
The Midwest Energy Crisis: And Why Energy Efficiency Must Be a Top Policy Priority

Martin Kushler, Ph.D.

Director, Utilities Program

American Council for an Energy-Efficient Economy

Presented to the Council of State Governments
Midwestern Legislative Conference Annual Meeting

August 28, 2007



BACKGROUND

ACEEE (my organization)

- The leading non-profit organization on energy efficiency research in U.S.
- Works closely with Congress and federal agencies (DOE, EPA) & other national organizations (NARUC, NCSL, NGA)
- Works with all the major leading industry groups

Martin Kushler, Ph.D. (Director, Utilities Program, ACEEE)

- 25 years conducting research in the energy efficiency area
 - 8 years at a state Energy Office (Michigan)
 - 10 years as Supervisor of Evaluation at a state utility regulatory agency (Michigan Public Service Commission)
 - 7 years as Director of the Utilities Program at a national non-profit organization (ACEEE)

SOURCES OF INFORMATION ON OTHER ENERGY EFFICIENCY POLICIES IN THE U.S.

ALL POLICY AREAS: www.aceee.org

[e.g., see ACEEE's *State Energy Efficiency Scorecard*

<http://aceee.org/pubs/e075.pdf?CFID=527376&CFTOKEN=86519831>

ALL POLICY AREAS: www.mwalliance.org

[Midwest Energy Efficiency Alliance]

BUILDING CODES: www.bcap-energy.org/home.php

[Building Codes Assistance Project]

APPLIANCE STANDARDS: www.standardsasap.org

[Appliance Standards Awareness Project]

KEY POINTS

- **Midwest states face a severe economic problem** with high energy costs. Some would call it a crisis.
- **High energy prices are not temporary.** They are the new reality. States must plan accordingly.
- **Requiring utility funded energy efficiency programs is the cheapest, fastest, and cleanest** policy option available.
- Energy efficiency programs produce **savings at less than half the cost of new electricity or natural gas supplies.**
- Energy efficiency **policies are well-proven.** Many excellent state examples are available.



MIDWEST STATES FACE A HUGE ENERGY PROBLEM: THE MICHIGAN EXAMPLE

- Michigan uses a lot of energy
 - Total cost over \$20 billion per year (in 2000)
(in 2006, likely well over \$30 billion)
- **Michigan is almost totally dependent on fuels imported from other states and countries**

Michigan imports:

- 100% of the coal and uranium we use
- 96% of oil & petroleum products
- Three-fourths of the natural gas



IMPORT DEPENDENCE IN OTHER MIDWEST STATES

	<u>OIL</u>	<u>NAT. GAS</u>	<u>COAL</u>
Illinois	95%	100%	38%
Indiana	99%	100%	51%
Iowa	100%	100%	100%
Minnesota	100%	100%	100%
Missouri	99%	100%	98%
Ohio	97%	88%	66%
Wisconsin	100%	100%	100%

COST OF MICHIGAN'S ENERGY IMPORTS

- Before the current crisis (circa 2000), roughly \$12 billion per year was leaving Michigan to pay for fuel imports
- **At current market prices, this dollar outflow is over \$20 billion per year**

THIS IS A HUGE ECONOMIC DRAIN ON THE STATE ECONOMY!

EFFECTS ON HOUSEHOLDS

- In 2002, the average household nationally spent about \$3,000 on energy
[half for transportation, half for home uses]
- For 2006, that amount is up to \$4,600 per year
... an increase of over 50%,
....or \$1,600 taken out of every household's annual disposable income

EFFECTS ON THE STATE ECONOMY

This **additional \$8 billion** annual drain on Michigan's economy is roughly equivalent to the lost payroll from **closing 80 major manufacturing plants.**

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, WY and TX) and countries (e.g., OPEC).

Bottom line: State economies are being clobbered by high energy costs....

And the best way to fight back is to become more energy efficient!

THE ENERGY CRISIS

YES, IT'S REAL. (and not a temporary blip)

Since 2000:

- World oil prices have tripled
- Natural gas prices have nearly tripled
- Spot market coal prices have doubled

Virtually all market experts foresee a prolonged period of high and volatile energy prices

THE CRISIS IS NOT A TEMPORARY PHASE

THE MARKET FUNDAMENTALS HAVE CHANGED:

- Oil
 - growth in world demand (China & India esp.)
 - OPEC losing control
 - Approaching world production peak
- Natural Gas
 - Primarily North American Market
 - several major negatives (see later slide)
 - no supply relief in sight
- Coal
 - spot prices have doubled
 - plentiful supply,
BUT power plant construction costs are soaring,
and major environmental costs are looming
- No magic supply side bullet anywhere in sight

MANY FACTORS DRIVING COAL POWER PRICES UP

- Coal demand up due to high natural gas prices (a major move to coal is underway...reminiscent of gas boom of 1990's)
- Coal plant construction costs have soared....up 40% in last two years
- Coal markets constrained by mining and rail line capacity, transportation costs have risen dramatically
- Some recent coal plants coming in at ~ 7.5 cents/kWh
- Significant risk of additional environmental costs for coal

SIGNIFICANT RISK OF SUBSTANTIAL ADDITIONAL ENVIRONMENTAL COSTS FOR COAL

Particularly Mercury and Carbon

[Yes, **Carbon costs are coming!**]

Experts calculate that even a moderate carbon tax, in the range of \$20 per ton, would add 1.5 to 2.0 cents/kWh to the price of coal generated electricity [EPRI, 2006]

[Add that to recent cost estimates for new coal plants at ~ 7.5 cents/kWh ... and we could easily be looking at 9 cent/kWh power from new coal plants in a few years]

Natural Gas is Particularly Important for Midwest States

- Very dependent on natural gas for space heating
- Very large industrial use of natural gas
- Very dependent on gas imports from outside the region

[Overall, Midwest imports 92% of the natural gas it uses from other states and countries. Every \$1.00 per Mcf increase in price drains an additional \$4 billion a year from the region.]

THE NATURAL GAS CRISIS:

Key Factors Contributing to the Problem

- Demand growth has outpaced supply (especially due to dramatic shift to gas for electricity generation)
- No net additional production projected from “lower 48” (additions in Rocky Mtn. region offset by depletion of old fields)
- Imports available from Canada projected to decline from current levels
- Alaska gas pipeline is a decade away
- LNG is the only relatively near term additional supply (and it has substantial risks that may delay and/or raise costs)

U.S. SOURCES OF NATURAL GAS

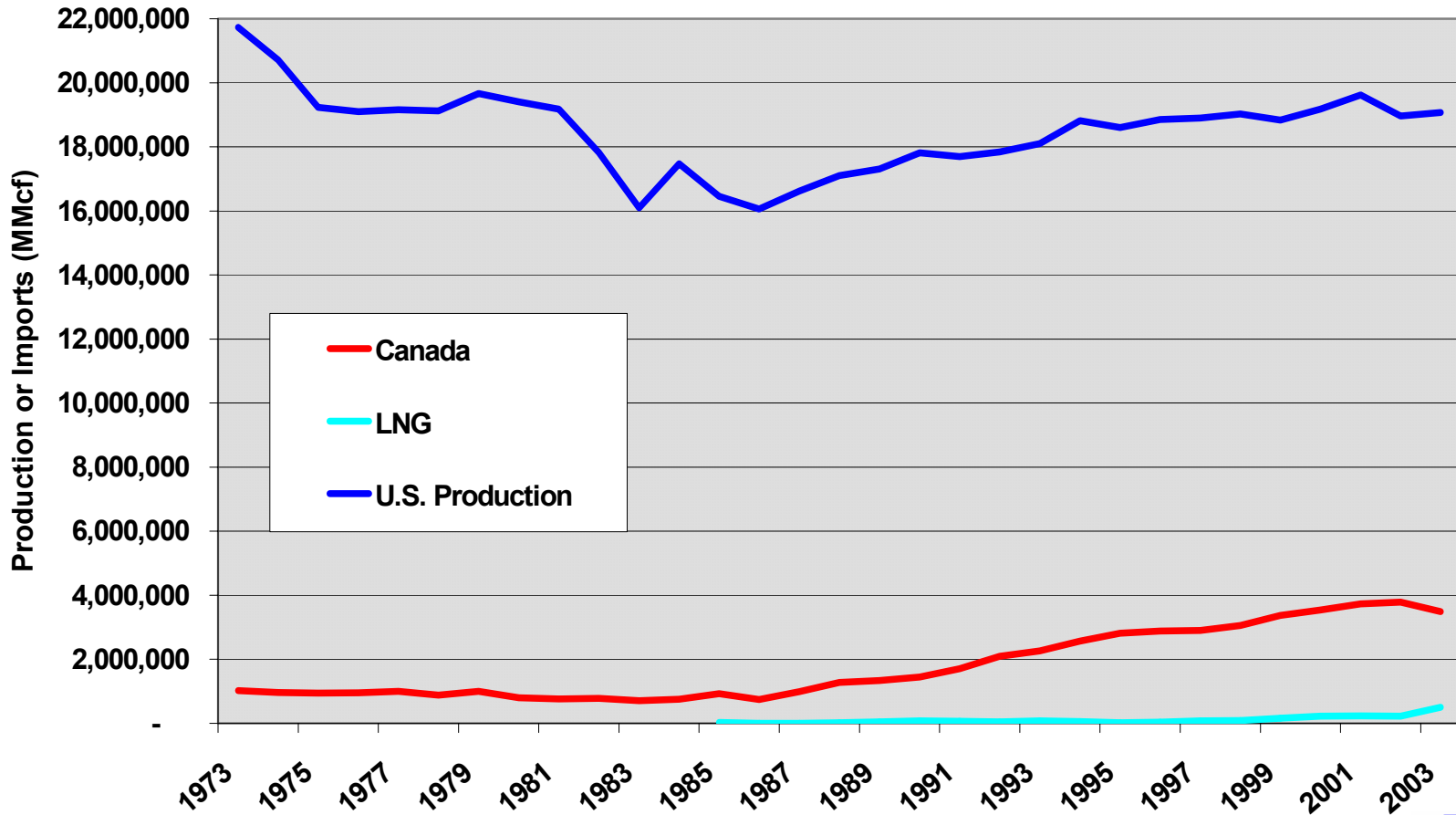
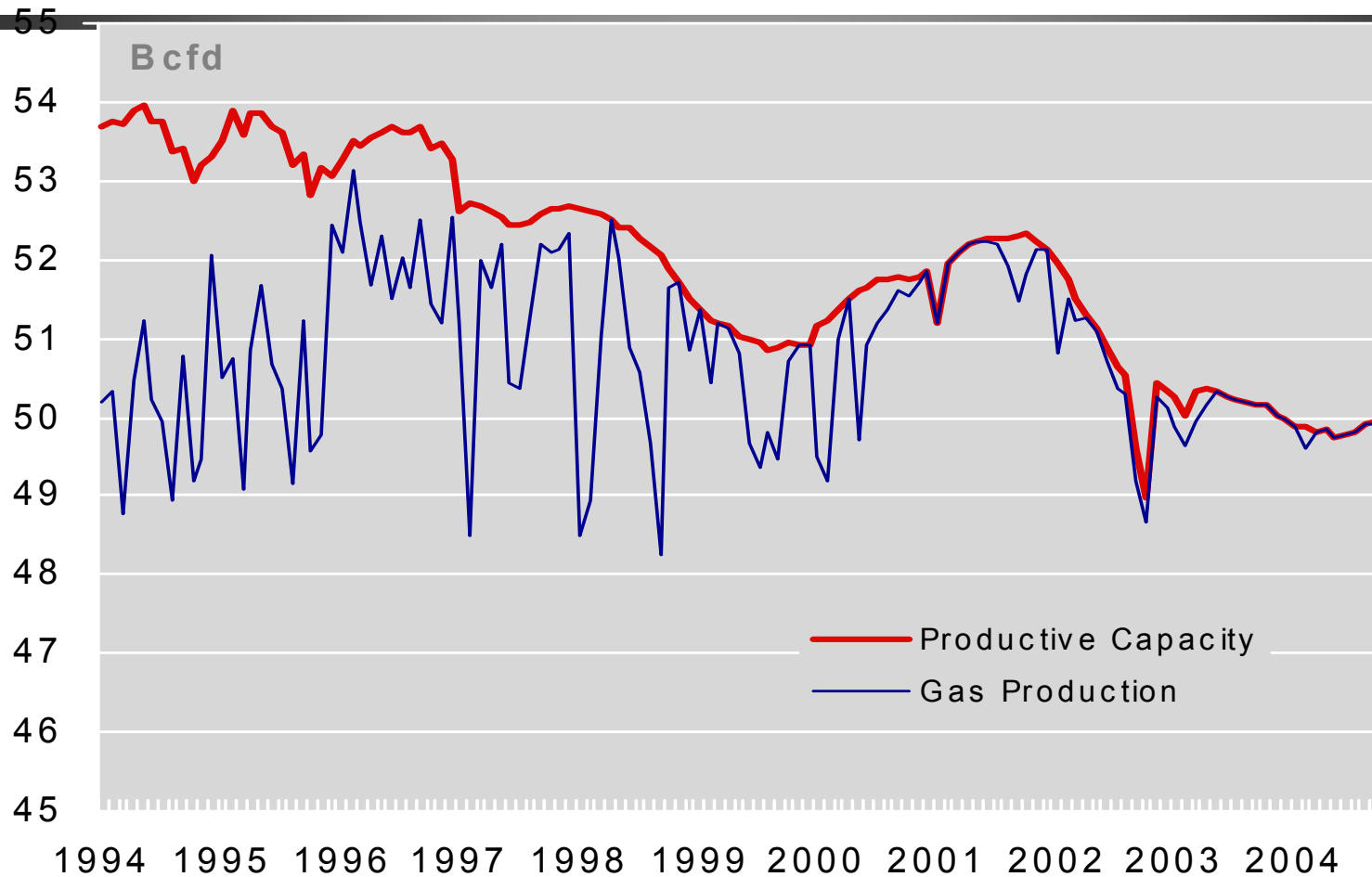


Figure . Lower-48 Dry Gas Production versus Dry Gas Productive Capacity (Source: Petak 2004)



THE NEW REALITY

We have entered a new era of high and volatile energy prices. The low energy prices we enjoyed in the 1980's and 1990's will not return....

States should be doing everything possible to make themselves more energy efficient.

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 on energy every year (\$10 billion in Michigan). Just direct 1% or 2% to energy efficiency

ENERGY EFFICIENCY IS A WELL-PROVEN RESOURCE

We have over two decades of experience showing energy efficiency programs can:

- Save natural gas at \$2.50/Mcf or less
[vs. wholesale price of \$7.50/Mcf & going up]
- Save electricity at 3 cents/kWh or less
[vs. recent market auction prices of 6 to 10 cents/kWh
....and that's without carbon costs of 1 to 2 cents extra]

Roughly 30 states now have significant utility sector energy efficiency programs

SOME GOOD REFERENCES ON UTILITY-SECTOR ENERGY EFFICIENCY RESULTS

Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets

by Richard Cowart, Regulatory Assistance Project,
Vermont, June 2001

<http://www.raonline.org/Pubs/General/EffReli.pdf>

Five Years In: An Examination of the First Half-Decade of Public Benefits Energy Efficiency Policies

Kushler, York & Witte, ACEEE, April 2004

<http://www.aceee.org/pubs/u041.pdf>



SOME SOURCES FOR EXCELLENT PROGRAMS FROM AROUND THE U.S.

America's Best: Profiles of America's Leading Energy Efficiency Programs York & Kushler, ACEEE, 2003

<http://www.aceee.org/pubs/u032.htm>

[profiles 63 energy efficiency programs selected from around the country for their "best practices" ... spread across 20 different categories, from commercial new construction to residential lighting.]

Energy Efficiency and Electric System Reliability: A Look at Reliability-Focused Energy Efficiency Programs Used to Help Address the Electricity Crisis of 2001 Kushler, Vine and York, ACEEE, 2002.

<http://aceee.org/pubs/u021full.pdf>

[22 "case studies" of successful examples of "reliability-focused energy efficiency programs"]²²

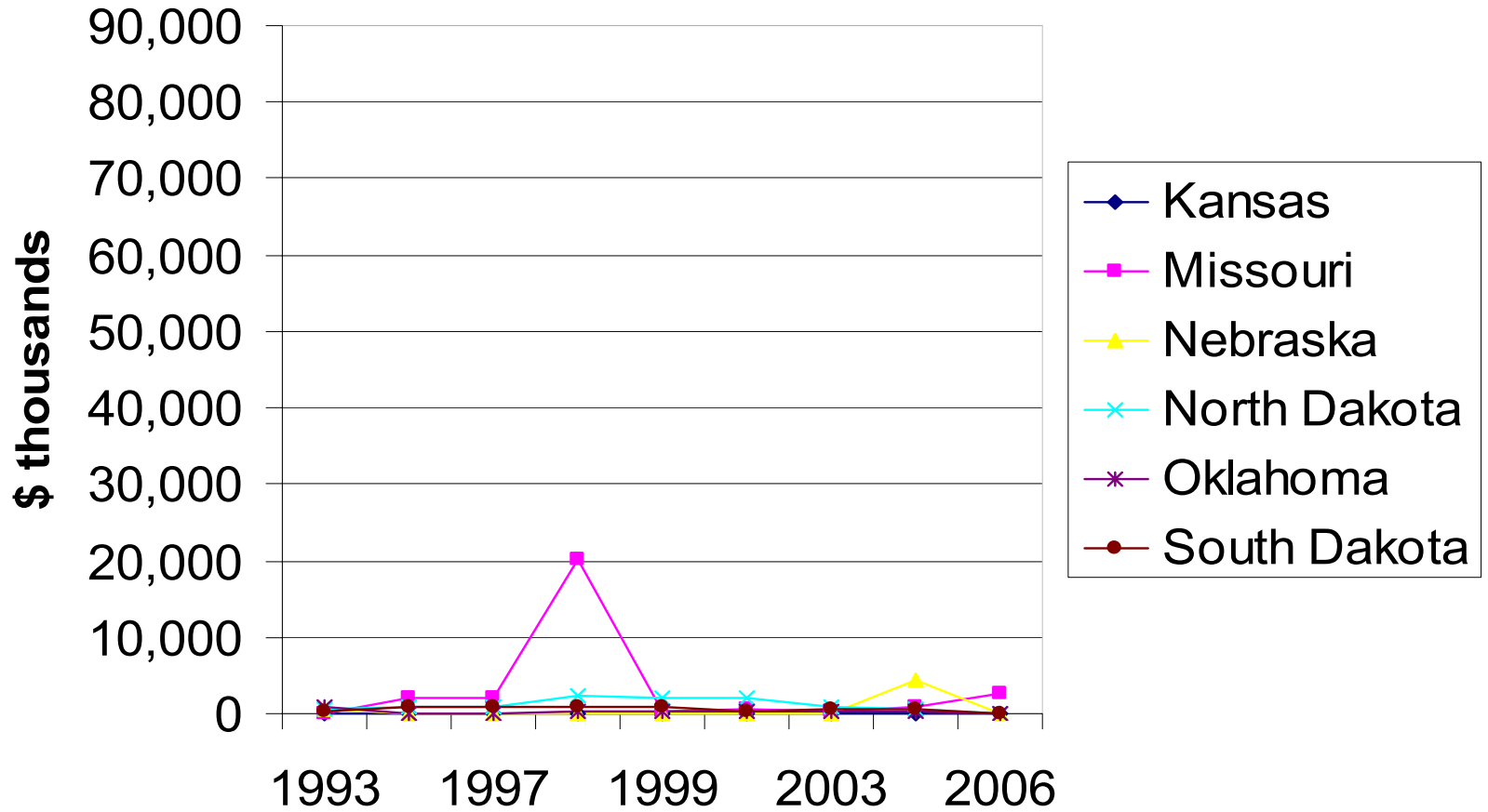


ENERGY EFFICIENCY ON A "POWER PLANT" SCALE

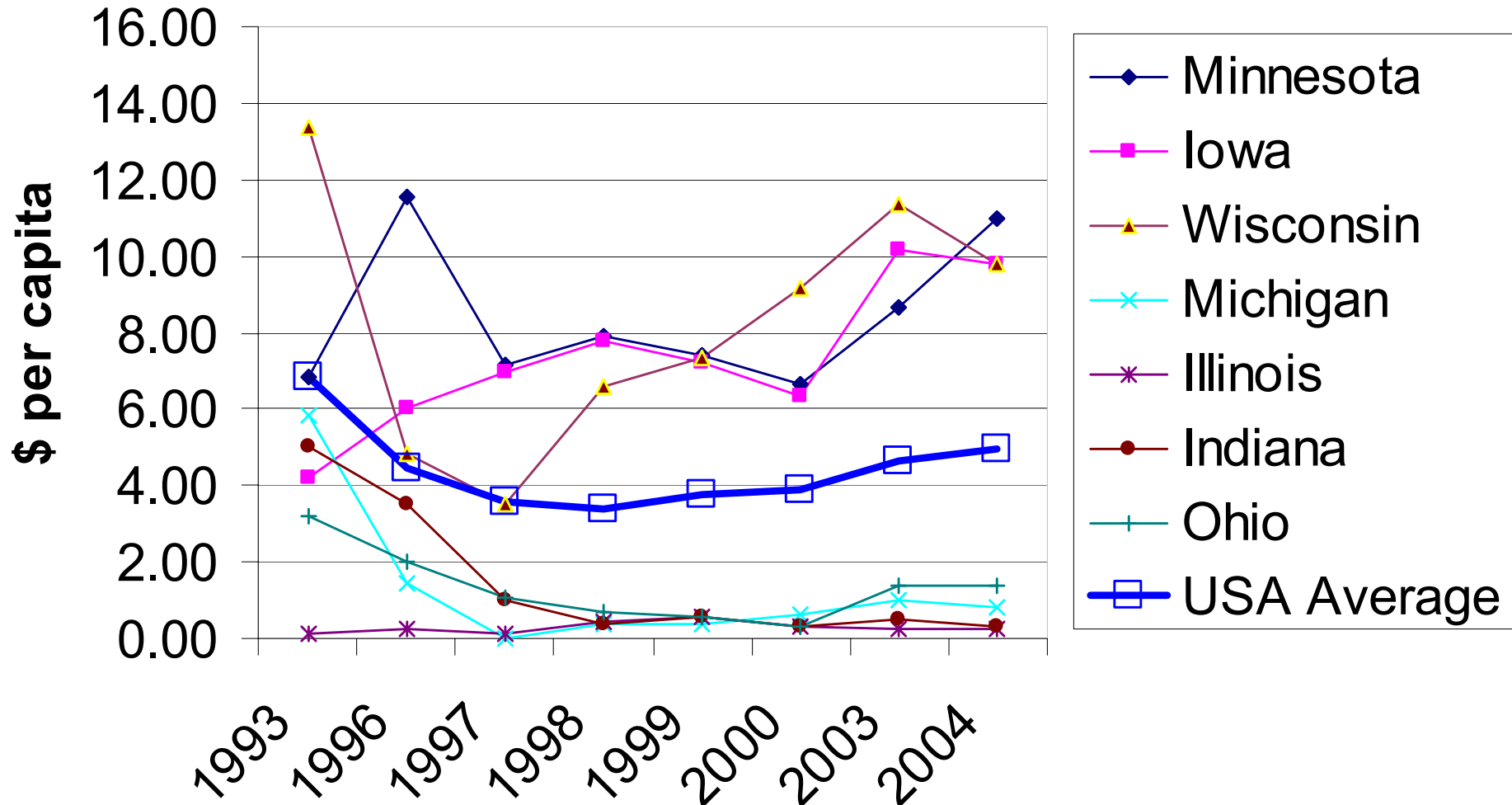
- Some leading state examples
 - ❖ Minnesota has saved over 2,300 MW since 1990
 - ❖ The Pacific Northwest has saved over 1,600 MW over a similar timeframe
 - ❖ California has saved over 1,500 MW in the last 5 years
- At least ten states have EE programs on a scale large enough to displace power plants (i.e., save 0.4% to 1.0% of load each year)
 - ❖ CA, CT, IA, MA, MN, NY, OR, RI, VT, WI
- The Midwest has a very mixed record



State Energy Efficiency Program Spending Total



State Energy Efficiency Program Spending Per Capita



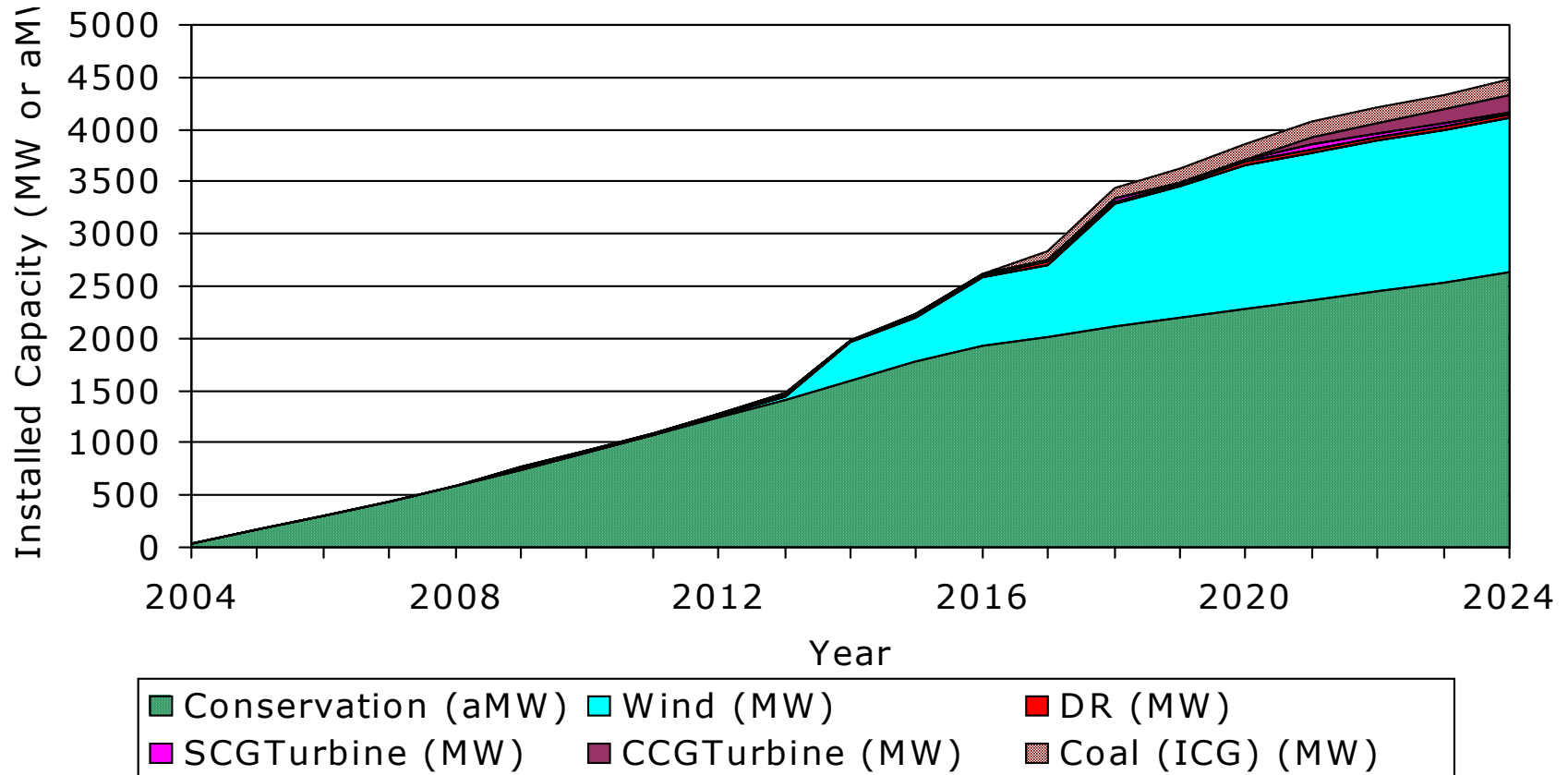
THE PACIFIC NORTHWEST (ID, MT, OR, WA)

- Best electric resource planning process in the U.S.
 - 25 years of energy efficiency program experience
 - Planning to meet all new electricity resource needs through 2013, and two-thirds of new needs thru 2025
-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/>]

NW Plan Relies on Conservation and Renewable Resources to Meet Load Growth



BENEFITS TO ALL UTILITY CUSTOMERS

- *FROM REDUCING OVERALL UTILITY SYSTEM COSTS:* which reduces the total costs that ratepayers must pay in utility bills
- *FROM REDUCED ENVIRONMENTAL POLLUTION:* energy efficiency reduces the burning of fossil fuels. (Note that these EE programs are entirely justified just by the utility system cost economics.... the environmental benefits are essentially a ‘free’ bonus!)
- *FROM LOWER MARKET PRICES:* energy efficiency reduces overall demand, which helps drive down market energy prices

ACEEE Midwest Natural Gas Study

Examining the Potential for Energy Efficiency to Help Address the Natural Gas Crisis in the Midwest

**Martin Kushler, Ph.D., Dan York, Ph.D.,
and Patti Witte, M.A. January 2005**

URL: <http://aceee.org/pubs/u051.htm>

Total Midwest Customer Dollar Savings From a Strong Utility Energy Efficiency Effort

	<u>5-yr. Annual</u>	<u>5-yr. Cumulative</u>
Gas price effects:	\$ 1.4 billion	\$ 5.2 billion
Gas Efficiency:	\$ 1.1 billion	\$ 3.9 billion
Elec. Efficiency:	\$ <u>1.86 billion</u>	\$ <u>6.75 billion</u>
Total Savings:	\$ 4.34 billion	\$15.85 billion

[Over 30,000 net new jobs in 5 years]

WHY ENERGY EFFICIENCY PRODUCES NET JOB GROWTH

KEY ECONOMIC COEFFICIENT DATA FOR MICHIGAN

<u>Sector</u>	<u>Direct Jobs per Million \$</u>
Natural Gas Utilities	1.3
Electric Utilities	1.5
Manufacturing	2.4
Finance	5.6
Wholesale Trade	5.8
Construction	8.9
Business & Services	9.2
Retail Trade	16.2

Source: IMPLAN data for Michigan, Minnesota IMPLAN Group



ENERGY EFFICIENCY PROGRAMS PRODUCE A "2 FOR 1" BENEFIT TO STATE AND LOCAL ECONOMIES

- *FROM PROGRAM BUDGETS*: Energy efficiency program budgets are spent on staff, contractors, and other local employees, plus supplies and materials from local business outlets
- *FROM REDUCED ENERGY BILLS*: The money saved on participant utility bills is re-spent locally, rather than being exported to import more energy fuels

[Actually a '3 for the price of 1' benefit if you consider the environmental benefits produced by energy efficiency]

**OK, so we agree we need to increase
utility investment in energy efficiency
in our states.....**

How should we go about this?

ONE KEY LESSON: GOVERNMENT POLICY MANDATES AND OVERSIGHT ARE ESSENTIAL

There are a number of economic and institutional reasons why utility companies will not voluntarily provide serious energy efficiency programs

[see reports *Can We Just “Rely on the Market”* by ACEEE and *Efficient Reliability* by RAP, plus: *Regulating Electric Distribution Utilities as if Energy Efficiency Mattered* Kushler & Suozzo, ACEEE 1999]

THE KEY CHALLENGE

*Utilities do not voluntarily engage in (or fund)
“serious” customer energy efficiency programs*

[“Conservation tips” and “on-line energy audits” 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

WHAT ARE STATES DOING?

*Aligning Utility Interests with Energy Efficiency
Objectives: A Review of Recent Efforts at Decoupling
and Performance Incentives*

Kushler, York, & Witte, 2006

<http://aceee.org/pubs/u061.htm>]

REASONS FOR RENEWED GOVERNMENT INTEREST IN ENERGY EFFICIENCY

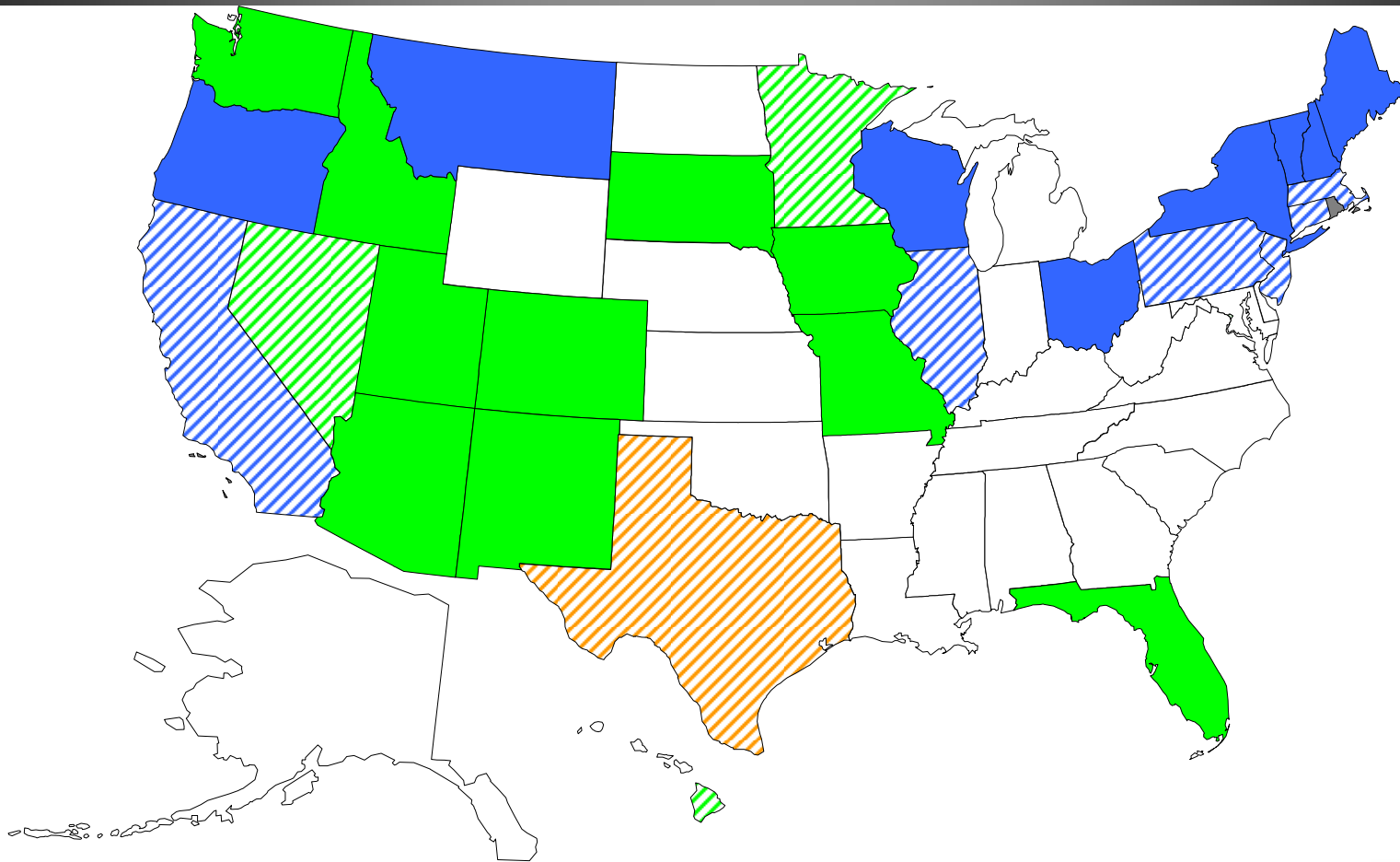
- High energy costs anger citizens (voters)
- High energy costs hurt businesses and the state economy
- Permanent changes in the electricity and natural gas markets mean there is no price relief expected
- Environmental concerns are increasing
- Other states have demonstrated success with utility energy efficiency programs

*So what should a state do if it wanted
to implement a strong utility sector energy
efficiency policy?*

3 BASIC POLICY APPROACHES FOR UTILITY SECTOR ENERGY EFFICIENCY PROGRAMS

1. Establish **spending requirement** for energy efficiency such as through statewide system benefit funds (most common recent approach, e.g., 1 to 3 mills/kWh)
 2. Establish **binding savings targets** for utilities, an “energy efficiency resource standard” [EERS] e.g., save 0.5% to 1.5% of total sales each year
(newest trend in the industry)
 3. Require funding for energy efficiency through **individual utility rate cases** (traditional approach)
- (Another fast growing strategy: combine EERS and RPS)

STATES WITH EE PUBLIC BENEFIT FUNDS OR OTHER UTILITY EE PROGRAMS



RECENT ADVANCEMENTS IN THE MIDWEST

- **Wisconsin** passed Act 141 in 2006 (virtually unanimous)
 - Requires both electric and natural gas utilities to spend 1.2% of revenues on energy efficiency
- **Minnesota** passed SF 145 this year (very strong bi-partisan)
 - Sets requirement for 1.5% savings per year, for both electricity and natural gas utilities
- **Illinois** passed SB 1592 in July (very strong bi-partisan)
 - Establishes an EERS savings requirement for electricity and gas utilities, ramps up to 1%/year by 2011 and 2%/year by 2015
- **Michigan & Ohio** interest growing quickly, (I testified before Energy Committees in each state in the last couple months)

ENERGY EFFICIENCY ADMINISTRATIVE APPROACHES (for utility-sector energy efficiency)

20 states: Utility Administration

7 states: State Agency Administration

3 states: “Third Party” Administration
(thus far, non-profit organizations)

ENERGY EFFICIENCY SPENDING LEVELS

- Nationally: over \$1.6 billion in 2005 (& going up)
- Range across states: \$3.0 million to \$580 million
 - 0.04% to 3.6% of gross revenues
 - Mean: 1.34% of gross revenues
 - Median: 1.2% of gross revenues

**[For Michigan: 1.2% to 1.34% of gross electric revenues
would be ~ \$ 96 million to \$107 million / year]**

(Plus perhaps another \$75 million for natural gas utilities)

THIS IS NOT A "TAX" !

NO "GOVERNMENT" FUNDING IS REQUIRED!!!

Rather, this would be having the utilities re-direct 1% or 2% of the billions of \$ they currently spend every year on supplying energy.

That 1% or 2% would be spent on energy efficiency resources instead of fossil fuel supply resources.

[Note: plans are already being discussed for building new coal-fired power plants in the near future. If that happens, rates will rise more than with energy efficiency.]

Because energy efficiency costs less than half as much, this would **reduce** the total cost of meeting a state's energy needs. [A dollar spent on energy efficiency saves 2 to 3 dollars on energy supply costs.]

WHAT IS THE SIZE OF THE ENERGY EFFICIENCY RESOURCE?

- In 2004 ACEEE completed a “meta-analysis” of energy efficiency potential studies from around the U.S.¹
- Median cost-effective “achievable” potential equivalent to 1.2% of total electricity consumption per year

[Note: leading states are saving 0.8% to 1.2% of total sales in current programs already]

¹ [*The Technical, Economic, and Achievable Potential for Energy Efficiency in the United States: A Meta-Analysis of Recent Studies*, Nadel, Shipley & Elliott, ACEEE, 2004.]

- **It is quite feasible to meet most or all electric load growth through energy efficiency programs**

GOOD POLICY = GOOD POLITICS

Surveys repeatedly show very strong public support for energy efficiency.

Plus, amazingly strong attitudes against importing more energy from outside the state. (MI, 1996)

% of the public that favors or strongly favors:

83% Energy Efficiency

72% Renewable Energy

30% Building a coal or natural gas power plant

21% Building a new nuclear power plant

**19% Buying more power from other states or
Canada**



CONCLUSIONS

- We are in an energy cost crisis, with the potential to be extremely serious.
- Midwest states are very vulnerable, due to their high energy use and almost total dependence on imported fuels. **States should be doing everything possible to become more energy efficient.**
- Energy efficiency is by far the **cheapest, fastest and cleanest** option for meeting new energy resource needs.
- Moreover, Energy Efficiency should be a key part of a state's **economic development** strategy..... and, is increasingly being looked at as a mechanism to meet **environmental objectives** (e.g., carbon reductions)
- This should not be a partisan issue. The best energy efficiency states have strong **bipartisan** support

