Michigan Electric Capacity Need Forum

Michigan Senate Committee on Technology and Energy and Michigan House Committee on Energy and Technology

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Capacity Need Topics

- Capacity Need Forum Goals and Process
- Forum's Electric Generation Need Forecast
- Policy Issues identified by Forum Participants

Commission Order U-14231

- Need for reliable, reasonably priced power
- Observed age of baseload generation
- Difficulty in siting and financing new generation and transmission facilities
- Recent additions to Michigan generation have been fueled by natural gas
- Provide guidance to developers for new plant construction
- Commission expressed interest in analyzing all options

U-14231 (Continued)

- Capacity Need Forum Goals
  - Comprehensive assessment of need for additional generation in Michigan
  - Review and recommendation regarding Commission's resource addition policy
- Participatory Process

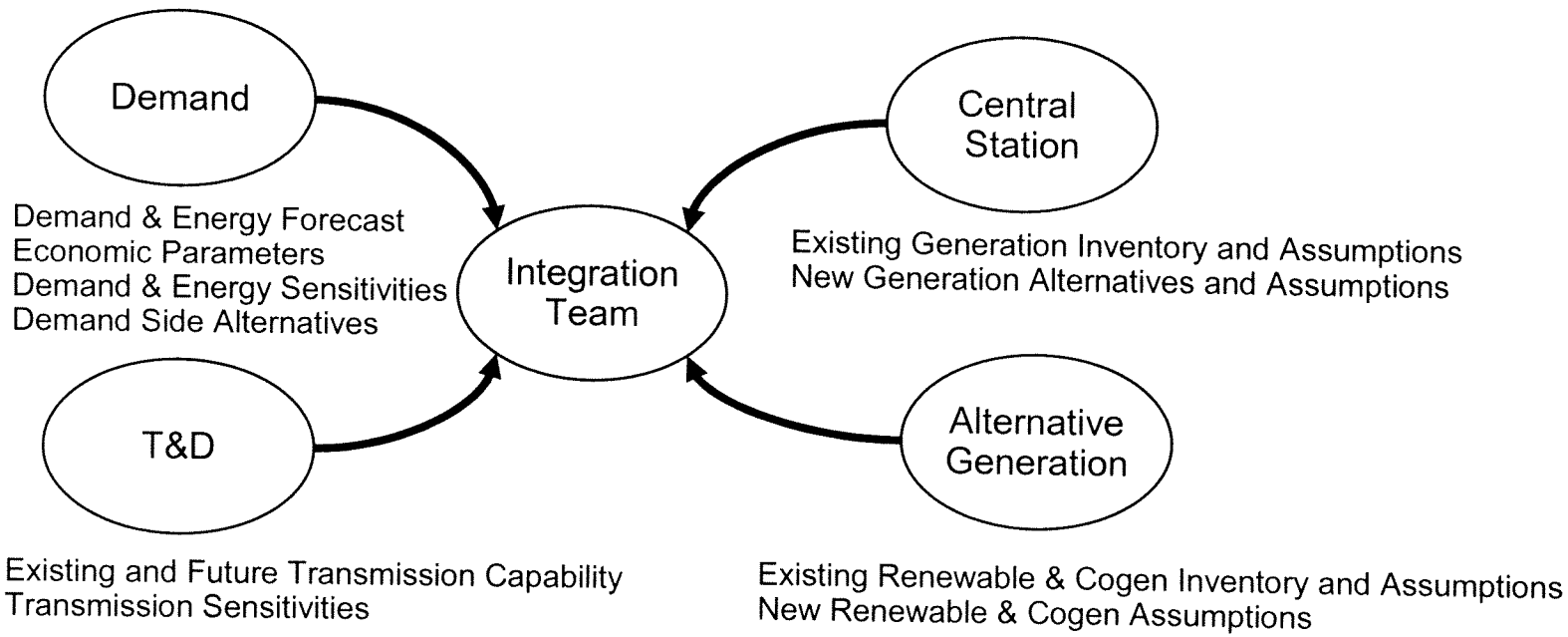
Electric Generation Adequacy

Process of Assessing Adequacy

- Forecast of energy and demand growth over short-, intermediate-, and long-term future
- Inventory of current assets (generation and transmission)
- Assessment of adequacy of current assets
- If needed, determination of best resources to acquire

Capacity Need Forum Process Overview

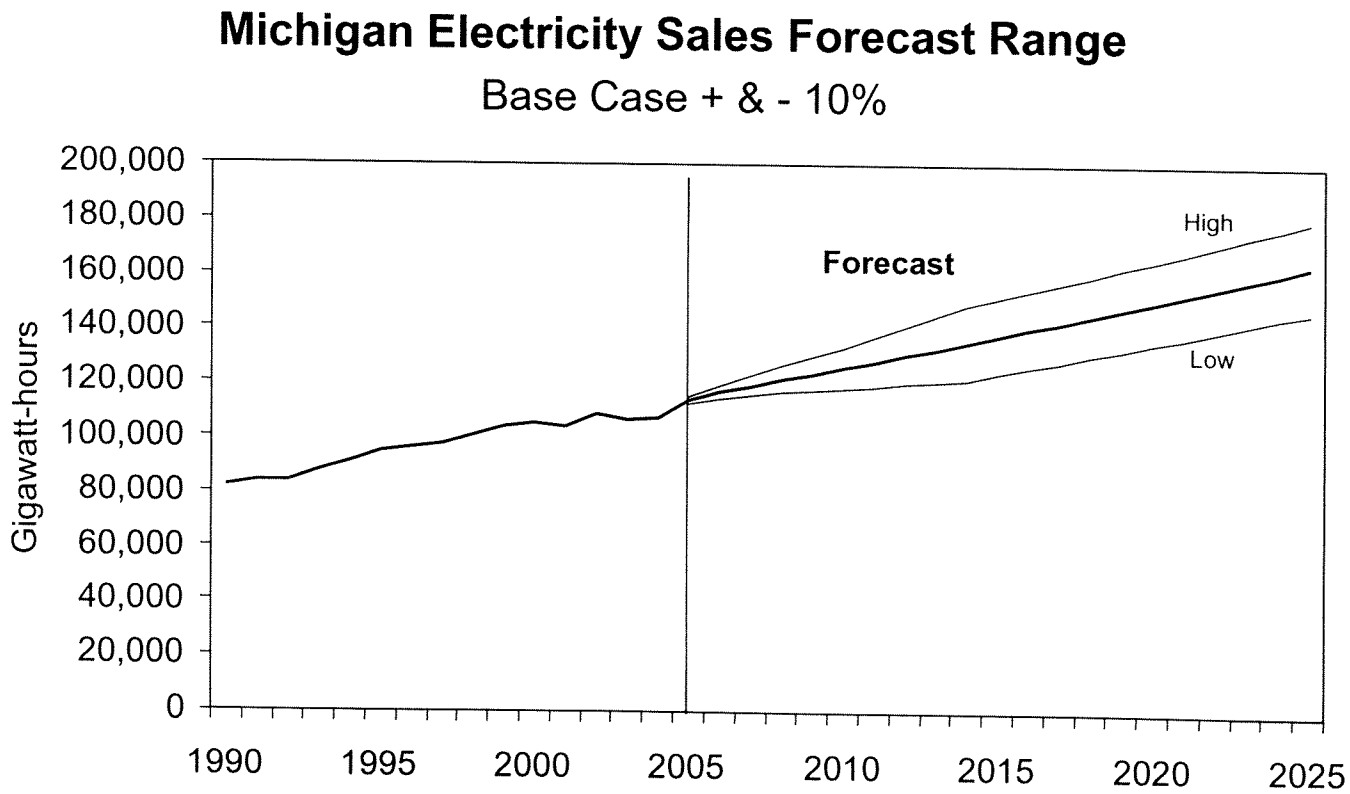
- Work Group Teams



Michigan Electric Demand and Energy Forecast

- Total energy sales growth 1.8%
  - Southeast Michigan energy growth 1.8%
  - Balance of Lower Peninsula growth 1.9%
  - Upper Peninsula growth .9%
- Total electric demand growth 2.1%
  - Southeast Michigan growth 1.7%
  - Balance of Lower Peninsula growth 2.7%
  - Upper Peninsula growth .9%

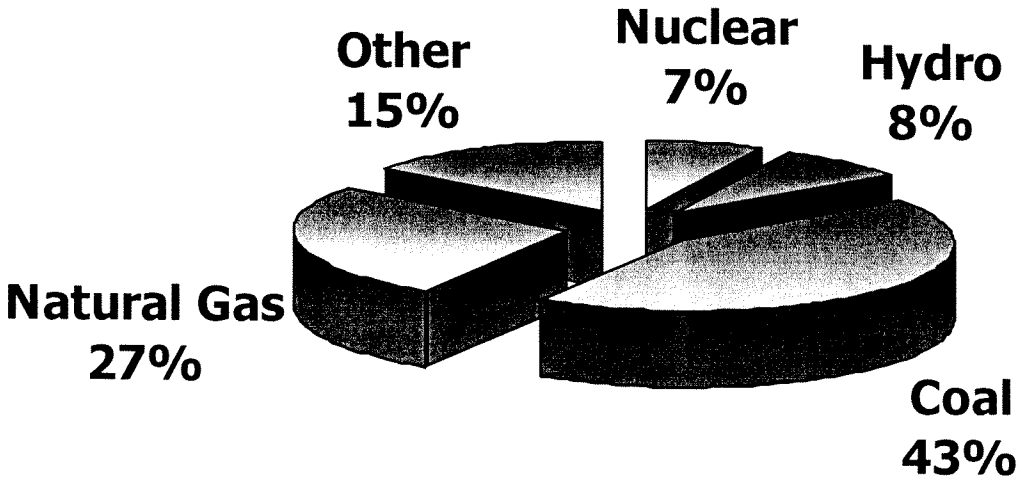
Michigan Energy Sales Forecasts



Prepared by: Demand Working Group Capacity Needs Forum, June 2005

Lower Peninsula Electric Generating Capacity

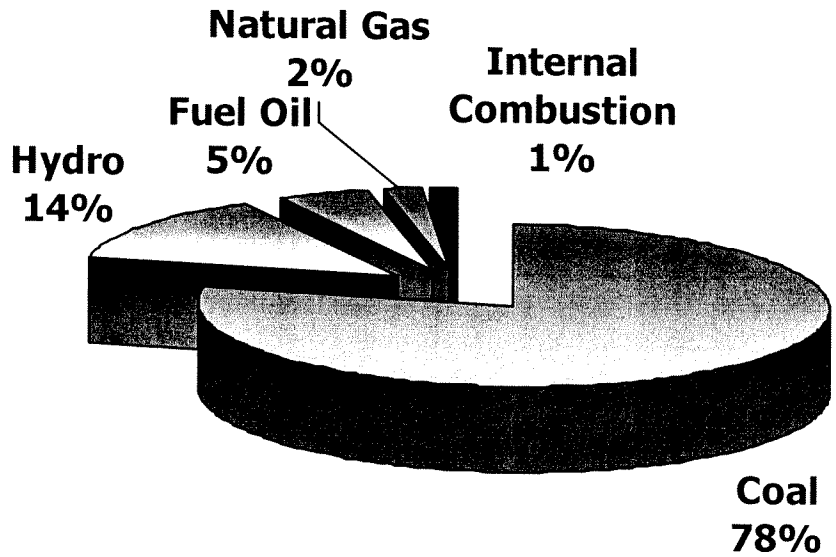
Central Station Work Group



Total Generating Capacity 27,300 MW

Upper Peninsula Electric Generating Capacity

Central Station Work Group

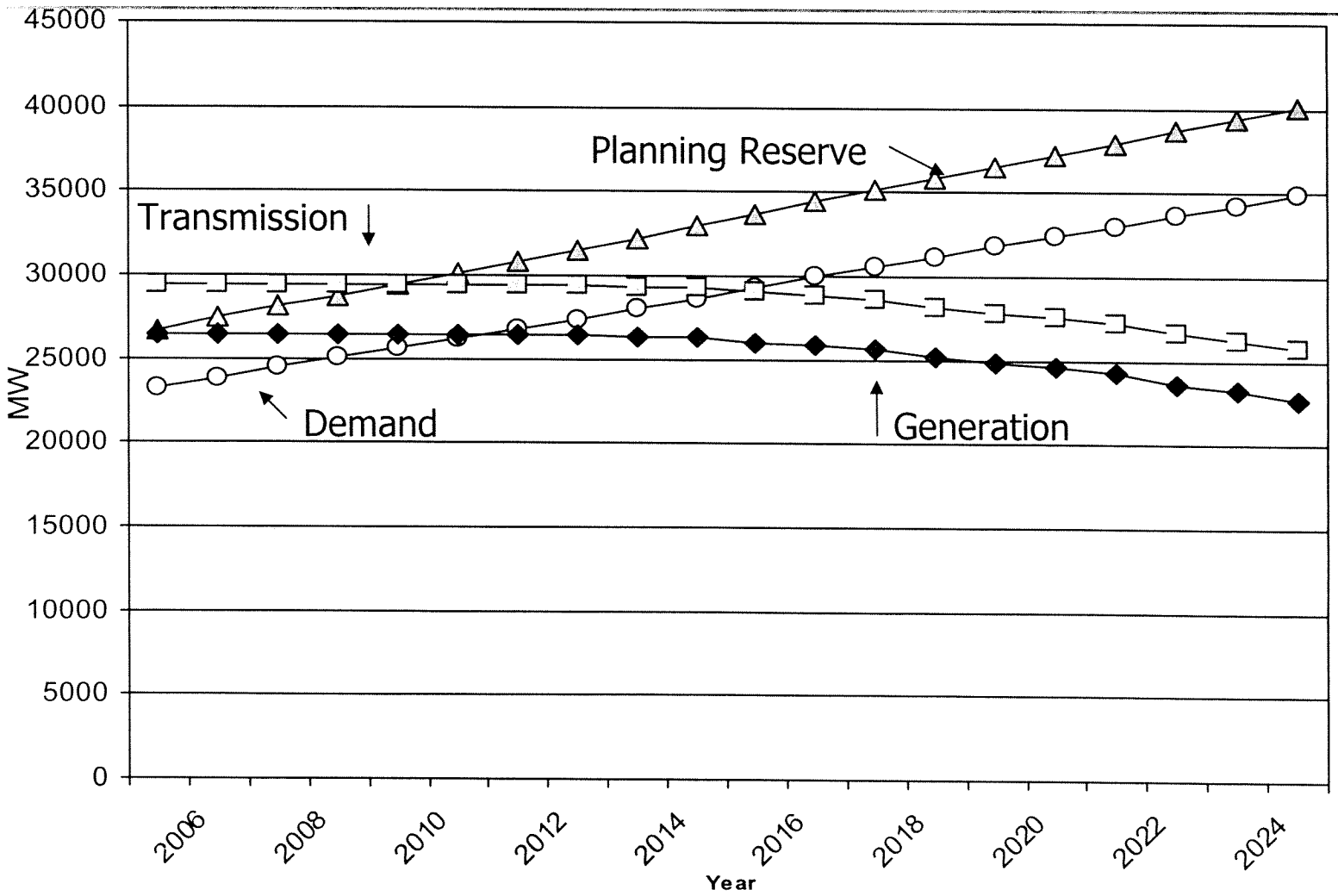


Total Generating Capacity 934 MW

Transmission Capability Into Michigan

- Lower Peninsula 3,000 MW for 2009
  - 0 flow to Ontario
  - 1,500 MW flow to Ontario
- Upper Peninsula
  - 2005 224 MW
  - 2006 300 MW
  - 2007 300 MW
  - 2008 325 MW
  - 2009 525 MW

Overview of Michigan Electricity Planning



"With Support" system – Summary

Reliability Modeling

(IESO Phase Shifter Flow = 0 MW)

Integration Work Group

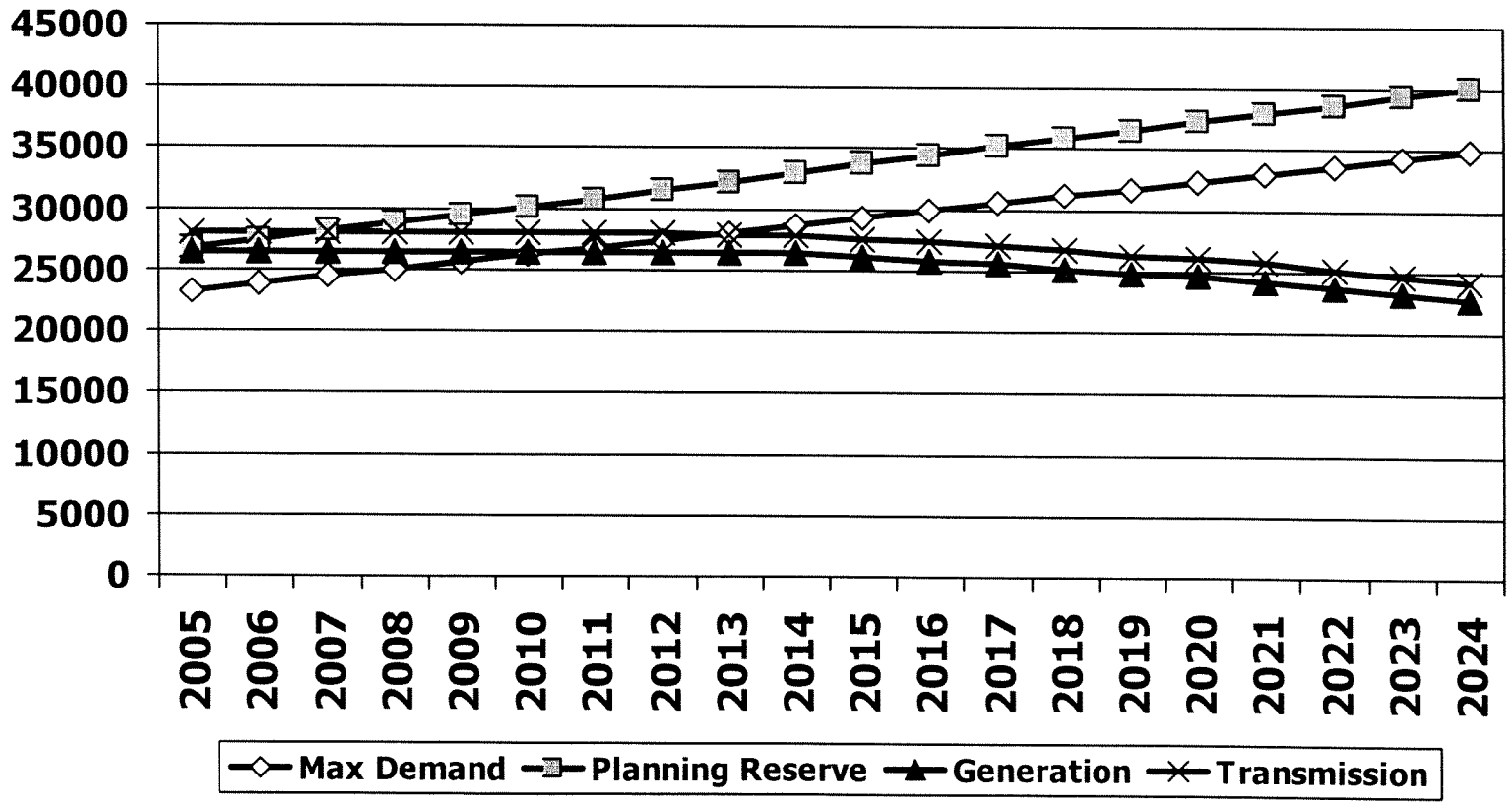
IESO Phase Shifter Flow = 0 MW								
			BaseCase		High Growth		Low Growth	
	Imports	Import		Additional Imports		Additional Imports		Additional Imports
Sink	From	Value	LOLP	Needed	LOLP	Needed	LOLP	Needed
ITC	MAIN	3000	0.69	880	2.2	1540	0.16	None
	TVA	2800	1.03	1050	3.03	1700	0.26	400
	VACAR	2700	1.24	1100	3.55	1800	0.33	450
	MAAC	2500	1.76	1350	4.75	1980	0.51	630
	ALL	2800	1.03	1050	3.03	1700	0.26	400
METC	MAIN	3800	0	(-) 3360	0	(-) 2800	N/A	
	TVA	3500	0	(-) 2645	0	(-) 2375	N/A	
	VACAR	3250	0	(-) 3720	0	(-) 2160	N/A	
	MAAC	3000	0	(-) 2530	0	(-) 1980	N/A	
	ALL	3500	0	(-) 2645	0	(-) 2375	N/A	
MECS	MAIN	3250	0.13	120	0.8	1440	0	(-) 1200
	TVA	3000	0.2	440	1.03	1540	0	(-) 880
	VACAR	3000	0.2	440	1.03	1540	0	(-) 880
	MAAC	2800	0.28	630	1.24	1890	0	(-) 630
	ALL	3000	0.2	440	1.03	1540	0	(-) 880

Note: A negative sign for "Additional Imports Needed" indicates the capacity a given area can export before reaching the criteria limit.

Source: Midwest Independent System Operator

Overview of Michigan Electric Planning:

1,500 MW Transmission Unavailable



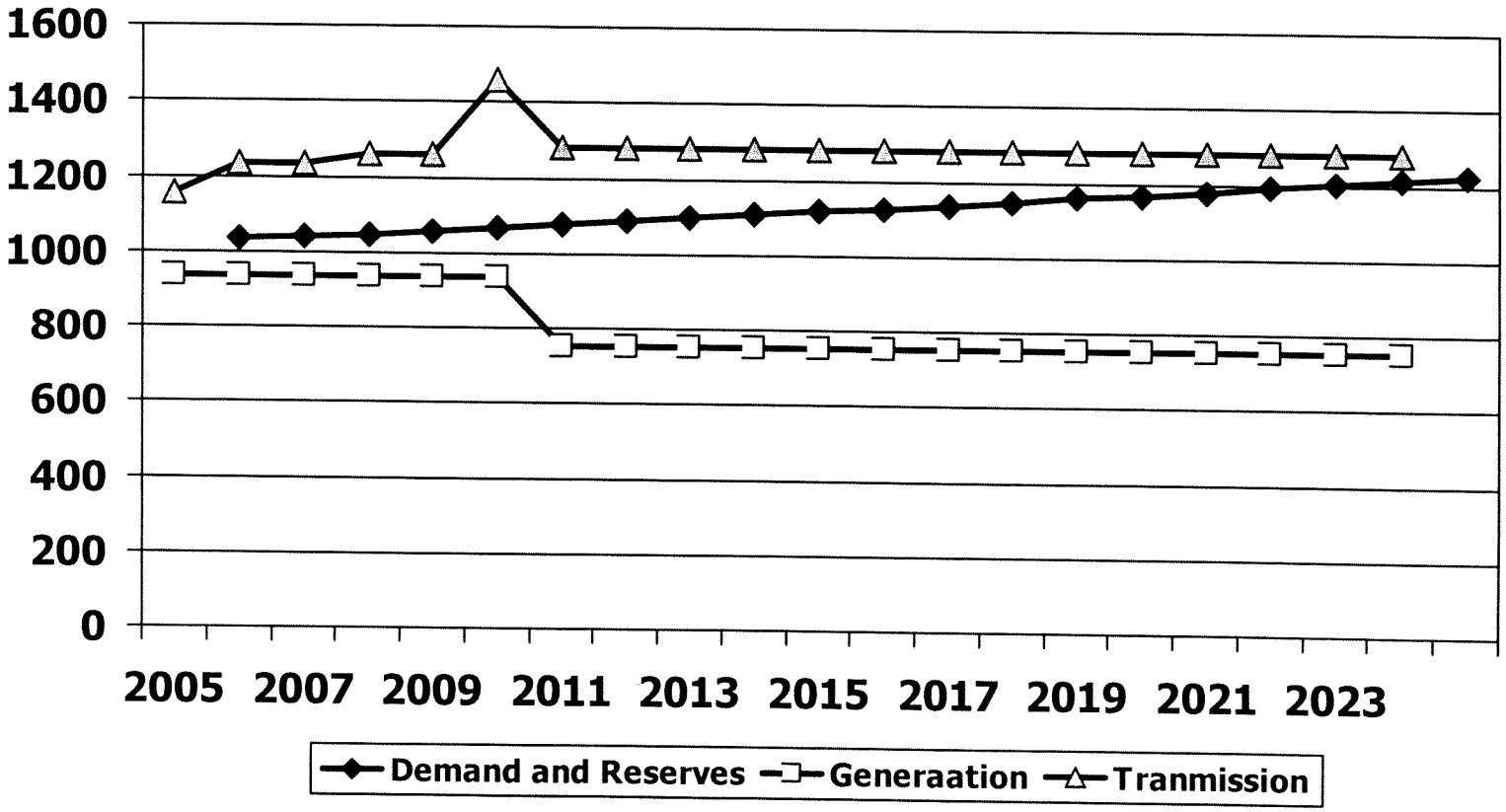
"With Support" system – Summary
(IESO Phase Shifter Flow = 1500 MW)

IESO Phase Shifter Flow = 1500 MW								
			BaseCase		High Growth		Low Growth	
	Imports	Import		Additional Imports		Additional Imports		Additional Imports
Sink	From	Value	LOLP	Needed	LOLP	Needed	LOLP	Needed
ITC	MAIN	1750	5.62	2080	11.33	2700	2.14	1430
	TVA	1750	same as above					
	VACAR	1500	7.63	2145	14.33	> 2200	3.22	1650
	MAAC	1500	same as above					
	ALL	1500						
METC	MAIN	1000	0.02	(-) 560	0.13	70	0	(-) 1120
	TVA	1000	same as above					
	VACAR	1000						
	MAAC	1000						
	ALL	1000						
MECS	MAIN	1500	1.33	1870	3.9	> 2200	0.3	660
	TVA	1500	same as above					
	VACAR	1500						
	MAAC	1250	1.68	1800	4.87	> 1800	0.43	900
	ALL	1250	same as above					

Note: A negative sign for "Additional Imports Needed" indicates the capacity a given area can export before reaching the criteria limit.

Source: Midwest Independent System Operator

Overview of Electric Planning: Upper Peninsula



Central Station Generation Options and Costs

Technology	Size (Mw's)	Construction Cost $/Kw	Fixed O&M $/Kw	Variable O&M $/Mwh	Heat Rate BTU/kwh
Pulverized Coal Sub-critical	500	1,370	42.97	1.80	9,496
Pulverized Coal Supercritical	500	1,437	43.60	1.70	8,864
Fluidized Bed	300	1,505	44.77	4.24	9,996
IGCC	550	1,647	59.52	0.95	9,000
IGCC - PRB	550	1,845	59.52	0.95	10,080
Nuclear	1,000	2,180	67.90	0.53	10,400
Combined Cycle	500	467	5.41	2.12	7,200
Combustion Turbine	160	375	2.12	3.71	10,450

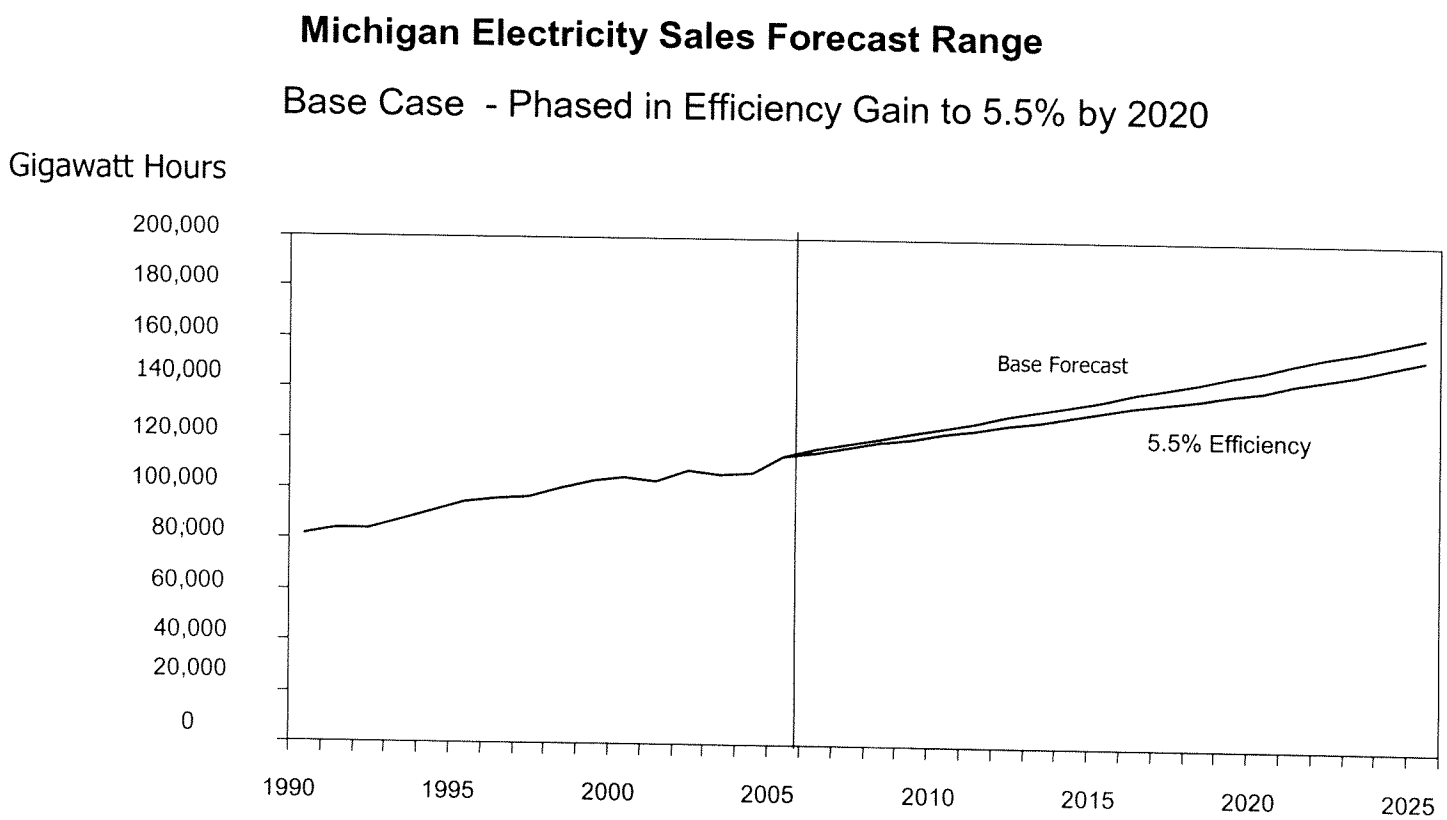
Alternative Generating Options and Costs

Technology	Capacity	$/KW	$/KWh
■ Landfill Gas			
– Expansion	44 MW	1,000	.048
– New	104 MW	1,200	.048
■ Anaerobic Digestion	51 MW	2,500	.025
■ Wind	415 MW	1,200	.010
■ Combined Heat and Power			
– Coal	182 MW	1,800	.02
– Natural Gas	365 MW	900	.04

New Transmission Options
Transmission Work Group

- TIER I Transmission upgrades into Lower Peninsula
  - 1,000 MW
  - $100 Million
- TIER II Transmission upgrades into Lower Peninsula
  - 1,500 to 2,000 MW
  - $500 to $700 Million

Demand Work Group Base and Energy Efficiency Forecasts



Prepared by: Demand Working Group Capacity Needs Forum, June 2005

Managing Risks
Integration Work Group

- Scenarios
  - Traditional
  - Emissions
  - Energy Efficiency
  - Renewable Energy
- Sensitivities
  - Demand Growth
  - High Fuel Price
  - Transmission Capability

Capacity Need Forum Proposed Integration Scenarios

	Traditional Power	Emissions	Energy Conservation	Non-Traditional
	Assume Clean Air Interstate Rule and Clean Air Mercury Rule for environmental regulations.	Mercury removal requirements raised to 85% from 1999 baseline emissions in 2018. Carbon tax at $30 per ton carbon by 2018.	Energy conservation portfolio wired in. CT's maybe assumed to be demand control options.	Mandated Renewable Portfolio Standard of 3% by 2008, 5% by 2010 and 7% by 2015.
Resource Units				
PC Unit	X	X	X	
CT Unit	X	X	X	X
GCC Unit	X	X	X	X
IGCC Unit	X		X	X
IGCC C Seq.		X		
Nuclear Unit	X	X	X	X
Waste Energy			X	X
Wind Generation		X	X	X
Cogeneration		X		X
Energy Conservation			X	
Sensitivities				
High Load	X	X	X	X
Low Load	X		X	X
High Gas Cost	X	X	X	X
Max Import [1]	X			
Restricted Import[2]	X			
Non-Traditional with PC				X
Assumptions				
Normal price driven energy conservatio	X	X	X	
Carbon tax ($10.00=2010-$30.00=2018)[3]		X		
85% Mercury Emissions Removal		X		
IGCC has CO2 sequestering		X		
Max energy conservation options			X	
Maximum waste to energy				X
Maximum Cogeneration				X
Scale-up Renewables to Reflect RPS				X
Assumed Transfer Capability(Normal)	3,000-3,500	3,000-3,500	3,000-3,500	3,000-3,500

1) Teir 1 transmission upgrades
2) 1,500 MW transfer to OH
3) Nominal dollars

Summary of Expansion Plans

Plan Name	Total Capacity Added MW	CT Capacity MW	CC Capacity MW	PC Capacity MW	Nuclear Capacity MW	IGCC Capacity MW	Other Capacity MW	Ending Reserve Margin %	Ending Peak Demand MW	PVRR $M
Base	16,880	2,880	2,000	12,000	0	0	0	15.03%	34,880	$ 54,605.6
Base High Load	21,320	4,320	4,500	12,500	0	0	0	15.00%	38,368	$ 60,895.9
Base Low Load	12,780	1,280	2,000	9,500	0	0	0	15.42%	31,392	$ 48,710.8
Base High Gas	16,880	2,880	2000	12,000	0	0	0	15.03%	34,880	$ 56,282.2
Base High Import	16,900	2,400	1,500	13,500	0	0	0	15.38%	34,880	$ 54,242.0
Base Low Import	16,880	2,880	2,000	12,000	0	0	0	15.03%	34,880	$ 54,873.1
Emissions	17,187	2,720	1,000	4,500	8,000	0	967	15.03%	34,880	$ 66,002.9
Emissions High Load	21,687	2,720	3,000	6,000	9,000	0	967	15.87%	38,368	$ 77,407.4
Emissions High Gas	18,027	2,560	1,000	4,500	9,000		967	17.55%	34,880	$ 67,779.9
Energy Conservation	16,166	3,040	2,500	10,000	0	0	626	15.07%	34,880	$ 54,066.4
Energy Conservation High Load	21,806	3,680	4,000	13,500	0	0	626	15.30%	38,368	$ 64,080.5
Energy Conservation Low Load	12,886	1,760	1,500	9,500	0	0	626	15.14%	31,392	$ 51,322.2
Energy Conservation High Gas	16,166	3,040	2,000	10,500	0	0	626	15.22%	34,880	$ 55,639.9
Non-Traditional	17,577	3,520	1,000	0	0	11,550	1,507	15.57%	34,880	$ 57,480.9
Non-Traditional High Load	21,867	4,160	3,000	0	0	13,200	1,507	15.28%	38,368	$ 67,028.6
Non-Traditional Low Load	13,007	1,600	0	0	0	9,990	1,507	15.51%	31,392	$ 53,526.4
Non-Traditional High Gas	17,577	3,520	1,000	0	0	11,550	1,507	15.57%	34,880	$ 59,152.0
Non-Traditional with PC as an option	17,367	3,360	1,000	11,500	0	0	1,507	15.00%	34,880	$ 55,874.4

Lower Peninsula Planning Results

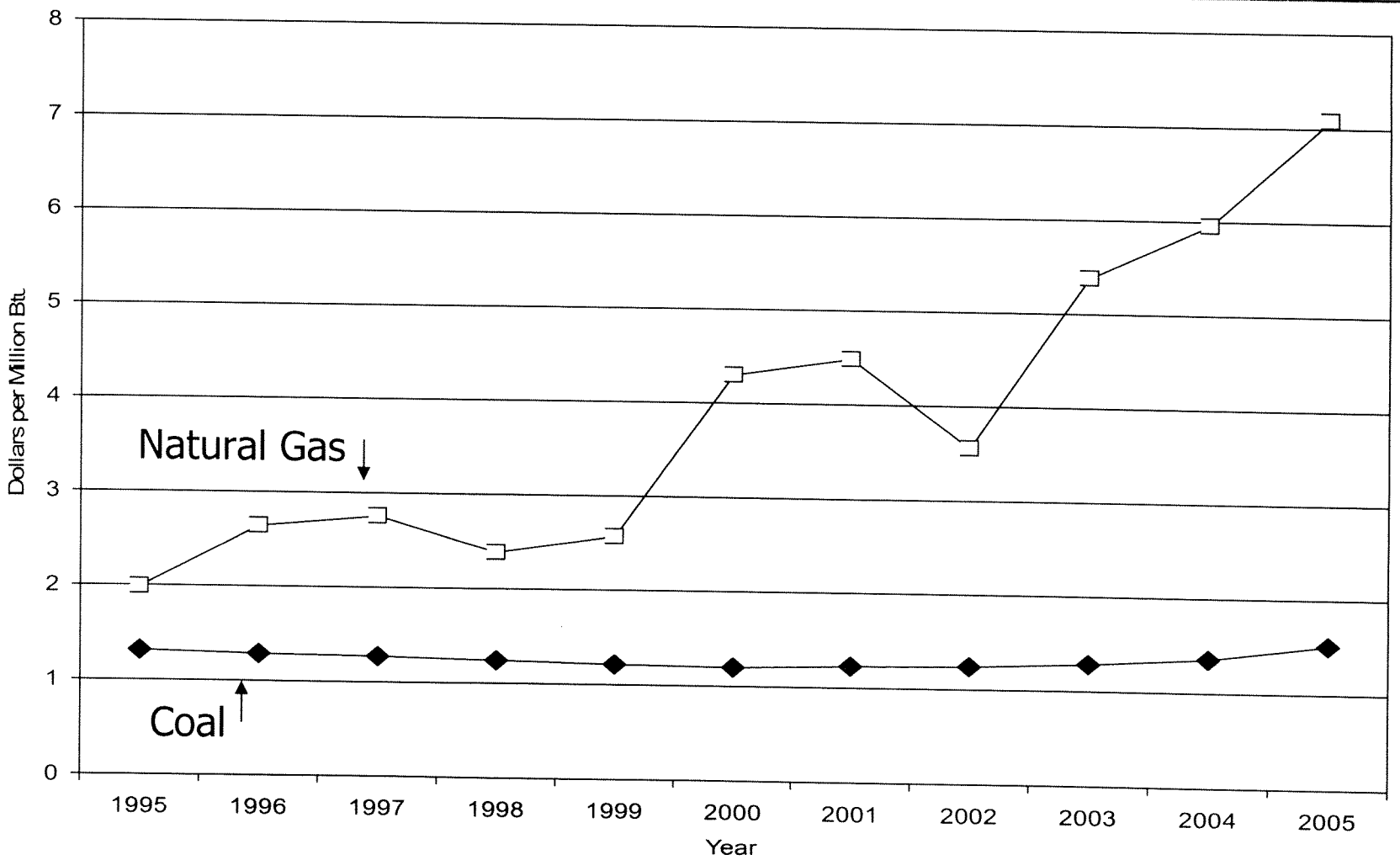
- Demand and energy expected to grow at about 2%
- Electric reliability sufficient until 2009
- Additional generation, transmission, or load management needed by 2009
- Economic supply of electricity will require 1 or 2 new base load generating plants, with first becoming operational in 2011-12

Upper Peninsula Planning Results

- Electric demand and energy expected to grow by about 1% annually
- Electric reliability sufficient if Northern Umbrella (NUP) Project proceeds on schedule
- Economic supply of power dependent on NUP and completion of new Wisconsin generating plants
- Additional study is underway to assess transmission from the Lower Peninsula
- Major contingencies include NUP schedule, Presque Isle units 1-4, and mine demand

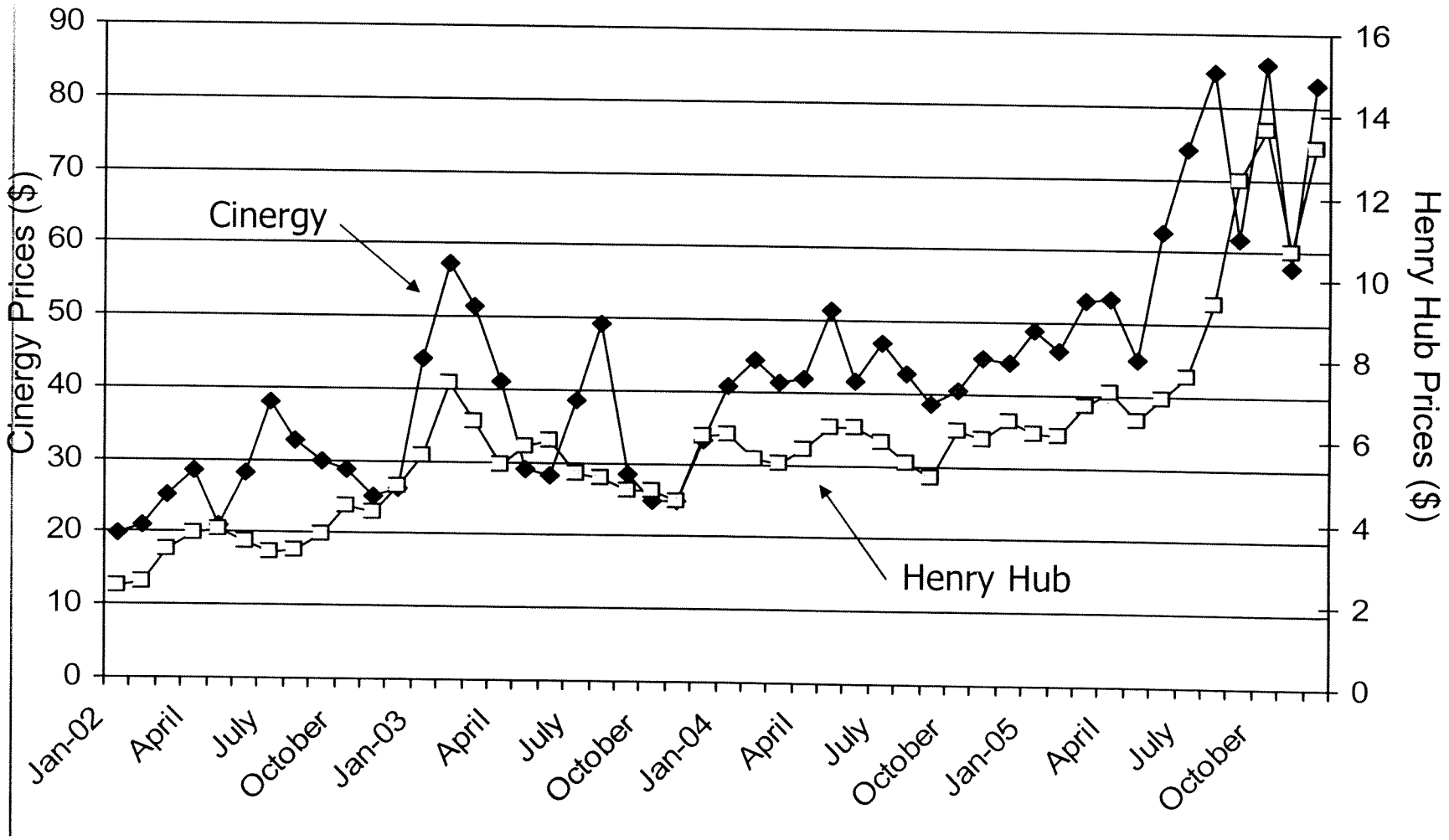
Cost of Fossil-Fuels Receipts at Electric Generating Plants

1995-2005 yearly averages



Cinergy/Henry Hub Historical Prices (in US Dollars)

January 2002-December 2005



Commission Policy
Utility Builds

- Utility finances construction
- CWIP is booked as part of rate base
- AFUDC is computed as an offset to CWIP
- Utility requests rate treatment for the plant, when completed
- Utility must demonstrate that the plant is used and useful
- Rate treatment includes return on and of capital based on net book plant so revenue requirement starts high and declines through time
- Revenue requirement charged to customers on average cost basis

Commission Policy
Utility Purchases Capacity

- Utility requests Act 304 approval for recovery of capacity payments
- Utility must demonstrate that capacity payments are reasonable
- Utility seeks recovery of demand and energy payments through PSCR

Policy Recommendation

- Will the Commission's current policy induce construction of new generation if needed?
- If not, what changes need to be made to the Commission's policy?

Policy Recommendation (Continued)

- Pre-approval
- Revenue certainty
- Financial support during construction (CWIP)
- Market Power

Recommendation for Changing Commission's Policy

- Encourage adoption of demand-side management, renewable resources, and combined heat and power installations, current policy does not encourage adoption of these resources
- Create fair and transparent bidding process with performance standards and proper risk allocation
- Involve MISO in process
- Revenue certainty should provide benefit for payment

Staff Reliability Option

- Upfront approval of proposed plant through contested case
  - Determination of need and type of plant
  - Enforceable commitment to cost and schedule
  - Demonstration of need for plant through comprehensive energy assessment of demand growth and resource options
- Utility may request CWIP without and AFUDC offset
- Utility may request a universal reliability charge
- All entities paying reliability charge entitled to prorated share of reliability value
- Alternate electric suppliers paying reliability charge entitled to one-time opportunity for prorated purchase of plant
- Fair and transparent competitive bidding mandatory
- Partnerships strongly encouraged

State Ratemaking Procedures

State	Customer Choice	Preapproval	CWIP without AFUDC
Illinois	Yes	No	NO
Indiana	No	Yes	Limited
Iowa	No	Yes	Yes
Minnesota	No	Yes	No
Ohio	Yes	No	No
Wisconsin	No	Yes	Yes

Michigan Electric Capacity Need Forum Source

- http://www.dleg.state.mi.us/mpsc/electric/capacity/cnf/index.htm
- grstoji@michigan.gov