WHY ENERGY EFFICIENCY SHOULD BE A TOP POLICY PRIORITY IN MINNESOTA:

DOING WELL….BUT MANY REASONS, AND OPPORTUNITIES, TO DO MORE

Presentation to the Minnesota Legislative Energy Commission

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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 research 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
- Minnesota experience:
  - Advisor to Xcel CIP Advisory Board 2000-2008, 2012
  - Advisor to MN Legislative Auditor on CIP evaluation (2005)
  - Advisor to MNCEE, 2012-present

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TOPICS

- Minnesota's energy disadvantage
- Why energy efficiency should be the top priority
- Energy efficiency as a utility system resource
- Energy efficiency as economic development
- A few current 'hot topics'
- Grading Minnesota
- Opportunities for further progress

KEY POINT #1: MINNESOTA HAS A BIG ENERGY PROBLEM

- Minnesota uses a lot of energy
  - Total cost $12 billion per year in 2000

    By 2010, had increased to $21 billion!!!

- **Minnesota is essentially totally dependent on fuels imported from other states and countries**

  Minnesota imports:

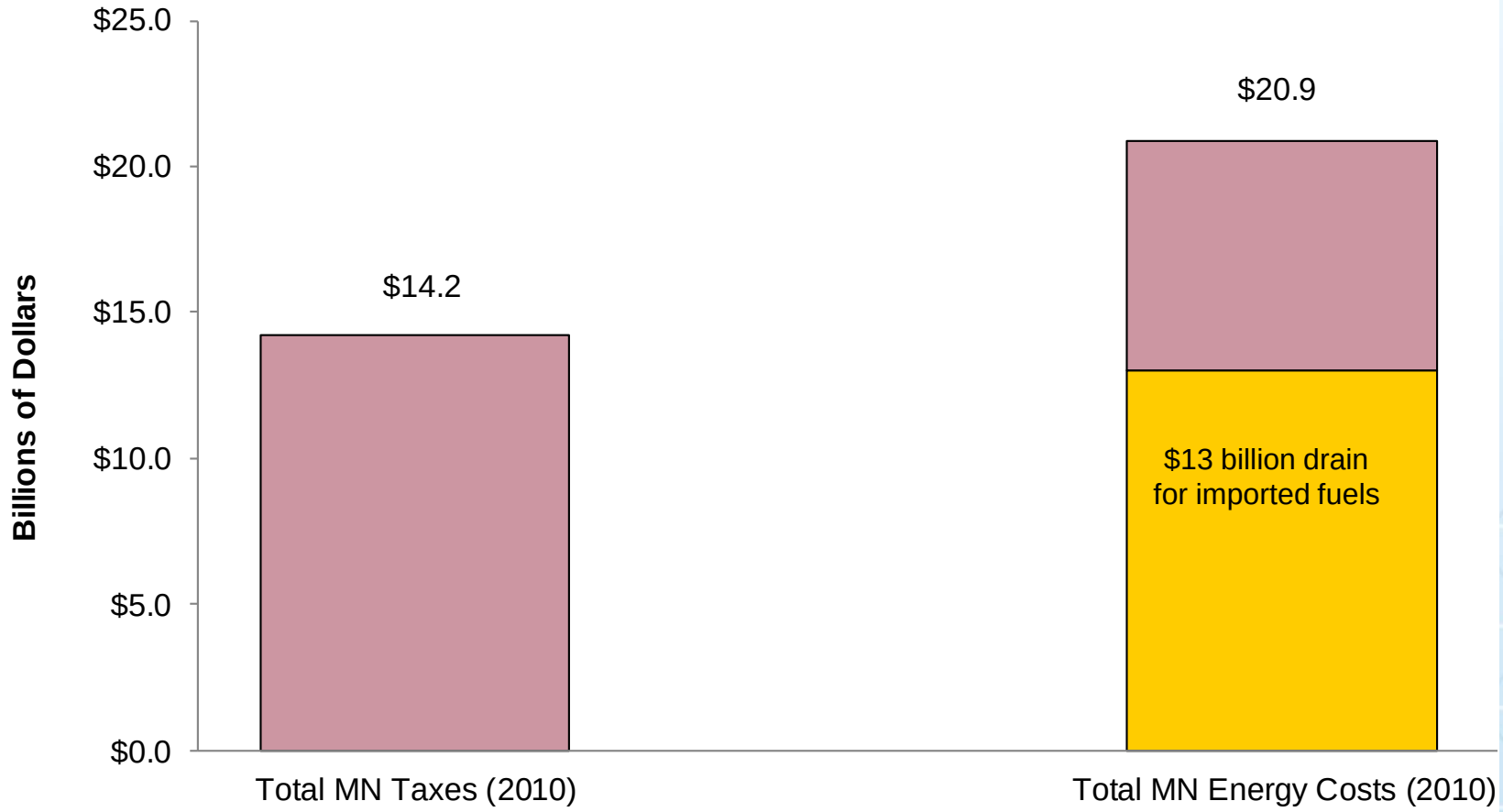
  - 100% of the coal and uranium used
  - 100% of oil & petroleum products
  - 100% of the natural gas

COST OF MINNESOTA'S ENERGY IMPORTS

- Before the new 'high energy cost' era (circa 2000), roughly $7 billion per year was leaving Minnesota to pay for fuel imports
- **At 2010 market prices, this dollar outflow was over $13 billion per year**

THIS IS A HUGE ECONOMIC DRAIN ON MINNESOTA'S STATE ECONOMY!

Economic Burden on Minnesota Homes and Businesses: State Taxes vs. Energy Costs (2010)



EFFECTS ON THE STATE ECONOMY

This ***additional*** **$6 billion** annual drain on Minnesota's economy is roughly equivalent to the lost payroll from **closing 120 major manufacturing plants**.

(assuming 1000 jobs @ $50,000 each, per plant)

Even the Wall Street Journal has written about the unprecedented transfer of wealth, calling it a "bonanza" and "windfall" for the handful of big energy producing states (i.e., AK, NM, ND, WY and TX) and countries (e.g., OPEC).

KEY POINT #2:

MINNESOTA'S FUTURE IS **NOT** IN FOSSIL FUELS

MINNESOTA'S RECOVERABLE RESERVES AS A SHARE OF U.S. RECOVERABLE RESERVES (Source: U.S. EIA)

- Coal: 0%
- Oil: 0 %
- Natural Gas: 0%

[also Uranium: 0%]

Why would Minnesota support policies that encourage greater consumption of these resources?

(At the state OR federal level !)

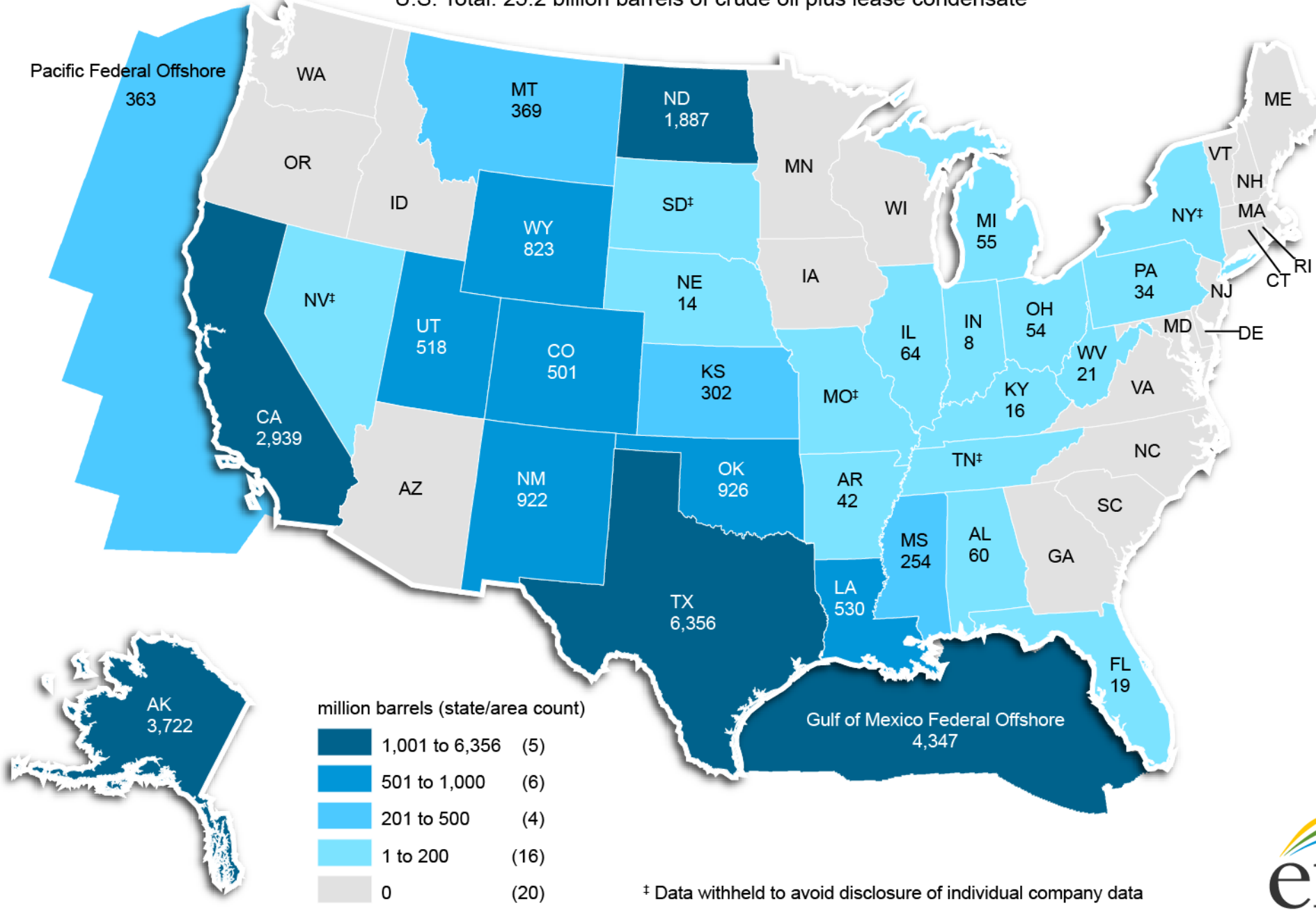
2011 Coal Production by Region

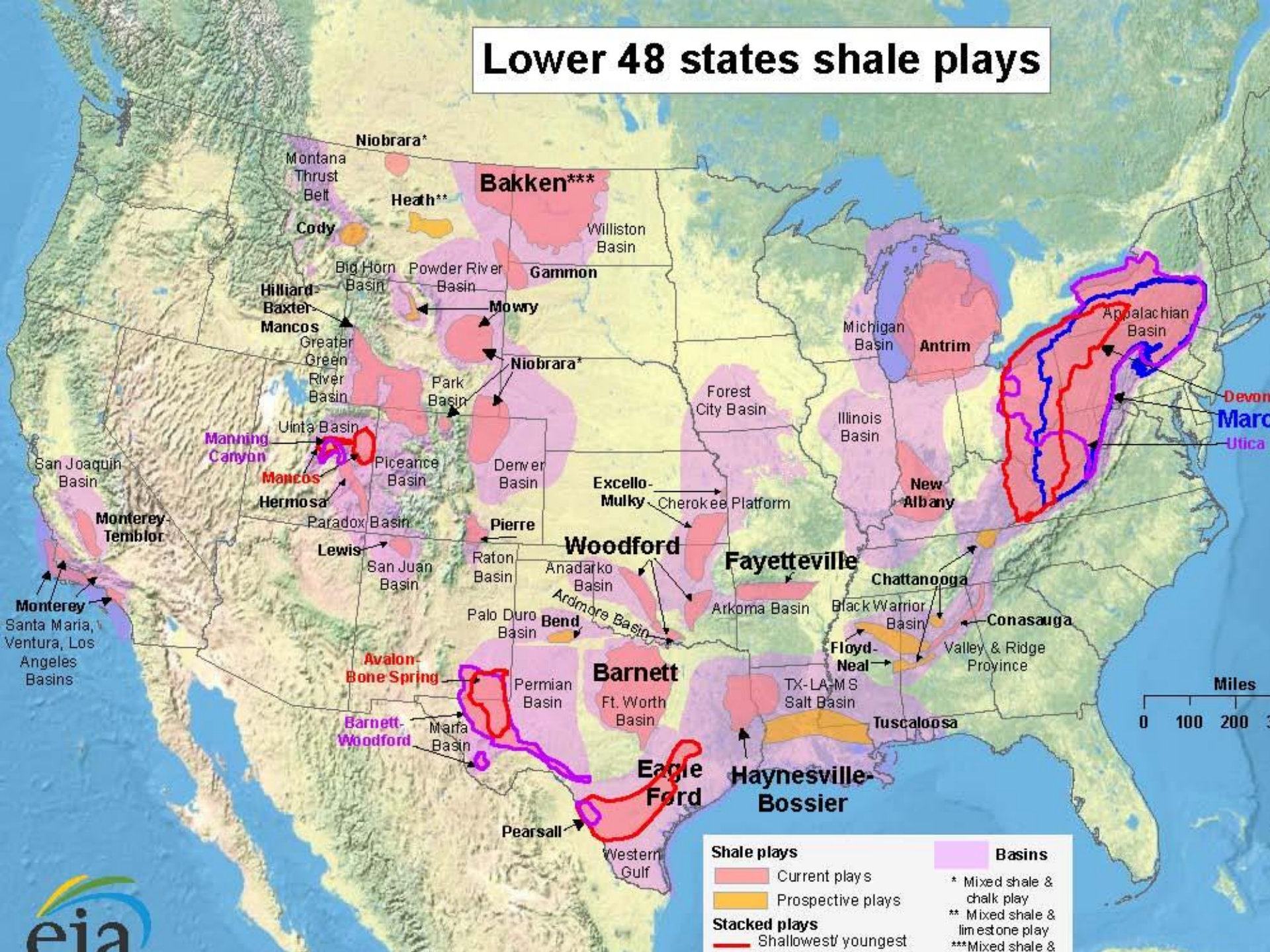
Million Short Tons
(percent change from 2010)

Source: U.S. Energy Information Administration, *Quarterly Coal Report,* October-December 2011 (April 2012), preliminary 2011 data. Production does not include refuse recovery.

Figure 9. Oil proved reserves by state/area, 2010

U.S. Total: 25.2 billion barrels of crude oil plus lease condensate




Lower 48 states shale plays
Niobrara*
Montana Thrust Belt
Heath**
Bakken***
Cody
Williston Basin
Big Horn Basin
Powder River Basin
Gammon
Hilliard-Baxter-Mancos
Mowry
Greater Green River Basin
Niobrara*
Park Basin
Forest City Basin
Michigan Basin
Antrim
Appalachian Basin
Devon
Marc
Utica
Uinta Basin
Manning Canyon
Mancos
Hermosa
Piceance Basin
Denver Basin
Illinois Basin
San Joaquin Basin
Monterey-Temblor
Paradox Basin
Excello-Mulky
Cherokee Platform
New Albany
Pierre
Lewis
Woodford
Fayetteville
Raton Basin
San Juan Basin
Anadarko Basin
Chattanooga
Monterey
Santa Maria, Ventura, Los Angeles Basins
Palo Duro Basin
Bend
Ardmore Basin
Arkoma Basin
Black Warrior Basin
Conasauga
Floyd-Neal
Valley & Ridge Province
Avalon-Bone Spring
Permian Basin
Barnett
Ft. Worth Basin
TX-LA-MS Salt Basin
Barnett-Woodford
Marfa Basin
Tuscaloosa
Eagle Ford
Haynesville-Bossier
Pearsall
Western Gulf
Miles
0 100 200
Shale plays
Current plays
Prospective plays
Stacked plays
Shallowest/ youngest
Basins
* Mixed shale & chalk play
** Mixed shale & limestone play
***Mixed shale &
eia

As a matter of state policy, Minnesota should be trying to <u>maximize</u> the amount of energy efficiency it can accomplish…

… and <u>minimize</u> the amount of additional fuel imports it needs

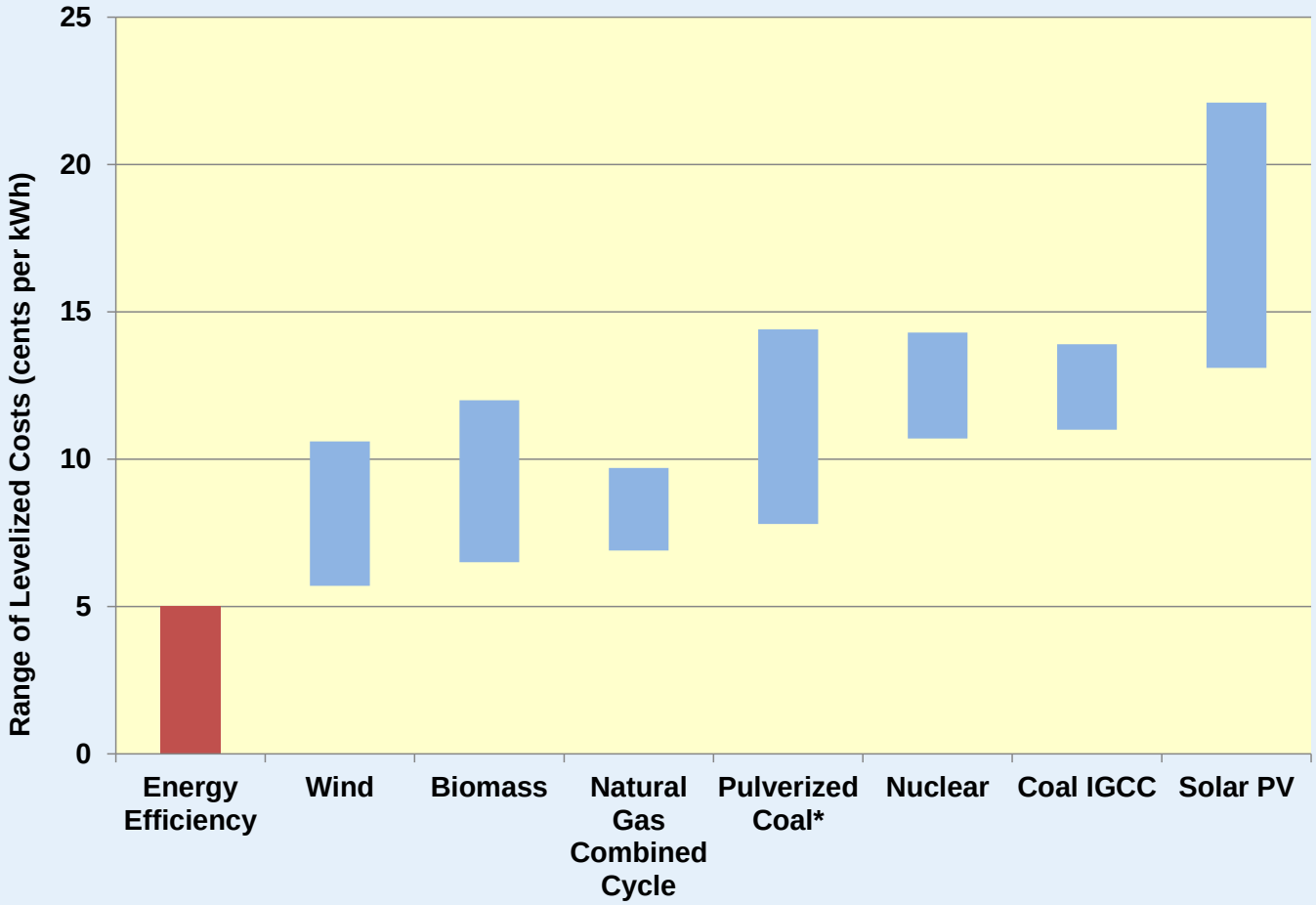
KEY POINT #3

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]

Cost of New Electricity Resources

[Source: Lazard 2011]



Minnesota's electricity policy, should be trying to maximize the amount of energy efficiency resources it can acquire,

… and minimize the amount of new power plants needed

(This is in fact now the declared policy of a number of leading states….)

POLICY PRIORITY #1: UTILITY SECTOR ENERGY EFFICIENCY PROGRAMS

- Substantial **utility-funded** energy efficiency resource programs are the cornerstone of the policy efforts of every leading state on energy efficiency
  - States don't spend tax dollars on this…they are all broke
  - Utilities spend $billions every year (~ $8 billion in Minnesota). Just direct 3% or 4% to energy efficiency

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

  [True for electricity and natural gas]

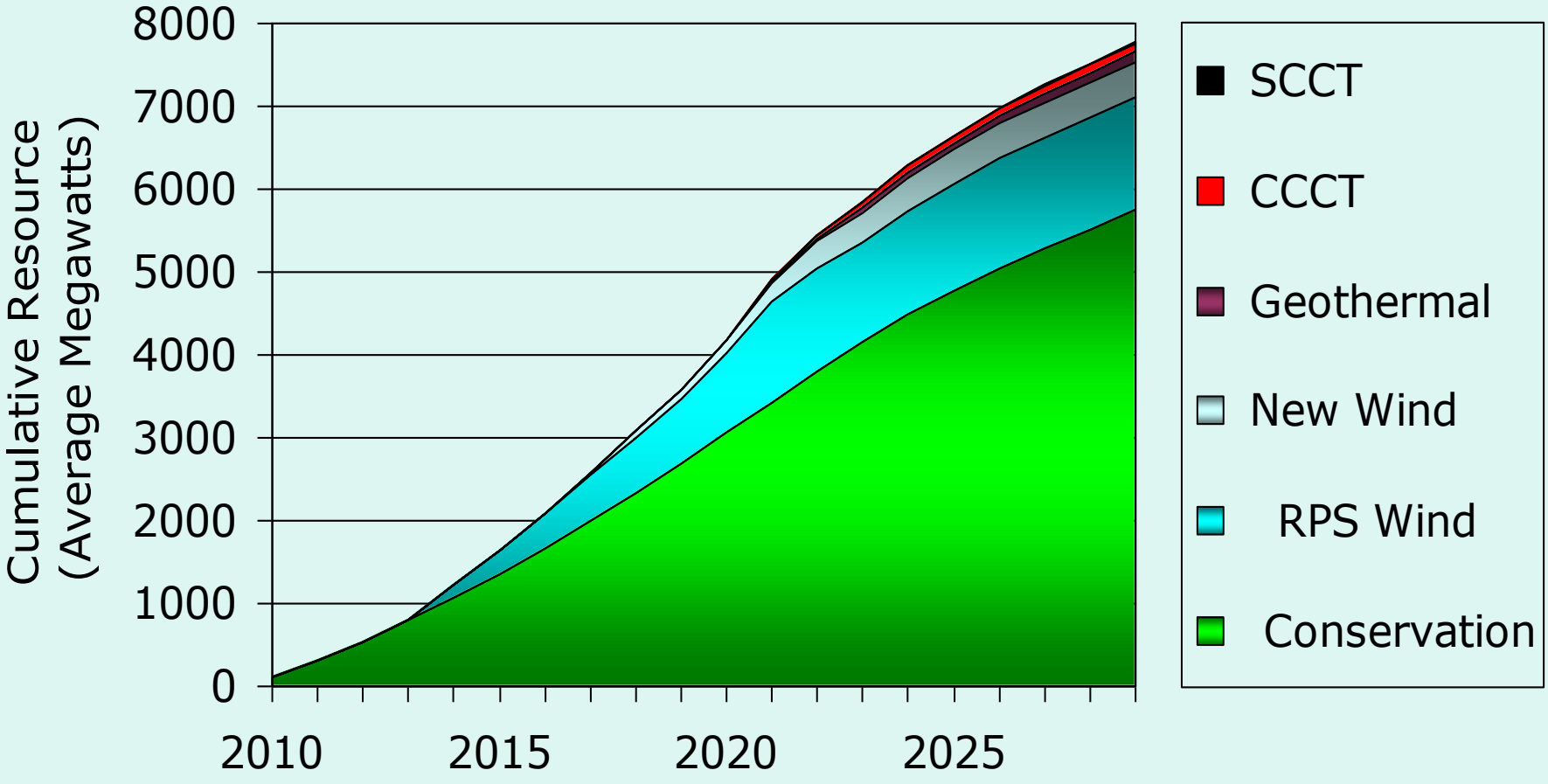
THE PACIFIC NORTHWEST (ID, MT, OR, WA)

- Best electric resource planning process in the U.S.
- 30 years of energy efficiency program experience
- Since 2005, have met virtually all of their new electric resource needs through energy efficiency and wind power

….The energy efficiency has been achieved at a levelized cost of 2.4 cents/kWh

The Sixth Northwest Conservation and Electric Power Plan
Northwest Power and Conservation Council, February 2010.
[http://www.nwcouncil.org/energy/powerplan/6/plan/]

Pacific NW 6th Plan Resource Portfolio (2010)



The Pacific Northwest provides a great example of what is possible….

Minnesota can chart an energy course that is fundamentally based on energy efficiency and cost-effective local Minnesota renewable resources

KEY POINT #4

ENERGY EFFICIENCY

is

Minnesota's best opportunity

For economic development

THE ECONOMIC "TRIPLE PLAY"

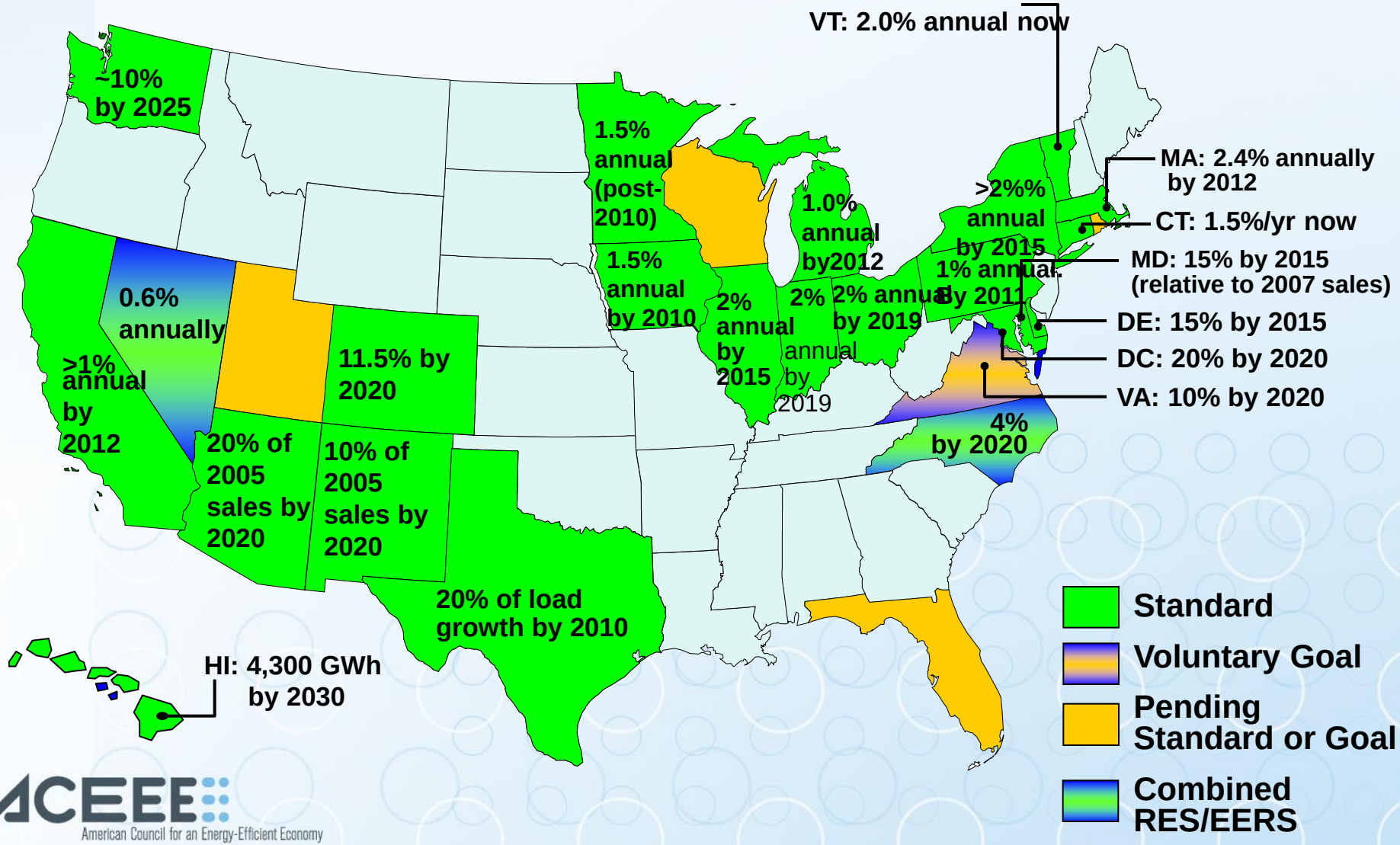
Energy Efficiency is the only resource that boosts the economy and provides jobs in 3 key ways:

1. Direct employment in delivering the EE
2. Local re-spending of saved energy dollars
3. Reduced energy costs for all ratepayers
   - Cheapest resource for the utility system
   - Downward pressure on market energy prices

So how does Minnesota compare to other states on utility-sector energy efficiency?

Energy Efficiency Resource Standards

25 States –as of 2012



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Cumulative Electricity Savings of State EERS Policies Extrapolated to 2020

State	Cumulative 2020 Target	State	Cumulative 2020 Target
Vermont*	27.00%	**Wisconsin***	13.50%
Maryland*	26.70%	**Maine***	13.40%
New York*	26.50%	**Connecticut***	13.14%
Massachusetts	26.10%	**California**	12.94%
Rhode Island*	25.26%	**Ohio**	12.13%
Arizona	22.00%	**Michigan**	10.55%
Illinois	18.00%	**Oregon***	10.40%
Hawaii*	18.00%	**Pennsylvania***	9.98%
Washington	17.24%	**New Mexico**	8.06%
Minnesota	16.50%	**Arkansas***	6.75%
Iowa*	16.10%	**Texas**	4.60%
Delaware	15.00%	**Florida**	4.06%
Colorado	14.93%	**Nevada**	3.76%
Indiana	13.81%	**North Carolina**	2.92%

*Savings beginning in 2009 extrapolated out to 2020 based on final year of annual savings required

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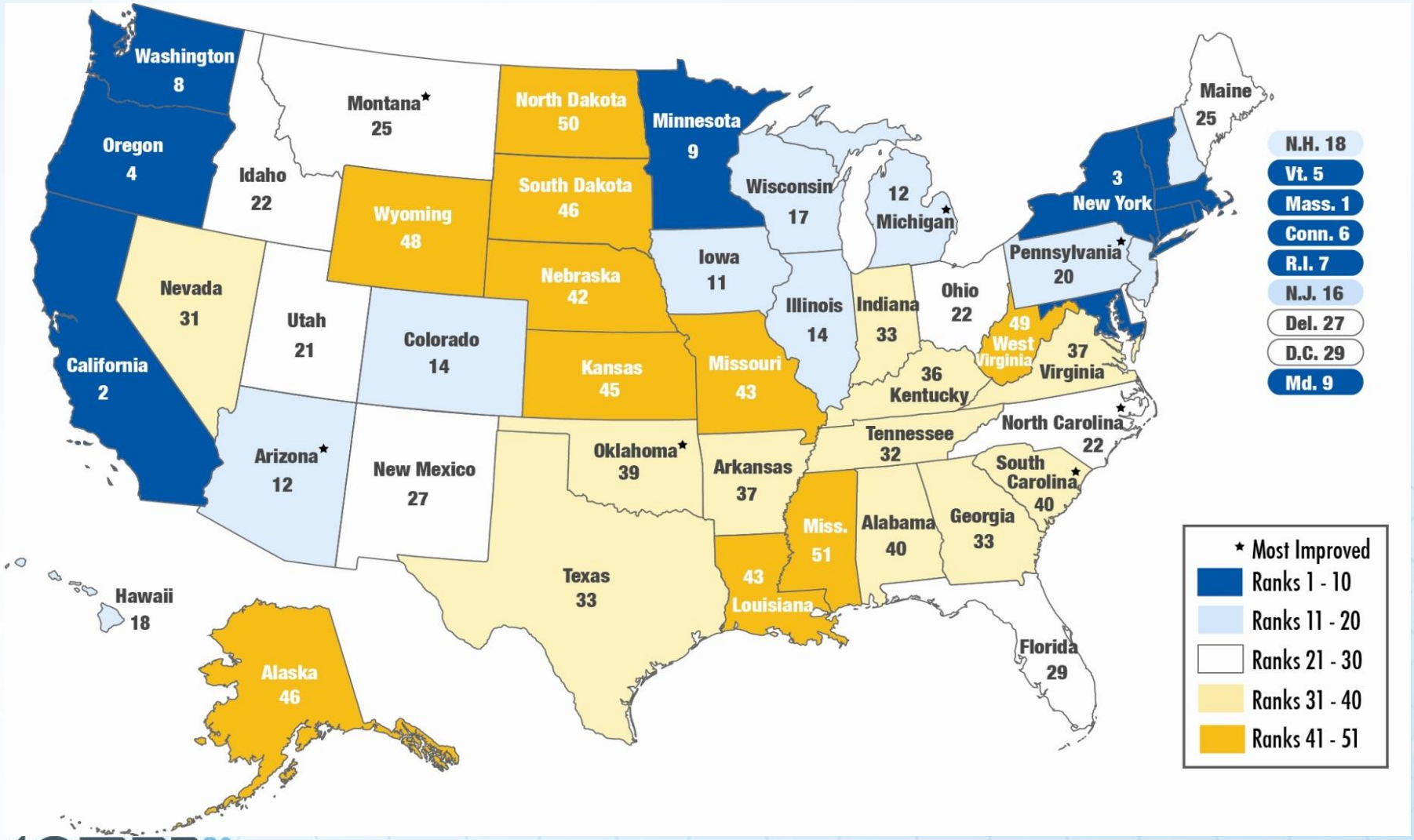
Note: Assumptions and methodology detailed in full report

2012 ACEEE State EE Scorecard Rankings



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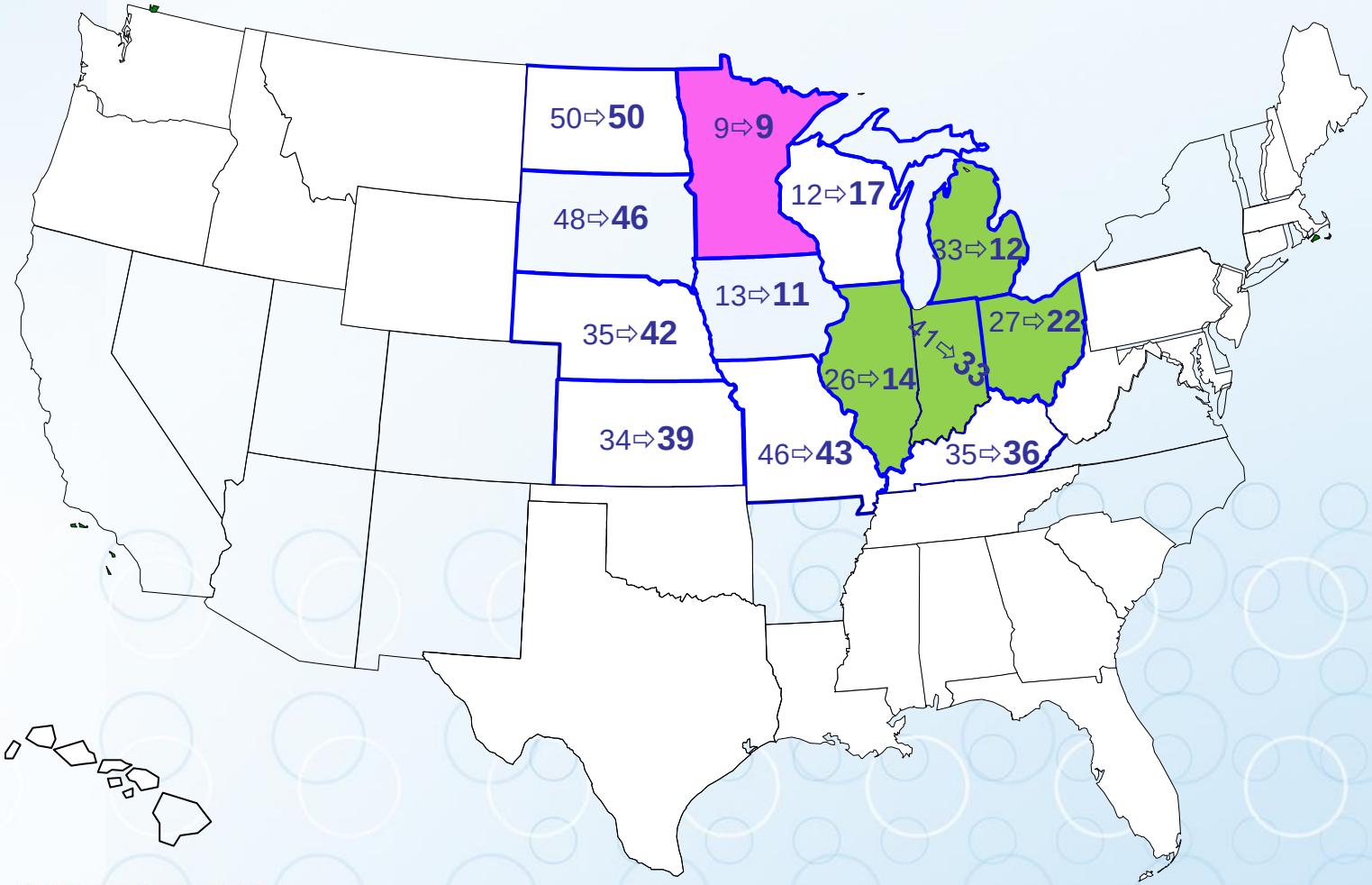
CHANGE IN ACEEE OVERALL EE SCORECARD RANKINGS MIDWEST STATES 2006 ⇨ 2012



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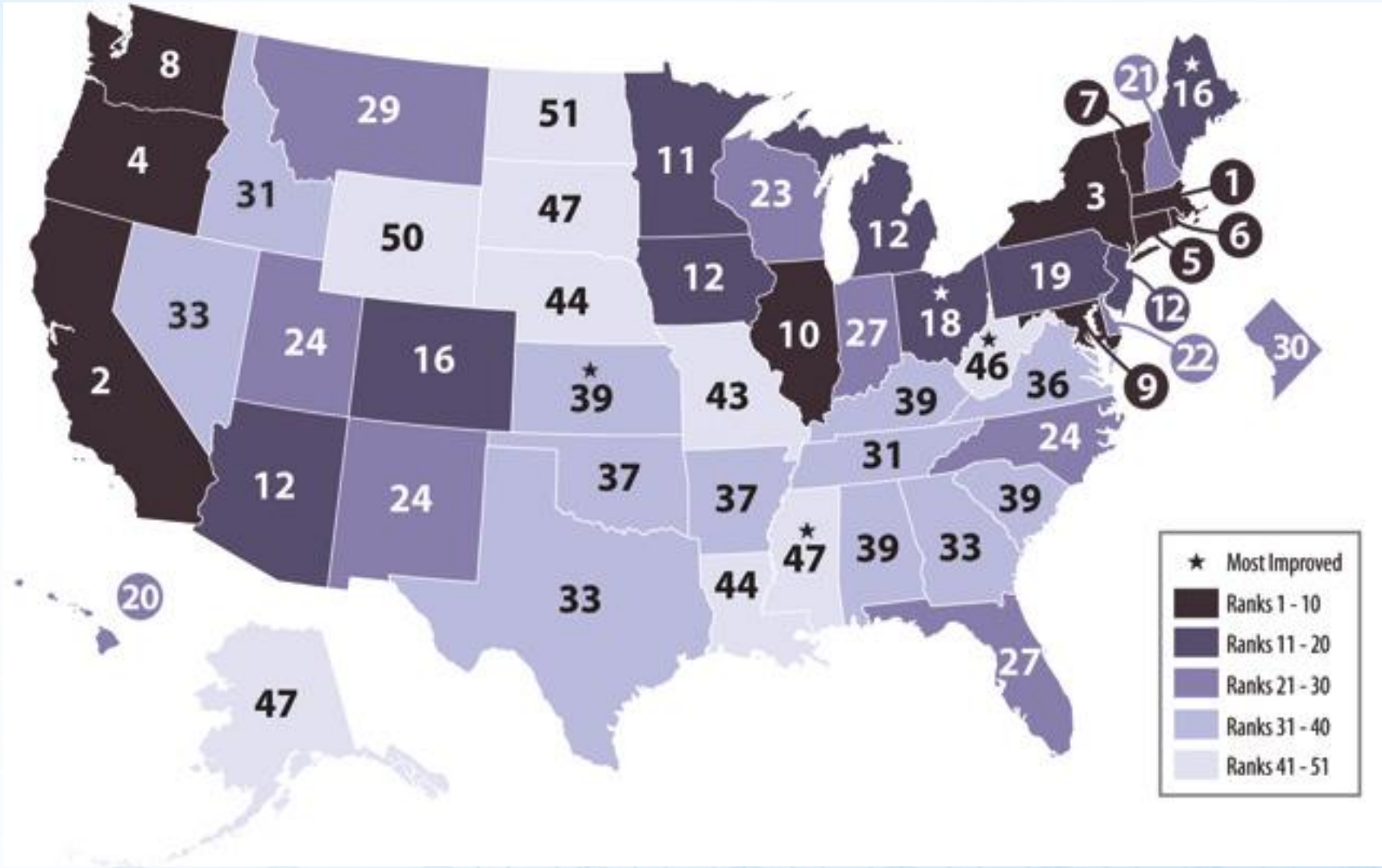
2013 ACEEE State EE Scorecard Rankings



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GRADING MINNESOTA… ON UTILITY-SECTOR ENERGY EFFICIENCY POLICIES AND PERFORMANCE

Overall grade: **B+/A-**

Areas for improvement to be truly "top tier":

- Find ways to save more than the 1.5%/year CIP standard
- Find ways to include deliverable fuels (oil & propane)
- Improve industrial customer buy-in to the EE policy
- Find a way to capture CHP as a win-win for all
- Improve regulatory structure for EE through decoupling
- Ensure strong participation by public power (muni's & coops)
- Use hook-up fees and rate design to recognize EE
- Formally incorporate utility EE in state air quality objectives (ideally including GHG)
- Implement utility on-bill EE loan repayment

[other areas for improvement: transportation, bldg. codes]

CONCLUSIONS

- Minnesota has historically been among the leading states on energy efficiency policy (e.g., “top ten”)
- In the last decade, Minnesota has stagnated a bit, while other leading states continue to improve

  (e.g., Minnesota just fell out of the top ten in ACEEE’s rankings)
- Minnesota has more economic reasons to pursue energy efficiency than almost any other state

  (energy import dollar drain, zero fossil fuel resources)
- Considering ‘climate’ (GHG) goals only adds frosting to the cake
- There are substantial opportunities to do even better

  (see Appendix A)

APPENDIX A

Some Suggestions for EE Policy Improvement

1. STRENGTHEN THE EE STANDARD

- MN is very good, but not quite top tier. Several states have EE savings requirements ramping to 2%/yr., and a couple are already achieving that.

Suggestion:

For electric utilities above ____ in size:

- Consider a higher savings standard, by incorporating additional methods of achieving savings. For example:

Ramp up to 2.0%/yr. by 2016 (1.75% by 2015, 2.0% by 2016)

- 1.5% from traditional CIP EE programs
- Up to 0.5% can be from other efforts (e.g, bldg. codes, standards, rate design, possibly fuel switching, etc.)

[Gas utility standard could stay the same]

2. FIND A WAY TO INCORPORATE DELIVERABLE FUELS SAVINGS (OIL AND PROPANE)

- MN is 100% dependent upon imported energy fuels
- These fuels are expensive for customers, and drain dollars from the MN economy
- Some of the leading states are pursuing policies to integrate deliverable fuel savings into their utility EE programs

Suggestion:

➢ Consider allowing 'credit' (& incentives) to utilities for savings of those fuels

More challenging option:

➢ Consider establishing a CIP requirement (funding and savings) on deliverable fuels suppliers

3. ENSURE THAT ALL CUSTOMERS ARE INCLUDED IN THE STATE EE POLICY OBJECTIVES (I.E. FIX THE 'OPT OUT' PROBLEM)

- Energy efficiency is a utility system resource. All customers should pay for that resource, just like they pay for power plants.
- Industrial customers are about one-third of total electric load in MN. They must be a key part of any policy to address state objectives in this area (electric resource supply and costs, dollar drain for imported fuels; environmental impacts; etc.) They are big, what they do matters a lot.

Suggestions:

- Create a practical and effective "self-direct" program for customers that don't want to be in the 'normal' CIP program
- Create desirable programs to motivate large customers to participate in CIP…including a program for customers "sell" EE savings to the utility. Enable current opt-outs to opt back in

4. ESTABLISH PARALLEL CHP GOALS AND INCENTIVES

- CHP is a very desirable energy strategy for MN to pursue. However, it is not really an end-use energy efficiency measure such as the measures CIP generally targets.
- If CHP is expanded within the existing CIP savings goals, there is a risk that it will displace end-use efficiency savings…resulting in a 'zero sum game'.

Suggestion:

➢ Establish a parallel goal for CHP implementation, and create regulatory mechanisms to facilitate and reward utilities for CHP accomplishments

5. IMPROVE REGULATORY STRUCTURE SUPPORTING UTILITY EE EFFORTS

- In order to sustain large-scale energy efficiency achievements over time, it will be necessary to address the utility concern with declining sales levels over time
- Minnesota's "3-legged Stool" of utility regulatory mechanisms is currently imbalanced, with no electric decoupling and an over-reliance on a shareholder incentive mechanism.

Suggestions:

- ➢ Implement electric utility decoupling (some things can be done through regulatory cases, and some things legislatively to assist this)
- ➢ Reform the shareholder incentive mechanism so that the incentive is not so large relative to the EE program costs

6. ENSURE CONTINUATION OF STRONG MUNI AND CO-OP PARTICIPATION IN CIP

- Public power is a very important component of the electric system in MN. To achieve state objectives, this sector must be fully engaged.
- Capabilities and economic circumstances vary widely.

Suggestions:

- Consider 'bundling' across utilities so low savers can acquire savings credit from high savers, and the target is met in aggregate.
- Consider allowing programs that target electric fuel choice using high-efficiency options such as geothermal hvac and geothermal/heat pump water heat, to displace inefficient deliverable fuel end uses. Perhaps allow credit for these savings once a minimum (e.g.,1%) savings level is reached.

7 & 8. UTILIZE LINKAGES WITH CIP TO SUPPORT RELATED OBJECTIVES

- Minnesota's CIP framework is a very powerful platform to support additional energy efficiency gains in MN.

Suggestions:

- Have electric and gas utilities develop special lower rates and hook-up charges for qualifying new buildings that meet the "Sustainable Building 2030" requirement. Allow utilities to claim the incremental savings from this practice toward their CIP savings goals.
- Develop a clear policy for MN to include the impacts of utility CIP programs in the state's environmental air regulation compliance strategies. Enable the MPUC to recognize the value of reduced emissions in developing incentives for utilities' CIP accomplishments.

9. INCORPORATE A NEAR-TERM STATE CARBON POLICY AND GOALS INTO CIP GOALS AND INCENTIVES

- There is a substantial risk of explicit costs being attached to CO2 emissions some time in the foreseeable future
- Energy efficiency is universally regarded as the lowest-cost method for reducing CO2 emissions

Suggestions:

- Establish a near-term state policy and goals for CO2 emission reductions. Integrate those goals into CIP plans and enable the MPUC to factor CO2 reduction achievements into utility shareholder incentive mechanisms

10. IMPLEMENT UTILITY ON-BILL EE LOAN REPAYMENT

- Lack of access to convenient, low-cost financing is a significant barrier to customer implementation of energy efficiency improvements
- Several leading states now allow customers to repay energy efficiency loans through their utility bill

Suggestion:

➢ Enable utilities to offer on-bill loan repayment for energy efficiency improvements, and develop rules and procedures to encourage utilities to do so.

APPENDIX B

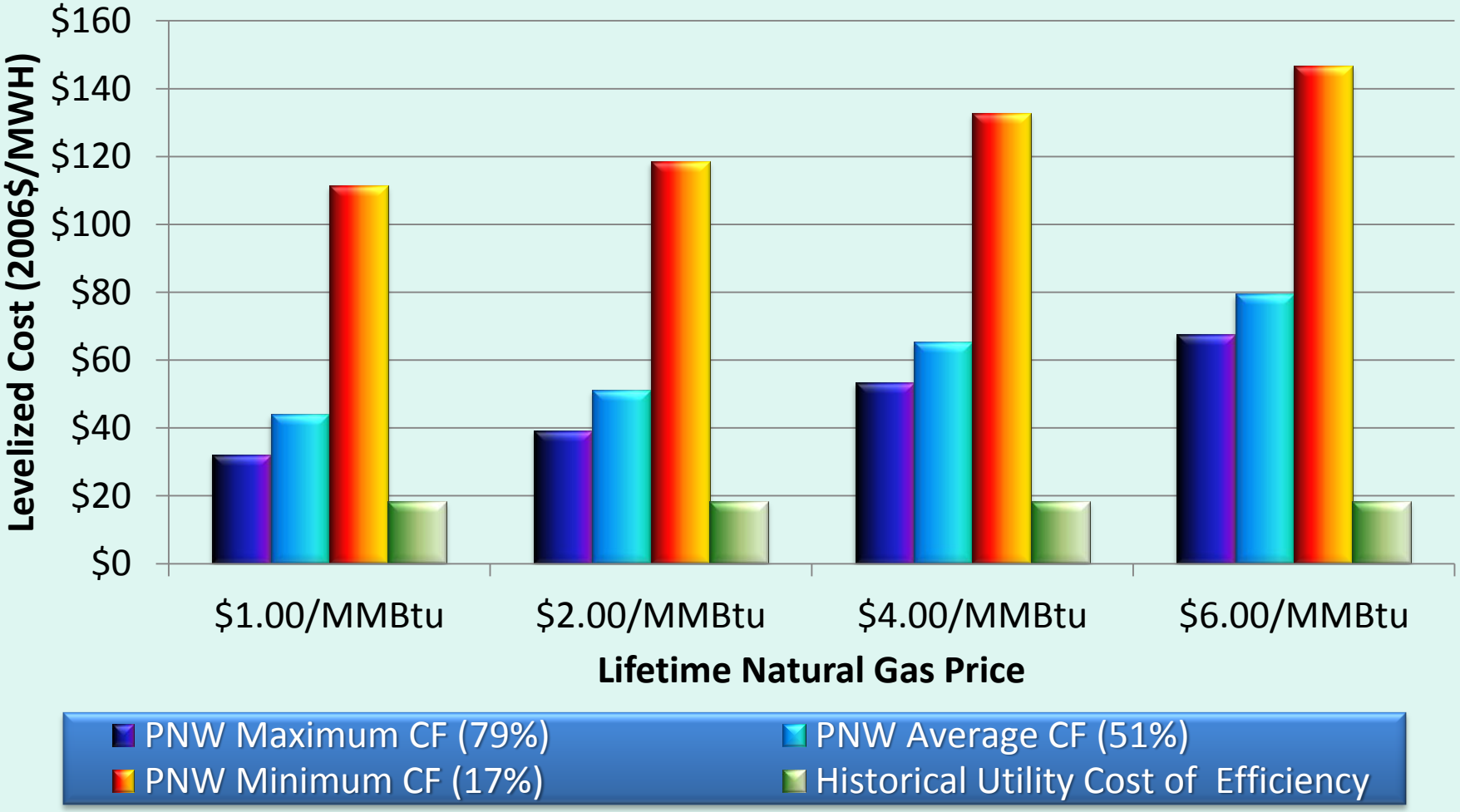
Three current 'hot topics'

1. Natural gas prices
2. Climate Change
3. Industrial Customers

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

1. No. Energy efficiency is still very cost-effective [see next slide]
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]

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



WHAT ABOUT CLIMATE CHANGE?

1. Energy efficiency is by far the cheapest electricity resource option….even without adding CO2 costs
2. A modest $20/ton cost for CO2 would ***add*** nearly 2 cents per kWh to the cost of electricity from coal, and nearly a penny/kWh to natural gas fired electricity
3. Energy efficiency **reduces risk** to Minnesota by reducing the amount of such future costs the state would face (i.e., by burning less coal and natural gas)
4. Energy efficiency is a “no regrets” policy because it’s other benefits are so substantial. The carbon cost “risk reduction” benefit is essentially “free”. EE is smart policy ,..even if no dollar cost is ever attached to CO2 emissions
5. ***If*** one does want to take action on climate, there is general consensus that energy efficiency should be the first priority

WHAT ABOUT INDUSTRIAL CUSTOMERS?

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

   [~ a third of total MWh sales in MN]

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]

4. The keys are strong policies keeping industrials “in”, and attractive programs to encourage participation

WHY INDUSTRIAL CUSTOMERS "ON THEIR OWN" DO NOT CAPTURE ALL COST-EFFECTIVE EE

The Problem

A typical large corporation will not invest in a project unless there is a very quick return…a historical "rule of thumb" has been about a two-year 'payback' [With the current tight economy, it is likely closer to 1-year now]

Assume a 2-yr. payback [device costs $2, saves $1 per year]

Typical industrial rate: 7.5 cents/kWh [$1/.075 = 13.33 kWh]

For the utility, a device that cost $2 and saved 13.33 kWh/yr., levelized over a 10-yr. life, would cost just 1.9 cents/kWh

That means that any EE with a cost over 1.9 cents per kWh will likely not get done by the customer, "on their own"

Here's how utility EE programs overcome that problem….

EXAMPLE OF HOW A UTILITY EE PROGRAM FOR INDUSTRIAL CUSTOMERS PRODUCES COST-EFFECTIVE EE THAT WOULD NOT OTHERWISE HAPPEN

- Assume an EE project with a four-year payback

  Cost: $4, annual savings: $1 (again, 13.33 kWh/yr.)

On its own, the customer would not do this project

<u>The Utility EE Program</u>

The utility provides a $2 incentive to the customer, to "buy down" the payback to 2 yrs, allowing the project to proceed

- The utility is essentially "buying" energy efficiency savings from the customer….in this case at a levelized cost of just 1.9 cents/kWh [$2 x CRF of .1294/13.33 kWh]
- This is about one-fourth the cost of electricity from building, fueling and operating a new power plant.
- The industrial customer benefits directly, the utility system (all ratepayers) benefit by avoiding higher-cost supply

A LEADING STATE EXAMPLE: INDUSTRIAL CUSTOMERS **SUPPORTING** PLAN FOR RECORD LEVELS OF UTILITY ENERGY EFFICIENCY

"These are very ambitious goals and we look forward to partnering with the electric and gas utilities to realize these goals and deliver energy efficiency solutions to our members statewide,"

Robert Rio, SeniorVice President of Associated Industries of Massachusetts, who serves on the Energy Efficiency Advisory Council as its industrial energy users representative.

[In response to the announcement of Massachusetts' new plan for a $1.1 billion three-year program , to save 2.4% per year through energy efficiency]