

High Electricity Prices in Connecticut
Causes, Effects and Solutions

The United Illuminating Company

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I. Introduction

Connecticut's electricity rates are among the highest in the United States, ranking 2nd only to Hawaii. The combination of policies directed at stimulating retail switching, the forced divestiture of utility owned generation, and the structure of the New England wholesale market with the dominance of gas-fired generation are effectively a three legged stool supporting a climate of high, volatile electricity prices that have caused substantial pain for consumers and businesses alike. The promise of industry restructuring was that gains from innovation and efficiency improvements would lower prices for consumers. Unfortunately, the only "innovations" have been the development of new, expensive market structures at the wholesale level to encourage the continued development of the mix of resources required for grid reliability, and unattractive utility standard offer pricing at the retail level designed to encourage customer participation in retail markets. The three legged stool has created a perfect storm for high and volatile prices, and changes to the restructured business model are needed to prevent further financial harm to consumers. This white paper summarizes some of the key analysis of electric rates performed in early 2008 by various parties, and discusses long-term solutions for "fixing" the pricing problem within a market structure that's open for retail choice. While there is no silver bullet solution that will ease pricing pressures overnight, a back to basics strategy of cost of service pricing, planned fuel diversity and focus on customer benefits may help to provide price stability and cost savings over time.

II. The current market structure is not providing benefits to customers.

The impact on consumers of electric industry restructuring has been the subject of much heated debate in recent years. Empirical evidence that customers are not seeing benefits from industry restructuring, but are instead being subjected to excessive prices is mounting rapidly. For starters, we can look at the experience here in New England.

Table 1
Comparison of Retail Rates in New England RTO¹

State	1999 Retail Rate (c/kWh)	2007 Retail Rate (c/kWh)	Change (c/kWh)	Percentage Change
Massachusetts (restructured)	9.3	15.3	6.0	65%
Connecticut (restructured)	10.0	16.2	6.1	61%
Rhode Island (restructured)	9.1	13.1	4.0	44%
Maine (restructured)	9.8	13.0	3.2	33%
New Hampshire (partial rest) ²	11.7	13.9	2.2	19%
Vermont (not restructured)	10.2	11.9	1.7	17%

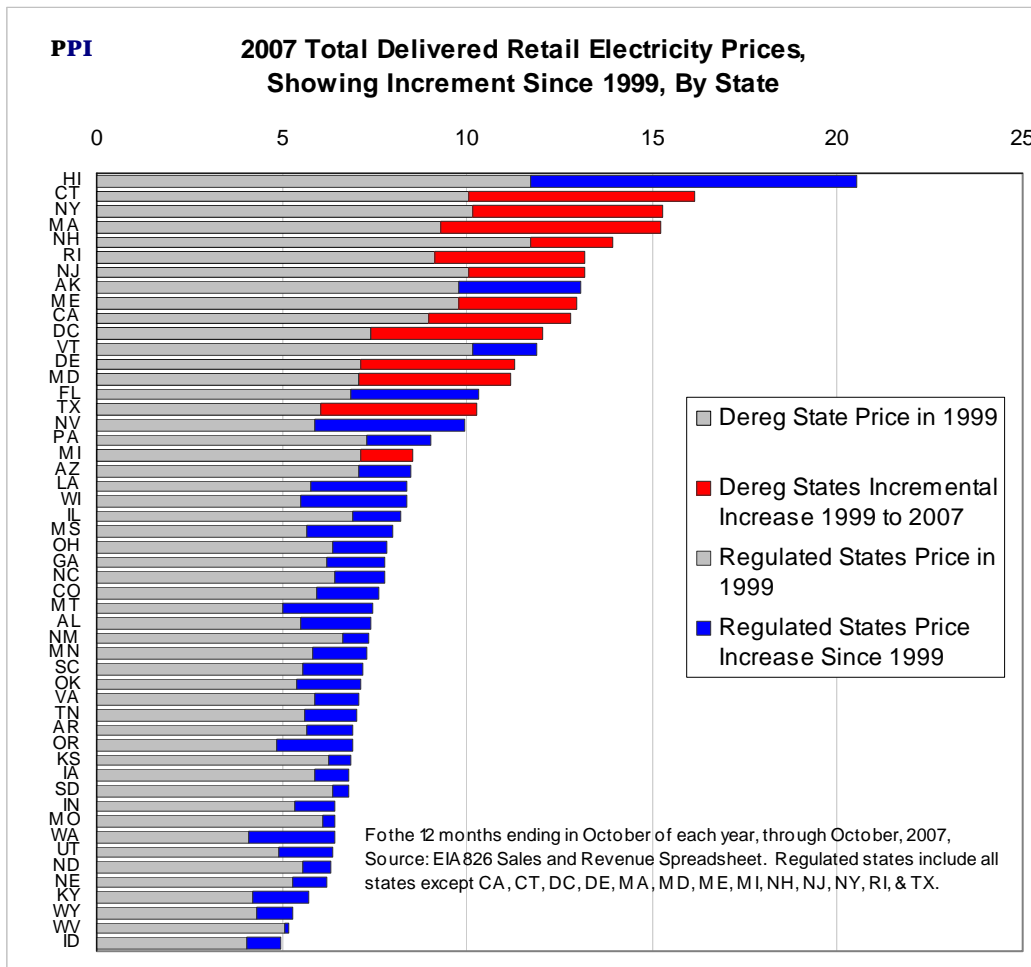
¹ The source of data is EIA 826 Sales and Revenue Spreadsheet. This spreadsheet reflects information derived from both Form 826 and Form 861. Data was provided by Power in the Public Interest.

² New Hampshire is restructured for purposes of retail access, but utilities still own generation that is paid for at cost of service pricing which has mitigated the increase in customer prices.

As shown in Table 1, above, states in New England that restructured at the retail level, and forced the divestiture of utility owned generation, have seen rate increases that far exceed those of the regulated states, even though they participate in the same New England RTO markets and are subject to the same regional natural gas and oil prices.

Several studies have been published in early 2008 that call attention to the growing problem of pricing in restructured markets. In a January 28, 2008 report prepared for the Connecticut General Assembly by Power in the Public Interest (“PPI Report”), retail generation rates in Connecticut were compared with those in non-restructured States, and the data revealed that “since 1999 Connecticut rates have gone from 68% higher to 109% higher than rates in the regulated states. (All of these percentages hold regardless of whether nominal or real prices are compared.)”³

The chart below from the PPI Report demonstrates that deregulated states have experienced substantially higher price increases than regulated states since 1999.”⁴



³ PPI Report PP 2-3

⁴ PPI Report P 9

A report issued in March of 2008 by the American Public Power Association (“APPA”) examined prices in New England and stated that:

Average rates in all states increased more than the national average over the 1997-2007 period, with Connecticut and Massachusetts experiencing rate increases more than double the national average. The smallest rate increase was in New Hampshire, where the state’s largest IOU still owns a significant amount of generating capacity... In contrast, rates in Vermont – the one New England state that did not implement retail choice – increased less than the national average.⁵

The third report is a publication called “Consumers in Peril”⁶ which was released in February, 2008, also by the APPA. This report focuses on issues in RTO run wholesale power market (like New England) and finds that “(i)n restructured states where customers are now fully exposed to market prices, electricity rates increased almost 40 percent since 2002, compared to 19 percent for states that remain regulated.”⁷

There’s reason to believe that the difference will get worse if the current market structure is allowed to continue unchecked. The Integrated Resource Plan for Connecticut, filed by the state’s distribution utilities on January 1, 2008⁸ compared future power prices under the current market structure with prices under a hypothetical cost of service scenario for new and existing generating units in Connecticut. As shown in Table 2 below, the results were very telling.

Table 2
Comparison of Market and Cost of Service Prices²

Test Year	Market (c/kWh)	COS (c/kWh)	Differential	Differential %
2011	11.26	6.18	5.08	82%
2013	10.63	6.17	4.46	72%
2018	11.30	6.73	4.57	68%

It’s pretty clear from all of these numbers that consumers have been adversely affected by the combined structure of the wholesale and retail markets as it currently exists in Connecticut. The current market structure has failed. Before developing solutions, it is important to understand why the market has failed.

⁵ Retail Electric Rates in Deregulated and Regulated States: A Ten Year Comparison; March, 2008, American Public Power Association, P4

⁶ “Consumers in Peril; Why RTO-Run Electricity Markets Fail to Produce Just and Reasonable Electric Rates”, February, 2008, American Public Power Association

⁷ Consumers in Peril P3

⁸ Integrated Resource Plan for Connecticut: the Brattle Group, Connecticut Light & Power, The United Illuminating Company, January 1, 2008 (“IRP”)

⁹ IRP, Current Trends scenario; Conventional solution set.

III. Why the current market structure has failed.

The current market structure, both at the wholesale and retail level, was designed based on the assumption that competition would lower consumer prices by driving out the perceived inefficiencies of vertical integration and cost of service rate regulation. The markets were essentially designed by economists who assumed that the free market principles that have led to success in other industries would translate just as well to electricity. Unfortunately, what the economists either ignored, or didn't understand, was that electricity is not like any other product or service that is sold in competitive markets. Electricity has a combination of traits that, when taken together, create a unique environment that defies conventional market theory.

- Electricity is an essential need
- Electricity must be produced at the time that it is consumed (cannot be stored)
- There is no product differentiation between sources of electricity¹⁰
- Barriers to entry are high for power producers

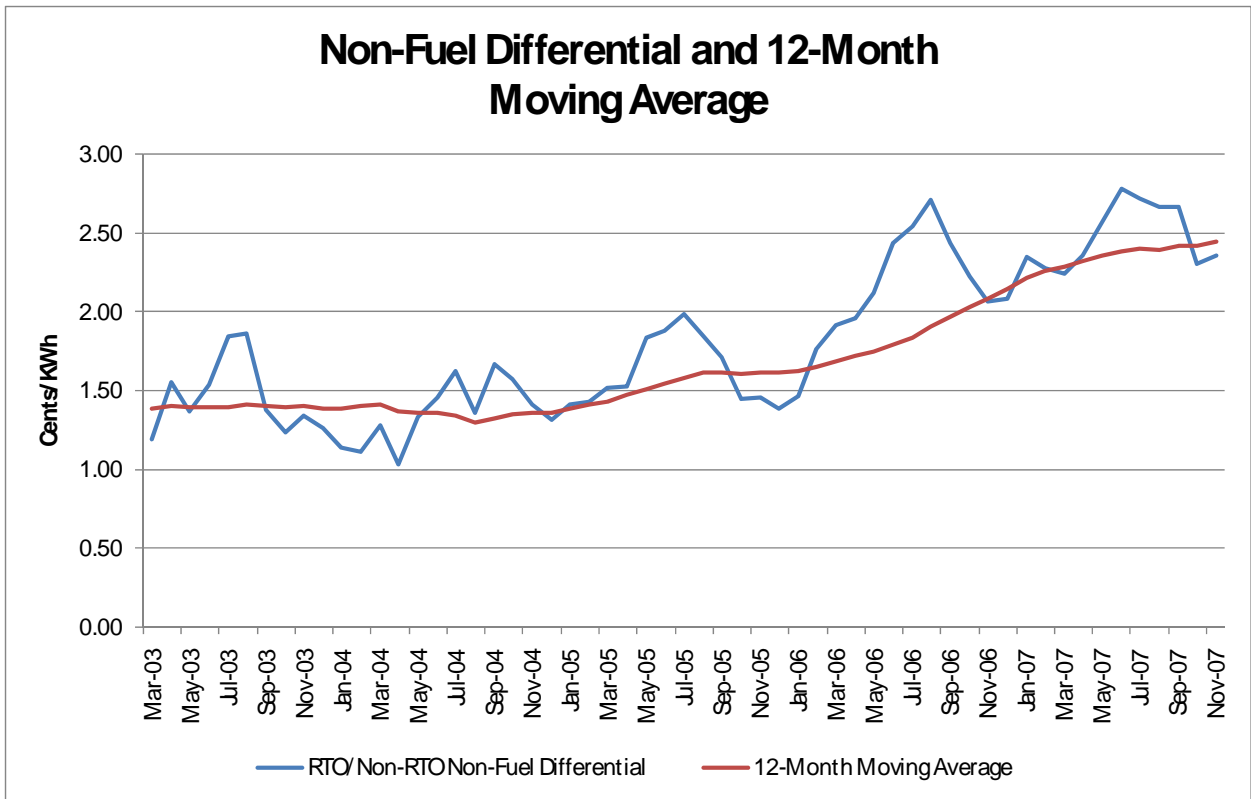
As the reports cited above have concluded, the combination of retail competition, forced divestiture of utility generation, and RTO run wholesale markets has created an unfavorable pricing climate for customers. The price paid by consumers for electricity is no longer tied to the long-run cost of production. Rather, the price is based on short term spot market prices that exhibit far more volatility than the underlying production cost.

Proponents of restructuring cite the cost of fuel as the reason for the sharp increase in prices. While fuel is a substantial cost driver, fuel costs can not explain away the growing disconnect between prices in restructured and non-restructured markets. The data presented above with respect to the New England states makes this obvious. Other studies support this conclusion as well. In a presentation to the Connecticut General Assembly, Robert McCullough of McCullough Research demonstrated that:

It is common for advocates of administered markets to blame their failure to serve consumers in a cost-effective fashion on natural gas prices. Unfortunately there is no statistical relationship between natural gas prices and the RTO/non-RTO differential. The following chart shows the differential with all fuel prices removed. Surprisingly, the differential is even higher when only non-fuel charges to consumers are considered.¹¹

¹⁰ The exception to this statement is renewable energy which can command a market price premium from some buyers; however, the actual product consumed by the customer is simply energy

¹¹ Connecticut Energy Policy: Critical Times – Critical Decisions; McCullough Research, April 1, 2008; PP6-7



McCullough’s chart shows that the non-fuel difference between prices in deregulated and regulated markets was around 2 ½ cents per kWh in 2007, which correlates well with another independent study published by the Carnegie Mellon Electric Industry Center in early March of 2008. The report concludes with the following paragraph:

The combination of introducing retail competition into an electric utility’s operating territory and divestiture of that utility’s generating assets has increased costs, but has increased prices even more. **In particular, we find an average difference of 2 to 3 cents per kWh between prices and costs that is explained by restructuring rather than by increases in fuel prices.** We conclude that restructuring has been beneficial to companies that restructured, but the benefits have not reached consumers.¹²

IV. The three legs of the stool.

Since fuel costs alone cannot explain this growing price difference between restructured and non-restructured markets, it is important to understand what is really causing the difference. This paper suggests that the sources of these problems are three legs of a stool supporting high and volatile prices. Each of these legs appears to play a significant role in the current power pricing crisis:

¹² Carnegie Mellon Electricity Industry Center Working Paper CEIC-08-03, P26, emphasis added

Policies Designed to Foster Retail Competition: While retail competition in itself may be a good thing for customers, the actions taken by States such as Connecticut and Massachusetts to support retail competition have actually had the effect of limiting customer choice. In addition to the forced divestiture of cost of service generation by the utilities, which is discussed below, the strict limitations on how utilities can procure power to meet their customers' requirements have had a detrimental effect on consumers. Whether the service is called Default Service, Standard Service (as in CT), or Basic Service (as in MA), the product is the same – load following full requirements service procured under short term contracts. In general, utilities have been prohibited or discouraged from pursuing long-term contracts with generators that could provide a measure of rate stability. Rather, the utilities have procured power at essentially prevailing marginal natural gas based short term pricing, largely because of retail marketer assertions that stable utility price offerings would be disruptive to competition. Interestingly, the sellers of the short-term full requirements service contracts may be affiliates of retail marketers who act as middlemen between generators and utilities (and as middlemen add their own markup to the cost).

Somehow, the best interests of the average consumer have been lost in the attempt at the State level to encourage competition by constricting the utilities' ability to provide stable pricing options for customers. One need only look to the guiding principles of the Retail Energy Supply Association to see this goal spelled out clearly:

For smaller customers not on hourly-priced default service and not taking service from an alternative retail supplier, standard offer service prices should reflect a market based retail price and have the ability to be adjusted as frequently as necessary to reflect changes in the market¹³

What this language means in plain terms is that consumers take all of the price risk associated with an underlying wholesale spot market. The “choices” that customers have, whether they procure from a retail marketer or the utility, are all based on this short-term wholesale market. Customers who desire, or need, price stability have no options. Retail marketers do not need to provide this kind of long-term price stability because they don't have to do so in order to compete with utility pricing under current rules.

Forced Divestiture of Cost of Service Generation: In Connecticut, and in most other deregulated states, utilities were required to divest their generation resources to promote customer choice. Utility customers used to pay for generation service at the actual cost (fixed and variable) of the units that were dispatched to operate the grid in a reliable manner (cost of service pricing). The efficiency benefit of resources that could be dispatched at a low marginal cost, such as nuclear and coal units, belonged to the customers. Since the divestiture, the price has been set by the last, or marginal, unit dispatched which deprives customers of this efficiency and diversity benefit. Markets for other products such as capacity and forward operating reserves generally exhibit this same trait, with customers paying all resources the price that the highest priced resource

¹³ Retail Energy Supply Association: <http://www.resausa.org/ouradvocacy.asp>

will sell at. If automobiles were priced in this manner, every car would cost as much as a Lamborghini.

RTO Markets: Under vertical integration, with significant planning and subject to regulatory approval, utilities built the right type of generation, in the right locations to meet reliability needs at the lowest possible cost. The utilities' resource portfolios were assembled as a mix of generation types including baseload, intermediate and peaking generation; and, were powered by a diverse mix of fuel types to mitigate the operational and economic impact of a fuel shortage or price spike in one fuel.

Under the New England RTO market structure, without generation priced at cost of service, each unit must make a profit individually to remain financially viable. The efficiency of the portfolio has been eliminated. When the energy market was deemed insufficient to financially support less-efficient intermediate and peaking units, a capacity market was developed. When the energy and capacity markets were deemed insufficient to financially support critical fast-start peaking units, a forward reserve market was developed. Additionally, there are numerous non-market compensation mechanisms that serve as additional revenue streams for generators that fit specific reliability needs. If, after all of these markets are considered, a generator is not able to remain financially viable it may seek a cost of service "reliability must run" contract. For a constrained region like Connecticut that cannot afford the retirement of generation, this effectively sets cost of service as the floor price on a unit by unit basis. Therefore, while consumers used to pay cost of service, they now pay the greater of cost of service or market because units needed for reliability will be kept online regardless of cost.

Under this market structure there are clear winners and losers. As a by product of restructuring, non-regulated generation developers around the country flocked to combined cycle, gas-fired generation due to its relatively low capital cost. This strategy was particularly prevalent in New England where 97% of the capacity added to the region since 1999 is gas powered¹⁴. It's no surprise that natural gas sets the clearing price for energy almost every hour in New England. The combination of an overbuild of gas fired generation and industry restructuring has created a windfall for the owners of inexpensive, non-gas fired generation. McCullough estimates that the Millstone 3 nuclear facility in Connecticut earned 2007 profits of 110.05%, while the Bridgeport Harbor 3 coal unit, also in Connecticut, earned 256.37%¹⁵. While the owners of these facilities are among the biggest winners from deregulation, the biggest losers are consumers who foot the bill for these profits through the marginal cost dispatch market design.

The marginal cost market design is not the problem in and of itself. This pricing mechanism was originally designed to be used as a balancing market, and not be "the" market for all energy. Unfortunately, the combination of divestiture and mandatory short term contracts has created a market structure where long term bilateral contracts are not

¹⁴ New England Electricity Scenario Analysis, ISO New England, August 2, 2007 at 9.

¹⁵ Connecticut Energy Policy: Critical Times – Critical Decisions, McCullough Research, April 1, 2008; P17

only rare, but are likely discouraged. This had led to marginal pricing being the driving force for not only the spot market, but for forward markets as well.

V. Where do we go from here?

There are steps that can be taken to moderate prices and reduce the price volatility that have been causing economic hardship for Connecticut's energy consumers. Some of these measures, such as aggressively pursuing all cost-effective energy efficiency, would apply equally for restructured and non-restructured states. The focus here is exclusively on the conditions affecting wholesale power procurement.

The restructured energy market needs to be designed in a way that provides benefits to all customers. Put simply, the market needs to adapt to customer needs, not the other way around. Retail choice can be a very good thing for consumers, but only if customers are given meaningful choices that include options to purchase power at rates that are stable over the long run. When considering changes to the current market rules, it is of crucial importance to ask the question "how does this affect consumers?" The answer to this question should not be based on the same textbook economic theory that has already failed to account for the uniqueness of the power industry, but should instead focus on practical reality. Below are a few proposed changes that would be expected to have a positive impact on consumers if they are implemented properly.

1. A portfolio approach to power procurement should be adopted to provide price stability for utility power supply customers. Investors understand the importance of diversification. Any prudently designed investment portfolio will contain a diverse mix of securities and assets to ensure that an event that adversely impacts one type of asset have a less significant impact on the investment portfolio as a whole. Currently in Connecticut, power is procured under a single type of service (full-requirements), and under contract terms of up to three years in duration. As explained above, this ties customer prices to highly volatile natural gas prices for essentially 100% of the customers' requirements. Under a portfolio approach, the utilities would buy a more diverse set of products (energy, capacity, renewable credits, etc.), and more importantly would buy under a mix of long, medium and short term contracts. As with an investment portfolio, the diverse portfolio approach to power procurement would help to mitigate the adverse impact of events affecting one source of fuel. In the event of natural gas and oil price spikes, a blended portfolio would soften the impact on consumers because only part of the portfolio would be tied to those short term markets.

2. Cost of service pricing can provide customers with price stability and long run savings. Under cost of service pricing, the customer pays only the cost of a facility plus a reasonable rate of return, regardless of market prices. Even with conventional gas-fired generation, a substantial customer benefit can be achieved through the adoption of cost of service pricing despite the current fuel prices. In mid April 2008, the on peak forward energy price for August, 2008 in New England was about \$120/MWh, with a delivered natural gas price of approximately \$11.75/MMBtu. This implies a marginal heat rate of about 10,200. A newer combined cycle natural gas facility with a heat rate of 7,000 could

convert that same natural gas to energy at \$82/MWh, a savings of \$38/MWh (3.8 cents/kWh) or 31% from the forward price.. Under cost of service pricing, this benefit would go to the customer. Under the current market structure, the benefit is pocketed by the generator. It is important to note that cost of service pricing does not have to lead back to full vertical integration of utilities. The robust response to Connecticut's proceeding to consider peaking generation proposals demonstrates that many generation developers are willing to forego the potential for high market profits in exchange for the revenue certainty that cost of service pricing can provide for them. It is also important to note that the entire region does not have to return to cost of service pricing for this strategy to be effective. As evidenced by the lower increases seen in New Hampshire and Vermont, cost of service pricing can co-exist with the RTO markets on a state by state, or even utility by utility, basis, and provide benefits to customers.

3. New resources should be developed that ease the region's reliance on natural gas. As explained above, cost of service pricing for gas-fired generation can help mute the price spikes associated with marginal gas pricing. However, even more of price stability can be achieved by applying cost of service pricing to non-gas generation, such as renewable generation from sources such as wind and biomass.

4. Utility owned generation should be considered as a means to ensuring that the right type of generation is built in the right locations, and at the lowest possible cost. In many cases, a strategy of seeking proposals from non-utility generation developers to construct new resources for cost of service compensation would be sufficient to meet this objective. However, to ensure the best result for customers, utilities should be allowed to build new generation if they can provide the overall best solution. This is particularly crucial for classes of generation for which market revenues could be expected to exceed cost of service to ensure that customers benefit appropriately from the development of such generation.

VI. Conclusion.

The numbers paint a clear and disturbing picture. The way in which power markets were restructured at both the wholesale and retail level has led to a crisis for consumers. While it is pointless to look backward, looking forward there are steps that can be taken to ease the upward pressure on consumer prices and begin to reconstruct the price stability that was lost. The strategies available to improve consumer rates would likely have modest results initially, but can have a significant positive impact over the long run. In recent years, many utility holding companies have adopted a "back to basics" strategy of divesting non-regulated assets and re-focusing on growing their core regulated businesses. A similar strategy should be employed for power procurement. In this context, "back to basics" means putting customers first and pursuing strategies that are likely to ease price pressure and provide stability. It appears that Thomas Farrell, CEO of Dominion Resources, the owner of the aforementioned Millstone nuclear facility, agrees. In a Washington Post editorial, Farrell states that "Virginia's new regulatory structure is a step in the right direction, one that protects its energy future and should serve as a model

for other states.¹⁶ These comments refer to a structure in Virginia that returns to cost of service pricing for generation. If a back to basics strategy is good for the customers of Dominion's regulated utility, then it should also be good for the customers in New England, where Dominion owns generation.

¹⁶ Doing Power Regulation Right"; Thomas Farrell II, CEO, Dominion Resources; Washington Post, Monday, March 31, 2008; Page D03