Michigan's Energy Crisis
and
Why Energy Efficiency Must Be a Top Policy Priority

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TOPICS

1) Background: Michigan's Serious Energy Cost Problem
2) Why energy efficiency should be the first policy response
3) Energy efficiency as an electric system resource (including examples from around the nation)
4) Making it happen: utility system energy efficiency policy approaches for Michigan

SOURCES OF INFORMATION

ACEEE (my organization)

- The leading non-profit organization on energy efficiency research in U.S.
- Work closely with Congress and federal agencies (DOE, EPA)
- Work with all the major leading industry groups

Energy and Environmental Analysis, Inc. (EEA)

- They do our energy modeling and natural gas forecasts
- Same firm that does natural gas forecasting for the National Petroleum Council

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

- 25 years conducting research in the utility industry
- 10 years as Supervisor of Evaluation at the MPSC
- Currently assisting over a dozen states with EE policies, including several in the Midwest (IN, OH, IL and MN).

KEY POINTS

- Michigan faces 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. Michigan must plan accordingly.
- For states like Michigan, energy efficiency is the only viable near to mid-term policy response.
- Energy efficiency is faster, and costs less than half as much as new electricity or natural gas supplies.
- Energy efficiency policies are well-proven. Other leading states are far ahead of us.

BACKGROUND: MICHIGAN'S ENERGY VULNERABILITY

- Michigan uses a lot of energy
  - Total cost over $20 billion per year (in 2000)
    (in 2006, likely well over $30 billion)
  - 8th highest cost burden in the nation
- **Michigan is almost totally dependent on fuels imported from other states and countries**

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

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 up to $18 billion or more**

THIS IS A HUGE ECONOMIC DRAIN ON OUR 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 $6 billion** annual drain on Michigan's economy is roughly equivalent to the lost payroll from **closing 60 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: Michigan is in an economic war regarding energy costs…and we are losing!

THE ENERGY CRISIS

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

Since 2000:

- World oil prices have more than doubled
- 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 BLIP

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 major environmental costs are looming
- No magic bullet (Forget about Hydrogen)

MANY FACTORS DRIVING COAL PRICES UP

- Coal demand up due to high gas prices (a major move to coal is underway…reminiscent of gas boom of 1990's)
- Coal markets constrained by mining and rail line capacity
- Industrial consolidation reduced spare capacity – need major new investments in the mining sector
- Rail capacity also limited by shortage of rail cars
- Effects on coal prices and coal plant capital costs already evident….PLUS….
- Significant risk of additional environmental costs for coal

SIGNIFICANT RISK OF SUBSTANTIAL ADDITIONAL ENVIRNOMENTAL 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]

[and the latest cost estimates for new coal plants are already coming in at ~ 8 cents/kWh….before carbon costs!]

Natural Gas is Particularly Important for Michigan, and the Midwest

- 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

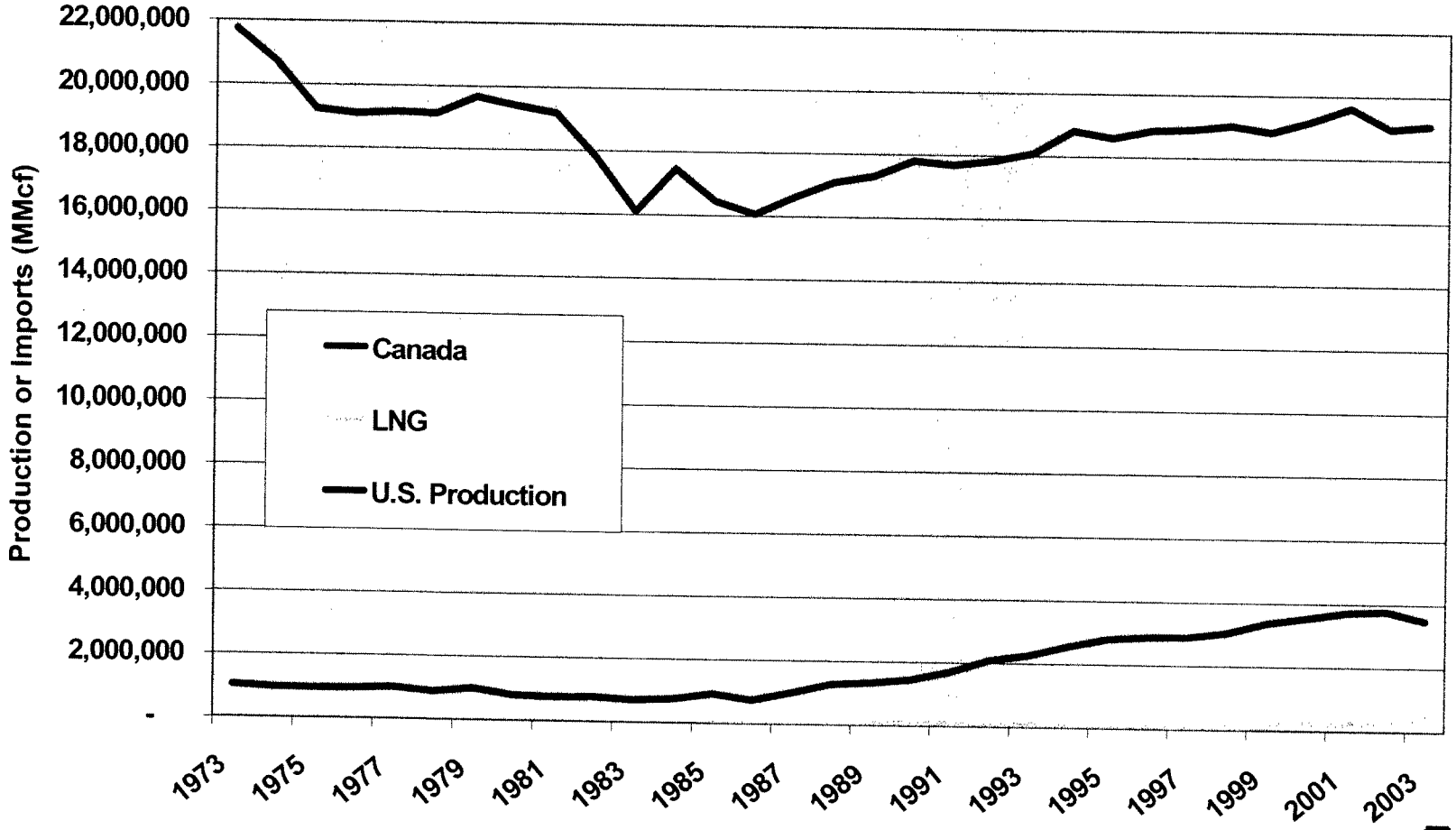
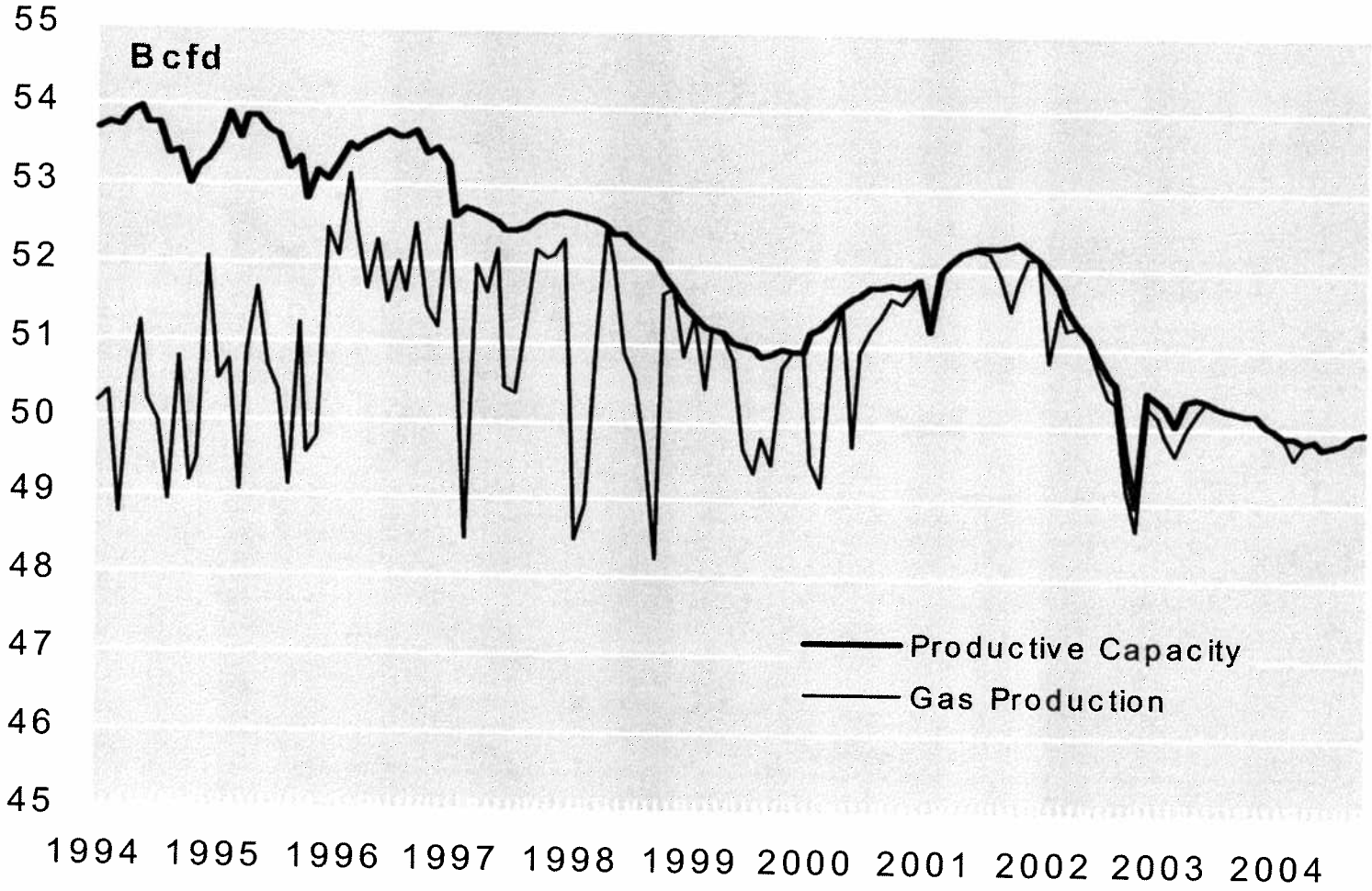


Figure . Lower-48 Dry Gas Production versus Dry Gas Productive Capacity (Source: Petak 2004)



BOTTOM LINE

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….

Michigan should be doing everything possible to make itself more energy efficient.

Fortunately, Help Is Available

- **Energy Efficiency** can save energy for half the cost of new energy supply, or less (both natural gas and electricity)

- In addition, energy efficiency produces a number of other significant economic benefits

Definitions

ENERGY CONSERVATION

Saving energy by doing with less or doing without (e.g., setting thermostats lower in winter and higher in summer; turning off lights; taking shorter showers; turning off air conditioners; etc.)

ENERGY EFFICIENCY

Measures which result in producing the same or better levels of amenities (e.g., light, space conditioning, motor drive power, etc.) using less energy. This is accomplished by installing more energy efficient equipment.

WHAT IS AN "ENERGY EFFICIENCY PROGRAM" ?

An organized effort to try to encourage customers (residential and business) to implement energy efficiency improvements

<u>Key elements</u>

- Public information, education and persuasion
- Information, training, and incentives to "trade allies" (retailers, contractors, etc.)
- Economic incentives for customers (e.g., rebates)
- Quality control, monitoring, and evaluation

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

COST-EFFECTIVENESS RESULTS

From a previous ACEEE national study (*Five Years In...*)

Overall median B/C results reported

- C&I programs: 2.5-2.6 to 1
- Residential programs: 1.6-1.7 to 1
- Across all programs: 2.1-2.5 to 1

Median reported cost of conserved energy: 3.0 cents/kWh

From ACEEE's most recent survey (December 2006)

Estimate of overall cost of conserved energy:

~ 3.0 cents/kWh (from reported spending and savings across 19 states)

SOME GOOD REFERENCES ON UTILITY-SECTOR ENERGY EFFICIENCY

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.raponline.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

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

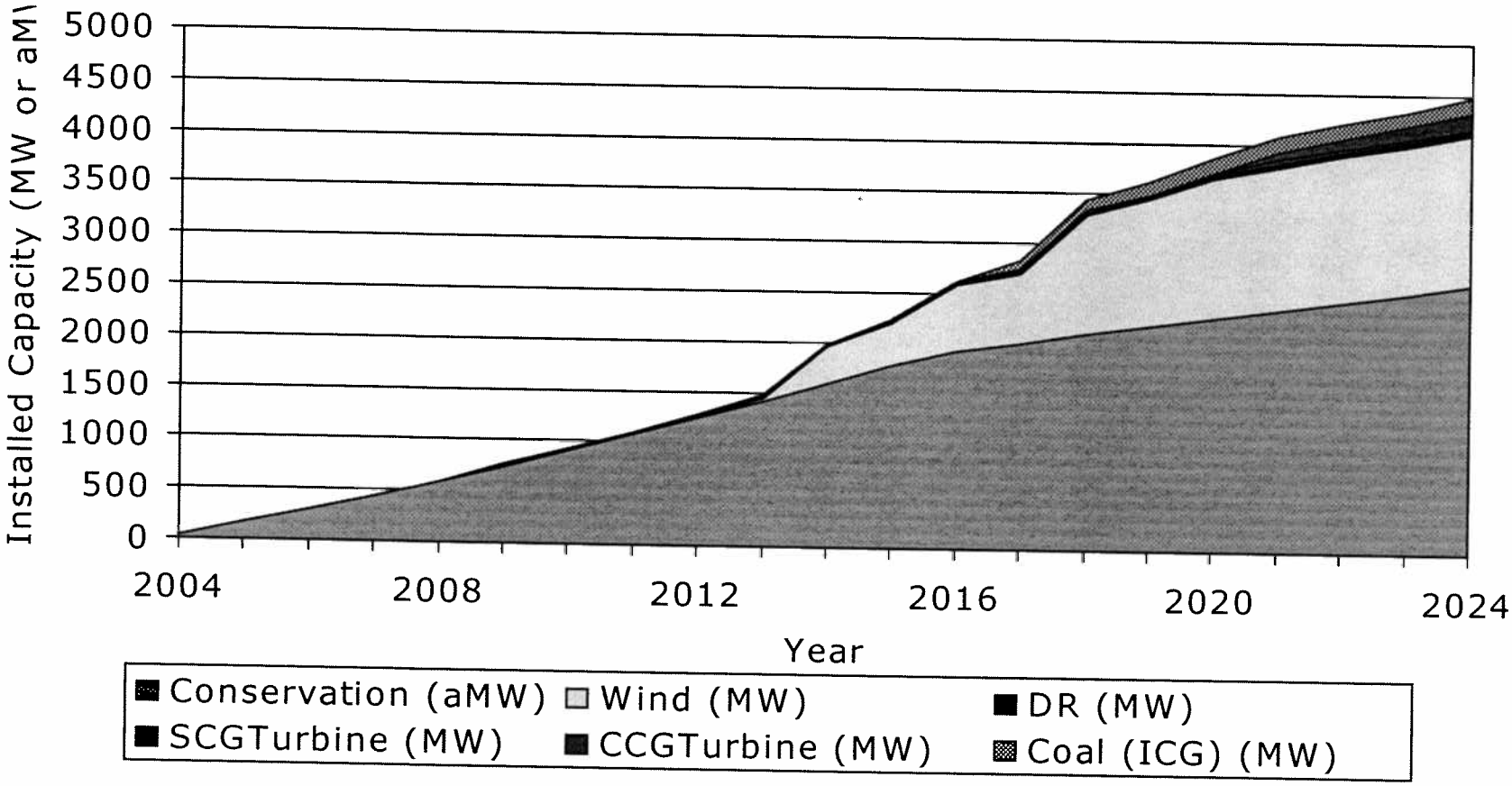
THE PACIFIC NORTHWEST (ID, MT, OR, WA)

- 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



MPSC 21st CENTURY ENERGY PLAN

"...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 RPS, this projection has been decreased further to one new unit by 2015." (p.32)*

"By displacing traditional fossil fuel energy, ***the energy efficiency program alone could save Michigan $3 billion in electricity costs over the next 20 years.*** *" (p.33)*

21st CENTURY PLAN PREFERRED POLICY SCENARIO

Energy efficiency program funding:

- Average of $114 million/yr. for first five years
  [annual savings ~ 0.6% of total annual sales]
- Average of $146 million/yr. over first ten years
  [savings ~ 0.9% of total annual sales yrs 6-10]

- Reduces total net utility system costs by over $3 billion over 20 years.

BENEFITS TO ALL UTILITY CUSTOMERS

- *FROM REDUCING OVERALL UTILITY SYSTEM COSTS:* which reduces the total costs that ratepayers must pay in utility bills

- *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

	2010 Annual	2010 Cumulative
Gas price effects:	$ 1.4 billion	$ 5.2 billion
Gas Efficiency:	$ 1.1 billion	$ 3.9 billion
Elec. Efficiency:	$ 1.86 billion	$ 6.75 billion
Total Savings:	$ 4.34 billion	$15.85 billion

[MICHIGAN: $800 million $3 billion]

[5,200 net new jobs in MI by 2010]

WHY ENERGY EFFICIENCY PRODUCES NET JOB GROWTH

KEY ECONOMIC COEFFICIENT DATA FOR MICHIGAN

Sector	Direct Jobs per Million $
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

TWO KEY DIRECT BENEFITS TO THE 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

MICHIGAN WAS ONCE A LEADER IN ENERGY EFFICIENCY

- **In the early 1990's, Michigan was among the national leaders in utility efficiency programs.**
- Our top utilities were spending 1 to 2% of revenues on energy efficiency
- **Independent evaluations documented that the energy efficiency programs were very cost-effective (1.5 to 2.6 cents per kWh saved)…less than half the cost of new electric supply.**
- The programs were very popular with the public

WRONG TURN IN MICHIGAN

- Michigan's utility energy efficiency programs were terminated in 1996, in the rush to utility deregulation
- Many other states maintained their energy efficiency programs, and have realized hundreds of millions of dollars in utility cost savings.

BOTTOM LINE

Michigan is facing a serious energy crisis, and all indicators are that very high energy prices are here to stay.

This suggests we need a new top priority policy approach to energy and the funding of energy efficiency.

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

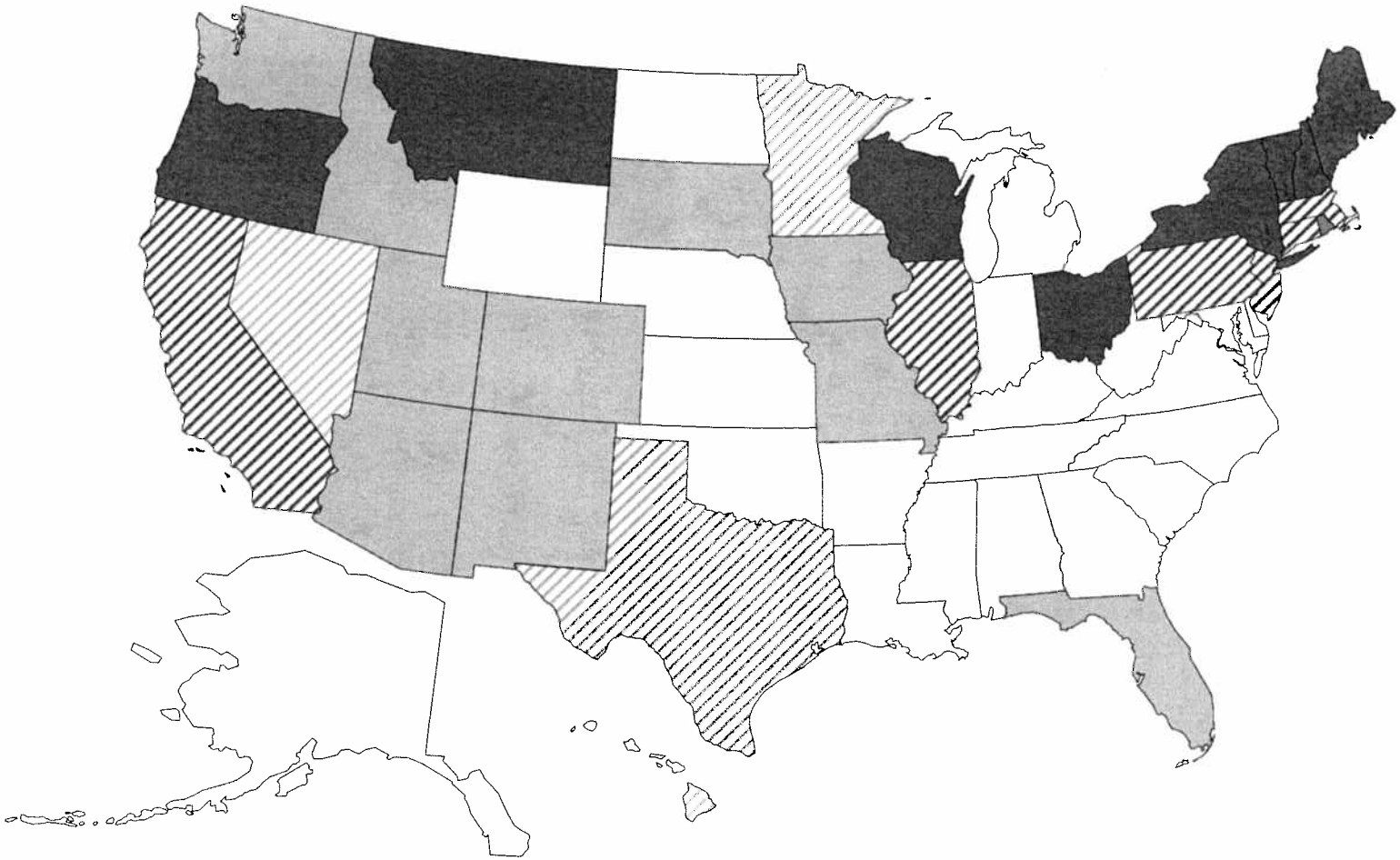
3 BASIC POLICY APPROACHES FOR UTILITY SECTOR ENERGY EFFICIENCY PROGRAMS

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



ENERGY EFFICIENCY COST RECOVERY MECHANISMS

16 states: statewide system benefit charge

10 states: included in rates

4 states: tariff rider

[At least 9 of those states have an EERS type mechanism in place or under consideration]

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
- 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 revenues would be ~ $ 96 million to $107 million / year]

ANOTHER BENCHMARK TARGET FOR MICHIGAN

[Based on 20 restructured states with energy efficiency funding.]

Energy Efficiency Funding

- Range: 0.03 to 3.3 mills/kWh
- Median: 1.0 mills/kWh

>>If Michigan spent at median: 1.0 mills/kWh

~ **$110 million/yr. for electric energy efficiency**

[This would save $200-300 million per year in electric system costs.]

BENCHMARK TARGETS (CONT.)

On the natural gas side, a corresponding energy efficiency charge would be about 10 cents/MCf, yielding about **$75 million/year for natural gas energy efficiency**

For a typical household, the combined electric and natural gas energy efficiency charge would amount to less than $20 per year… (about a 1% increase)

Compared to the increased energy costs of $1,600 per year (50%) that households have experienced over the last 4 years.

In return for the $20 per year, Michigan would obtain large-scale electric and natural gas energy efficiency programs that would save hundreds of millions of dollars per year.

THIS IS NOT A "TAX" !

Rather, this would be having the utilities re-direct 1% or 2% of the $10 billion 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. So it's really: "pay me now, or pay me (more) later"]

Because energy efficiency costs less than half as much, this would **reduce** the total cost of meeting Michigan'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 for energy efficiency was 24% of total forecasted electricity use
- Median 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.]

PUTTING IT ALL TOGETHER

A significant "mid-level" electric utility sector energy efficiency policy in Michigan would:

- Provide funding of about $110 million per year (approximately 1 mill/kWh of sales, 1.3% of revenues), ramping up to an average of $146 million/yr. over 10 yrs
- Achieve savings of 0.6% of total sales per year, ramping up to 0/9% per year after five years
- Provide net savings of over $3 billion in utility system costs over 20 years

[Note: if we matched the effort of the most aggressive states, we would be at about double those levels]

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

EVEN AMONG UTILITIES, MOMENTUM TOWARD EE IS BUILDING RAPIDLY

Many factors are converging to make energy efficiency the top priority electric system resource

- High and volatile fuel prices
- Customer/political dissatisfaction with high costs
- 'NIMBY' issues re: power plants and transmission lines
- Rising power plant construction costs and cost recovery risks
- Environmental policy objectives (esp. global warming)
- Environmental cost risks

A number of states are actively examining strategies to expand their utility-sector energy efficiency efforts (including 'decoupling' and 'shareholder incentives')

CONCLUSIONS

- We are in an energy crisis, with the potential to be extremely serious.
- Michigan is very vulnerable, due to our high energy use and almost total dependence on imported fuels. Energy costs are crushing our economy.
- Energy efficiency is the only viable near to mid-term option. It reduces costs directly through energy savings, and helps lower market prices.
- Energy Efficiency should be a key part of Michigan's economic development strategy.
- This should not be a partisan issue. The best energy efficiency states have strong bipartisan support.

ACEEE