

Bio-Picks: Options for the Sale of Electricity and Bio-Gas;

Michigan Landfill Gas To Energy
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Questions?

- Who sets the prices and how?
- Wheeling gas or electricity on the existing grid(s)?

Relevant Michigan Laws

- Public Act 69 of 1929 – Who is a public utility? Access to local rights of way. Certificate of need. (MCL 460.501)
- Public Act 141 of 2000 – What is self-service power? Wheeling? Alternative Electric Suppliers (MCL 460.10)
- Bills in play today: RPS, PA141 rewrite, etc.

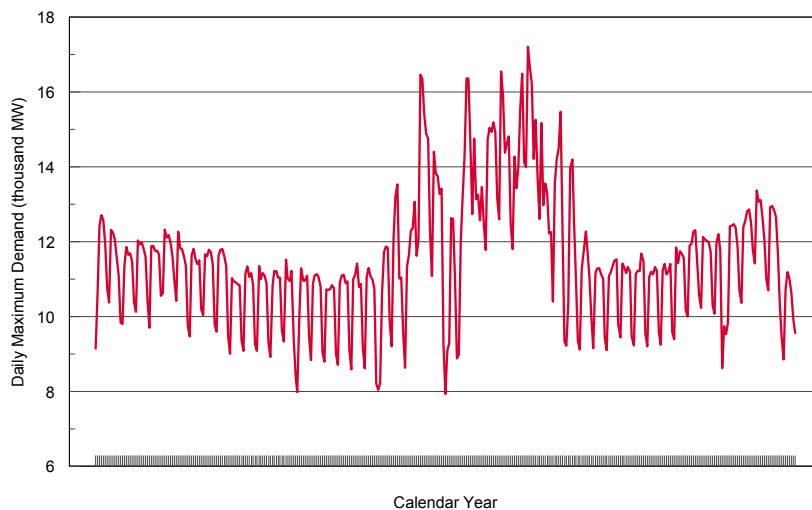
Choices for Development

- On-site or off-site?
- Single feedstock or multiple?
- Sell gas, electricity, or both?

Choices for Development (2)

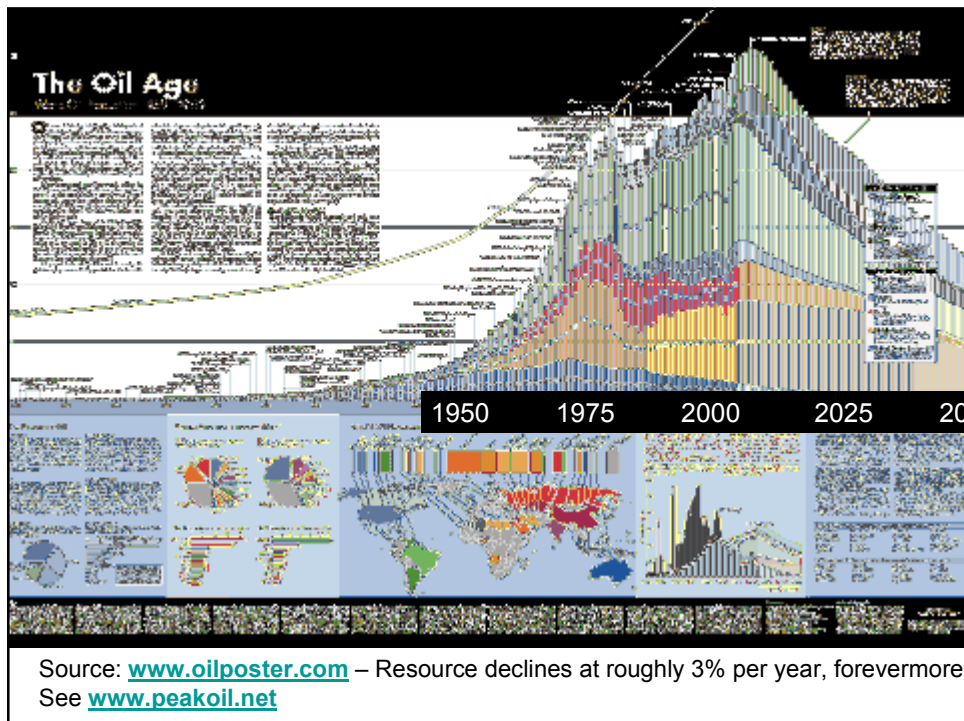
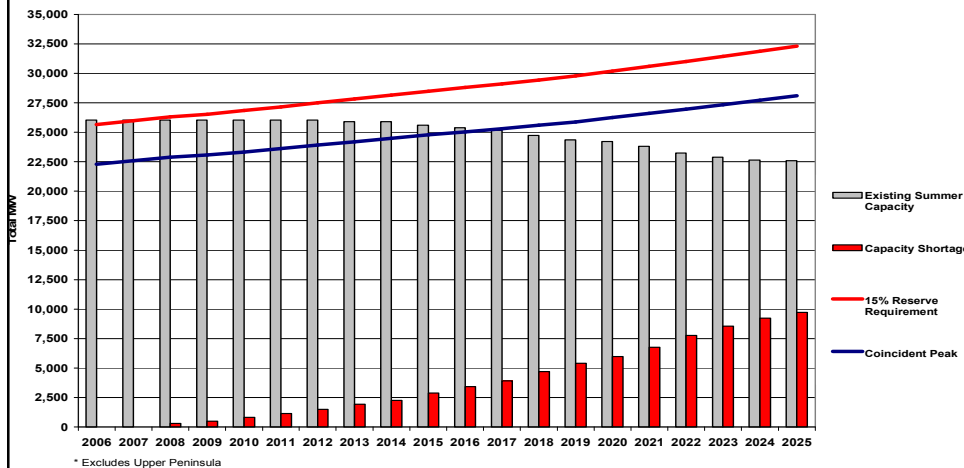
- Wholesale or retail?
- Wholesale to Utility, AES, or Open Wholesale Market?
 - Green Pricing Options: RECs with or without energy
- Retail self-service power or retail delivery

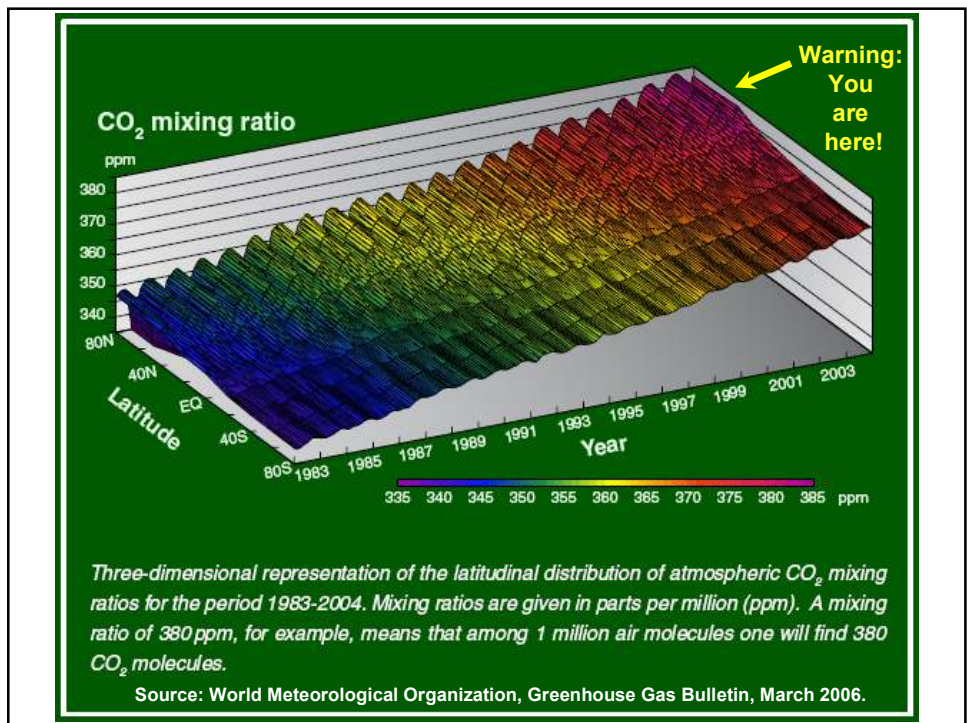
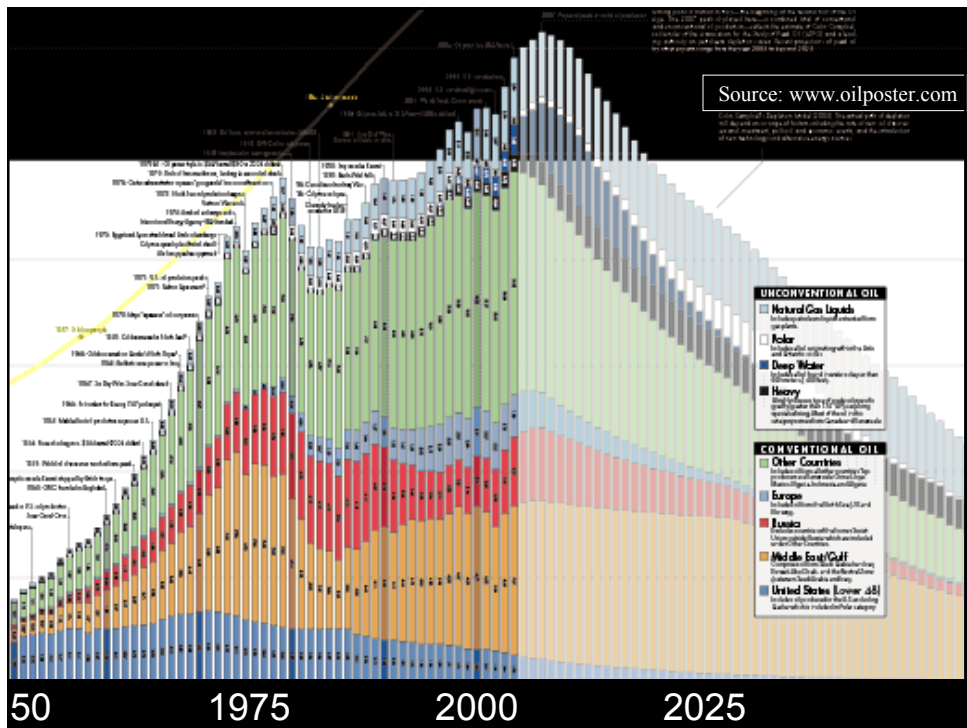
Consumers Energy & Detroit Edison Combined Daily Maximum Demand (1995)

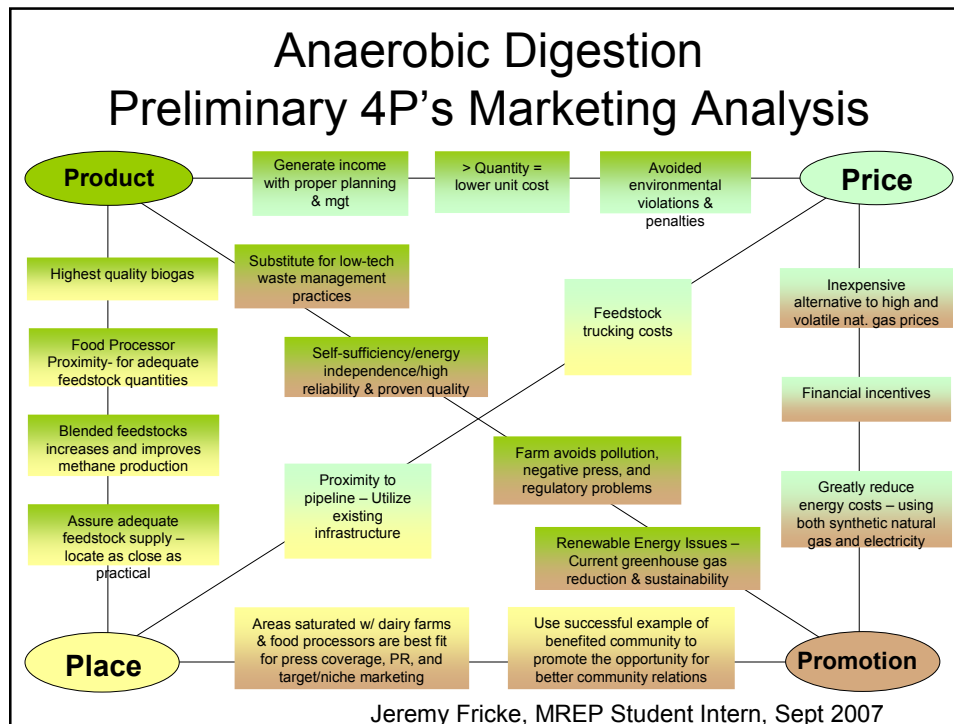


Overview of Michigan 20-Year Generating Resource Needs

MECS Resource Gap Analysis
Summer Peak Load and Resource Balance of Existing System







Michigan Examples

- Wood burning power plants
- Landfill gas plants
- Dairy anaerobic digesters:
 - Scenic View Dairy, Fennville
 - Country Meadows Dairy, Elsie
 - den Dulk Dairy, Ravenna
- Wastewater treatment plants

Comparing Options

- Ease of start-up, implementation,
- Technical complexity in design, construction, operations
- Contractual complexity
- Rate(s) paid

Comparing Options (2)

- Any size = “self-service power”
- Any size = RECs for sale
- <30 kW = net metering
- <100 kW, Detroit Edison R-DG
- >100 kW, “avoided cost” contract

Renewable Energy Certificates

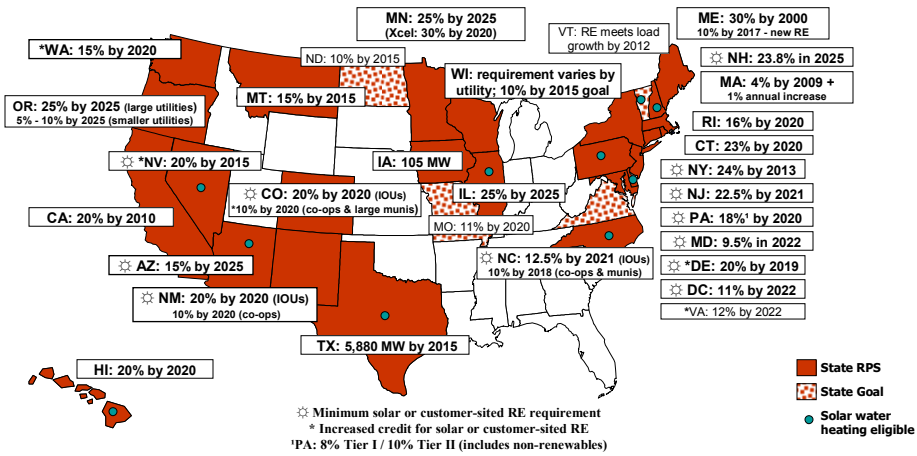
- 7 Michigan regulated utilities + 3 municipals currently offering “green rates” (15,000+)
- 54 U.S. commercial and wholesale REC marketers; 30 U.S. retail REC products
- 7 REC Tracking & Consumer Protection Organizations in U.S.
- Trading in both Utility Green Energy & Carbon Markets
- See Midwest Renewable Energy Tracking System – www.m-rets.com

Attention to policies

- Barriers:
 - What are they?
 - How are they being addressed?
 - Who is addressing them?
 - If I care, how can I help?

Source: www.dsireusa.org September 2007

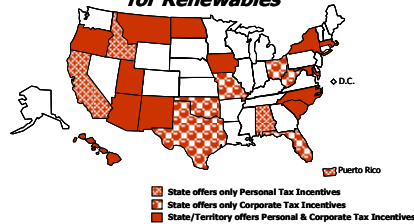
Renewables Portfolio Standards



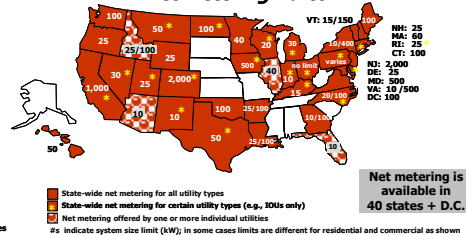
12 new higher standards since 2003; 8 since 2007; Michigan on tap? HB4562

Other related policies

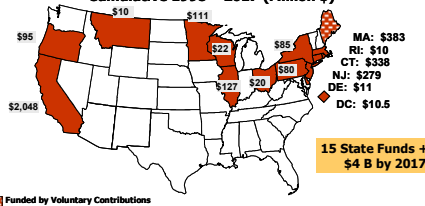
State Tax Credits & Deductions for Renewables



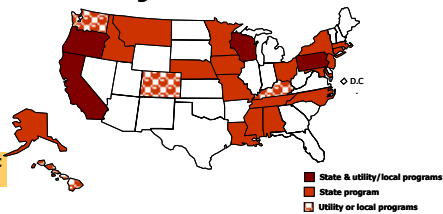
Net Metering Rules



Public Benefit Funds for Renewables Cumulative 1998 - 2017 (Million \$)



Loan Programs for Renewables



Overlay: States with carbon emissions standards



See: www.westcarb.org, www.westgov.org, www.rggi.org,
www.pewclimate.org

Basic Features of RPSs

- What LSEs are covered?
- Starting & ending year?
- What are the targets & who, when, how can they be changed?
- What happens if the targets are not met? Alternative compliance payments (ACP) &/or penalties?

Basic Features of RPSs (2)

- What technologies/system types are included?
 - New versus pre-existing?
 - Set-asides or carve-outs for specific technologies?
 - In- vs. out-of-state?
- How are renewable energy certificates (RECs) included?
- What other supporting policies are in place?

Summary of State RPS Programs

State	Start Year	Target Year	Start %	Target %	ACP? (\$/kWh)	Muni's Covered?	New / Existing?	Set-Asides?	Uses RECs?	Choice State?
Arizona	2001	2012	0.2	1.1		Limited	New	Solar		Y
California		2010		20	SEP	Limited	Both	N		N ²
Colorado	2007	2015	3	10		Limited	Both	Solar	Y	N
Connecticut ¹⁵	2004	2010	4	14	Y	Exempt	Both	N	Y	Y
D.C.	2007	2022	4	11	Y	No munis	Both	Solar	Y	Y
Delaware	2007	2019	1	10	Y	Limited	Both ¹⁰	Y ⁸	Y	Y
Hawaii	2003	2020	7	20		No munis	Both	N		N
Illinois ¹	2007	2013	2	8			Both	Wind		Y
Iowa ¹⁶						Exempt		N		N
Maine	2000	2000		30		Exempt	Both	N	Y	Y
Maryland	2006	2019	3.5	7.5	Y	Limited	Both	Y ⁸	Y	Y
Massachusetts	2003	2009	1	4 ¹³	Y	Exempt	New	N	Y	Y
Michigan Proposal	2007	2025	3.3	?	0.01	?	Both	N	Y	Y
Minnesota ¹	2005	2015	1	10			Both	Biomass		N
Montana	2008	2015	5	15	Y	Limited	Both ¹¹	N	Y	Y ³
Nevada	2005	2015	6	20	Y	Exempt	Both	Solar	Y	Y
New Jersey	2004	2020	3.25	22.5	Y	Exempt	Both ¹¹	Solar	Y	Y
New Mexico	2006	2011	5	10		Exempt	Both	Y ⁸	Y	N ²
New York		2013	19	24		Exempt	New	Y ⁷	N	Y
Pennsylvania	2007	2020	5.7	18	Y	Exempt	Both	Solar	Y	Y
Rhode Island	2007	2019	3	16	Y	Exempt	Both ¹⁰	N	Y	Y
Texas	2007	2015			Y	Limited	New	Y ⁸	Y	Y
Vermont ¹	2005	2012 ¹⁴			Y		New	N	Y	N
Wisconsin		2015		10		Yes	Both	N	Y	N

Notes: ¹ This state has established a voluntary goal, rather than a mandatory RPS.

² This state has formally reversed, suspended, or delayed restructuring.

³ This state has limited restructuring.

⁴ This state provides extra credit toward RPS compliance for solar PV, fuel cells, and wind turbines.

⁵ This state provides extra credit toward RPS compliance for solar PV, wind, and methane.

⁶ This state provides extra credit toward RPS compliance for biomass, solar, geothermal, landfill gas or fuel cells.

⁷ New York has a carve-out for customer-sited generation.

⁸ Texas requires at least 500 MW from renewable sources other than wind.

⁹ Data from Wiser (2006), Lawrence Berkeley National Laboratory. See <weblink>.

¹⁰ RPS limits the amount of existing renewables that can be used to meet annual requirements.

¹¹ Out-of-state renewables must be new.

¹² Certain existing renewable energy facilities may be eligible if they demonstrate a need for financial support.

¹³ Ending Percentage increases 1% per year until DOER end the program.

¹⁴ Vermont's total incremental energy growth between 2005 and 2012 is to be met with new renewables. (10% cap)

¹⁵ States with rows shaded gray do not have utility green pricing programs. States with rows shaded green mandate their utilities to offer green pricing programs. States with rows not shaded have both an RPS and utility green rate programs. No states with both allow sales to the green rate programs to count towards RPS requirements. (Source for Green Pricing data is National Renewable Energy Laboratory, July 2006; <http://www.eere.energy.gov/greenpower/markets/pricing.shtml?page=0>).

RPS Consistency?

States shaded green recently increased their RPS goals & duration.

Lowest goal = 4% (MA). Highest = 40% (ME).

State	Goal %	State	Goal %
HI	20	ME	40
WI	10	NM	20
CO	10	RI	16
OR	25	NJ	22.5
MN	10	IL	25
PA	18	NH	23.8
NC	12.5	DE	20

RPS Consistency?

States shaded green recently increased their RPS goals & duration, but only DE increased its growth rate in new % per year.

State	Goal %	New %/yr	State	Goal %	New %/yr
HI	20	0.8	ME	40	1.0
WI	10	0.8	NM	20	1.1
CO	10	0.9	RI	16	1.1
OR	25	0.9	NJ	22.5	1.2
MN	10	0.9	IL	25	1.3
PA	18	0.9	NH	23.8	1.3
NC	12.5	1.0	DE	20	1.6

Alternative Approach: Feed-In-Tariffs

- a.k.a. REFITs, ARTs, SOCs
- Set prices for renewables by type
 - Prices set on cost-plus basis
- Guaranteed grid access
- All comers receive standard offer price, typically for 20-years
- Prices set to decline over time, as technologies mature
- Examples: Germany, other EU countries, Ontario
- See Herman Scheer's work:
<http://www.hermanscheer.de/en/>

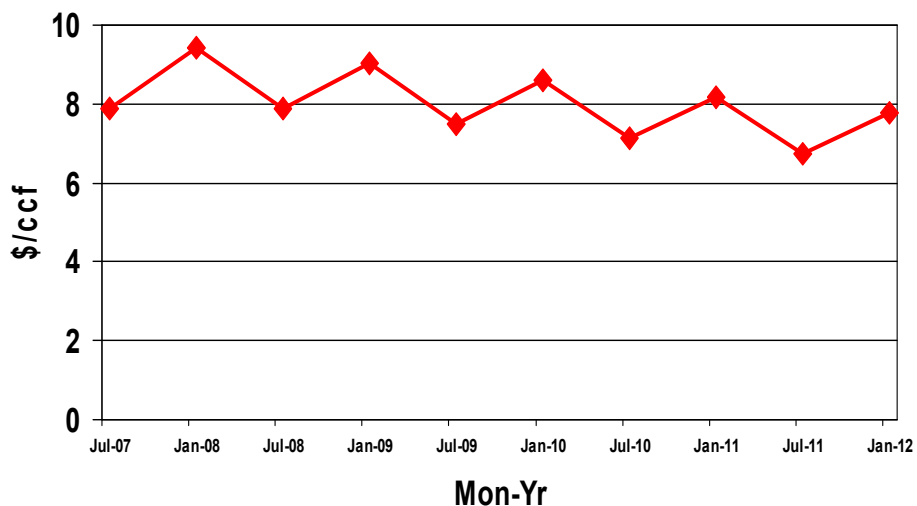
Financing

- Incentives?
- Grants?
- Loan terms?
- See www.dsireusa.org

Tax incentives & credits?

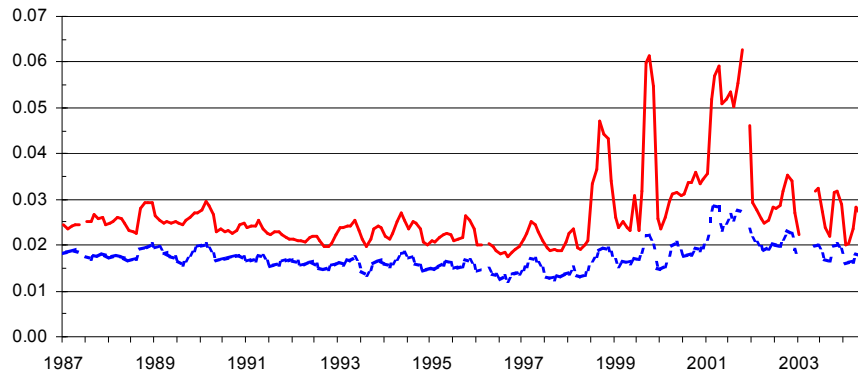
- U.S. Congress Energy Bills in play today
- MEDC can help you understand Michigan new tax structure and how it plays with NextEnergy incentives

Natural Gas Price Futures Forecast by MichCon (Dec-06)



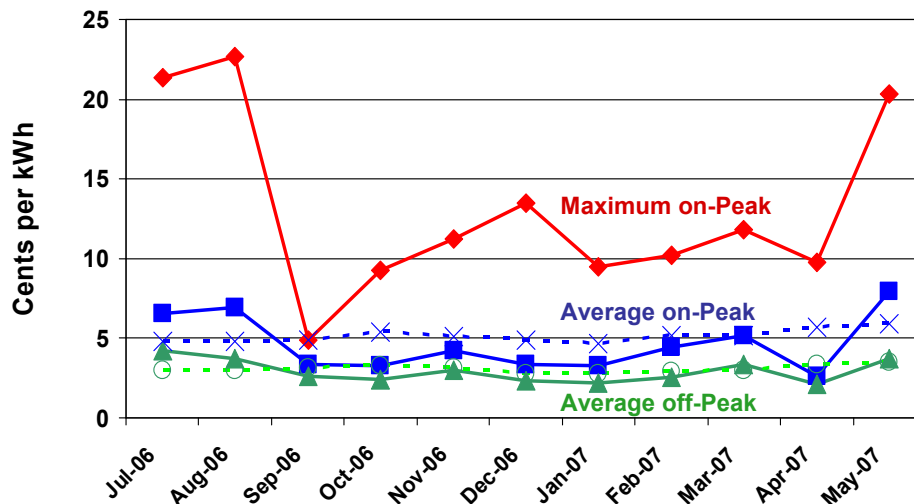
Monthly Average Highest Cost Power Production/Purchase (TIC)

Consumers Energy Co. Energy-Only Purchase Price,
On-Peak & Off-Peak, 1987-2003 (\$/kWh)



Data from Rate CG: On-Peak (7a-10p; top line) & Off-Peak (bottom line) price of top 10 MW of generation and interchange power sources, calculated as "the rolling average of the three consecutive months ending on the last day of the second month prior to the month purchases are made."

Actual Electricity "Avoided Costs" from Consumers Energy & Detroit Edison (Jul-06 – May-07)



Learn more...

- www.michigan.gov/mrep
- www.michigan.gov/eorenew
- [www.greatlakeswiki.org/
index.php/Green Energy](http://www.greatlakeswiki.org/index.php/Green_Energy)
- [www.eere.energy.gov/
greenpower](http://www.eere.energy.gov/greenpower)