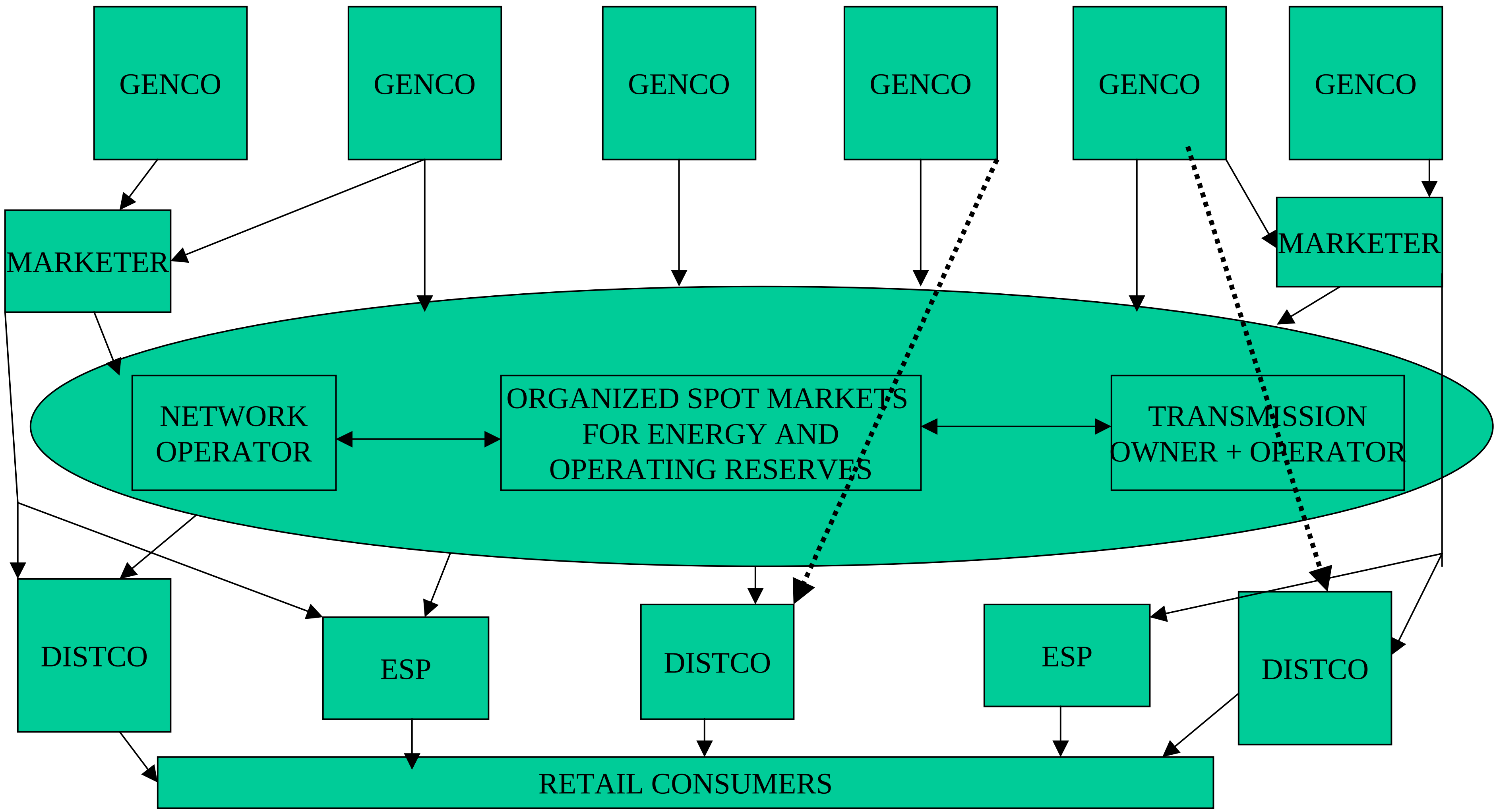
INVESTMENT IN NEW GENERATING CAPACITY

Paul L. Joskow

May 30, 2002

massachusetts institute of technology

COMPREHENSIVE REFORM
COMPETITIVE WHOLESALE + RETAIL MARKETS



WHY WHOLESALE AND RETAIL COMPETITION?

- Provide better incentives for controlling capital and operating costs of new and existing generating capacity
- Encourage innovation in power supply technologies
- Shift risks of "mistakes" to suppliers and away from consumers
- Sustained reduction in retail electricity prices reflected lower costs
- Provide enhanced array of retail service products, risk management, demand management, and service quality differentiation
- Reform regulation of residual monopoly services to enhance efficiency incentives
- While maintaining or enhancing system reliability
- And enhancing environmental quality

INVESTMENT IN NEW GENERATING CAPACITY

- About 100,000 Mw of new generating capacity added in the U.S. over the last three and one-half years

- One of the few bright spots of the electricity restructuring and deregulation program in the U.S.

- But many merchant generating companies are facing a challenging financing situation. New capital is almost impossible to raise and substantial amounts of debt must be rolled over in the next couple of years

- Many "announced" projects are being cancelled or delayed indefinitely (125,000 Mw +/-) and maintenance of existing plants is being reduced to conserve cash

INVESTMENT IN NEW GENERATING CAPACITY

- The short and medium term generating supply situation looks very good (2002-2003) as projects under construction are completed and electricity demand growth recovers slowly

- Potential short term supply problems are caused primarily by transmission congestion and related network issues (e.g. SW CT, NYC), though generation supplies appear tight in the SW and increase in forced outage rates could lead to supply problems elsewhere (e.g. CA)

- But what of the longer term investment picture? Can the reform program survive a boom-bust cycle of generating capacity investment and associated price volatility?

GENERATING CAPACITY ADDITIONS

1997	3,000 Mw
1998	5,000 Mw
1999	10,265 Mw
2000	23,500 Mw
2001	42,300 Mw
2002 (est)	55,000- 60,000 Mw
2002+ “announced”	250,000 +/-
2002+ “delayed/cancelled”	125,000 +/-

NERC SUMMER ASSESSMENT
AUGUST 2002

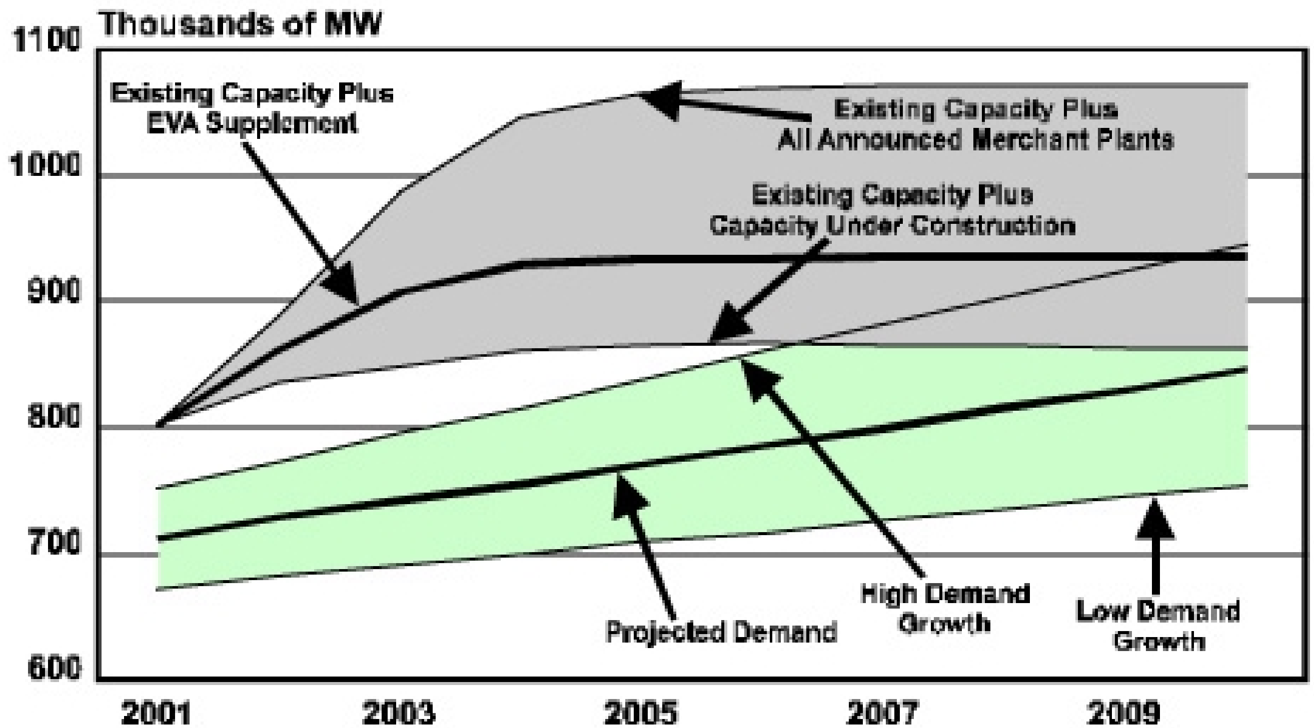
	Reserve Margin (%)	Capacity Margin (%)
U.S.	23.7	19.2
ECAR	28.2	22.0
NEPOOL	24.4	19.6
NY	22.7	18.5
MAAC	27.8	21.7
SERC	21.8	17.9
ERCOT	40.9	29.0
AZ-NM-NV	12.0	10.7
CA-MX	20.1	16.7
NW	48.0	32.4

NERC 2001 LONG TERM ASSESSMENT

	2005 Mw	2010 Mw
Capacity Additions (EVA)	131,600	134,000
Capacity Additions (announced)	263,000	270,423
Capacity Margin (EVA-2005/2010)	20.2%	12.4%
Capacity Margin (announced-05/10)	29.3%	22.7%
Capacity Margin (EVA 2003 Only)	18.2%	10.0%

[August 2002 Capacity Margin: 19.2%; Reserve Margin: 23.7%]
Forecast Demand Growth 2.0% (peak) & 1.9% (energy) per year
Actual Growth 1992-2000: 2.7% per year; GDP: 3.7% per year

United States
Capacity vs Demand – Summer



EIA LONG-TERM OUTLOOK GENERATING CAPACITY ADDITIONS

Forecast Date	2000-05 Reference	2000-10 Reference	2000-10 High
December 2001[a]	74.4 Mw	192 Mw	215Mw
December 2000[b]	81.5 Mw	221 Mw	257Mw

[a] Long-term electricity demand growth 1.8% per year in reference case

[b] Adjusted 1999 – 2005/2010 outlook for actual additions in 2000

WHY IS NEW INVESTMENT DRYING UP?

- Market could not have profitably absorbed anything like the amount of new generating capacity “announced.” Significant delays, cancellations, and period of soft prices should have been expected.

- The “Enron fallout,” accounting irregularities, round-trip trades, etc. has depressed market valuations for merchant generating and trading companies and closed the financing window for many of them

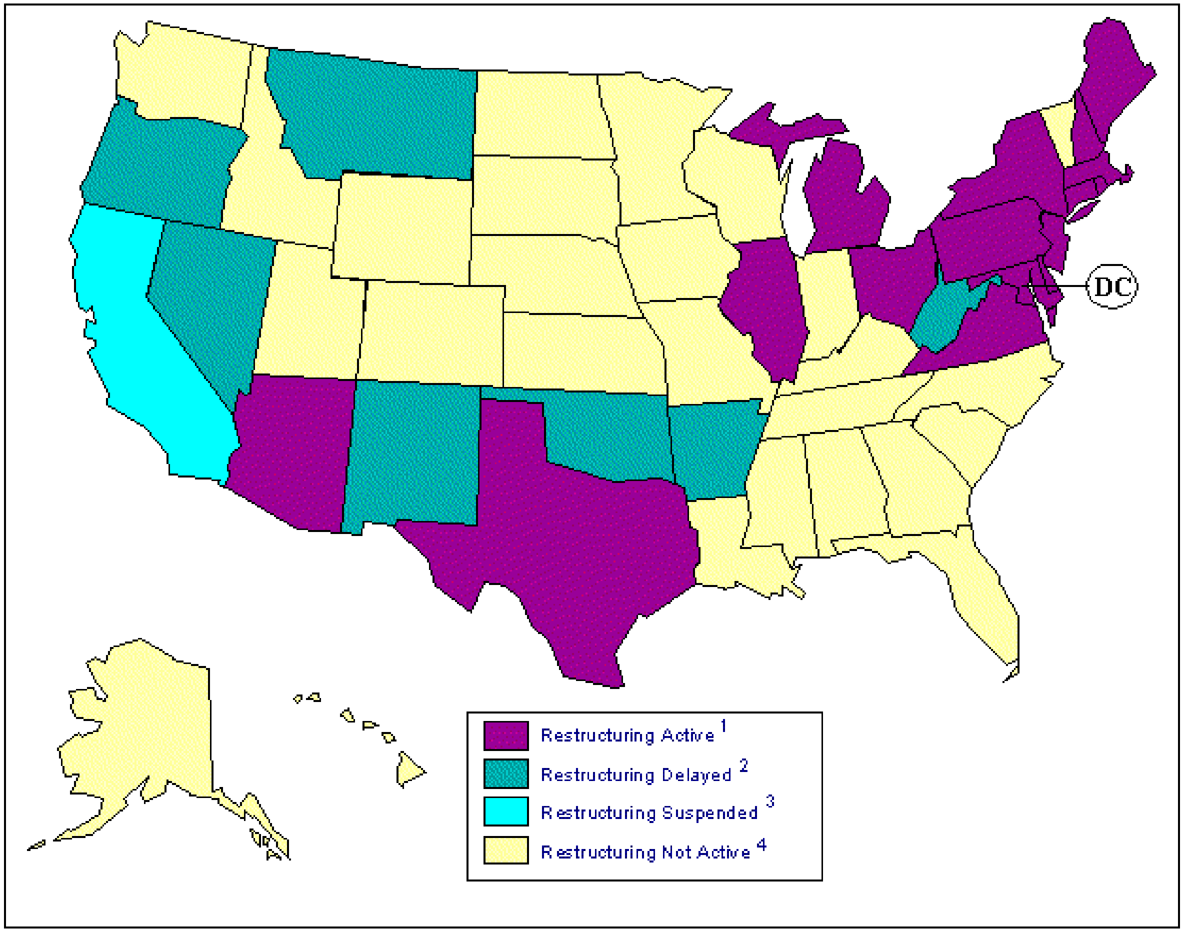
- End of stock market bubble, collapse of internet and telecom sectors has decreased supply and increased cost of capital for merchant investment as well

- These developments have led investors to take a new look at the market and regulatory environment that merchant investors face and they don’t like what they see!

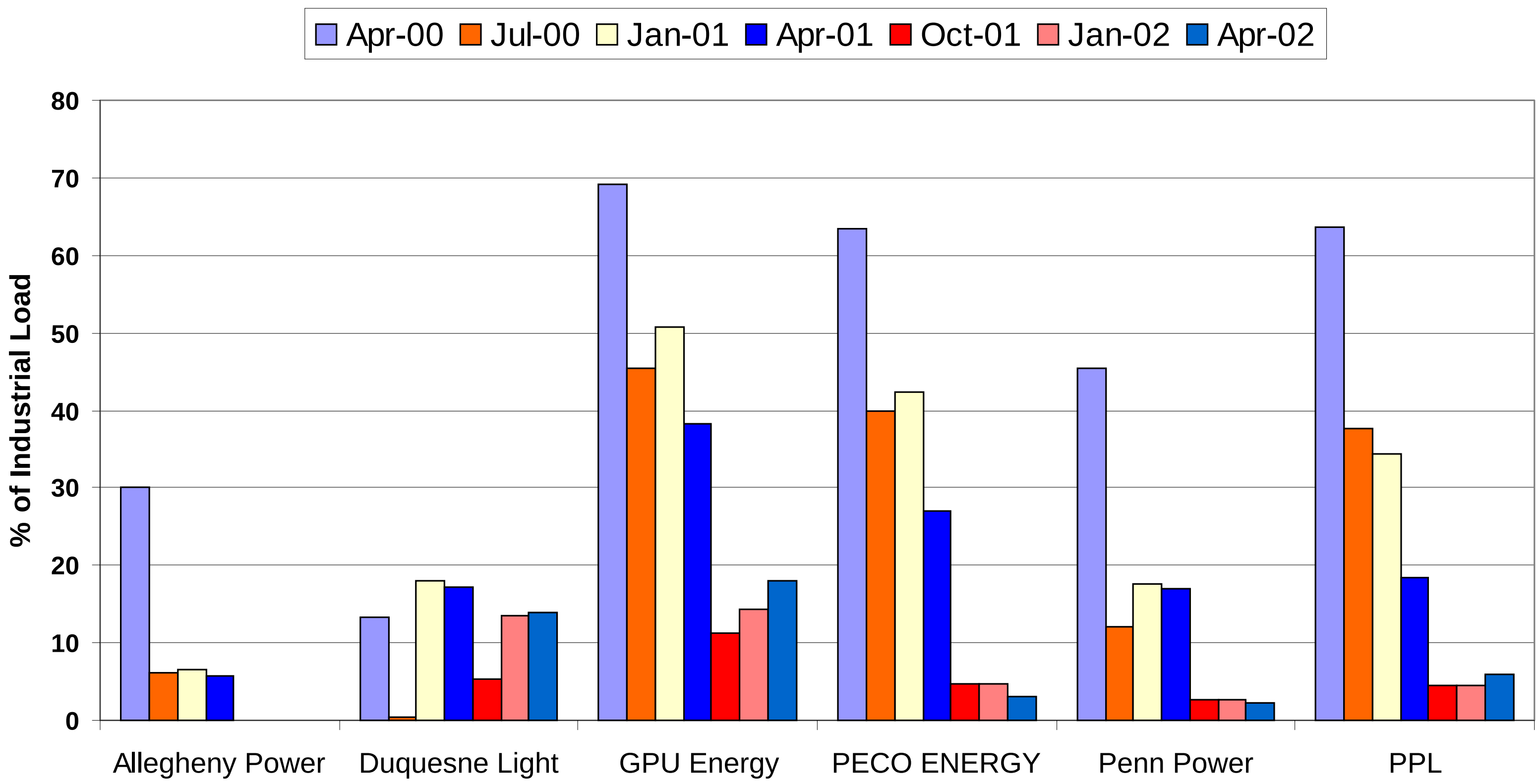
WHAT DO INVESTORS SEE?

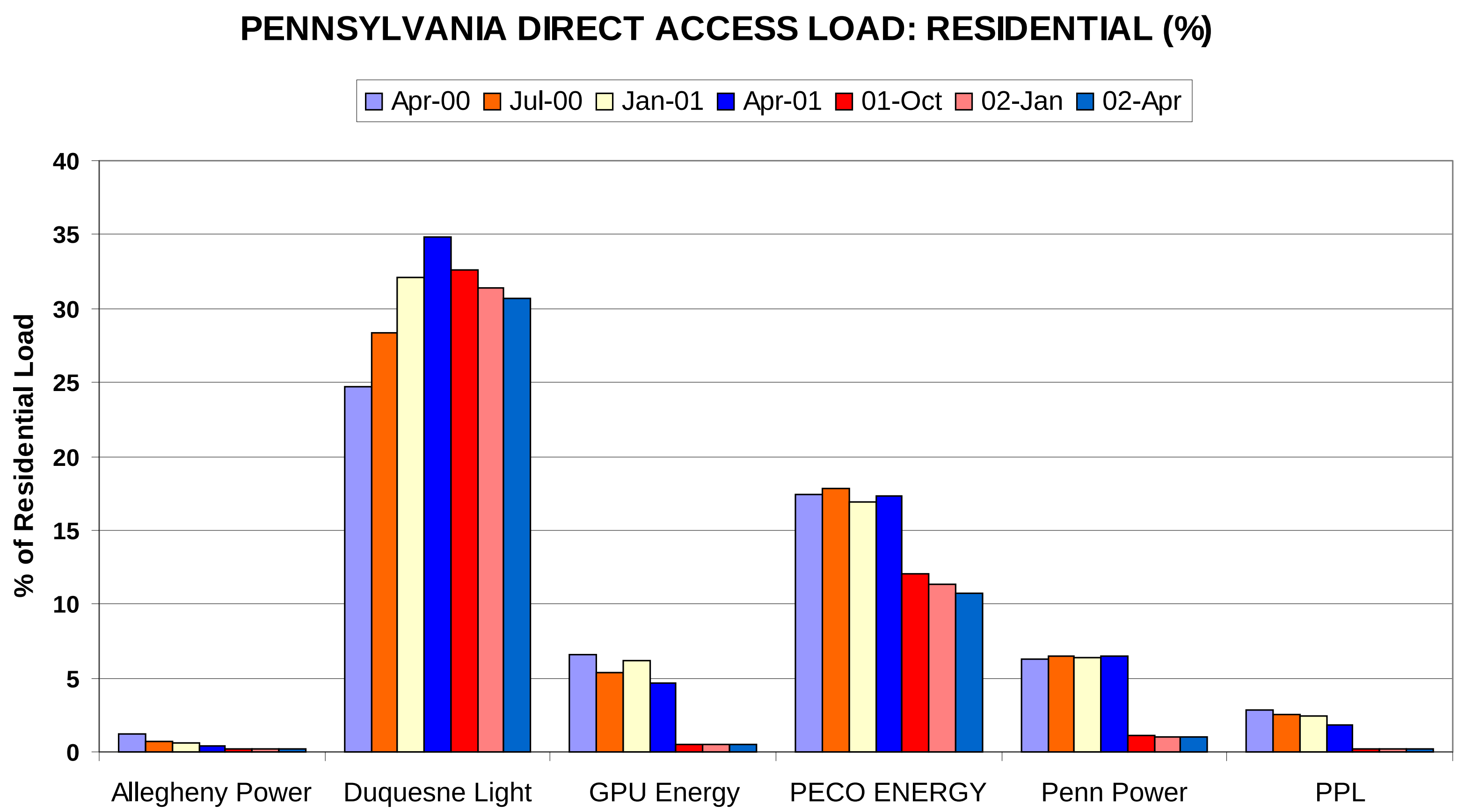
- Uncertainties about the pace and direction of retail competition and restructuring at the state level and loss of political support for competition at state and federal levels
- Limited opportunities to obtain medium and long term commitments from load serving entities for supplies from new capacity
- Continuing uncertainties about the reforms to wholesale power market and transmission institutions
- Uncertainties about rules governing “gaming” and market power behavior and associated liabilities combined with increased regulatory and political scrutiny of wholesale market behavior
- Resulting uncertainties about future financial prospects of merchant generating companies

STATUS OF COMPREHENSIVE REFORM PROGRAMS



PENNSYLVANIA DIRECT ACCESS LOAD: INDUSTRIAL (%)

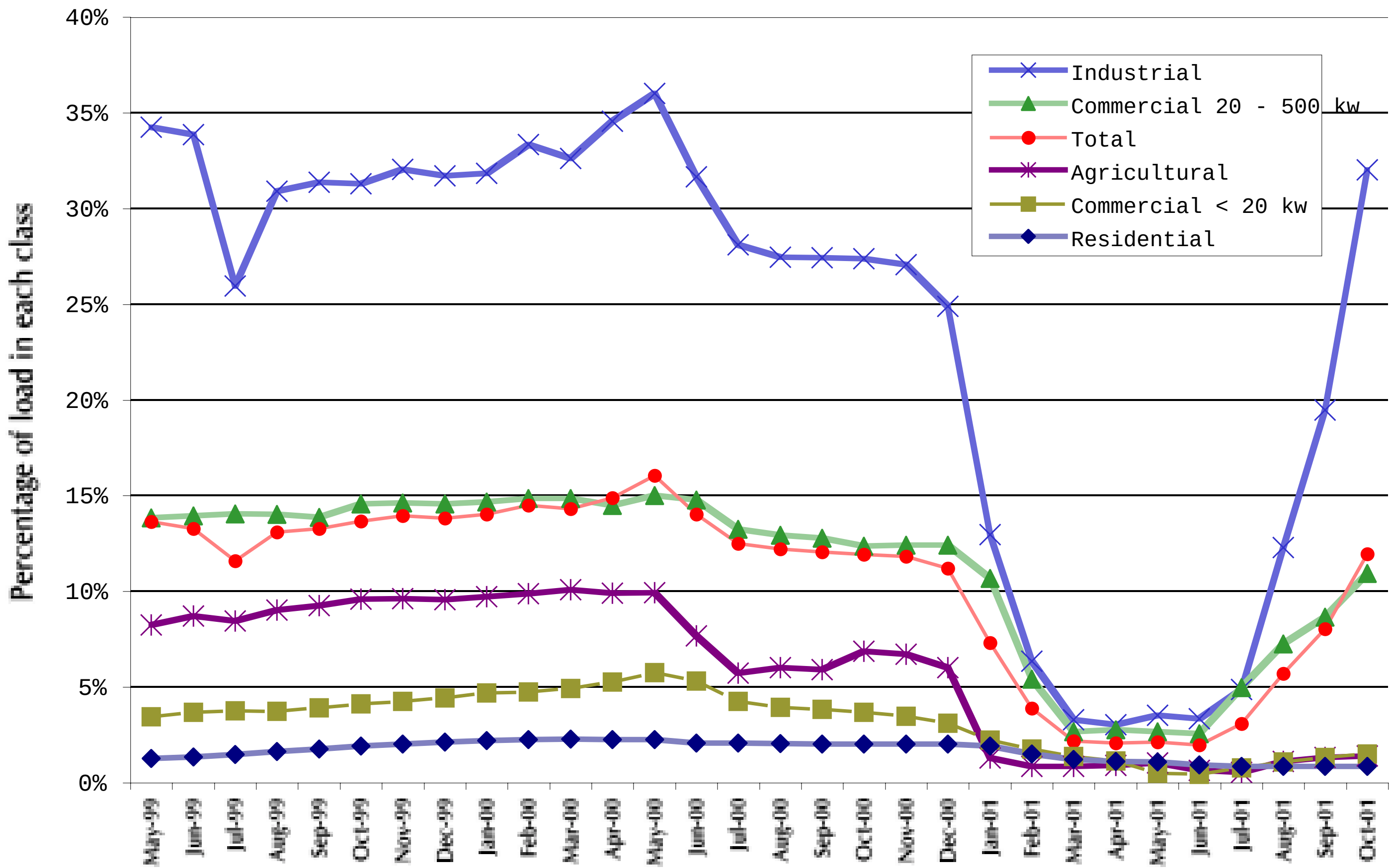




Excludes PECO customers involuntarily assigned to the New Power Company

Customers Choosing Non-Utility Servic

by percentage of class load



WHAT TO DO?

- States need to clarify and stabilize retail procurement framework so that load serving entities have incentives to contract forward for power, including reserves
    - States with retail competition
    - States without retail competition

- FERC needs to push forward quickly with standard wholesale market redesign and RTO initiatives
    - Capacity obligations a la PJM should be part of the market redesign
    - It's not ideal, but given other market, political and regulatory imperfections it's the best that we can do

- We need to find a better way to respond to market power, "gaming" and other market performance problems. Market participants need to support reasonable rules to regain public confidence

MARKET MONITORING REFORMS

- FERC needs to define clearly what behavior is permitted and what behavior is not permitted *ex ante*.

- Investment will be discouraged with vague open-ended refund liabilities. Damages should be a last resort to respond to egregious violations of clear market rules

- Quid pro quo is that market monitors must have the power to act <u>quickly</u> to remedy behavioral problems and to recommend needed changes in market rules that will be acted upon quickly

- FERC must have the ability to interact on a continuing basis with market monitors and to respond <u>quickly</u> to problems that emerge.

- Serious efforts must be made to increase market transparency and public information to restore public confidence and to de-politicize