

Analysis of the Impact of Coordinated Electricity Markets on Consumer Electricity Charges

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The views presented here are not necessarily attributable to any of those mentioned, and any errors are solely the responsibility of the author.

“Real competition has not been realized. Restructuring has replaced the old state regulatory regime that had at least some end-user focus and rates based on average costs with a costly ISO/RTO federal regulatory regime that has no end-user focus and rates based on the highest accepted bid, which need not be based on marginal cost. A reasonable expectation would have been that competitive markets would deliver greater benefits to end-use consumers than regulated markets.”

Supplemental Comments of the
Electricity Consumers Resource Council,
FERC Docket No. AD07-7-000, pp. 2-3.

Motivation

In the past few years, several interest groups have questioned whether power consumers have benefited from restructuring and the implementation of LMP-based coordinated power markets.

An essential first step in assessing the empirical benefits, if any, from these changes is to specify which changes we seek to evaluate.

What is the Question?

The terms “restructuring,” “deregulation” and “implementation of coordinated markets” are used to describe a variety of distinct operational and regulatory changes in the electric industry since 1996.

- Transition of historic tight power pools from split-savings, inter-utility pricing to bid-based competitive wholesale markets (PJM [1998], NYISO, ISO-NE);
- Implementation of coordinated, bid-based competitive wholesale markets across multiple control areas (Ercot, CAISO, MISO, SPP, PJM [2002-2007]);
- Implementation of retail competition in electricity supply at the state level; and
- Implementation of competitive power procurement policies for regulated utilities at the state level.

“It is possible to surmise ‘what might have been under regulation’ for industrial rates and make an apples-to-apples comparison with what happened to a similarly situated load in a Deregulated State. Several utility systems overlap a Deregulated State in the footprint of a FERC-approved organized market and one or more Regulated States. The rates charged to similarly situated industrial loads in the Deregulated State can be directly compared with the rates charged under traditional rate regulation in the Regulated State. The chart on the next page shows Allegheny Energy, Inc. (APS) charges to industrial customers in both Maryland and West Virginia with an 85% load factor, in 1998 and in 2006. West Virginia consumers paid and still pay a fully bundled, state regulated cost of service rate. Maryland consumers paid comparable rates in 1998, but now pay a rate based on the PJM ‘market’ clearing prices, irrespective of whether they continue to be served by APS or are instead served by a third-party supplier. Costs to a similarly situated industrial consumer in Maryland are now almost double what they would be for the identical consumer located across the West Virginia border. Both are served by APS, and both APS operating subsidiaries share the same generating asset base, transmission infrastructure, operating costs, corporate overheads etc.”

Supplemental Comments of the
Electricity Consumers Resource Council,
FERC Docket No. AD07-7-000, pp. 7-9.

What is the Question?

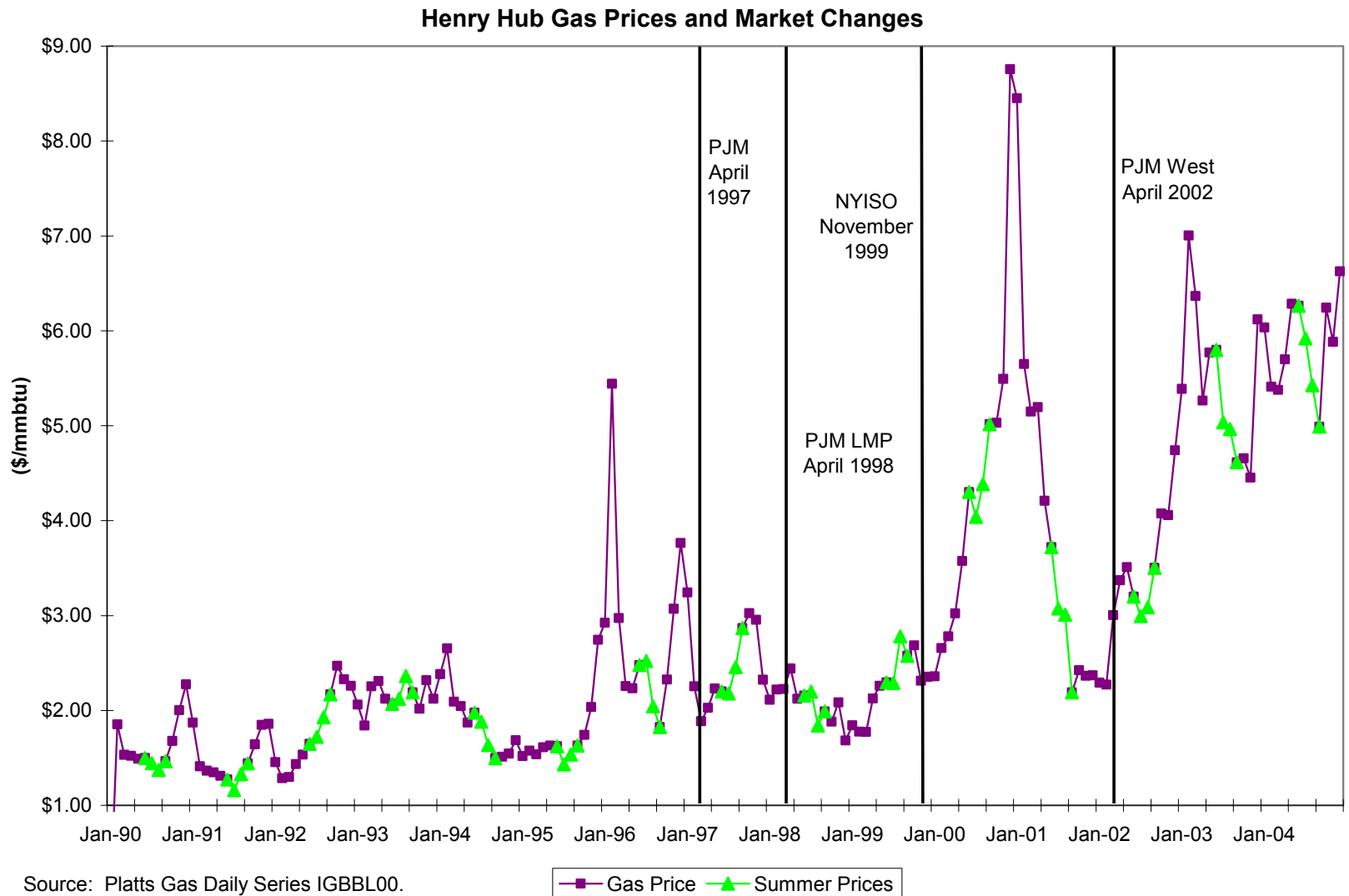
Confusion in the meaning of “restructuring” often extends into empirical assessment of the benefits of wholesale market competition and implementation of coordinated markets.

- Retail rate differences between the Maryland and West Virginia affiliates of Allegheny Energy have absolutely nothing to do with the implementation of coordinated markets in PJM.
- The Maryland and West Virginia affiliates of Allegheny Energy are both currently located in PJM, they both operate in a coordinated market, both buy and sell power in a competitive wholesale market at market clearing prices, and they both joined PJM at the same time.

What is the Question?

Our analysis focused on assessing the retail rate impacts of the transition to coordinated competitive wholesale markets; in particular, we have attempted to distinguish the potential benefits from implementation of competitive wholesale markets from the effects of implementing retail competition and alternative procurement policies for traditional regulated utilities.

Monthly Henry Hub Gas Prices and Market Changes



Complicating Factors

Assessing the effect on consumer prices of the implementation of LMP-based coordinated markets is complicated by the reality that everything else has not been constant since the implementation of LMP.

- The implementation of coordinated markets has largely coincided with a rise in natural gas prices, making it necessary to distinguish the rate impact of implementing coordinated markets from the effect of changes in fuel prices.
- Simply comparing the retail rates in coordinated market regions before and after introduction of coordinated markets will mix the impact of fuel price changes with the effects of implementing coordinated markets.

Regional Fuel Mix Differences, 1990

	Percent Gas and Oil Generation ¹
<i>Coordinated Power Markets</i>	
New York	41.8
Delaware	32.6
New Jersey	22.5
Maryland	15.4
Pennsylvania	4.3
West Virginia	0.5
<i>Traditional Power Markets</i>	
Florida	33.6
South Carolina	1.4
Georgia	1.3
North Carolina	0.6
Alabama	1.5
Arkansas	9.4
¹ As a percentage of total state generation (MWh). Source: http://.www.doc.gov/eneaf/electricity/epa/generation_state.xls	

Complicating Factors

Comparing the change in retail rates across regions implementing coordinated markets and other regions also requires accounting for differences in fuel mix.

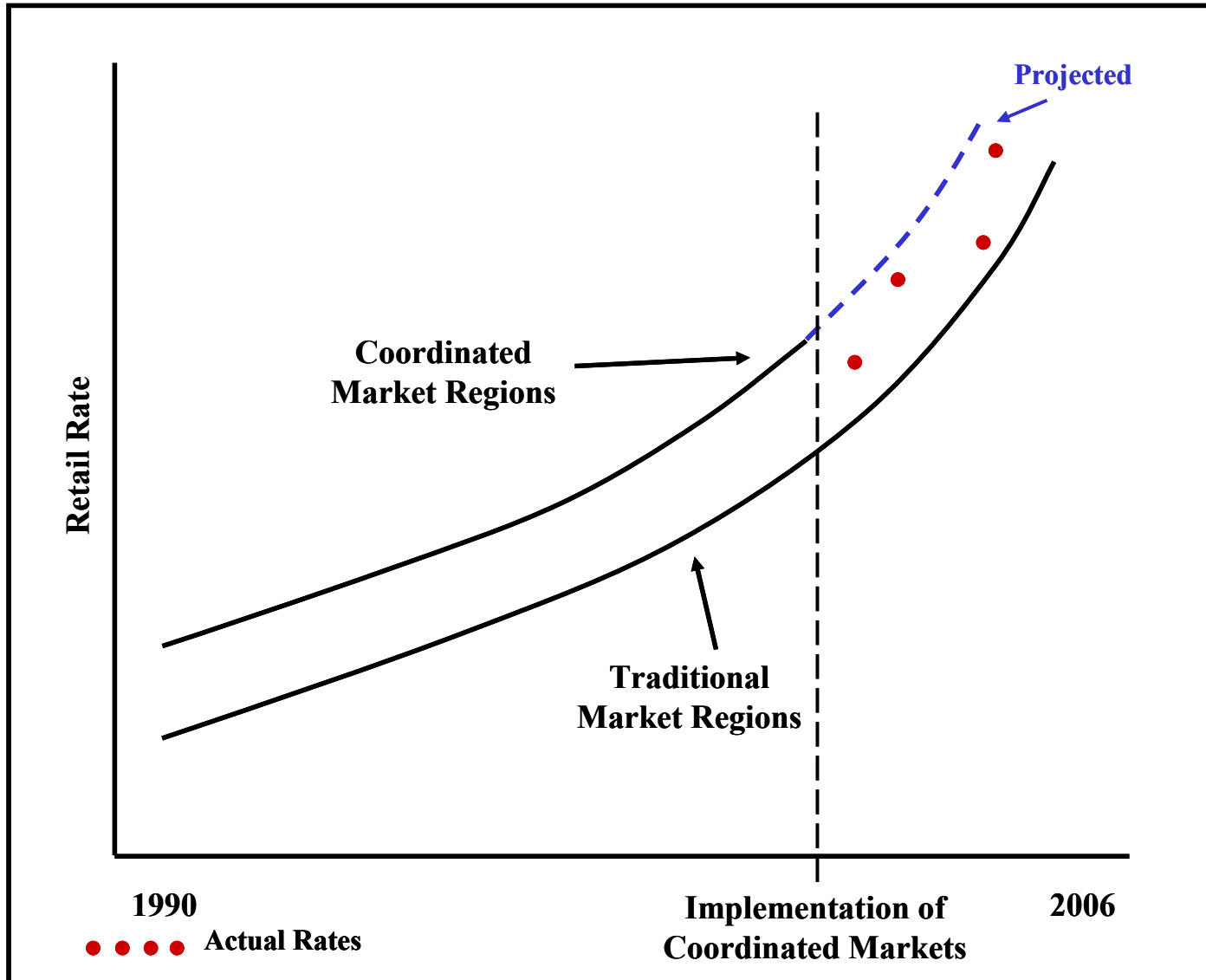
- The degree of dependence on oil- and gas-fired generation, and rate sensitivity to oil and gas prices, varies regionally.
- Simply comparing retail rates across regions without accounting in some manner for fuel mix differences will therefore mix the effects of coordinated markets with the effect of changes in fuel costs.

Complicating Factors

In most regions, the implementation of coordinated markets has coincided with the implementation of retail competition, making it necessary to distinguish the impact of the two changes on rates.

- Since most retail access regulatory designs tend to discourage long-term hedging by consumers, the prices paid by consumers in retail access states potentially rise and fall more than regulated rates with changes in fuel prices.
- Retail access also complicates rate comparisons because not all customers pay regulated rates.

Actual and Projected Consumer Rates



Methodology

Three features of the study methodology address these complicating factors:

- Public utility sample (little or no retail access);
- Control for historic regional gas dependence; and
- Pooled cross-section time series model (controls for historic regional differences).

**Average Residential Retail Rates
Public Utilities \$/MWh**

	1990 – 1997	1999 – 2004
Eastern PJM	93.96	95.82
Florida	82.84	86.67
	11.13	9.15

Methodology

A high-level statistical model was used to examine the effects of implementing coordinated competitive wholesale power markets on the retail residential rates of public utilities.

- Because there is more than one reasonable formulation of such a model, a number of alternative models were estimated.
- All formulations of the model indicated that implementation of competitive wholesale power markets reduced retail rates in New York and PJM, although not all of the formulations found statistically significant differences.
- The general level of the estimated rate impacts was a reduction of $-\$.70/\text{MWh}$ to $-\$1.70/\text{MWh}$.

Utility Dummy Model

Coordinated Market Impact (t-statistics in parentheses)		
	Coordinated Market	Additional Allegheny LMP Impact
<i>East Coast Gas Dependent Regions (n = 1830) r² = .947</i>		
Florida, New York, New Jersey, Delaware and Maryland	-\$1.621/MWh (2.61)	
<i>Low Gas Dependence Regions (n = 4995) r² = .843</i>		
Pennsylvania, North Carolina, South Carolina, Georgia, Alabama, Arkansas	-\$0.879/MWh (1.41)	
<i>Low Gas Dependence Regions And APS (n = 5190) r² = .854</i>		
Pennsylvania, APS Maryland, West Virginia, Carolina, South Carolina, Georgia, Alabama, Arkansas	-\$0.803/MWh (1.30)	\$0.708/MWh (0.50)

1990 Rate Model

Coordinated Market Impact (t-statistics in parentheses)		
	Coordinated Market	Additional Allegheny LMP Impact
<i>East Coast Gas Dependent Regions (n = 1830) r² = .892</i>		
Florida, New York, New Jersey, Delaware and Maryland	-\$1.415/MWh (2.01)	
<i>Low Gas Dependence Regions (n = 4995) r² = .631</i>		
Pennsylvania, North Carolina, South Carolina, Georgia, Alabama, Arkansas	-\$1.872/MWh (2.61)	
<i>Low Gas Dependence Regions And APS (n = 5190) r² = .656</i>		
Pennsylvania, APS Maryland, West Virginia, Carolina, South Carolina, Georgia, Alabama, Arkansas	-\$1.474/MWh (2.08)	-\$0.297/MWh (.16)

Adjustments for Heteroskedasticity

	Gas Dependent Region	
	White Standard Errors	Weighted Model
Utility Dummy Model t-statistic	-1.621 (2.60)	-1.59 (2.57)
1990 Rate Model t-statistic	-1.415 (1.65)	-1.392 (1.99)
	Non-Gas Dependent Region	
	White Standard Errors	Weighted Model
Utility Dummy Model t-statistic	-.879 (1.36)	-.721 (1.15)
1990 Rate Model t-statistic	-1.87 (2.10)	-.917 (1.27)

Sensitivity Cases for Gas-Dependent Sample Coordinated Market Impact

Coefficient Estimate Summary							
	Base Model	Exclude Maryland Coops	Include A&N	Include A&N			
				Drop New York Munis	Drop Industrial Load Variable	Add Retail Sales Squared	Drop Retail Sales
Utility Dummy Model	-1.621	-1.546	-1.613	-4.781	-1.780	-1.924	-.78
t-statistic	2.61	2.44	2.63	5.08	2.90	3.09	1.31
1990 Rate Model	-1.415	-1.943	-1.24	-.707	-1.23	-1.147	-1.17
t-statistic	2.01	2.71	1.79	.71	1.79	1.65	1.72

Sensitivity Cases for Non-Gas-Dependent Sample Coordinated Market Impact

Coefficient Estimate Summary						
	Base Model	Exclude Blue Ridge	Exclude Blue Ridge			
			Drop Industrial Load	Add Retail Sales Squared	No APS Dummy	Drop Retail Sales
Original PJM						
Utility Dummy Model	-0.879	-0.877	-0.814	-1.163	NA	-0.52
t-statistic	1.41	1.40	1.30	1.86		0.83
1990 Rate Model	-1.871	-1.87	-1.89	-1.953	NA	-1.79
t-statistic	2.61	2.60	2.63	2.72		2.48
Include APS Region						
Utility Dummy Model	-0.803	-0.800	-0.735	-0.949	-0.674	-0.44
t-statistic	1.30	1.29	1.18	1.66	1.18	0.72
1990 Rate Model	-1.474	-1.470	-1.50	-1.587	-1.50	-1.36
t-statistic	2.08	2.07	2.11	2.24	2.24	1.92

Combined Sample Coordinated Market Impact

	Utility Dummy Model	1990 Rate Model
Base Coefficient (\$/MW)	-1.266	-1.874
t-statistic	2.85	3.67
Total Sales Squared	-1.48	-1.95
t-statistic	3.32	3.87
Drop Total Sales	-.734	-1.695
t-statistic	1.68	3.33

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