THE FUTURE OF MERCHANT POWER PLANTS

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MAJOR CONCLUSIONS

- **There is growing concern over the developing shortage of Indiana utility-controlled generation capacity. SUFG expects the statewide reserve margin to fall below 15 percent this year when the generation deficit (including 15 percent reserves) is expected to be 400 MW, or about 2 percent of Indiana's current generating capacity.**

- **If, as the forecast predicts, electricity sales and peak demand grow at 1.8 percent per year (down from 2 percent in the 1996 forecast), SUFG projects the need for 2250 MW of new capacity by 2005, and an additional 5400 MW by 2016, the end of the forecast horizon.**

MAJOR CONCLUSIONS (Continued)

- **If the current regulatory framework is unchanged over the forecast horizon, SUFG predicts real (inflation adjusted) prices to fall at a rate of slightly less than 1 percent per year until 2003, when prices level out until the end of the forecast horizon when they are expected to increase slightly.**

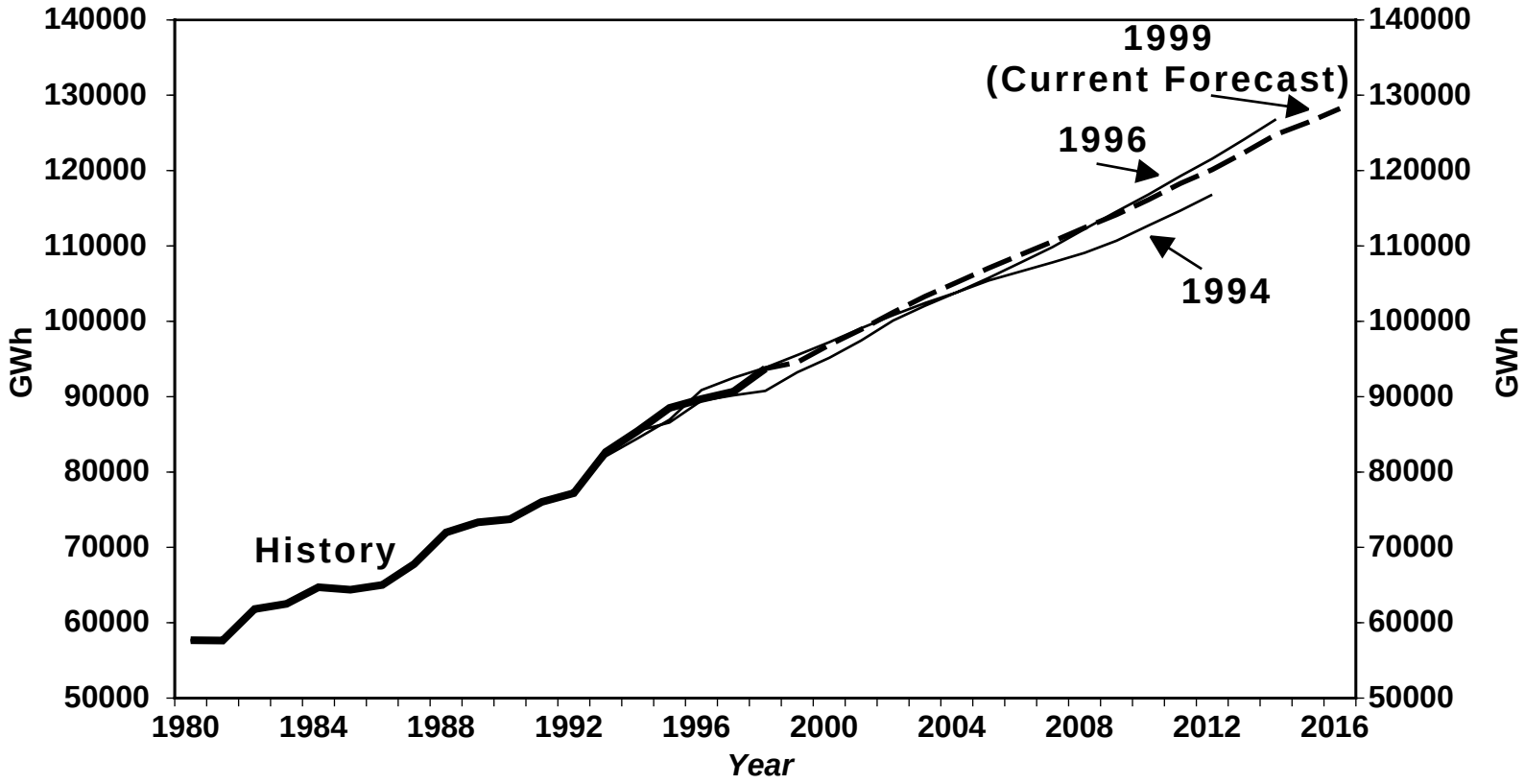
- **If, on the other hand, Indiana chose to allow competition among generators and competition works perfectly, SUFG would initially expect market clearing prices to drop below the level of prices that would prevail if regulation were to continue. SUFG would then expect competitive prices to rise quite rapidly as demand growth increases until such prices reach a point where new units are added at the long-run cost of electricity, which is slightly above the mid-term price under continued regulation.**

MAJOR CONCLUSIONS (Continued)

- **However, SUFG is doubtful that electricity markets will work perfectly; hence, the competitive price forecast should be considered as a lower limit on likely prices if competition is introduced. If market power is exercised by sellers, actual prices are not likely to be lower and could very likely be higher than those expected with perfect competition.**

- **In the long run, after the transition from regulation to competition is complete, SUFG would expect prices with competition to be lower than prices with continued regulation, as electricity generators are provided with greater incentives to reduce costs.**

INDIANA ELECTRICITY REQUIREMENTS IN GWh (HISTORICAL, CURRENT AND PREVIOUS FORECASTS)

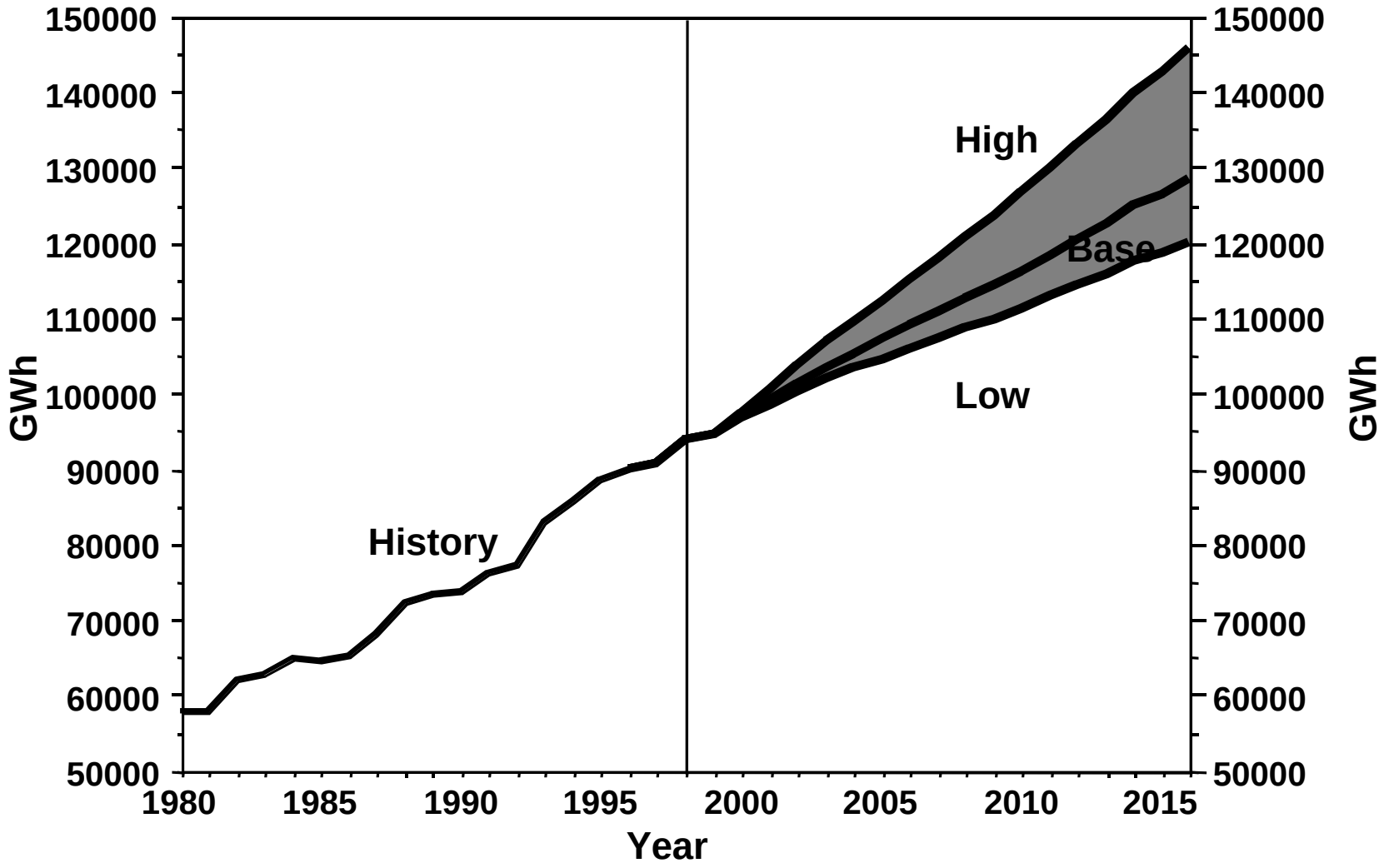


FORECAST ELECTRICITY CONSUMPTION (% GROWTH RATES)

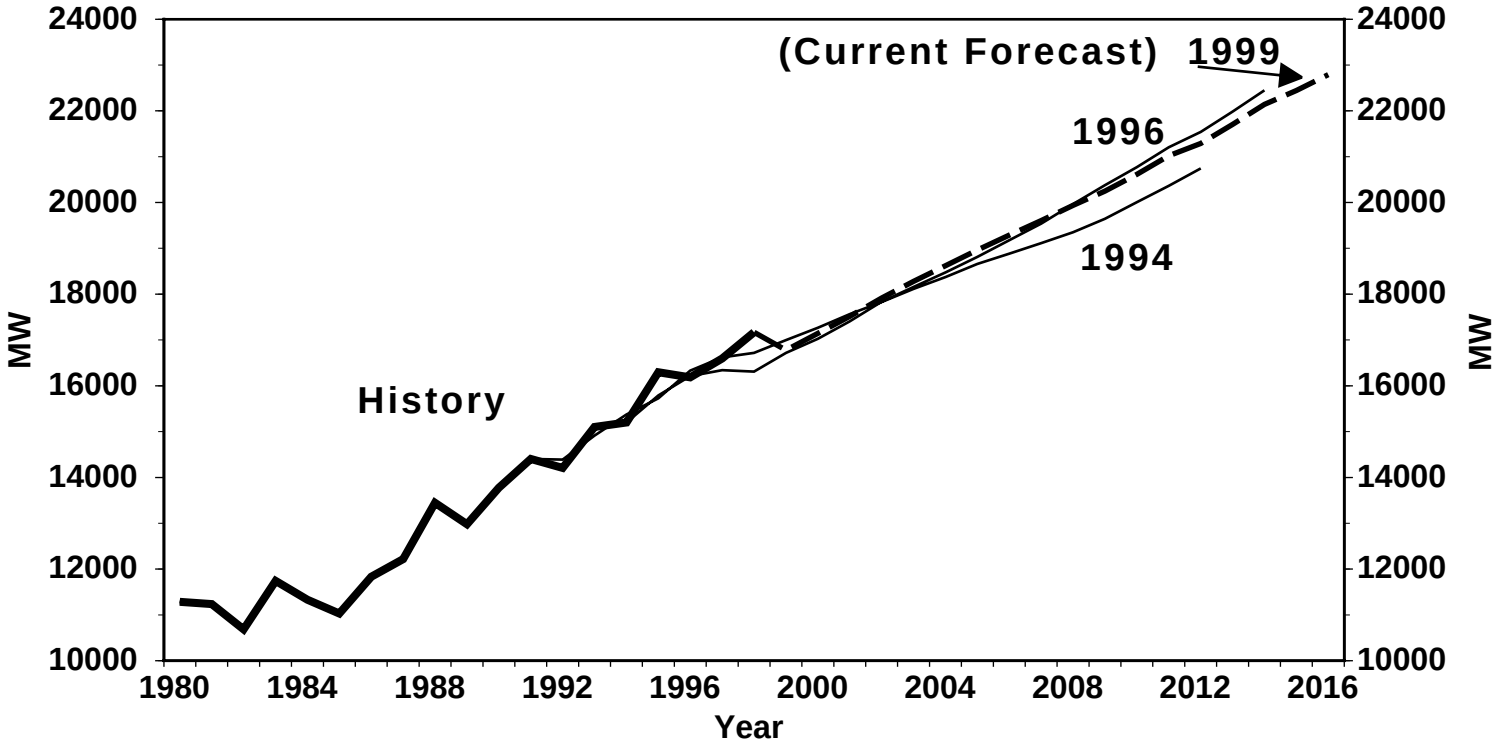
Sector	Utilization/ Unit (%)	# Units (%)	Total Growth Rates (%)
Residential	**1.01**	**0.66 (Customers)**	**1.67**
Commercial	**0.36**	**1.89 (Energy-Weighted Floorspace)**	**2.25**
Industrial	**0.23**	**1.44 (Outputs)**	**1.67**

- **Total residential growth primarily from increase in intensity (gadgets, AC).**
- **Commercial/industrial growth primarily from expansion of sector output.**

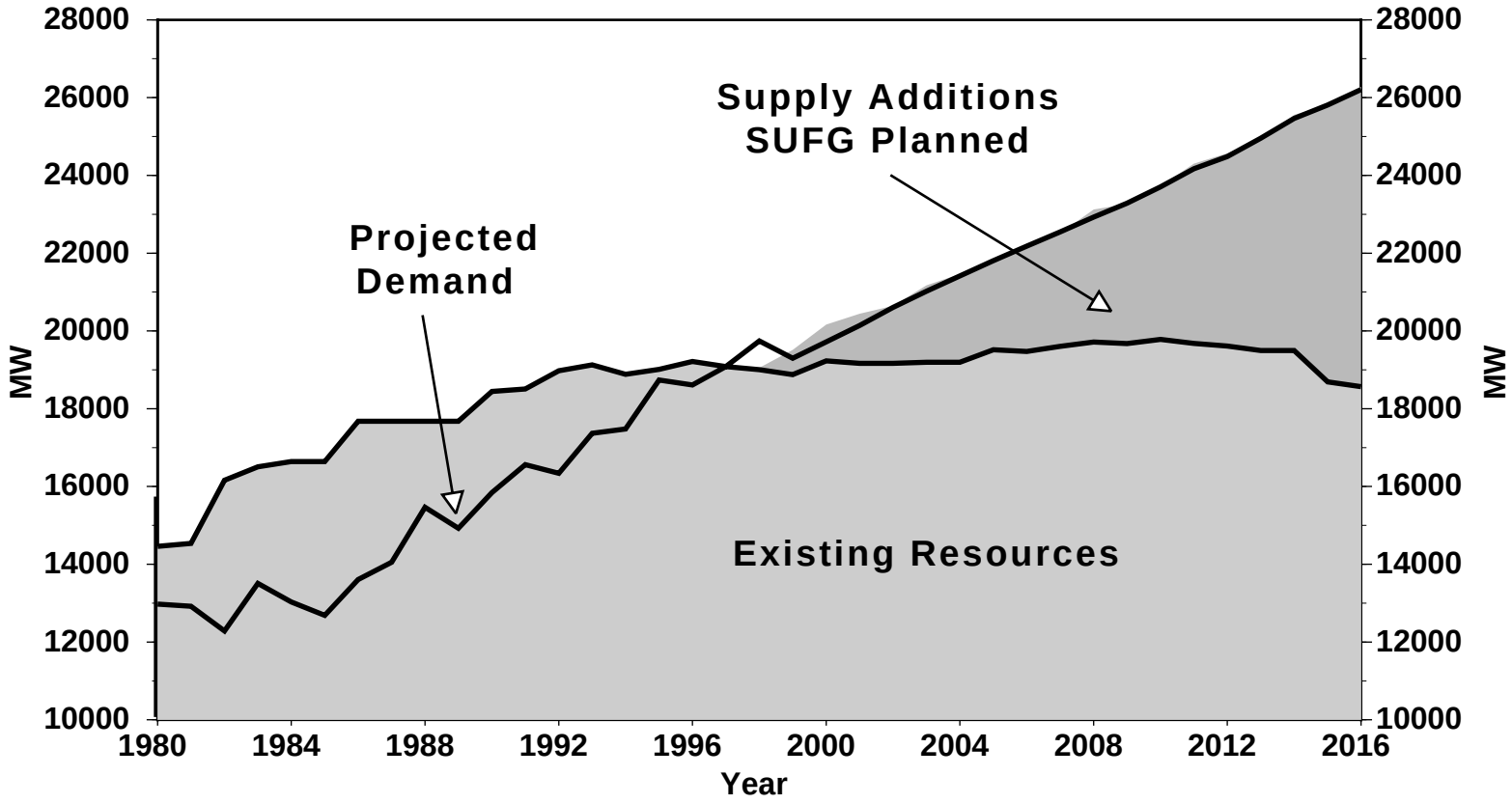
INDIANA ENERGY REQUIREMENTS BY SCENARIO IN GWh



INDIANA PEAK DEMAND REQUIREMENTS IN MW (HISTORY, CURRENT AND PREVIOUS SUFG BASE FORECASTS)



DEMAND AND SUPPLY IN MW (SUFG BASE) (INCLUDES 15 PERCENT RESERVES)

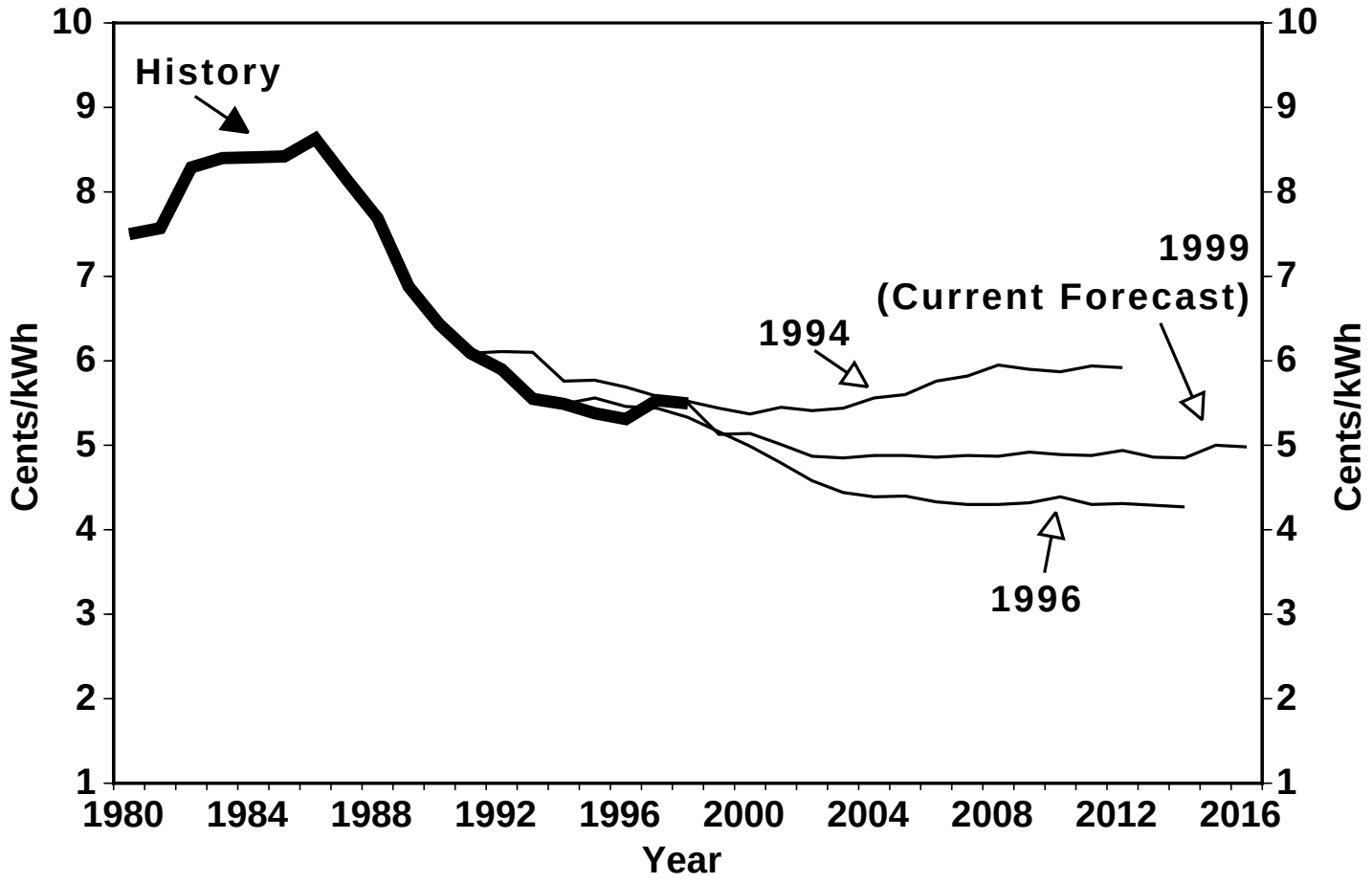


INDIANA RESOURCE PLAN (SUFG BASE)

Year	Demand	Capacity*	Additions (in MW)			Retired Penalty	Reserve Margin (%)	Comments
			Peaking	Cycling	Base Load			
1996	16184	19216	0	143	27	0	18.7	PSI adds Wabash River Repowering Project; SIGECO upgrades Culley Unit 3
1997	16596	19084	0	0	0	0	15.0	
1998	17168	19050	0	0	45	0	11.0	I&M upgrades Cook Unit 2 (Nuclear)
1999	16779	19520	600	0	0	0	16.3	
2000	17145	20174	300	0	0	0	17.7	I&M long-term firm sale expires
2001	17514	20460	350	0	0	0	16.8	
2002	17917	20660	0	200	0	0	15.3	
2003	18279	21190	0	0	500	0	15.9	
2004	18620	21490	300	0	0	0	15.4	
2005	18962	21810	0	0	0	0	15.0	I&M long-term firm sale expires
2006	19288	22267	0	0	500	43	15.4	NIPSCO retires Michigan City Units 9-12
2007	19604	22547	150	0	0	70	15.0	HEREC long-term firm sale expires; IPL retires Stout Units 3 and 4
2008	19936	23159	0	0	500	88	16.2	HEREC long-term firm sale expires; IPL retires Stout gas turbines 1-3; NIPSCO retires Bailly gas turbine 10
2009	20248	23295	0	175	0	39	15.0	IPL retires Pritchard Unit 1
2010	20614	23751	150	200	0	99	15.2	I&M long-term firm sale expires; IPL retires Pritchard Unit 2; NIPSCO retires Michigan City Unit 2
2011	21019	24323	0	175	500	103	15.7	IPL retires Pritchard Unit 3; NIPSCO retires Michigan City Unit 3
2012	21290	24583	125	200	0	0	15.5	
2013	21703	24940	275	200	0	118	14.9	IPL retires Pritchard Units 4 and 5
2014	22142	25565	125	0	500	0	15.5	
2015	22443	25812	375	675	0	804	15.0	I&M retires Tanners Creek Units 1-
2016	22789	26287	100	0	500	125	15.3	

*Includes installed capacity plus firm purchases minus firm sales.
Source: SUFG Modeling System and Utility IRP filings for retirements.

INDIANA REAL PRICE PROJECTIONS (1996 DOLLARS) (HISTORICAL, CURRENT AND PREVIOUS FORECASTS)



DSM

- **150 MW; large decrease from 1996.**

- **Previously:**
  - **1995: 250 MW**
  - **2000: 569 MW**
  - **2005: 792 MW**
  - **2010: 908 MW**

- **Interruptible: 540 MW; slight increase.**

- **Source: Utility IRP data.**

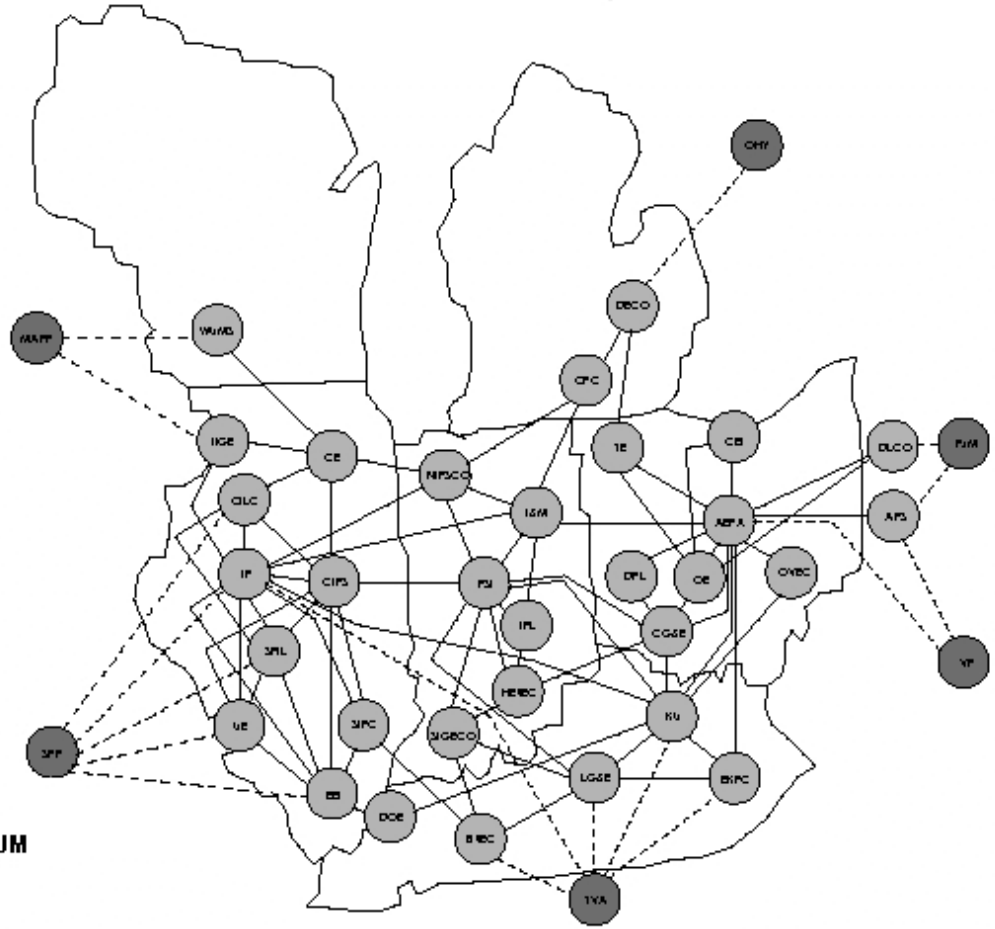
THE INDIANA ELECTRICITY INDUSTRY: TRADE AND PRICES UNDER RESTRUCTURING

- **Two major assumptions:**
  - **Perfect competition: marginal cost pricing scheme.**
  - **Imperfect competition: market price departs from marginal cost.**

PERFECT COMPETITION

- **Assumptions:**
  - **Power exchange for ECAR/MAIN.**
  - **Producers bid their marginal costs.**
  - **Consumers bid their reservation prices.**
- **Hourly prices are set at the marginal cost of the most expensive unit that is dispatched.**
- **No stranded cost recovery.**

SUFG's 1999 COMPETITIVE MODEL



Exogenous imports
and exports assumed
for MAPP, SPP, TVA, VP, PJM
and Ontario Hydro

SCENARIO A -- BASE CASE

- **Net export is 376 MW from ECAR/MAIN to surrounding utilities. (Source: NERC 1998 Summer Assessment Study)**

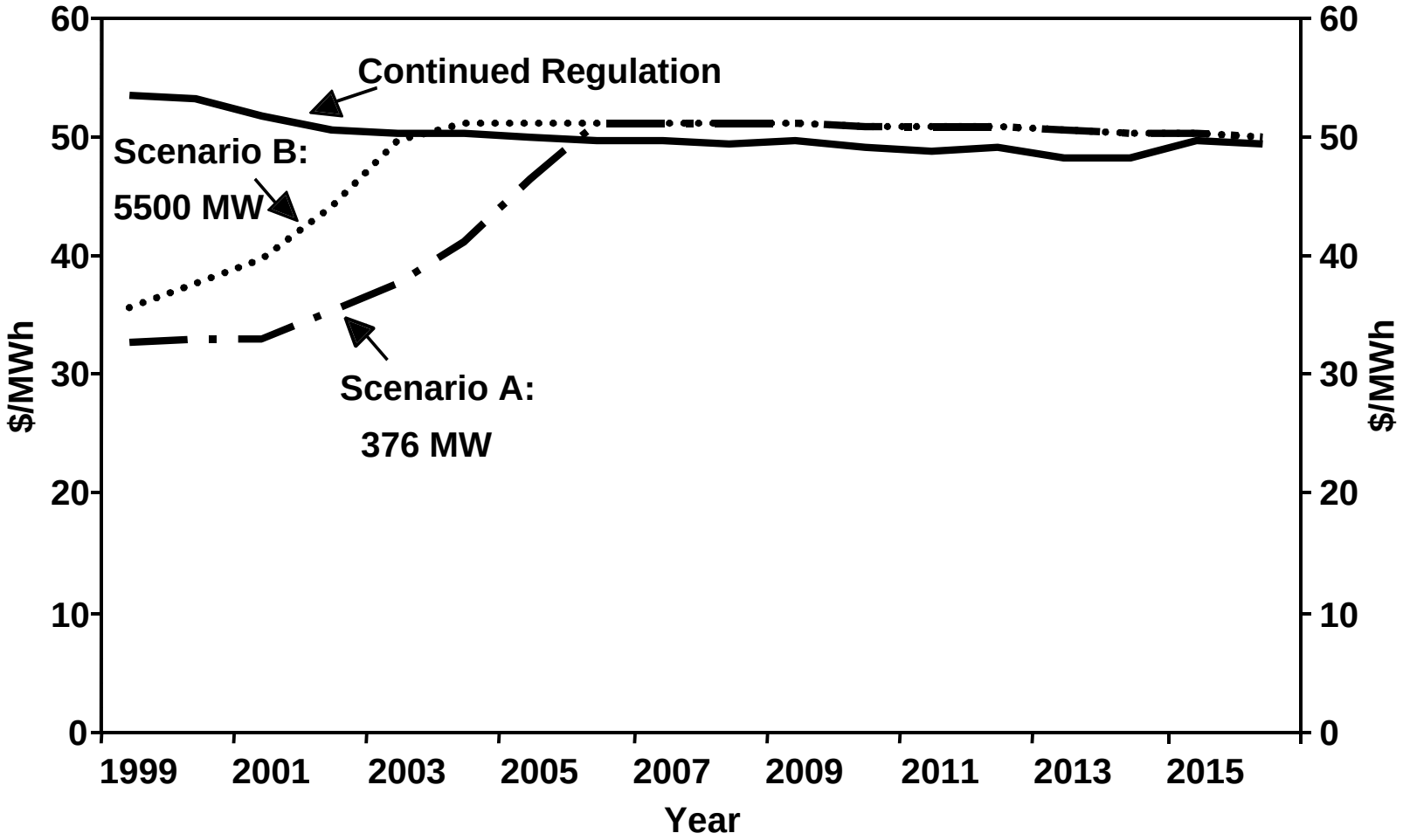
- **Yearly Forecast = energy-weighted average of hourly marginal costs + average T&D cost + average cost of ancillary services.**

SCENARIO B -- CASE WITH 5500 MW NET ECAR/MAIN EXPORT TO OTHER REGIONS

- **Assumed the higher ECAR/MAIN export is about 45 percent of the maximum transmission capacity limit.**

- **Yearly price calculated the same way as Case A.**

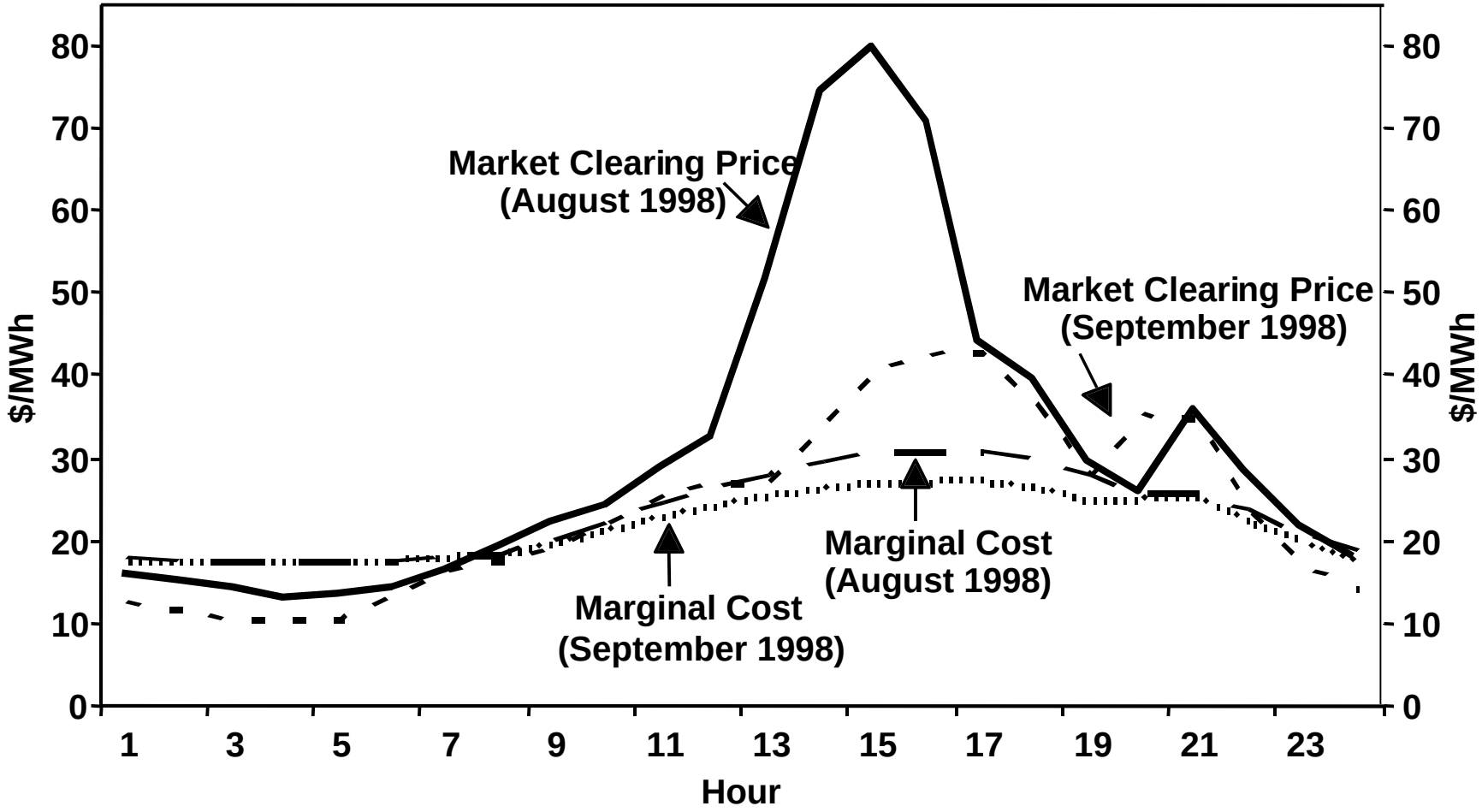
INDIANA YEARLY ENERGY-WEIGHTED AVERAGE PRICES--COMPETITION VS. REGULATION (1996 REAL DOLLARS)



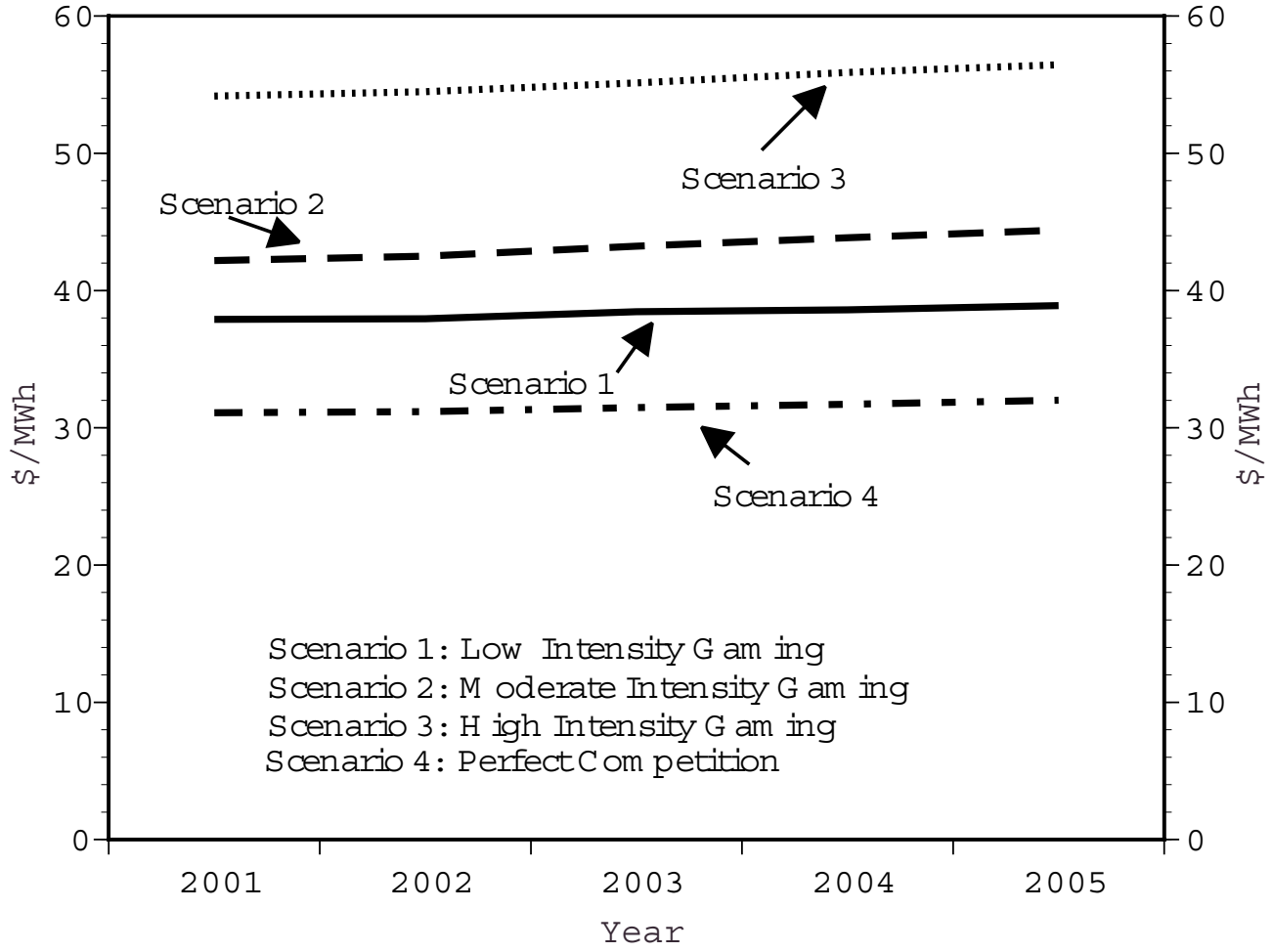
IMPERFECT COMPETITION

- **Key Assumptions:**
  - **Not enough producers to ensure competitive pricing.**

PJM DATA: ENERGY-WEIGHTED AVERAGE MARKET CLEARING PRICE AND MARGINAL COST



THE PROJECTED ENERGY-WEIGHTED AVERAGE RETAIL PRICES FOR INDIANA



CONCLUSIONS

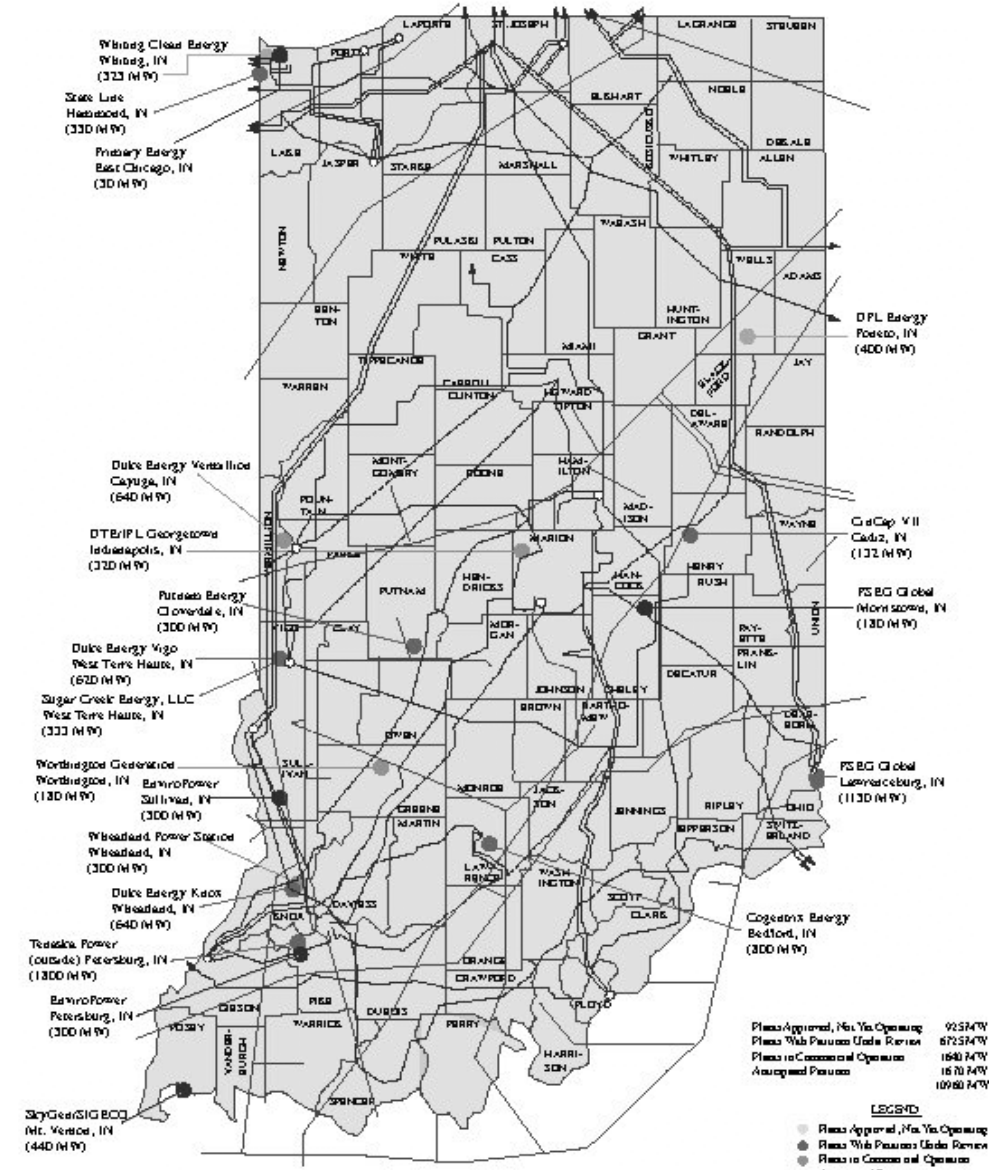
- **The perfect competition model has practical value because the results could be used as a benchmark to measure the degree of competitiveness.**
- **During low demand periods, pool market prices were close to marginal costs.**
- **The imperfect competition model is tailored for real world situations when demands are high and the capacity margin is tight. It captures the deviations from a perfect world and would give better forecasting.**
- **More studies are needed.**

1999 TOTAL DEMAND AND SUPPLY (MW) FOR INDIANA - 1999 to 2004

Year	Demand	Capacity	Additions			Reserve Margin (%)
			Peaking	Cycling	Base Load	
1999	16779	19520	600	0	0	16.3
2000	17145	20174	300	0	0	17.7
2001	17514	20460	350	0	0	16.8
2002	17917	20660	0	200	0	15.3
2003	18279	21190	0	0	0	15.9
2004	18620	21490	300	0	500	15.4

Conclusion: The 1680 MW installed would be sufficient IF all the MW stayed in Indiana. BUT, they are independent power producer plants, whose output will be purchased by the highest bidder, which may not be an Indiana utility.

Indiana Proposed Merchant Plants



Prepared by: STATE UTILITY FORECASTING GROUP
UPDATED OCTOBER 31, 2000
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ECAR/MAIN PROPOSED MERCHANT PLANTS (MW)

ECAR	
Indiana	**10960 MW**
Michigan	**8623 MW**
Ohio	**9941 MW**
Pennsylvania	**1170 MW**
West Virginia	**2768 MW**
Subtotal	**33462 MW**
MAIN	
Illinois	**21052 MW**
Missouri	**2022 MW**
Wisconsin	**3528 MW**
Subtotal	**26602 MW**
TOTAL ECAR/MAIN	**60064 MW**

THE COAL OUTLOOK

- **Still true that 98% of Indiana power is generated from coal (EIA data).**

- **New construction mostly CTs for peaking.**

- **SO_2 and NO_x emissions standards work against coal.**

- **High gas fuel costs work against gas. (If all ECAR/MAIN plants come on as planned, 25% increase in gas fuel use by U.S. utilities.)**

GENERATION COSTS -- PULVERIZED COAL VS. COMBINED CYCLE (CENTS/KWh)

	PC	CC
Capital Recovery	1.969	0.839
Fixed O&M	0.485	0.519
Variable O&M	0.210	0.055
Fuel	0.98	0.734 * Gas Price/10^6 Btu
	3.644	?

- Break even gas price is \$3.04/10^6 Btu; current price volatile, but well above that.

- PC capital cost based on 0.10 lbs./ 10^6 Btu NO_x emissions, within the proposed NO_x standards.