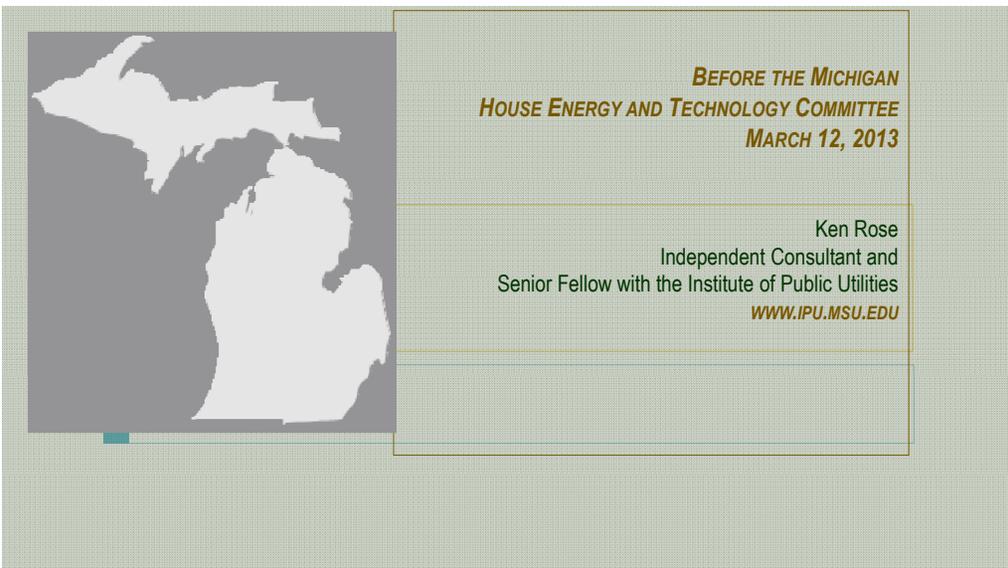


Electric Markets, Price Trends, and Electric Choice



Some National Price Trends

- ▶ Generally, all regions of the country are seeing higher prices since early 2000s
- ▶ Wholesale prices have fallen since 2008, and been roughly steady since
- ▶ Restructured state prices increased rapidly from 2002 until 2008, and have since leveled off (small decrease)
- ▶ For states that still regulate, prices continue to increase, but are still below states that restructured

Figure 1. Weighted annual averages for all states, regulated states and states that ended price caps for residential customers (1990 through October 2012)

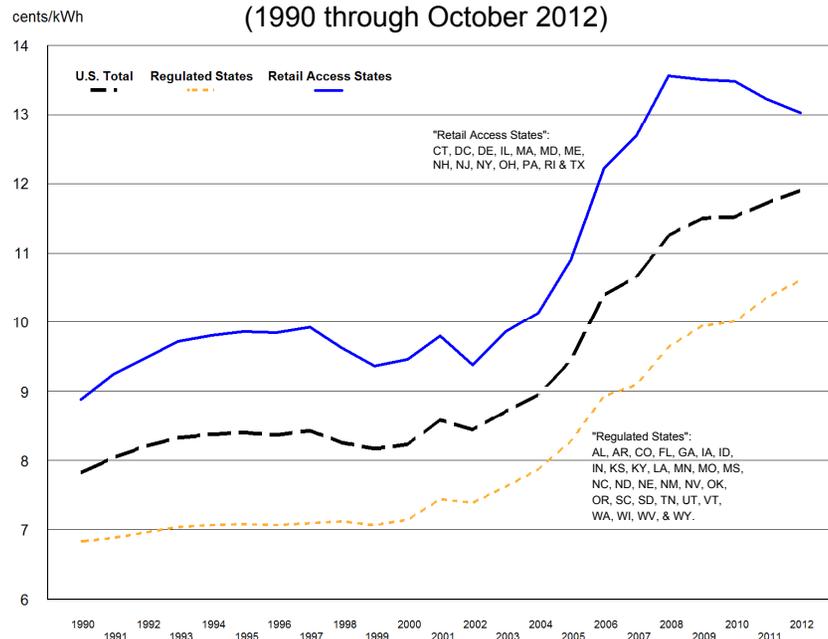


Figure 2. Weighted annual averages for all states, non-RTO states and states that ended price caps for residential customers (1990 through October 2012)

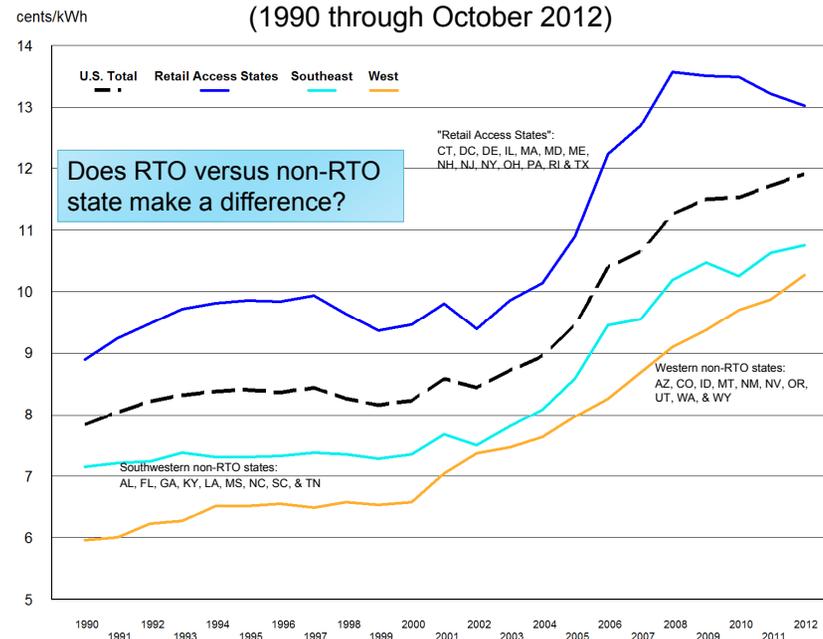
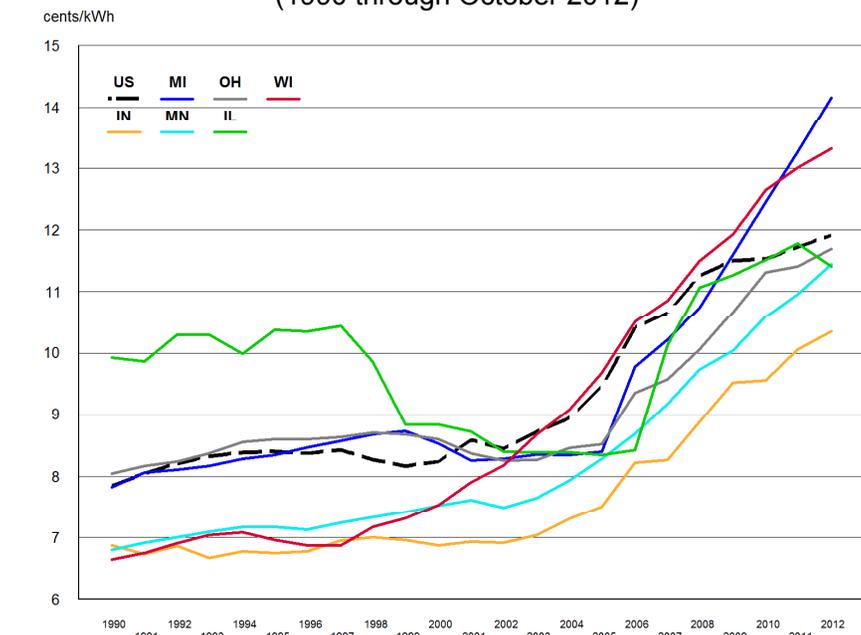


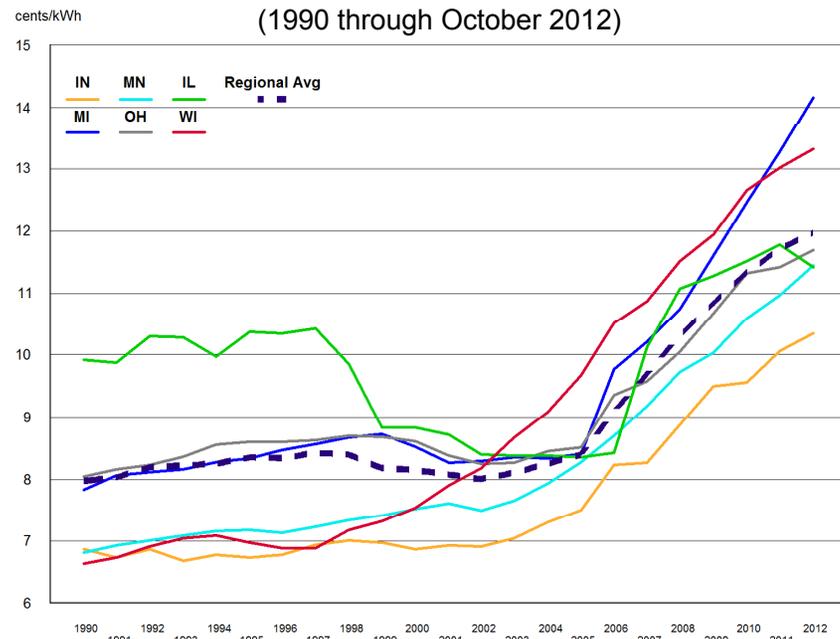
Figure 3. Weighted annual averages for Michigan and neighboring states (1990 through October 2012)



Data source: DOE/EIA.
5

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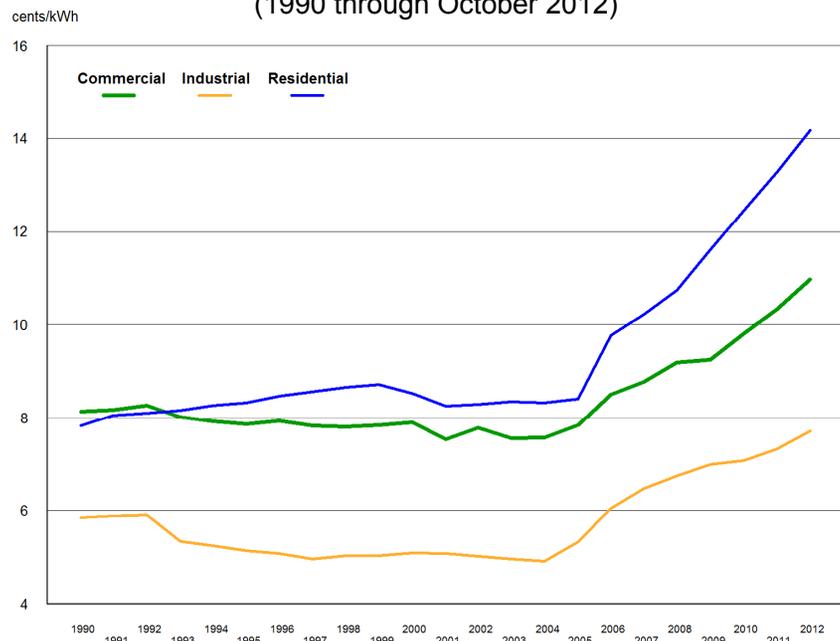
Figure 4. Weighted annual averages for Michigan, neighboring states, and regional weighted average. (1990 through October 2012)



Data source: DOE/EIA.
6

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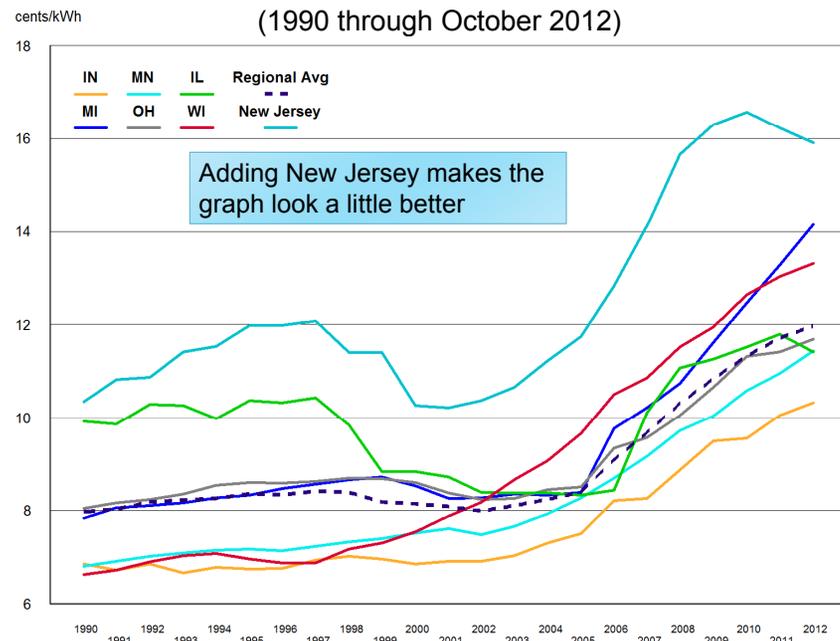
Figure 5. Michigan average prices by sector (1990 through October 2012)



Data source: DOE/EIA.
7

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Figure 6. Weighted annual averages for Michigan, neighboring states, and regional weighted average. (1990 through October 2012)



Data source: DOE/EIA.
8

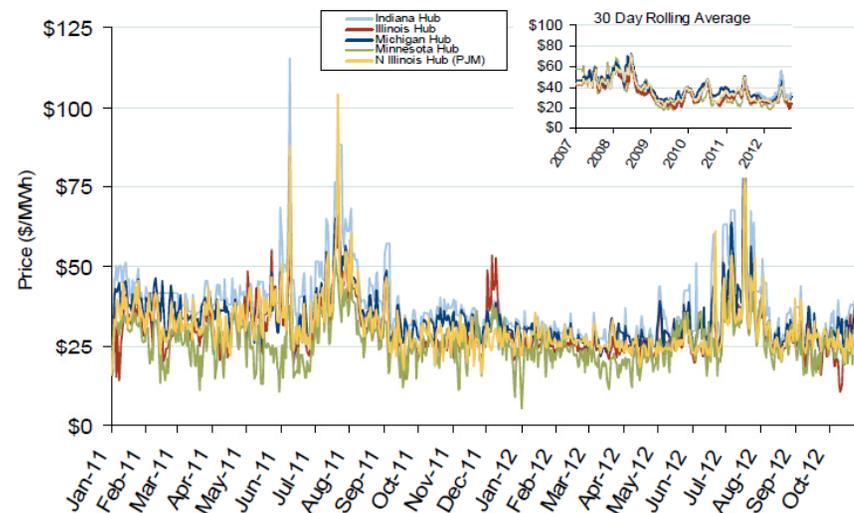
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Why is Michigan and other states seeing higher prices (even though fuel prices have been falling)

► First . . .

- Wholesale market prices?
- Declining sales (MWh sold)?
- EPA compliance costs?
- Fuel costs?

Daily Average of MISO Day-Ahead Prices - All Hours



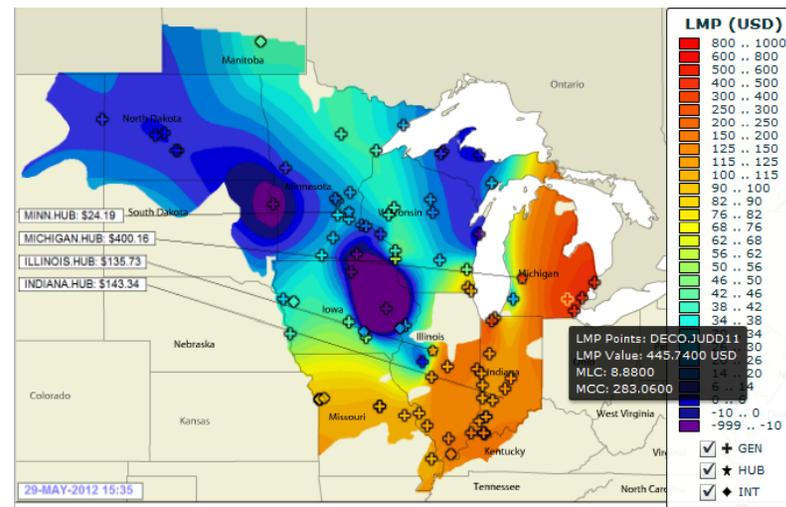
Source: FERC, November 2012, Derived from Bloomberg data.

Midwest Annual Average Bilateral Prices

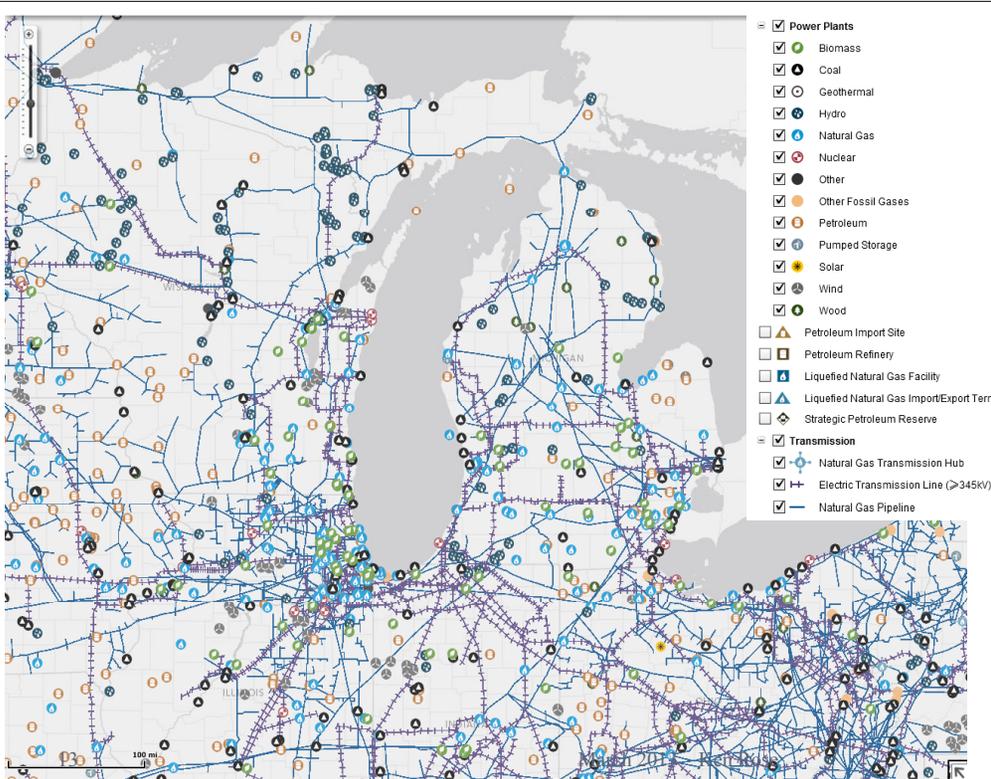
Annual Average Day Ahead On Peak Prices (\$/MWh)	2007	2008	2009	2010	2011	5-Year Avg
Cinergy	\$61.20	\$66.88	\$34.65	\$41.51	\$41.17	\$51.20
Michigan Hub	\$64.43	\$69.15	\$36.56	\$43.68	\$42.73	\$53.81
Minnesota Hub	\$72.32	\$67.46	\$32.09	\$36.86	\$34.57	\$53.62
NI Hub	\$58.93	\$66.13	\$34.47	\$40.85	\$40.31	\$50.57
Illinois Hub	\$59.88	\$62.52	\$31.36	\$38.22	\$38.12	\$48.65
MAPP South	\$61.18	\$69.18	\$33.31	\$37.60	\$35.48	\$51.28

Source: FERC, November 2012, Derived from the Platts data.

Peak prices on May 29th 2012 . . .

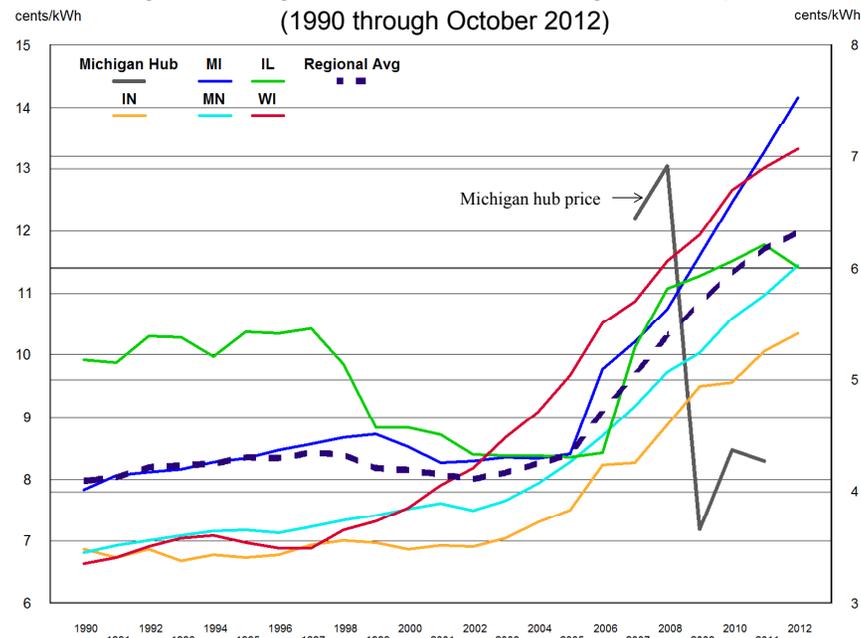


May. 29, 2012 - Interval 15:35 EST



Source: U.S. Energy Information Administration, From EIA Beta, State Energy Profiles, March 2013.

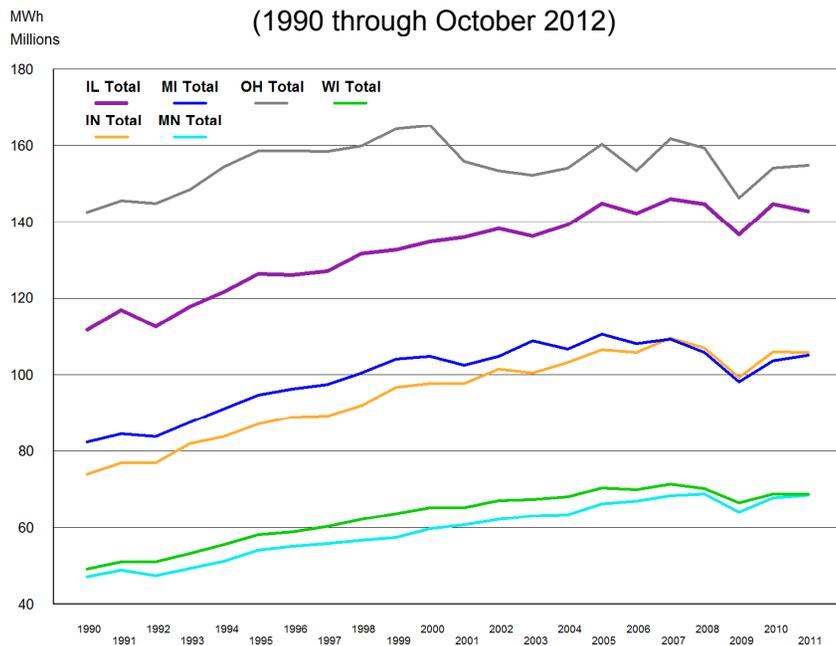
Figure 7. Weighted annual averages for Michigan, neighboring states, regional weighted average, and MISO annual average bilateral price.



Data source: DOE/EIA.

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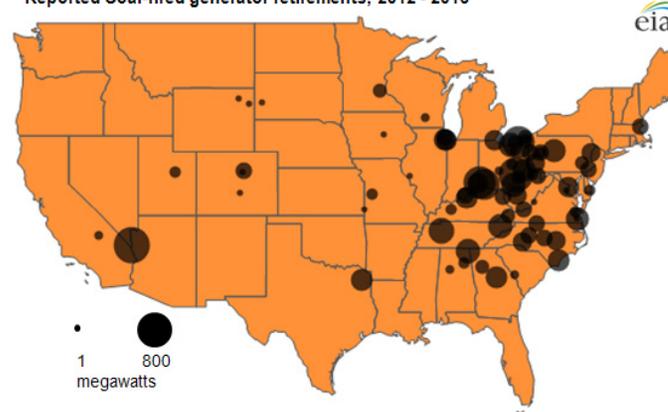
Figure 8. All sector sales for Michigan, neighboring states, and regional weighted average.



Data source: DOE/EIA.

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Reported Coal-fired generator retirements, 2012 - 2016

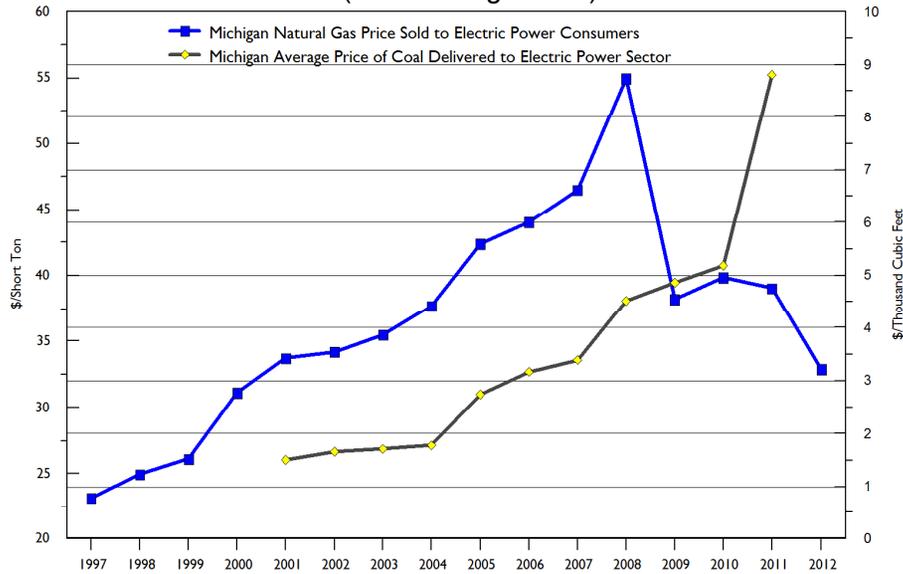


	Existing Coal Capacity ¹	Reported coal generator retirements						
		Historical			Planned			
		2009	2010	2011	2012	2013	2014	2015
Total Net Summer Capacity (MW)	317,469	529	1,528	2,517	8,890	2,098	4,715	9,865
Number Of Units	1,387	12	35	31	57	14	34	61
Average Net Summer Capacity (MW)	228	44	44	81	156	150	139	162
Average Tested Heat Rate (Btu/kWh)	11,281	12,200	12,879	10,714	10,897	13,922	11,067	10,659
Average Age at Retirement	N/A	50	54	62	56	55	57	57

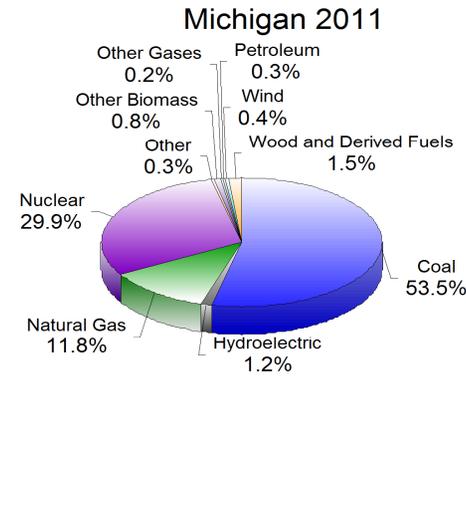
¹ Reflects all coal units that existed at year-end 2011.
 Source: U.S. Energy Information Administration, Form EIA-860, "Annual Electric Generator Report."
 Note: Data for 2009 through 2011 represent actual retirements. Data for 2012 through 2015 represent planned retirements, as reported to EIA. Data for 2011 through 2015 are early-release data and not fully vetted. Capacity values represent net summer capacity.

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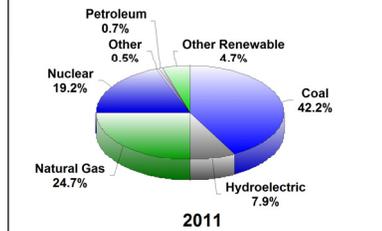
Figure 9. Michigan's electric power sector natural gas and coal prices. (1997 through 2012)



Michigan Net Generation by Energy Source, 2011 (percent of MWh)



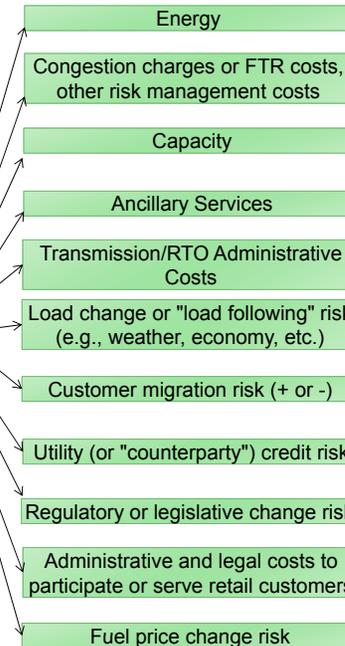
National Net Generation by Energy Source



Why is Michigan and other states seeing higher prices

- ▶ These factors contribute to higher prices, but don't seem to explain all the variation
 - ▶ Wholesale market prices
 - ▶ Declining sales (MWh sold)
 - ▶ EPA compliance costs
- ▶ Even though natural gas prices have been falling, coal is going in the opposite direction
- ▶ What about new capacity costs?
 - ▶ Not by itself, EIA is showing about 365 MW in the pipeline for Michigan (probably more being considered, but not far along in planning)
- ▶ Other RTO market and non-market costs? (next slide)

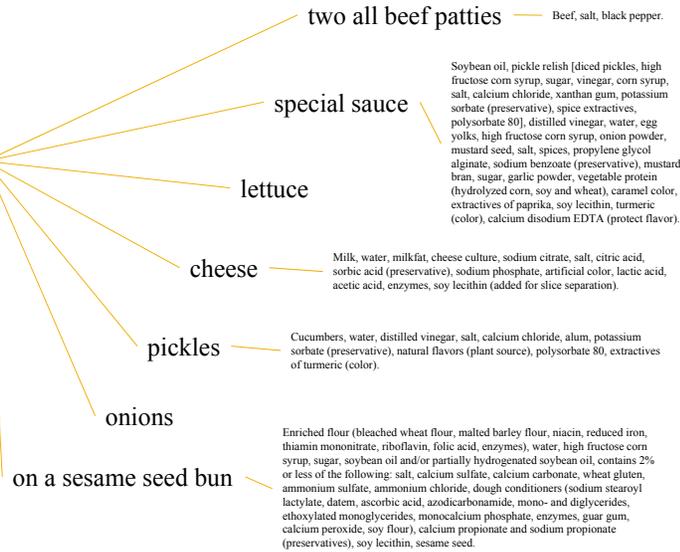
Costs for "full requirements" service to retail customers*



- ✓ The sum of the parts may be greater than the whole (due to new costs and risks)
- ✓ Some of these costs did not exist with regulation

*Not all costs may apply in all cases.

McDonald's Big Mac® Unbundled



- One bundled Big Mac cost about \$3.50*
- What would it cost unbundled?

*Prices vary by location.

Benefits & Costs of an RTO Structure

Benefits

- ▶ Capital efficiencies (no over-capitalization from ROR regulation)
- ▶ Operational efficiencies (lower operating costs)
- ▶ Savings from scale economies from operating a large RTO
- ▶ Less regulatory compliance cost (warning: may be higher!)
- ▶ Can facilitate variable resource integration (however, can be accomplished by other means)

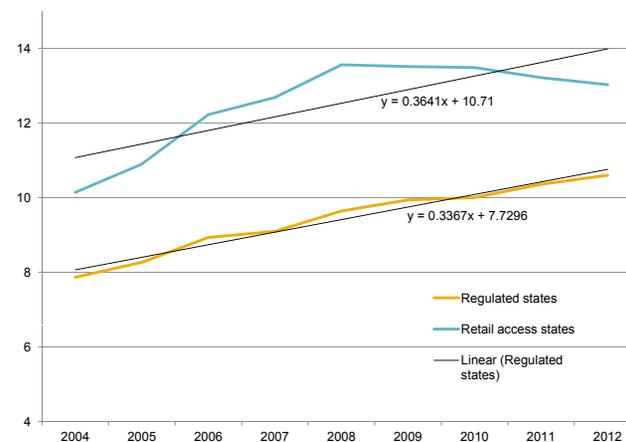
Costs

- ▶ De-integration costs, from loss of vertical economies (when one decentralized entity supplied all products and services, i.e., Big Mac example)
- ▶ Market power (made worse from any increase in market concentration)
 - ▶ cannot assume bidders will bid their cost
 - ▶ cannot assume mkt monitoring will fix it
- ▶ RTO operation (or administrative) costs
- ▶ Business costs of market participants incurred to deal with ISO/RTO complexity
- ▶ Possible underinvestment in infrastructure (e.g., transmission)
- ▶ Higher transmission congestion associated with trading over a larger footprint

Wrapping up . . .

- ▶ Not saying that one option is clearly worse or better than the other – retail access v regulation, but
 - ▶ . . . there appears to be no clear benefit for retail customers, unless you look at just the last couple years, with retail choice – and that could quickly change if natural gas prices increase again (as they have in the not too distant past)
 - ▶ cost-based regulation was no simple matter, but if the “restructured” model can’t beat it, then something’s wrong
- ▶ Not always sure what “competition” has to do with what we have been doing the past 20 years
 - ▶ replaced a complex, cumbersome, and expensive regulatory system with a complex, cumbersome, and expensive “deregulatory” system
 - ▶ the current RTO (wholesale) and retail access-based model is a composite of different markets, that are highly regulated and frequently adjusted by FERC and the states
- ▶ Most of the country is facing the same cost pressures (environmental, capacity, flat demand, renewable costs)

Figure 10. From another perspective . . .



• Just looking from 2004 through 2012, the average rate of change is not that different between the two groups of states
 • So, . . . it's fair to ask, where's the savings?

Figure 11.

Even Texas (yes, Texas) follows the same trend line over the entire time period

Maybe it doesn't matter what we do . . . because of the under lying economics of the industry

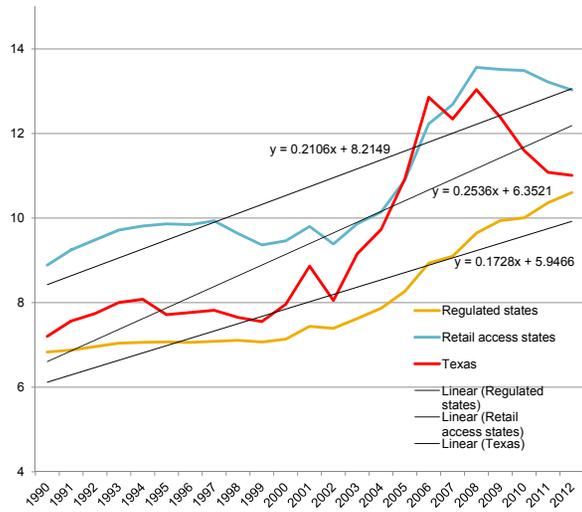


Figure 12. Average retail price of electricity, all sectors, 1960-2011

