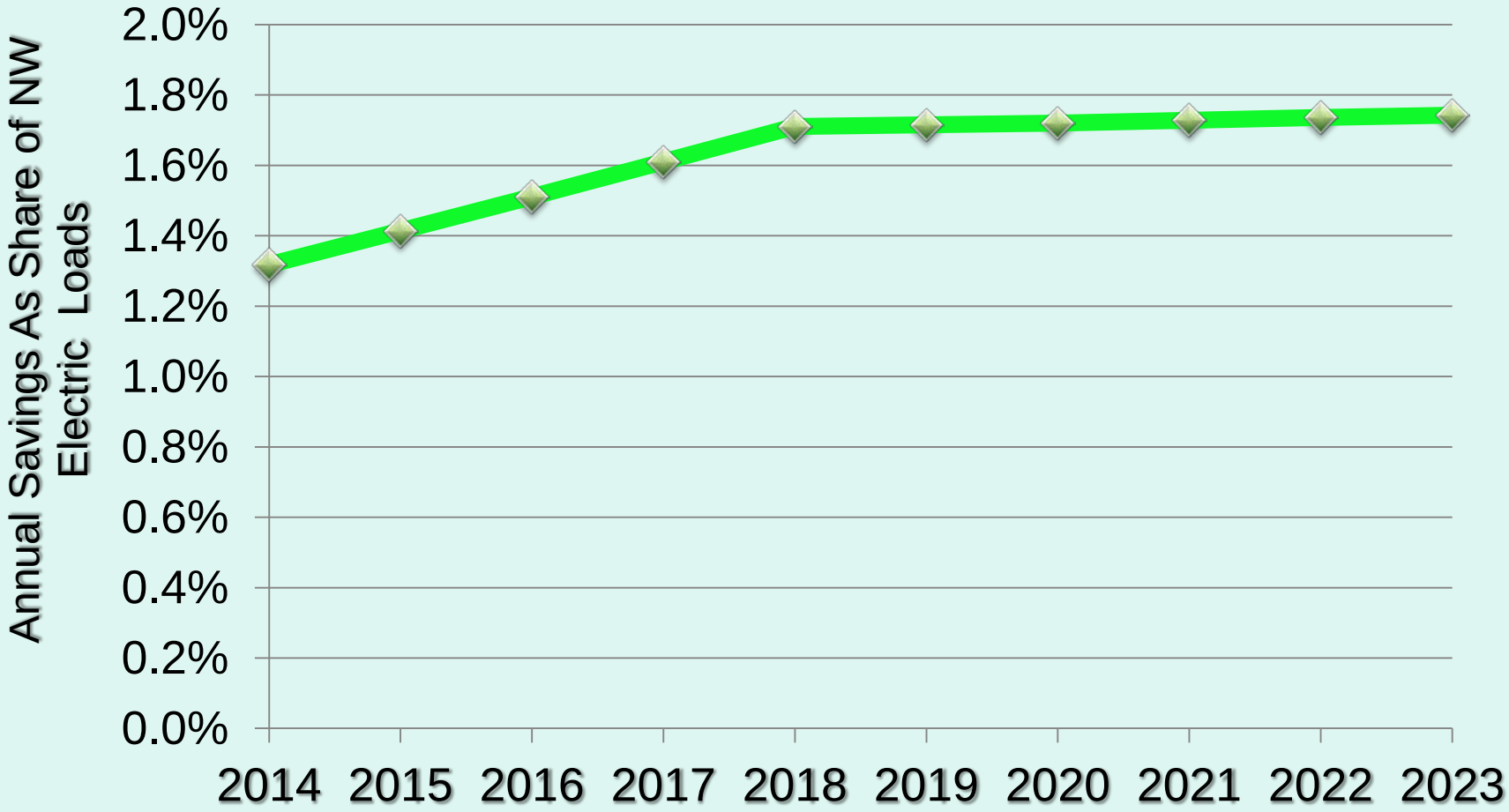
Since 2005 Energy Efficiency Has Reduced Northwest Load Growth by 1.2%/year
Result = No Net Load Growth for ***Seven*** Years



According to the Northwest Power and Conservation Council:

This energy efficiency resource saved the region's electricity consumers nearly $3.51 billion in 2013 alone

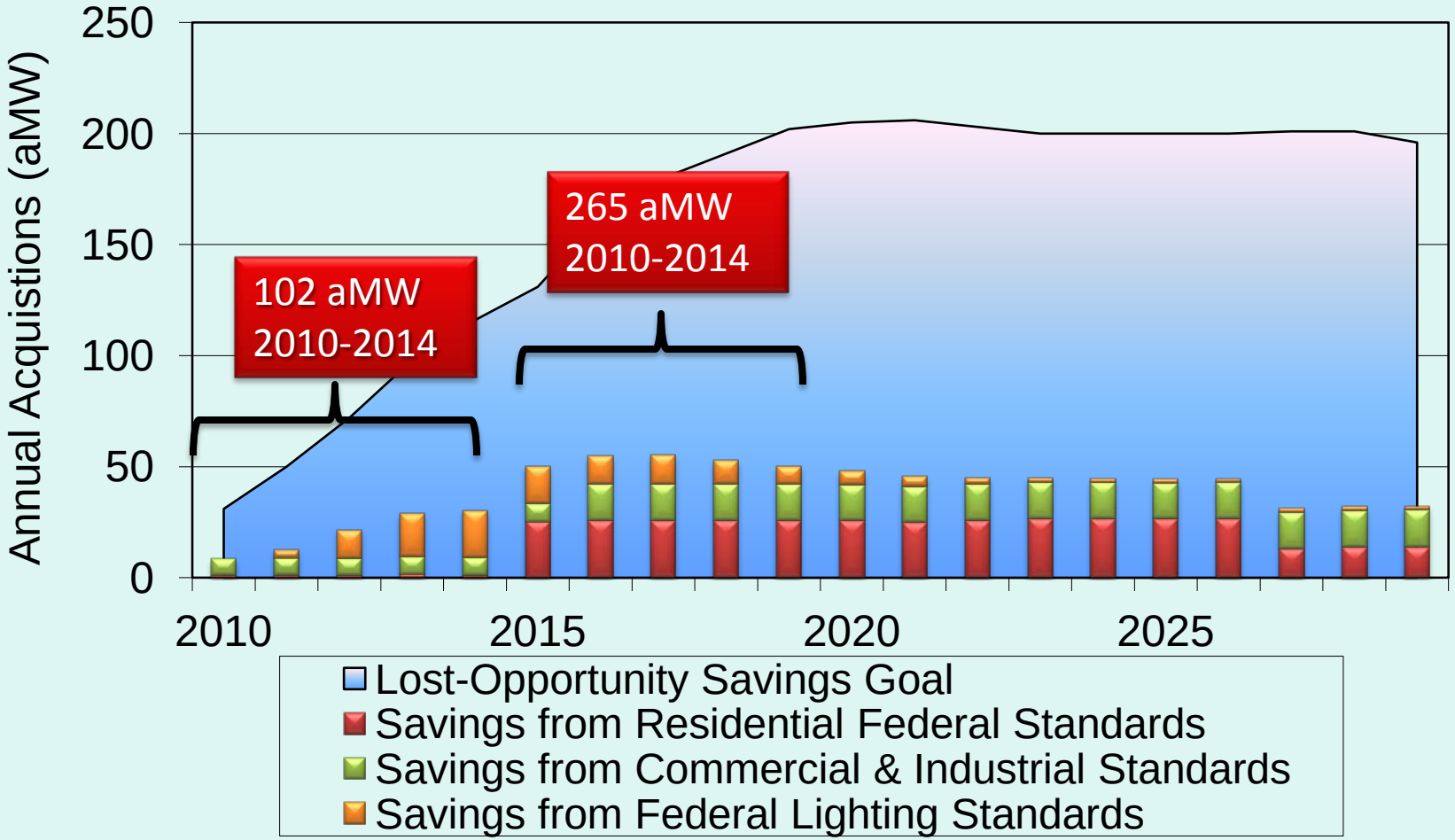
Looking Ahead:
Energy Efficiency Annual Savings Projected in the Current (2010) Plan



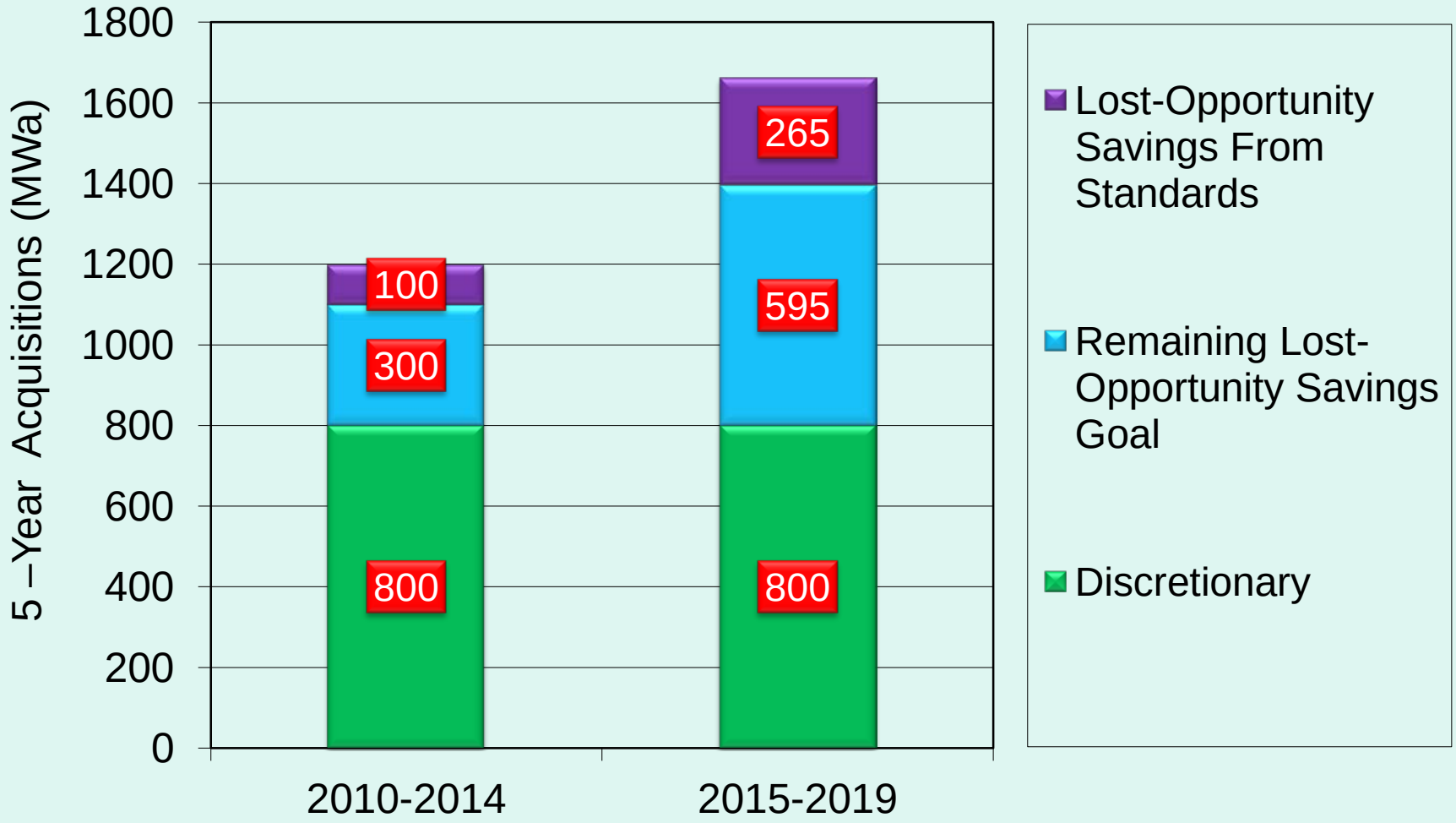
Some additional lessons From the Pacific Northwest

Extra Lesson 1: Energy Efficiency's Share of the Resource Portfolio Does Not Depend on Climate Policy Assumptions

EXTRA LESSON 2: FEDERAL STANDARDS HAVE RELATIVELY LITTLE EFFECT ON EE POTENTIAL (Federal Standards Are Estimated to Save Just Over 100 aMW by 2014 and 265 aMW between 2015-2019)



Proportion of 6th Plan Goals that will be met by the New Federal Energy Efficiency Standards



For more information on the Pacific Northwest Experience contact:

Tom Eckman:
Teckman@nwcouncil.org

A COUPLE ADDITIONAL RESOURCE PLANNING EXAMPLES, CLOSER TO HOME

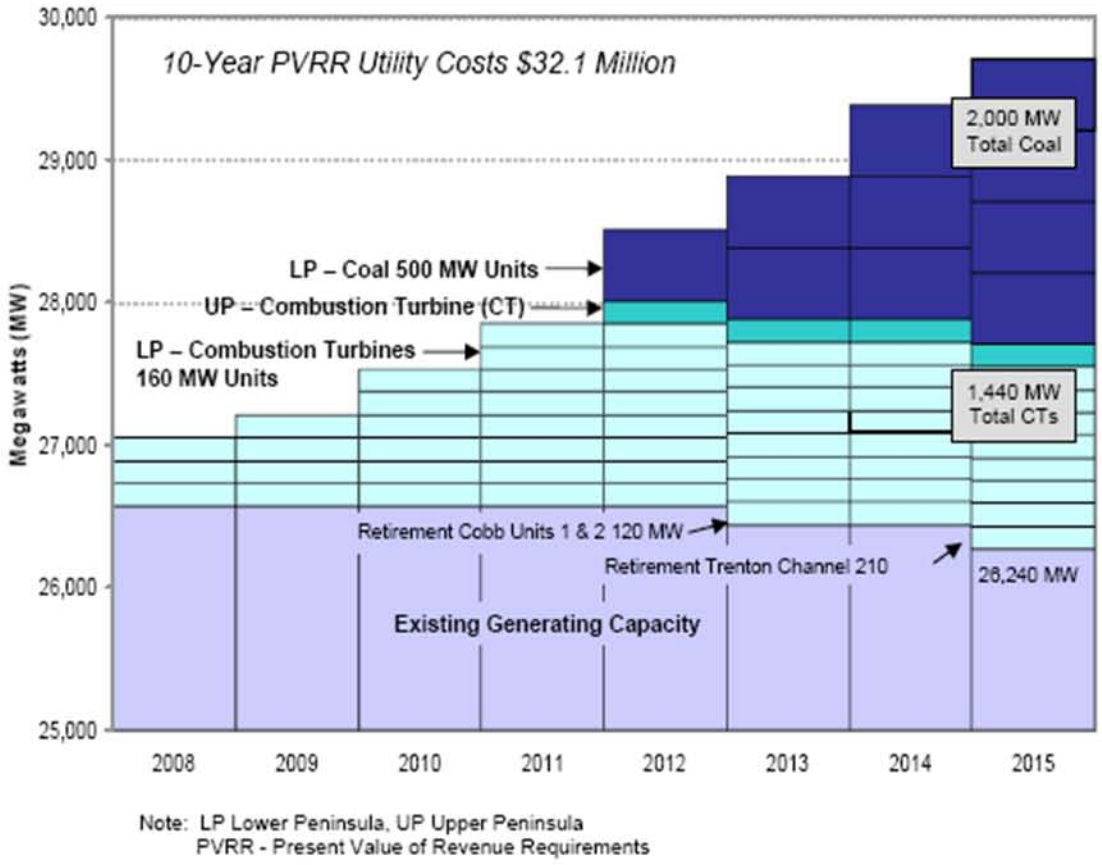
From Michigan 21st Century Plan

(http://www.dleg.state.mi.us/mpsc/electric/capacity/energyplan/index.htm)

Central Station Generation Scenario (Appendix I, p.6)

(represented "business as usual" in 2007)

Figure 4: Schedule of Cumulative Generation Additions for the Central Station Scenario



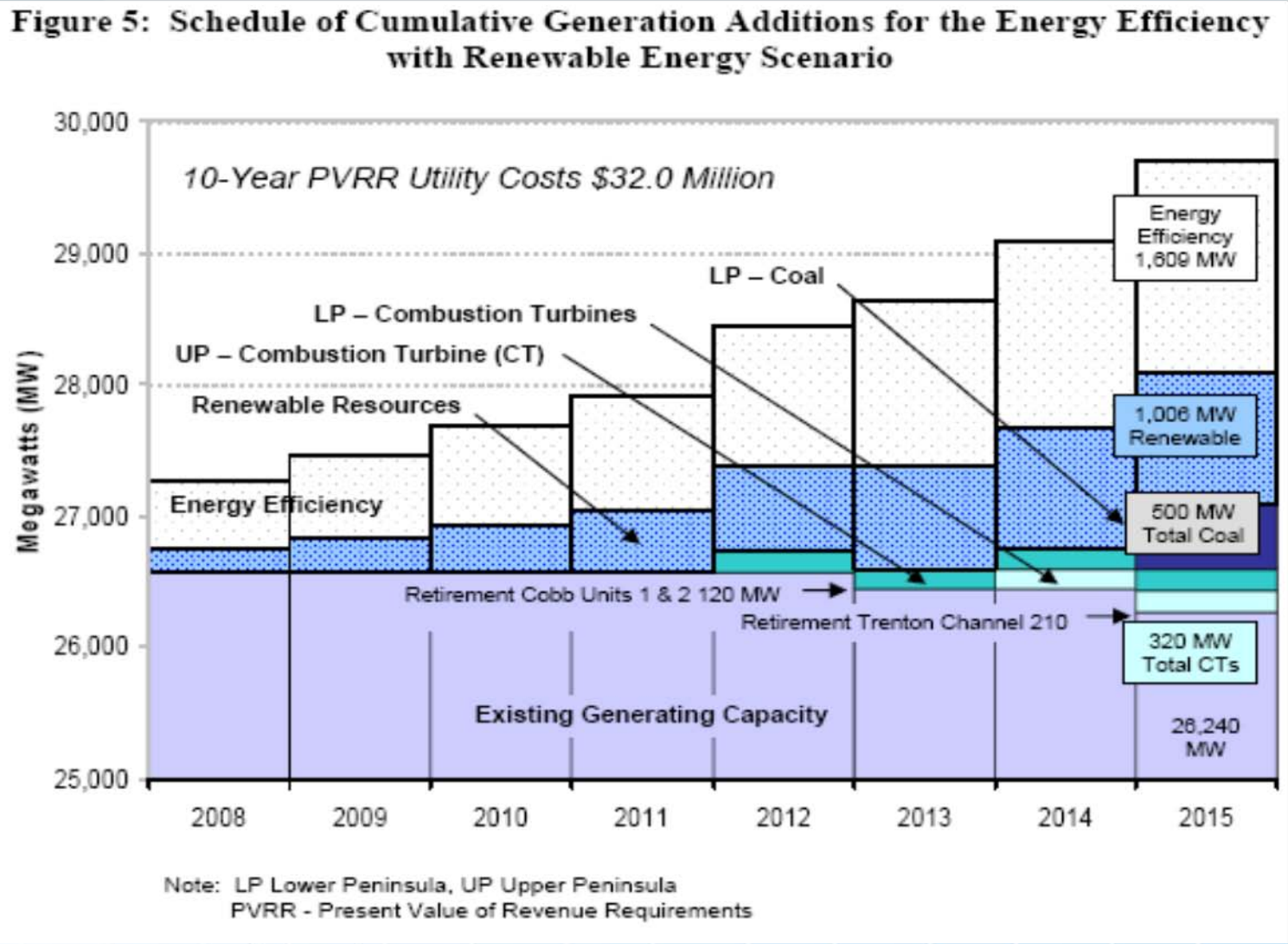
Note: LP Lower Peninsula, UP Upper Peninsula
PVRR - Present Value of Revenue Requirements

Coal: 10 cents/ kWh + carbon

nat gas 8-9 cents/ kWh or 8-9 cents/ for purch. power

From Michigan 21st Century Plan: Energy Efficiency & Renewable Energy Scenario

(Appendix I, p.7)



Energy Efficiency 3 cents/ kWh (no carbon)

Wind 7-8 cents/ kWh (no carbon)

A little gas or purch. power

MI 21ST CENTURY PLAN CONCLUSIONS

"modeling for the Plan showed that, **in the absence of any energy efficiency programming**, Michigan would need no fewer than four new 500 MW baseload units by 2015 to meet forecasted demand. **With energy efficiency programming**, the model decreased the forecasted need to two new baseload units on a staggered basis; and with the addition of the RPS, this projection has been decreased further to one new unit by 2015."

"By displacing traditional fossil fuel energy, **the energy efficiency program alone could save Michigan $3 billion in electricity costs over the next 20 years**. These results compare favorably to other statewide energy efficiency programs."

THE 21ST CENTURY PLAN LED TO PA 295

The Michigan 21st Century Electric Energy Plan of 2007 helped lead directly to lengthy legislative hearings and ultimately the passage of PA 295 in 2008….
…..which created for the ***first time*** in Michigan:

1. A requirement for utility energy efficiency programs, including annual energy savings requirements; and
2. A renewable energy portfolio standard, requiring 10% renewable electricity by 2015

Essentially, Michigan has followed that "Energy Efficiency and Renewable Energy" scenario from the 21st Century Plan. Results: **Michigan ratepayers have avoided billions of dollars of costs for new electricity generating plants**….just as the 21st Century Plan predicted.

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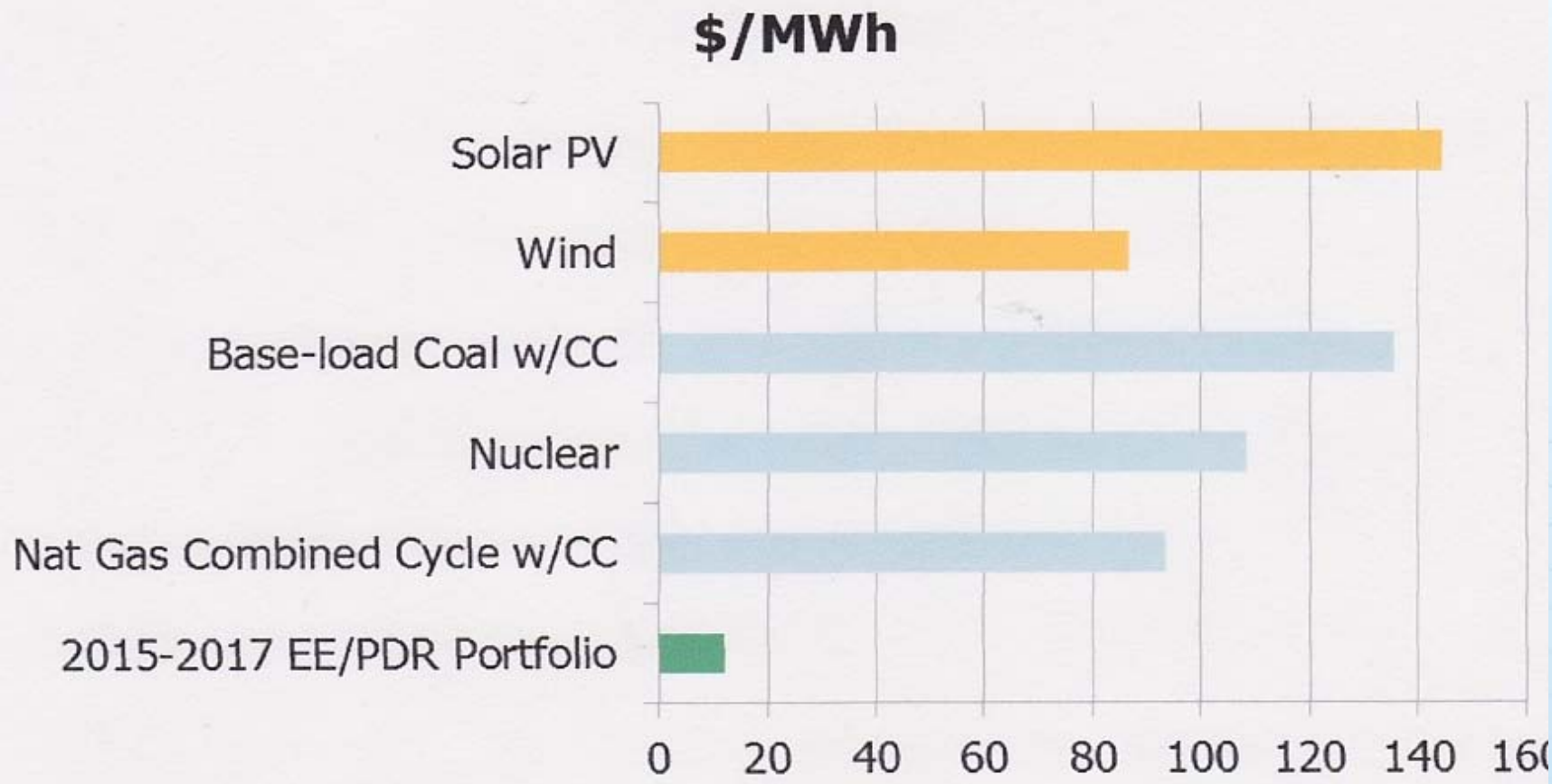
AEP OHIO's ENERGY EFFICIENCY/ PEAK DEMAND REDUCTION (EE/PDR) ACTION PLAN

[March 26, 2014]

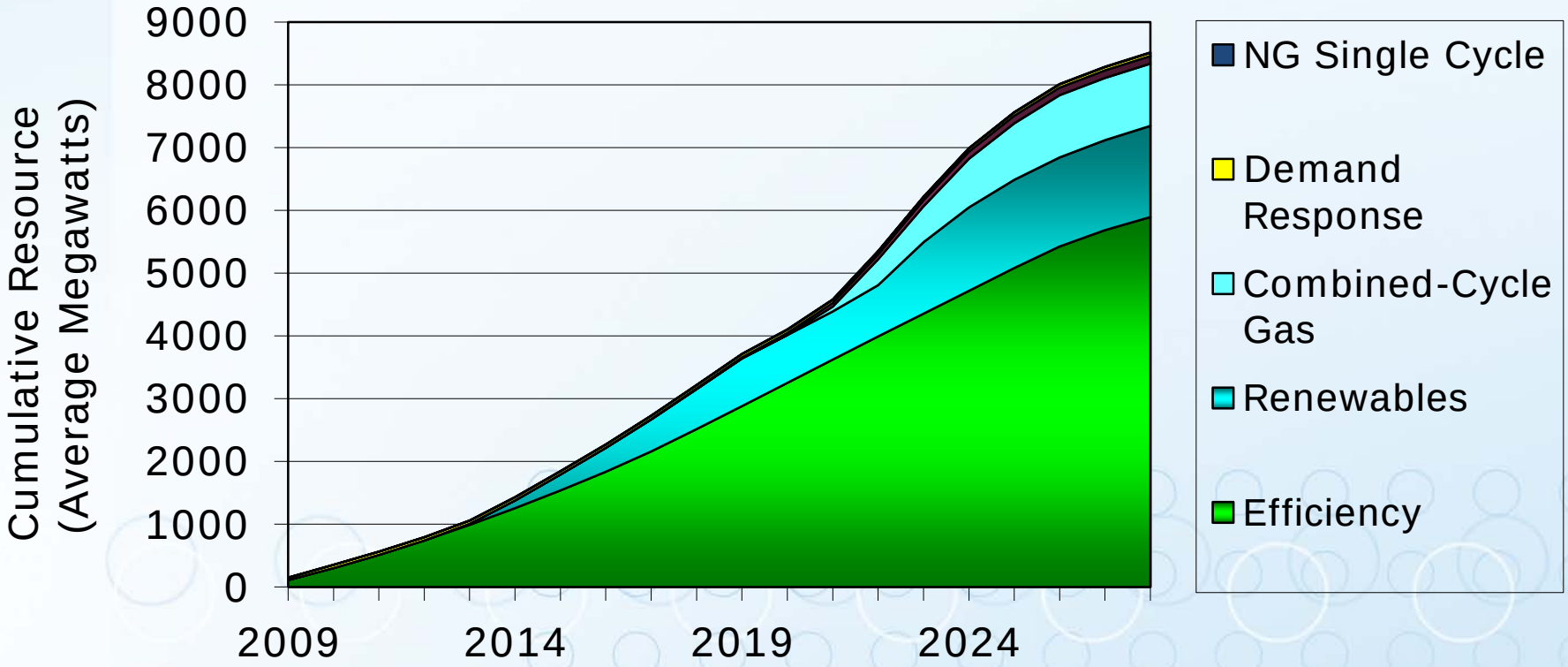
Figure 1. EE/PDR vs. Supply-Side Investments



Supply-side investments source: Energy Information Administration, Annual Energy Outlook 2013, January 2013, DOE/EIA-0383 (2012).

BOTTOM LINE

If your IRP for future resource additions doesn't look something like this:



You're doing something wrong.

Why is public policy needed for energy efficiency?

THE KEY CHALLENGE

Utilities do not voluntarily engage in (or fund) "serious" customer energy efficiency programs

["Customer education programs" don't count as "serious" energy efficiency]

Why not?

Economics

- Higher energy sales means higher profit (and vice-versa)

Organizational Traditions

- Institutional focus traditionally on supply side

UNDERSTANDING UTILITY ECONOMICS REGARDING CUSTOMER ENERGY EFFICIENCY

TWO KEY FINANCIAL MOTIVATING FACTORS:

1) **Drive to increase sales revenues - -** Under traditional regulation, once rates are set, if utility sales go up the utility's profits generally increase….

…. and if utility sales go down (e.g., through customer energy efficiency) the utility's profits decline.

Therefore, utilities have strong economic incentives to seek greater energy sales and avoid declines in sales

[This is sometimes referred to as: "***throughput addiction***". Affects ALL utilities, whether traditional vertically integrated or "restructured"]

UTILITY ECONOMICS (CONTINUED)

2) **Opportunity for earnings** - - Utilities earn a "rate of return" on their supply side investments (e.g., power plants, wires, meters),

but not on energy efficiency programs

[Those 2 factors apply to both vertically integrated and "restructured" utilities in "competitive" states]

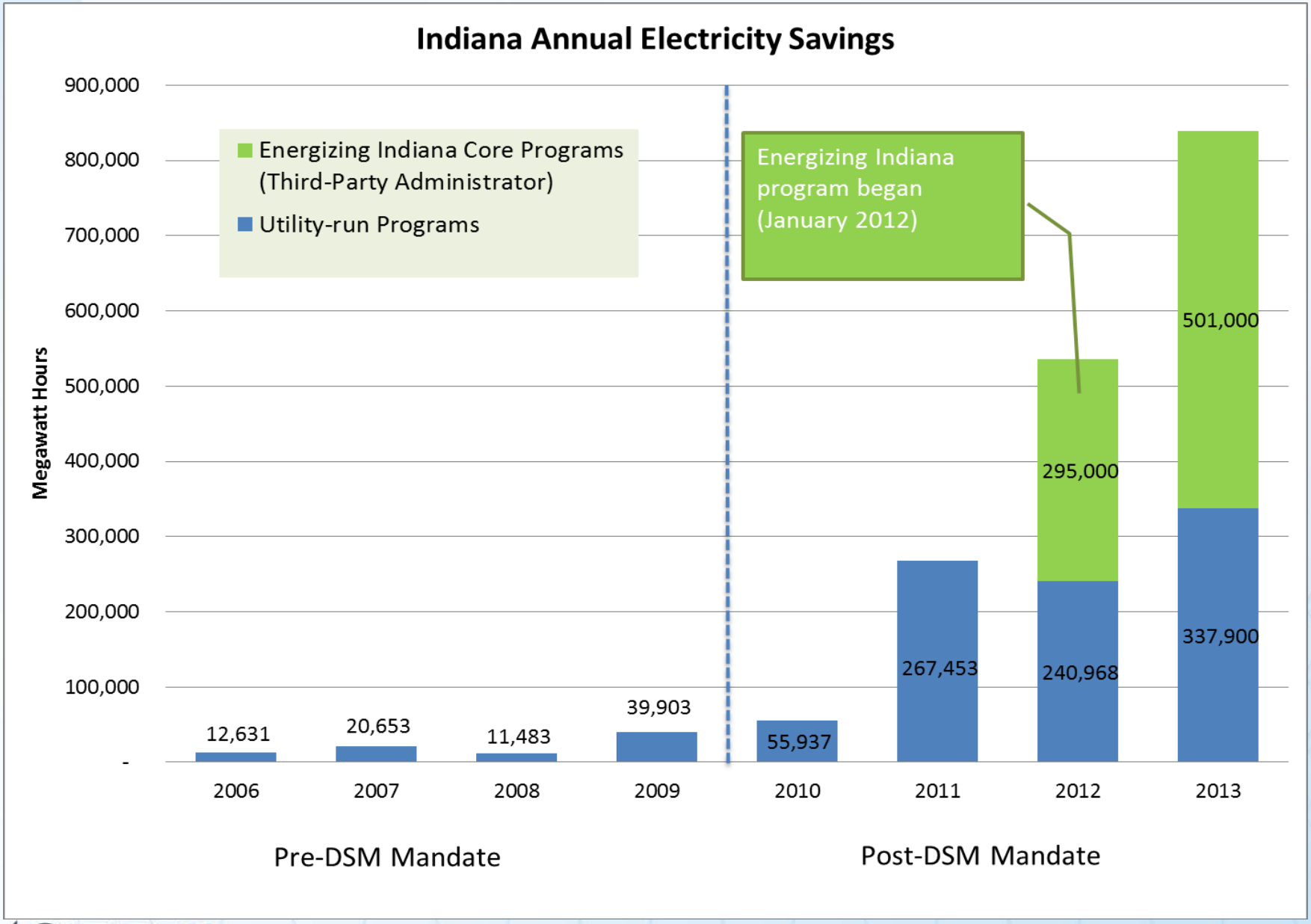
Not surprisingly….

the combination of those two factors results in what you typically see from utilities: proposals to build more power plants and sell more energy….(& passive or active opposition to strong energy efficiency requirements)

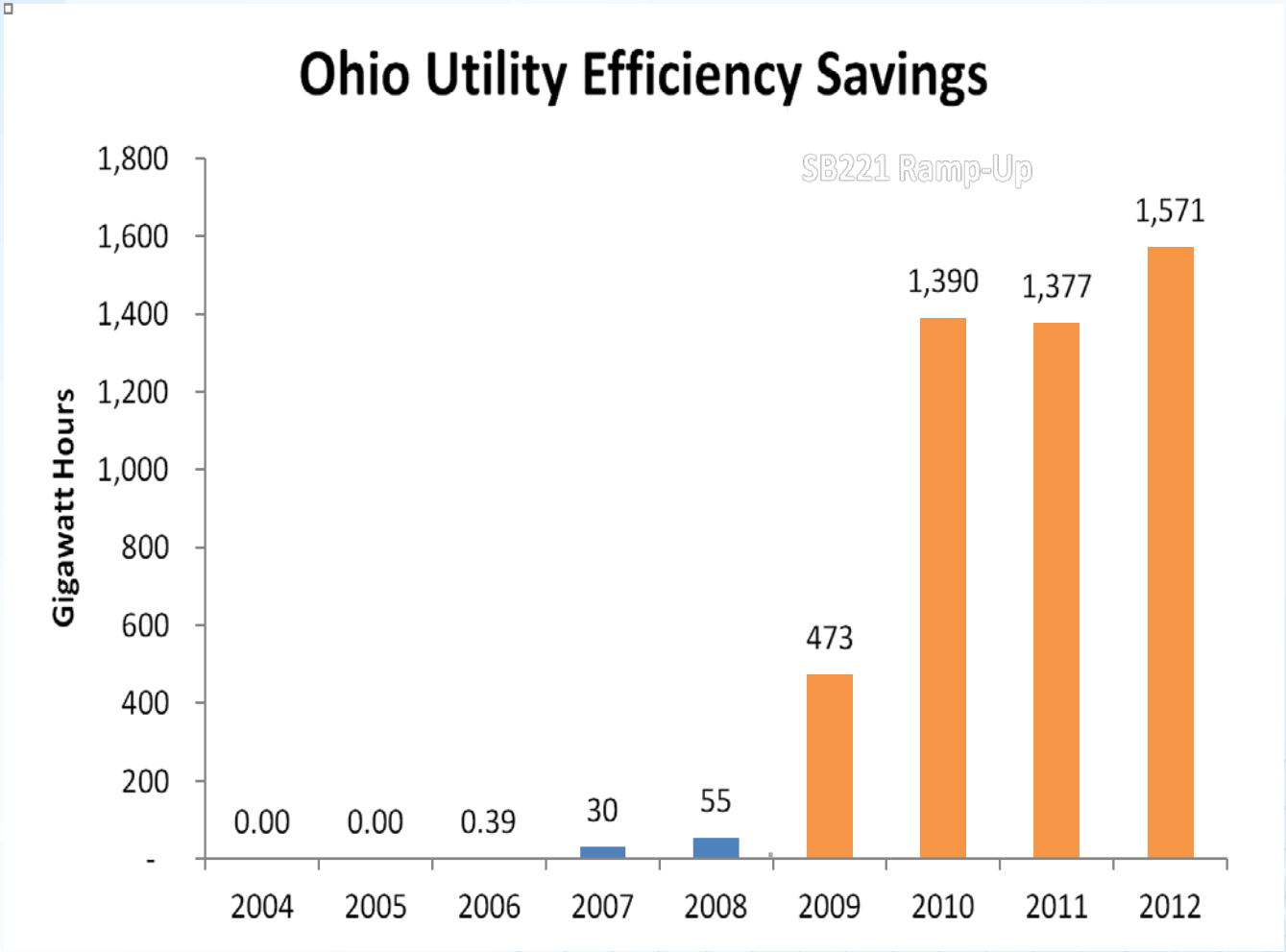
INDIANA IS A CLASSIC EXAMPLE OF THIS PROBLEM

- Indiana has had an "IRP" requirement since 1995
- Despite this, **Indiana utilities were achieving virtually no energy efficiency resource savings until the 2009 IURC order requiring utility EE programs** and setting annual savings targets [see next slide]
- After SB 340 eliminated the IURC order requirement for specific annual energy savings (i.e., the "Energy Efficiency Resource Standard", or "EERS")….

  the Indiana utility projected savings for 2015 programs are, in aggregate, 44% below the 2014 goals


Indiana Annual Electricity Savings
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
-
Megawatt Hours
Energizing Indiana Core Programs (Third-Party Administrator)
Utility-run Programs
Energizing Indiana program began (January 2012)
12,631
20,653
11,483
39,903
55,937
267,453
295,000
240,968
501,000
337,900
2006
2007
2008
2009
2010
2011
2012
2013
Pre-DSM Mandate
Post-DSM Mandate

OF COURSE, INDIANA IS NOT ALONE



Sources:

2004-2008: ACEEE Scorecard data

2009-2012: Utility filings under SB221

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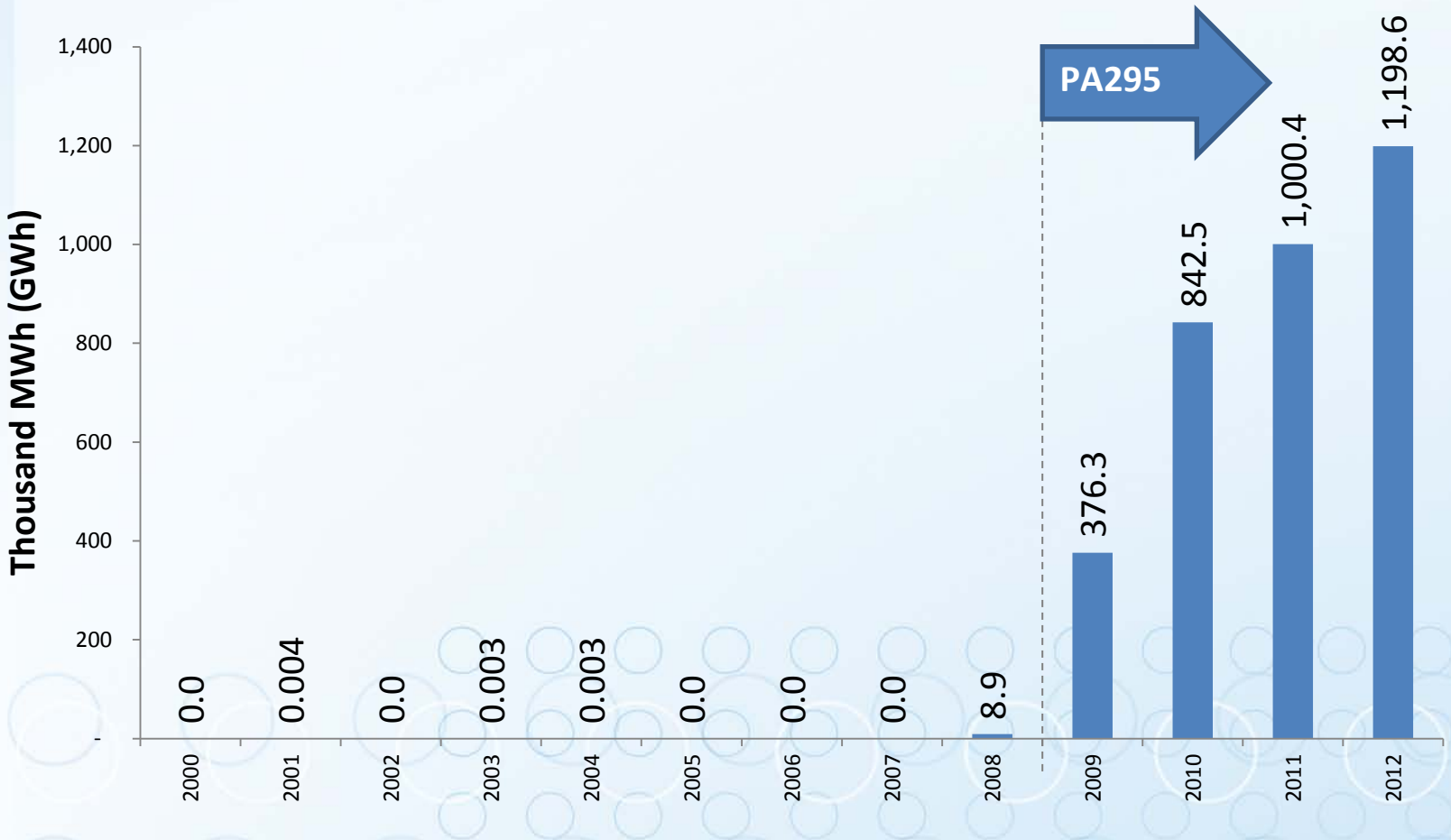
Michigan Electric Savings from EE



Sources
2000-2007: Form EIA-861
2008: ACEEE Scorecard 2010
2009-2012: MPSC PA295 Annual Reports
[Graph by MEEA]

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KEY LESSONS FOR PUBLIC POLICY ON UTILITY EE

- "Voluntary" approaches do not work
- "IRP" requirements must be backed up with specific policies to ensure that energy efficiency is indeed implemented as a resource

➢ 25 states have "Energy Efficiency Resource Standards" (EERS) in place, to ensure at least a minimum amount of the EE resource is captured

[Indiana was the first state to eliminate its EERS]

➢ 30 states have some type of "performance incentive" for utilities achievement of EE savings

➢ 15 states have "decoupling" to help mitigate concerns about revenue loss

EXAMPLE: KEY POLICIES THAT SUPPORT IRP AND ENERGY EFFICIENCY AS A RESOURCE IN THE PACIFIC NORTHWEST

- Under federal statute energy efficiency is defined as a "resource" and is the first priority for acquisition
- State laws and commission orders require utilities to 1) prepare and submit integrated resource plans (IRPs) and 2) treat energy efficiency as a resource in their IRPs
- Cost-recovery for IOUs is available for prudent investments in energy efficiency
- De-coupling "experiments/pilots" have been and are being tried, but are not the "norm"
- Oregon has an System Benefits Charge covering all IOU service areas (80% of state) & Washington has a "acquire all cost-effective efficiency" resource standard (EERS) for all utilities serving more than 25,000 customers
- Big carrot/stick: access to BPA's cheap hydropower

BEST PRACTICES FOR IRP

- Use an open, transparent process, with stakeholder input in the planning & analysis stages as well as reviewing results
  - ❖ This will increase stakeholder 'buy-in' for the results

  [note: for a regulated utility monopoly, very little should be "confidential"]
- Provide funding for 'public interest' groups to participate
- Make sure that energy efficiency is treated as a true "resource", allowed to be selected wherever cost-effective…..not restricted to an arbitrary limited amount
- Make clear that IRP results are to be used in actual utility resource decisions (e.g., specify that IRP results will be used in determining prudency)
- Provide other policy support to ensure that the EE resource will be utilized (e.g., EERS, incentives, decoupling, etc.)

➢ [NEW]: incorporate 111d scenarios into the analysis

BEST PRACTICES FOR EVALUATION
(Indiana does well on this one)

1. Independent evaluation by qualified professionals
2. Evaluation "overseen" by collaborative group of interested parties (not solely by the utility)
3. Transparent review of evaluation process, methods and results
4. Include both "process evaluation" (for program improvement) and "impact evaluation" [using industry best practices…e.g. DOE 'Uniform Methods Project']
5. Develop and maintain a DSM database (sometimes called a "Technical Reference Manual" or TRM) to contain key evaluation input assumptions
6. Assess the cost-effectiveness of energy efficiency as a utility resource using the "Utility Cost Test"

OVERALL RECOMMENDATIONS FOR INDIANA

1. If IRP is to be used, incorporate the "best practices" identified earlier
2. Re-instate an EERS as a 'back-stop' to ensure at least a minimum amount of the EE resource is acquired (perhaps triggered if a utility does not adequately pursue the EE resource through their IRP process)
3. Institute other policies to enable and encourage utilities to capture the energy efficiency resource
   - Performance incentives
   - Decoupling [Note: LRAM is NOT recommended!]
   - Factor into prudency reviews of any new supply-side resource
4. Maintain the program evaluation framework established over the last few years

CONCLUSIONS

- Energy efficiency is without question the lowest-cost supply 'resource' available
- Indiana has a clear need for resources (SUFG forecast)
- If utilities are not fully capturing the energy efficiency resource, then ratepayers and the citizens of Indiana are being harmed
- On its current trajectory, Indiana is failing to adequately capture the energy efficiency resource

[Note: in the just-released ACEEE national EE "Scorecard", Indiana is the state with the largest drop in ranking from the previous review…dropping from 27th to 40th….one spot worse than Alabama.]

- Indiana can and should do better

APPENDIX

DO THE CURRENT LOW NATURAL GAS PRICES MEAN THAT ENERGY EFFICIENCY IS NOT NEEDED?

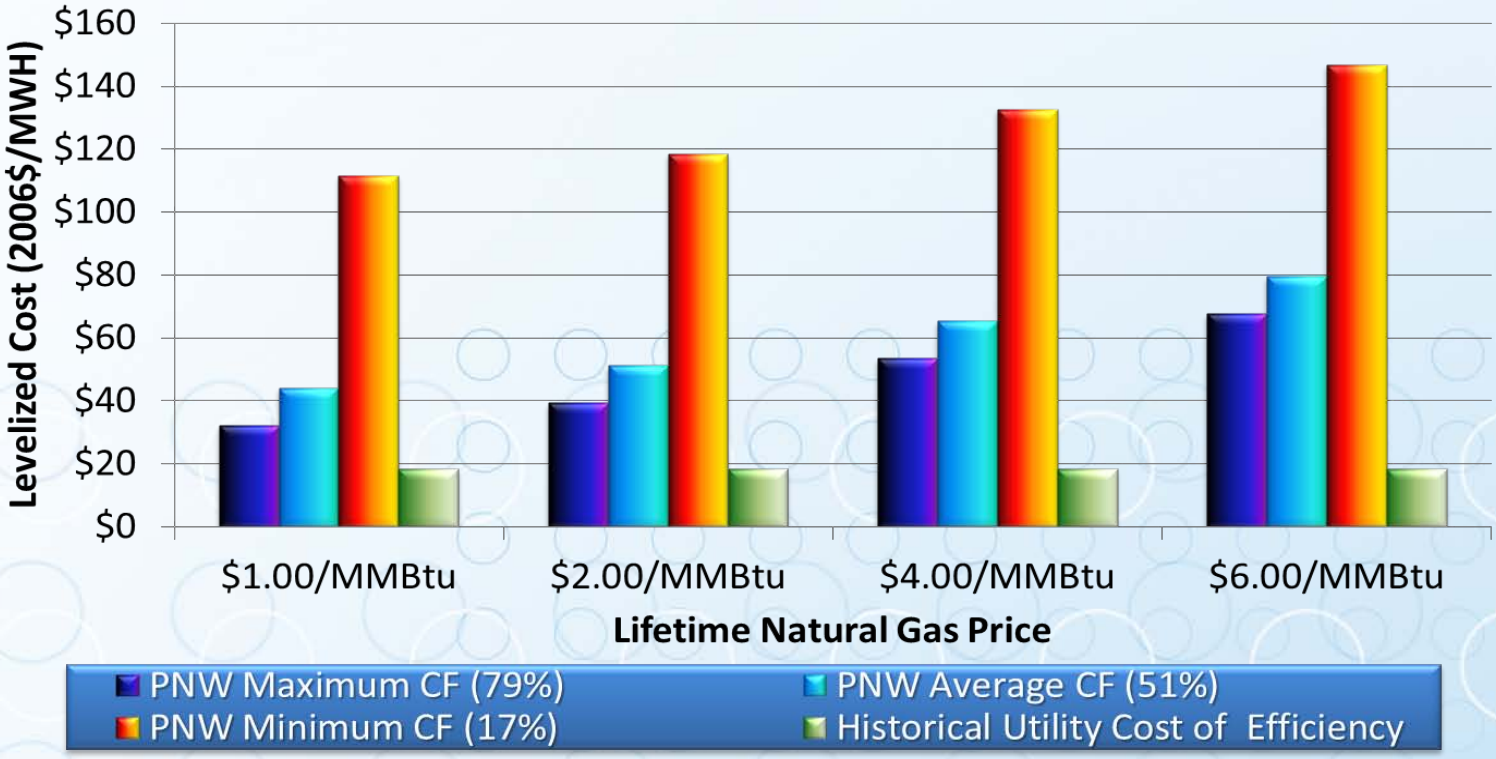
1. No. Energy efficiency is still very cost-effective
   [electricity: see next slide; gas: see appendix]

2. Natural gas prices won't stay this low for very long
   [resource decisions need to be made on 10, 20 and 30 year time horizons]

BEWARE OF THE NATURAL GAS DISTRACTION: "CHEAP" NATURAL GAS DOES NOT ELIMINATE THE NEED FOR, OR COST-EFFECTIVENESS OF, OF ENERGY EFFICIENCY

Levelized Cost of Combined Cycle Combustion Turbine at Alternative Natural Gas Prices and Lifetime Capacity Factors Compared to Utility Cost of Conservation

(source: Northwest Power and Conservation Council, 2012)



TWO BASIC MECHANISMS FOR ADDRESSING LOST REVENUES

- **Decoupling –** Essentially, "truing up" for actual sales above or below forecast

  NOTE: INCREASING THE FIXED CHARGE COMPONENT OF THE BILL IS **NOT** "DECOUPLING" !!!

- **Direct lost revenue compensation**

  DIRECT LOST REVENUE RECOVERY HAS SEVERAL DISADVANTAGES, AND HAS FALLEN OUT OF FAVOR

  - Vulnerable to 'gaming'
  - Leads to very contentious reconciliation hearings
  - Doesn't do anything to address the utility disincentive regarding broader energy efficiency policies (e.g., codes and standards),
  - Nor does it diminish the general utility interest in pursuing load-building

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RATIONALE FOR 'TRUE' DECOUPLING

- Utilities have rates established based on approved costs and an authorized rate of return, spread over a forecasted level of sales
- If EE programs cause sales to decline below forecasted levels, such that authorized fixed costs are not recovered, there is a 'moral argument' for allowing those costs to be collected (in exchange for the utility providing energy efficiency programs)
- However, if sales are still above the forecasted level, there is no actual deficit in recovering authorized costs, and no moral argument for collecting 'lost revenues'
- True symmetrical 'decoupling' recognizes those factors and simply 'trues up' actual sales to forecasted sales + or –

[in contrast, direct lost revenue recovery can lead to, in essence, 'double dipping', if sales are still above forecast]

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WHAT ABOUT INDUSTRIAL CUSTOMERS?

1. The industrial customer sector is a major share of the total electric system load

   [well over a third of total MWh sales in IN]

2. The industrial sector holds the largest and cheapest energy efficiency opportunities for the utility system

   [typically 1 to 2 cents/kWh or less]

3. Any serious effort to lower total electric system costs for all customers must include capturing energy efficiency improvements in the industrial sector

   [If industrial customers “opt out”, that is a major policy and program failure, and all customers will have to pay more for electric supply]

4. Need strong policies keeping industrials “in”, and
5. attractive programs to encourage participation