The Power of Generation: Continued Economic Benefits from Independent Power Development in Louisiana

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EXECUTIVE SUMMARY

The purpose of this report is to update the CES IPP Study issued over one and half years ago on independent power development within Louisiana. This report addresses two major areas. The first area is providing an update to stakeholders on recent events in the competitive energy business, the factors leading to its recent downturn, and the impact that this downturn has had on power plant development in Louisiana. The second area addressed in the report is to provide an estimate of the potential economic opportunities for the more efficient dispatch of these merchant power facilities and the displacement of older, less efficient power generation facilities in the region.

Economic Opportunities Associated with the Construction and Operation of Independent Power Facilities

Over the past year, the industry has been rocked by a souring economy, industry scandals, regulatory uncertainty, and declining access to capital markets for continued generation development. As a result, a number of the projects that were originally envisioned for development in Louisiana, and around the U.S., have been cancelled. Despite the industry set-back, there is still a considerable amount of new development likely to come on-line in Louisiana over the next several years. This study finds that despite the industry set back, the economic benefits from independent power facilities include:

- A $4.1 billion capital investment in the state by the end of 2005 in facilities that are likely to be completed;

- A likely investment of 7,406 MWs of new and efficient power generation;

- An estimated total economic impact associated with the construction of independent power facilities in Louisiana of $1.5 billion by 2005. The direct economic impact is $1.2 billion, and the "multiplier" effects of the construction activities in the state is $179 million.

- The total potential employment opportunities associated with the construction of these independent power facilities is 4,963 jobs. Some 2,408 jobs are associated with the multiplier effects of these construction activities.

- Value added is a broader measure of the total income created directly in an industry. The estimated total value added associated with the construction of the independent power facilities likely to be developed in the state is $237 million. Wages account for close to $155 million of this increased value added.

- The estimated total economic impact associated with the annual operation of the facilities likely to be developed in Louisiana is $932 million. Approximately $31 million is associated with the multiplier effects of these activities.

- The estimated total employment opportunities associated with the operation of these independent power generation facilities is 787 jobs. Around 430 of these employment opportunities are from the multiplier effects of plant operations.

Efficiency Opportunities Associated with Dispatching Independent Power Facilities in Regional Wholesale Markets

- The standard efficiency rating used for electric power generation is referred to as the "heat rate" and is measured by the amount of energy used to generate one kilowatt-hour (kWh) of electricity. The unit of energy is typically measured in British thermal units (Btus). A lower heat rate entails a lower amount of energy used to produce a single kWh, while a higher heat rate entails that more energy is being used to generate a single kWh. The heat rates for new natural gas fired independent power facilities are very efficient:

    - As low as 5,000 Btu/kWh heat rate for a new cogeneration (combined heat and power) application;

    - As low as 6,000 Btu/kWh heat rate for a new combined cycle facility;

    - As low as 10,000 Btu/kWh heat rate for a new combustion turbine facility.

- There are 12,901 MWs of natural gas fired, utility generating capacity that is operating at a heat rate of 10,000 Btus/kWh or higher. There are 18,958 MWs of natural gas fired, utility generating capacity that is operating at a heat rate of 9,000 Btus/kWh or higher. This compares unfavorably with newer natural gas technologies under development by competitive developers.

- Louisiana and our regional utility generating facilities are old. Some 73 percent are over 20 years old, while some 43 percent are over the age of 30.

- There are potentially significant opportunities for independent power facilities to begin to displace older utility generation facilities. Based upon estimates provided in this report, the potential fuel cost savings associated with the displacement of these older units are as follows:

- For the Entergy sub-region as a whole, some $411 million in 2000, $825 million in 2003, and $926 million in 2005;
- The share of these regional efficiency savings estimates for Louisiana could be as much as $178 million in 2000, $357 million in 2003, and $401 million in 2005.

SECTION 1: INTRODUCTION

In October, 2001, the Center for Energy Studies released a study examining the development of independent power generation in Louisiana (hereafter referred to as the "CES IPP Study").[1] The study examined the level and nature of merchant development in the state, the reasons for this development, and the potential economic impacts associated with independent power development in Louisiana.

The CES IPP Study concluded that there were considerable economic opportunities associated with the construction and operation of these new independent power facilities. Some of the study's conclusions included:

- An estimated $7.8 billion potential capital investment in announced independent power facilities in Louisiana.

- Some 13,758 MWs of existing and announced independent power capacity, 40 percent of which was from highly efficient cogeneration (combined heat and power) facilities at Louisiana industrial facilities.

- A total potential one-time economic impact associated with the construction of Louisiana's announced independent power facilities around $2.8 billion.

- A potential employment impact of some 9,382 jobs and some $300 million of increased wages associated with the construction of the new power generation facilities.

- A total potential economic impact associated with the annual operation of these facilities of $1.8 billion.

- Total potential employment opportunities associated with the operation of these announced independent power facilities around 1,483 jobs.

Since the last CES IPP study, the landscape of the energy business has changed dramatically. This landscape was indelibly altered by the Enron crisis and subsequent industry meltdown. As a result, a number of the economic opportunities that were estimated in the former CES IPP Study, are now in jeopardy of not being attained.

[1] David E. Dismukes, Dmitry V. Mesyanzhinov, and Williams O. Olatubi. *Moving to the Front of the Lines: The Economic Impact of Independent Power Plant Development in Louisiana*. Baton Rouge, LA: Louisiana State University Center for Energy Studies, 2001.

There is a lot of blame associated with the collapse of the competitive merchant energy industry.[2] A common and pervasive claim is that the industry has been the victim of its own negative actions. However, despite the purported revelations of anti-competitive practices and fraudulent activities, the industry is still an important party of the energy supply chain.

Generation developers will continue to be important as the operators of the fleet of power plants that will serve tomorrow's load. To date, this highly efficient power generation development has resulted in lower regional wholesale power prices, thus proving one of the points originally argued in the first CES IPP Study. Equally important is the fact that these IPP facilities will still have a considerable, albeit diminished, economic impact on the Louisiana economy and its regional energy markets.

The purpose of this report is to update the CES IPP Study issued over one and half years ago on independent power development within Louisiana. This report addresses two major topics. The first topic is associated with updating Louisiana stakeholders on recent events in the competitive energy business, the factors leading to its recent downturn, and the impact that this downturn has had on power plant development in the state. This report will provide revised economic impact numbers on likely development over the next several years. These economic impacts, as will be seen later, are considerable despite the fact that they are somewhat lower than originally projected.

The second topic addressed in this report is the outlook for the competitive energy industry in Louisiana. While current trends look somewhat dismal, there are considerable economic benefits that could be attained by harnessing the efficiency opportunities from replacing older, less efficient utility generation with newer competitive sources of power. This report will provide some estimates of the potential ratepayer savings from the efficiency opportunities of utilizing more efficient competitive sources of electricity.

[2]Merchant energy includes energy marketing and trading as well as the development of physical energy assets like pipelines, storage facilities, and power generation facilities.

SECTION 2: REVISITNG THE RISE OF INDEPENDENT POWER DEVELOPMENT

The summer of 2001 marked the high point in independent power generation development throughout the U.S. During this time period, 511,000 megawatts (MWs) of new generating capacity had been announced for development by 2010. In other words, an average level of 50,000 MWs of capacity development per year over the next ten years. This development was stimulated by several factors, the most important of which was the opening of the nation's electric power transmission grid on equal and non-discriminatory terms. Equally important was the decades-long lack of power generation investment by vertically integrated, incumbent electric utilities.[3]

Order 888 was probably one of the most significant bellwether events promoting the development of new competitive wholesale markets and the plethora of generation that was soon to follow. This rule, promulgated in 1996 by the Federal Energy Regulatory Commission (FERC), opened power transmission networks to third party use. In the past, the vertically integrated utility owners of these facilities could deny access and transportation to third parties across these lines. After Order 888, utilities were required to allow competitors to access these lines on the same rates, terms, and conditions as themselves.

The passage of Order 888 came at an opportune time for the nation's electric power system. The country's power generation infrastructure was in need of significant upgrades and capacity additions. As a result of the capacity shortfalls, a number of regions around the U.S. saw periods of incredibly high and volatile commodity electricity price spikes. In the summer of 1998, the Midwest was plagued by hot weather, unexpected outages, and transmission constraints that led to the nation's first major experience with super peak power price surges. Prices during this period leaped from a normal level of $25/MWh to as high as $7,500 per MWh in some hours.[4]

Later, in the summer of 1999, many other regions in the U.S. experienced a similar situation. This time, however, the area to incur the brunt of the shortfall was the Gulf South. For the first time in the region's history, the Gulf South experienced both relatively high prices for wholesale power and a significant number of "rolling blackouts."

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[3] For background, see David E. Dismukes and K.E. Hughes, III. "Coming to a Neighborhood Near You: The Merchant Electric Power Plant." (1999). *Oil, Gas, and Energy Quarterly.* 48:433-441.

[4] *Staff Report to the Federal Energy Regulatory Commission on the Causes of Wholesale Electric Pricing Abnormalities in the Midwest During June 1998*. September 22, 1998: 1-1.

In the summer of 2000, the U.S. was rocked by another energy crisis that was most pervasively felt by the State of California. Here again, another regional power market was jolted by unexpected weather conditions, low generation availability, and high demand. Aggravating this situation was the fact that the annual average growth in peak demand for California during this period (1982-1998) was approximately 3.2 percent compared to an annual average increase in generating capacity of less than 1 percent.[5] In addition, as many have recognized, the California regulatory structure for competitive markets was set up in such a manner that was doomed from its onset.

Some of the fundamental reasons for the regional dislocations of the late 1990s are:

- High growth in electricity demand that was not met by regulated utility generation additions; and
- A market that relied on older, less efficient technologies that do not run as reliably as newer ones.

The competitive energy business reacted favorably to both of these problems by announcing the development of a record number of power generation projects.

Throughout 2000-2001, the growth opportunities for the competitive energy business seemed boundless. Diversification into energy marketing and trading, to leverage the physical asset side of the business, seemed to be another stellar profit center for these companies. For the first time in almost 20 years, it became attractive to work in the high flying energy sector as young accountants, financial analysts, economists, and engineers flocked to the industry.

By late 2001, the fissures, that would quickly grow to gaping cracks, in the energy industry's financial and economic foundation were materializing. The retrenchment since that time has, and continues to be, relentless. Table 1 shows that the first casualty of the industry's demise was the competitive power generation opportunities scheduled for the next several years. Cancellations in independent power plants, scheduled to come on line in 2002, jumped to 15,000 MWs from a prior year level of close to 9,000 MWs. For the years, 2003-2004, these cancellations amount to well over 20 percent of originally planned projects. Each of these years could see at least 26,000 MWs of cancellations – if not more.

[5] *Staff Report to the Federal Energy Regulatory Commission on Western Markets and the Causes of the Summer 2000 Price Abnormalities. Part 1 of Staff Repot on U.S. Bulk Power Markets.* Washington, DC: Federal Energy Regulatory Commission, November 1, 2000: 2-3.

Year	Originally Announced Capacity	Annual Capacity Cancelled and Tabled	Annual Percent Cancelled and Tabled
2000	29,800	3,288	11.0%
2001	51,626	8,869	17.2%
2002	89,478	15,527	17.4%
2003	107,274	26,069	24.3%
2004	122,615	26,846	21.9%
2005	68,450	8,963	13.1%
2006	25,547	3,034	11.9%
2007	15,995	2,808	17.6%
2008	4,199	1,000	23.8%
2009	-1,765	--	--
2010	-2,016	--	--
Total	**511,202**	**96,404**	**18.9%**

Table 1: Announced, Cancelled, and Tabled Power Generation, 2000-2010

Source: Resource Data International.

On a regional basis, there is a more interesting, and potentially worrisome trend in project cancellations. A close examination of these numbers, by NERC region, shows that markets that moved early in the development of wholesale markets, namely ERCOT and the Mid-West, have had fewer cancellations on both a relative and absolute basis. The regions with the greater number of cancellations, both from a relative and absolute basis, are those whose markets developed relatively later in the process – like the southeast.

Investors have also lost confidence in the industry. This is reflected in the share prices from the major participants in this industry. Competitors in the merchant business come from a variety of energy industry backgrounds. Some companies have their origins primarily in natural gas transportation (i.e., pipeline) business. These types of companies include Williams Energy, Kinder Morgan, and El Paso Corporation, to name a few. Other companies are those that have arisen from vertically integrated utilities. These include Duke Energy, FPL Group, and TECO Energy. Others are purely competitive firms that include Calpine, Dynegy, NRG, and Panda.

Figure 1 shows the recent trends in share prices for major industry classifications: pipeline-originating merchants; vertically integrated utilities; and IPPs. Each of the respective indices is weighted by its component companies' share of announced merchant development in 2001.

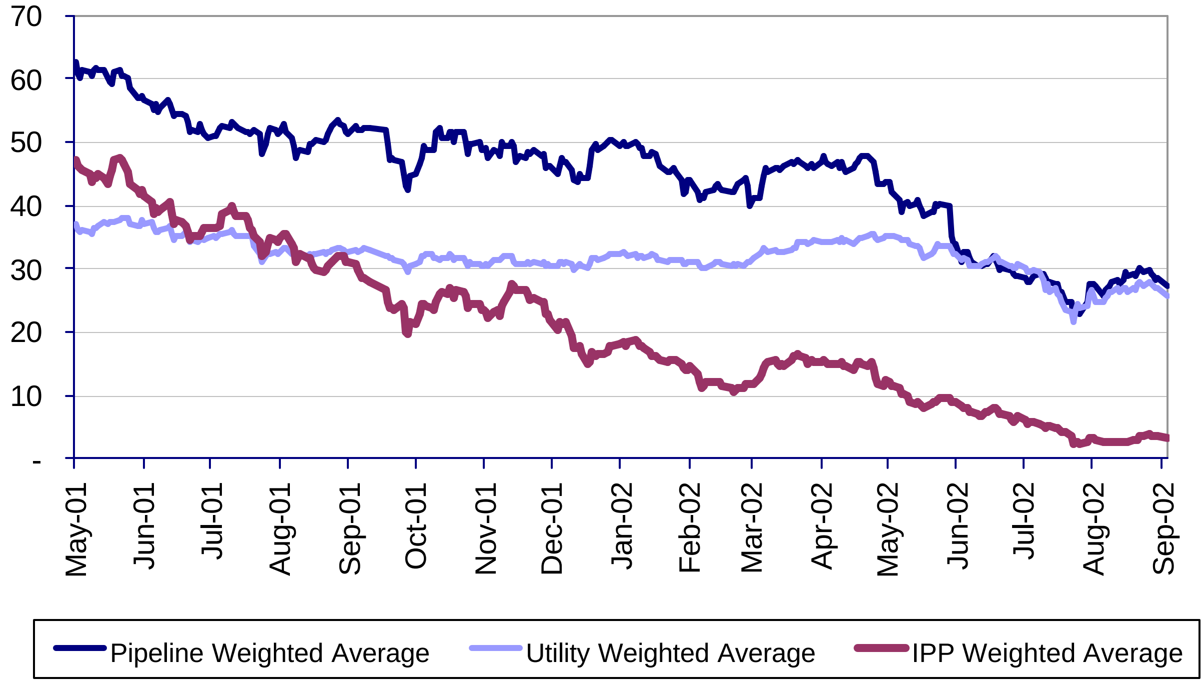

Figure 1: Share Prices of Merchant Industry Participants by Originating Sector

Source: Various company stock prices

All of the indices have seen declines since the industry's high point in the late spring of 2001. By late fall, 2002, the utility index had fallen by over 25 percent, while the pipeline-originating merchants have fallen by over 50 percent. True independent merchants have fallen a dramatic 96 percent over a similar period. From about May 2001 to the end of 2002, the industry has seen a loss of market valuation of around $250 billion.

The changes in debt ratings for many competitive energy companies have been equally traumatic and have resulted in serious financial impacts. For many companies, generation projects were financed under contingent lending, entailing that as debt ratings or financial performance change, so too do lending terms and schedules.[6] Table 2 shows the changes in these debt ratings from 2001 to 2003 for a select number of competitive energy companies.

[6] Peter Rigby. *Merchant Energy Survival Hangs on FERC's Blueprint for Market Design*. New York: Standard & Poor's, March, 2003.

Company	Credit Rating	
	2001	2003
Allegheny	A+	BB-
Aquila	BBB	B+
Dynegy	BBB+	B
El Paso	BBB+	B+
Enron	BBB+	D
Mirant	BBB	BB
NRG	BBB-	D
PG&E/NEG	BBB	D
Reliant	BBB+	B-
Williams	BBB+	B+

Table 2: Competitive Energy Industry Debt Ratings

Source: Standard & Poor's

SECTION 3: REASONS FOR THE INDEPENDENT POWER INDUSTRY'S DOWNTURN

There is no single reason for the collapse of the competitive energy business. Some of the reasons are outcomes resulting from the industry' own decisions, while others are clearly exogenous. The remaining subsections addresses each of the issues in greater detail.

3.1 Industry Exuberance: No matter how you look at it, prior to 2001, there was a considerable amount of independent power plant development announced throughout the U.S. As shown earlier in Table 1, 511,000 MWs of capacity announced for development is equal to approximately 80 percent of the total 2000 electric utility generating fleet capacity.

The risk of developing this monumental and unprecedented level of power generation capacity did not go entirely unnoticed. In July and August, 2001, a number of equity analysts and investment bankers began to raise questions about the realism of these developments. In August 2001, for instance, Barron's noted that:

> While brokerage analysts generally have applauded utilities' drive to exploit wholesale trading, some are now growing wary about the possible financial consequences of an energy glut. That's because a recent and unexpected short decline in power prices has raised red flags about the industry's future earnings from the sale of wholesale power.[7]

Such analysis did not go unnoticed by investors either. During 2000, the Standard & Poor's electric utility index rang up gains of more than 40 percent. According to Barron's, the popularity of this index was due in part to investors fleeing high technology shares for another high flying industry.[8] However, by mid-year 2001, the utility index was down by over 10 percent compared to the S&P 500 decline of only 8 percent.

Industry development on this massive scale was not entirely motivated by greed and exuberance. The timing of bringing the investment on-line is critical in order to realize potential profits. After all, the first to the market would be the first to capture the profits associated with any capacity constrained power generation market.

[7] Harlan S. Byrne. "Too Much Power? The Utility Industry's in a Building Boom. Why Skeptics Fear a Bust." *Barrons Online*. August 6, 2001: 4. This article, and the quotes taken from the article, incorrectly use the term "utility" as being synonymous with "power generation."

[8] *Ibid.*

In addition, it is probably not realistic to assume that most of the firms in the industry were unaware of the possibilities for over-development. However, even as late as 2001, there were still a number of positive indicators that could delay an overbuild situation, or at worse, minimize any over-development to a few players in a few geographic markets. The key to offsetting both of these potentially negative outcomes was: (1) continued strong electricity demand maintained by normal weather patterns and a healthy economy; and (2) the retirement of old, inefficient utility power generation. Both failed to occur, and as a result, the overbuild scenario became an unpleasant reality.

3.2 Economic Downturn: Throughout the late 1990s, there was a considerable amount of confidence about the continued upward pace of U.S. economic performance. This is probably best revealed in the rapid and continuous rise of the U.S. stock market as reflected in its major indices such as the Dow Jones Industrial Average, and more importantly, the technology-heavy Nasdaq. By spring 2001, however, the U.S. economy began to loose steam and fell into a recession. The terrorist events of September 2001, further exacerbated the already negative trends in the economy.

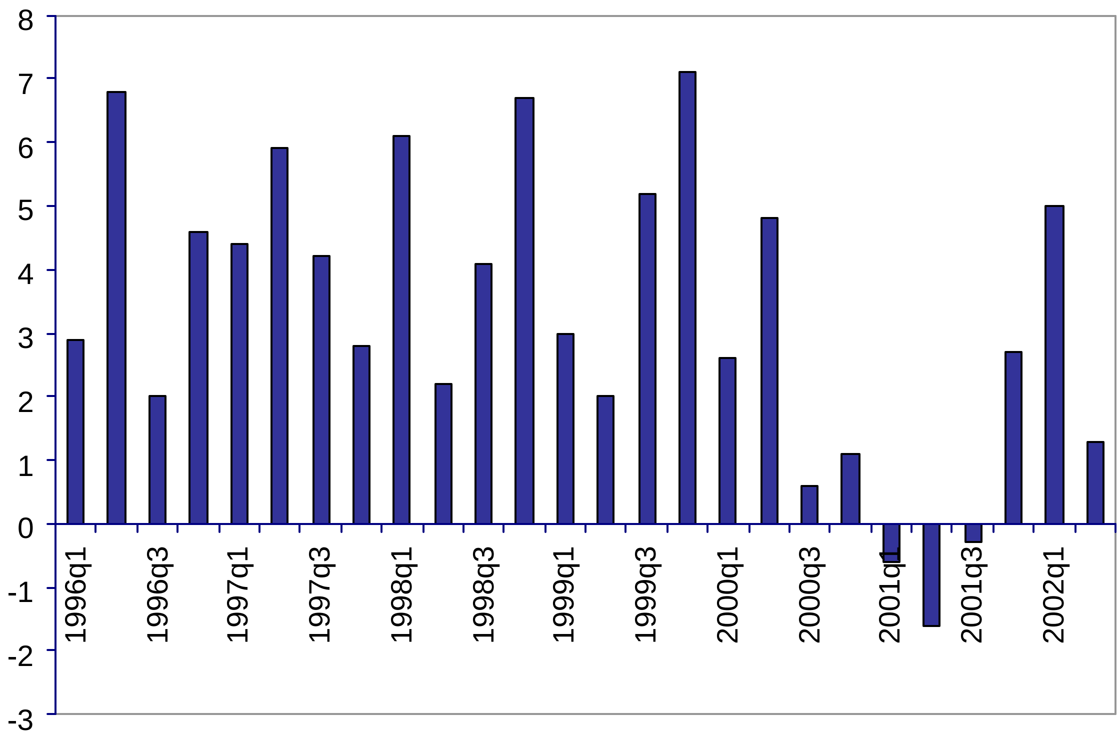

Figure 2: Annual Change of U.S. Real Gross Domestic Product (GDP)

Source: U.S. Department of Commerce

Outside of weather, economic activity is probably the most important determinant of electricity demand. If economic activity decreases, the amount of electricity demanded will decrease as well. As seen in Figure 2, the U.S. economy began to head into a recession in mid 2001. These decreases in economic activity, driven mainly by a sharp decline in the manufacturing and technology sectors, had significant implications for the independent power business.

Throughout the 1990s, the rate of growth of electricity ticked along at an average pace of about 2.7 percent per year. This growth was marked in part by the substantial performance of the U.S. economy. As seen in Figure 3, the growth of electricity consumption for 2001, however, fell to a degree not seen since the last recession in 1992.

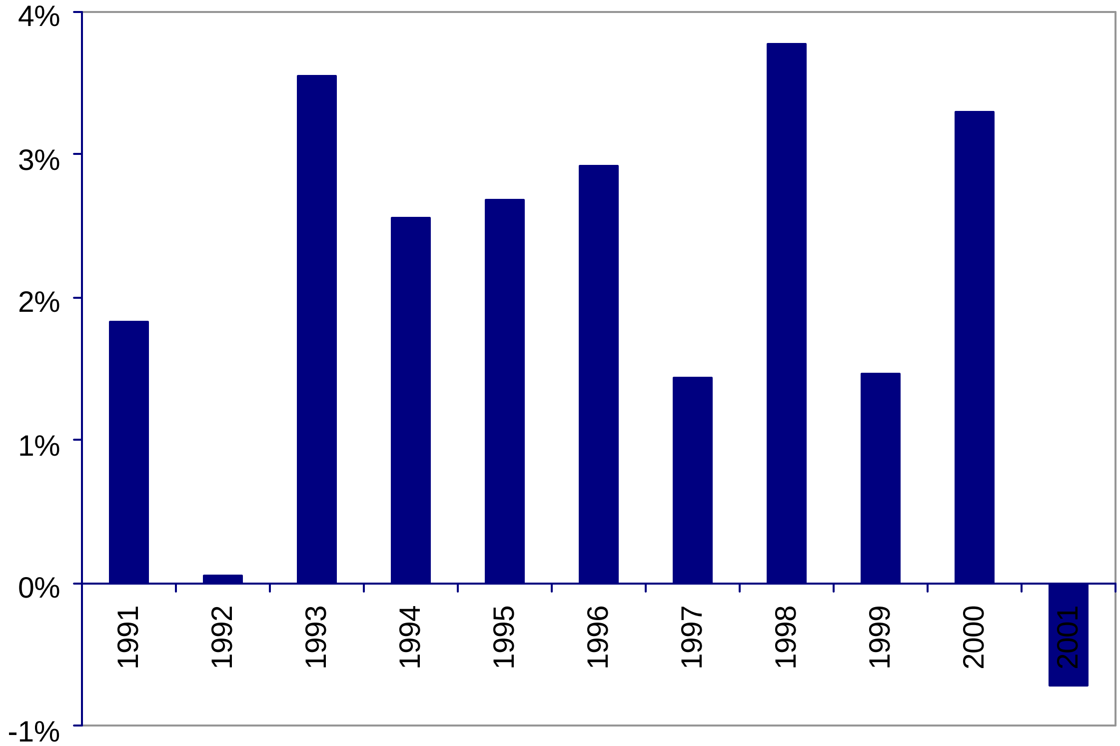

Figure 3: Annual Rate of Change of Electricity Consumption

Source: U.S. Department of Energy

The swift downturn of the economy caught the independent power business flatfooted. Electricity demand, stimulated by the high growth in manufacturing output and the electricity-hungry technology sector, vaporized. All that was left was the steady, but relatively limited growth in residential electricity usage – hardly enough to sustain the enormous amount of capacity scheduled to come on line during the 2002-2003 time period. The per customer class changes in electricity consumption are provided in Table 3.

Year	Residential	Commercial	Industrial	Other	Total
2000	292,583	244,851	258,898	25,944	822,276
2001	322,613	256,980	247,563	27,208	854,365
2002	312,001	255,785	227,496	25,585	820,867

Table 3: Electricity Consumption Per Class (Million kWhs, 2000-2002)

Source: U.S. Department of Energy

3.3 California, Enron, and Industry Credibility Crisis: The price spikes in California were one of the earliest challenges to the integrity of wholesale power markets in 2000. The difference between the spikes in California, and those that occurred in other parts of the country, was the political tenor of the problem. Almost from the onset, the debate roared between the positions that the source of California's problem was associated with bad market design and a decade-old failure to develop new power generation infrastructure, versus a claim of market manipulation.

Early in the debate, it appeared that the "pro-market" proponents of California's energy woes were winning the day and the debate. These proponents argued that it was the repeated failure of California's market structure, including its inability to add adequate amounts of power generating capacity over the past decade, that were at fault for price increases and power shortages. The FERC staff, in issuing its report on Western Bulk power markets, found that power sellers and marketers in California had the *potential* to exercise market power, but that further investigation was needed in order to substantiate any charges that market power was being exercised.

However, by fall of 2001, the greatest crisis to hit the merchant power industry was about to begin: Enron. The revelations and the depth of the scandal associated with the energy giant, one that assumed a leadership position in promoting the merchant power industry's competitive/free-market virtue, were of monumental proportions. The spotlight that began to shine on the energy giant revealed that there were a host of other players that might also have exercised less than prudent business decisions.

It wasn't long before the link between Enron and the California market was developed, and the Company became the "poster boy" for bad merchant energy behavior. Additional revelations soon implicated other energy companies such as Reliant, Williams, Mirant, and El Paso. Further investigations were initiated, not only in California, but also at the FERC, the Securities and Exchange Commission ("SEC"), and Congress. For instance, a recent Senate Governmental Affairs report was highly critical of FERC's inability to adequately review and respond to the California crisis:

> …the Commission did nothing to address the problem of individual companies' abusive practices, including responding to staff's proposal to continue its investigation, for almost 15 months after receiving the staff bulk power report. This was despite the fact that FERC continued to receive additional evidence that market abuse was occurring.
>
> …Had the Commission agreed to start a more thorough investigation immediately following the release of the November 2000 Staff report [on Western Bulk Power Markets], it may well have uncovered earlier the type of evidence it believed necessary to substantiate the charges of market abuse in California.[9]

California has provided a virtual stream of constant bad news in the industry that continues to raise questions about the character, as well as long run liabilities, of the industry. As long as the Western power market problem remains unresolved, it will be a thorn in the development of the merchant energy industry and competitive wholesale markets.

3.4 Regulatory Shortcomings: Order 888 removed a number of important barriers to wholesale power competition. However, it did not go far enough in the area of transmission governance. From its promulgation in 1996, through to the follow-up Order 2000, the FERC has relied upon a light handed regulatory approach of voluntary organization as a means of removing the remaining vestiges of vertically integrated monopoly control. In some parts of the country, this approach has been more successful than others. However, in other parts of the country, particularly those that do not have long track records at regional integration, the process of introducing complete wholesale competition has been more painful.

The process initiated by Order 888 was successful in creating an open market by developing an open access transmission tariff (OATT) and open access real time information systems (OASIS). However, the new paradigm has suffered with issues associated with transmission governance. The first challenges were in the post Order 888 environment that envisioned Independent System Organizations (ISOs) as the means of securing transmission independence. The slow, inconsistent pace of ISO development, in addition to the failure of some

[9] Senate Governmental Affairs Committee. Majority Staff Memorandum. *Committee Staff Investigation of the Federal Energy Regulatory Commission's Oversight of Enron Corporation*. November 12, 2002: 39.

regions to even develop an ISO or other form of independent transmission governing body, led the FERC to issue a more stern policy on transmission organization known as Order 2000.

The new institution of preference, known as Regional Transmission Organizations (RTOs), not only supported a revised and expanded version of transmission governance, it also supported the idea that for-profit transmission companies (Transcos) could exist within an RTO umbrella. The key with Order 2000 was to promote the development of these RTOs on a more "expedited" basis. Nevertheless, the approach was still voluntary and left a significant degree of latitude to transmission owning/forming companies.

Governance is not a theoretical issue. It impacts a number of short term and long term transmission activities including security coordination, long term planning, interconnection agreements, system impact studies, the calculation of available transmission capabilities (ATC), market monitoring, and congestion management. The day in and day out process of moving electrons is entirely governed by the operators of the power transmission grid in any given region. If this process is governed by an entity that also has competing generating assets, the conflict of interest is wholly apparent.

The next stage in the process of opening wholesale power transmission systems, and standardizing processes for moving electricity in wholesale trade, rests with the recently issued Standard Market Design (SMD) Notice of Proposed Rulemaking (NOPR or commonly referred to as the "Giga NOPR") Here, the FERC is again attempting to standardize markets and encourage large, independent regional power systems to promote competition. One of the motivating factors for promoting this new SMD has been the frustration that the FERC has with the ongoing dominance of open access abuses by those controlling vital transmission grids.

SECTION 4: INDEPENDENT POWER DEVELOPMENT IN LOUISIANA

Louisiana is an attractive area for locating independent power facilities. These important attributes, while outlined in detail in the 2001 CES IPP Study, are worth repeating.

For independent power developers, one of the primary and important Louisiana attributes is its considerable supply of natural gas. Louisiana is the second largest producer of natural gas in the U.S. Approximately 90 percent of all announced independent power plant additions in the U.S. will be gas-fired. Figure 4 shows the relative gas production by state for 1999.

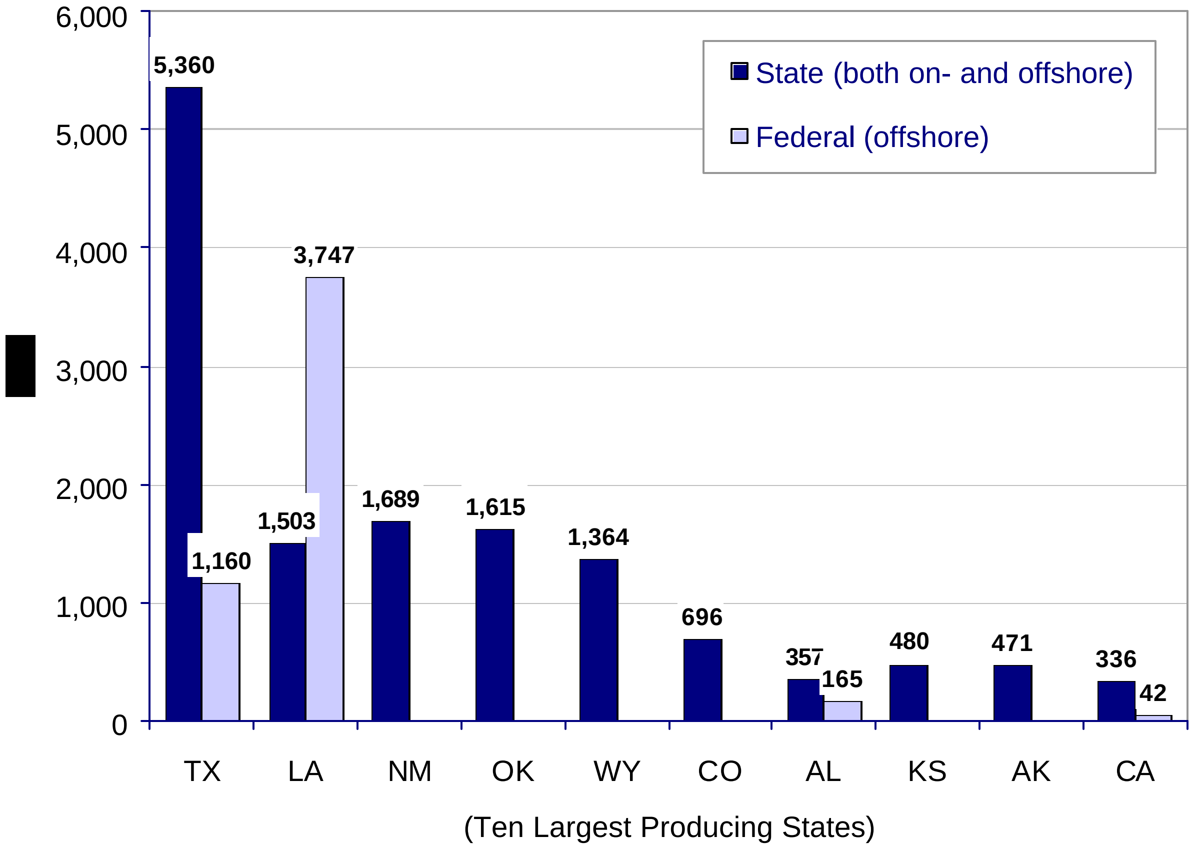

Figure 4: Natural Gas Production By State, 2000

Source: U.S. Department of Energy, Energy Information Administration, *Natural Gas Annual*.

Louisiana also has an extensive network of pipelines to transport its large supplies of natural gas. As shown in Figure 5, a considerable amount of natural gas flows through Louisiana to other regions in the U.S.

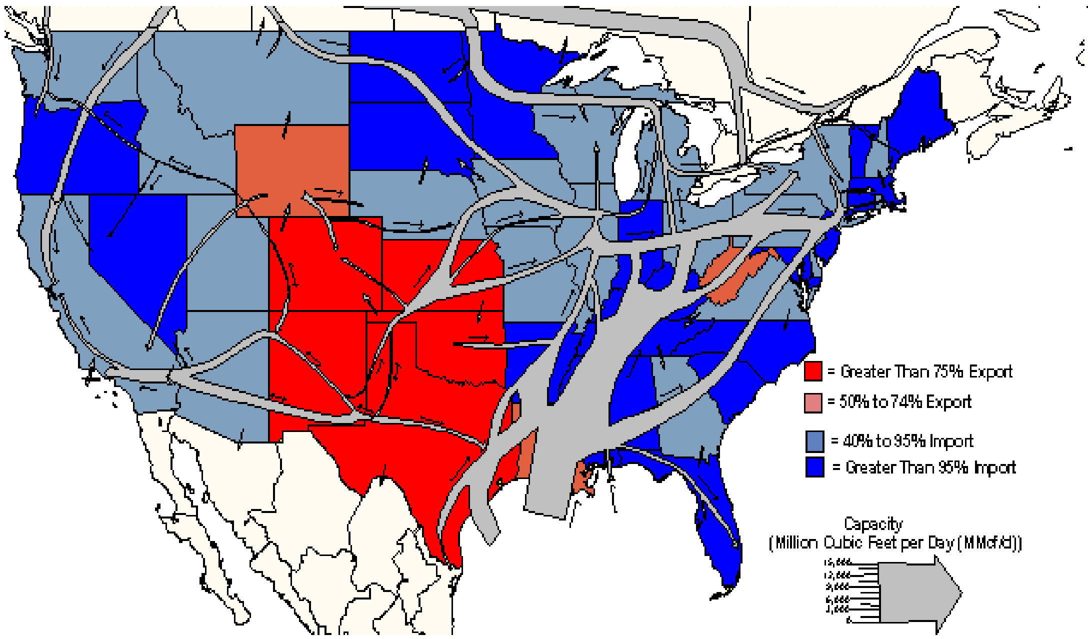

Figure 5: Natural Gas Flows in North America

Source: Energy Information Administration. (1999) *Natural Gas Trends and Issues, 1998*. Washington: U.S. Department of Energy.

Louisiana's natural gas pipeline industry is also marked by a diversity of providers of transportation services. There are a large number of inter- and intrastate natural gas pipelines in the state. Competitive forces in the industry give independent providers a number of gas transportation alternatives that are not available in other regions. The pipeline industry in Louisiana is one of the most pervasive in the country – one the reasons why it is referred to as "pipeline alley" by many industry analysts.

Louisiana also has a relatively extensive number of electric power transmission lines that can support and facilitate trade in the state and the region's wholesale power markets. Louisiana has 23,000 circuit miles of electric power transmission lines – the third highest level in the southeast.[10]

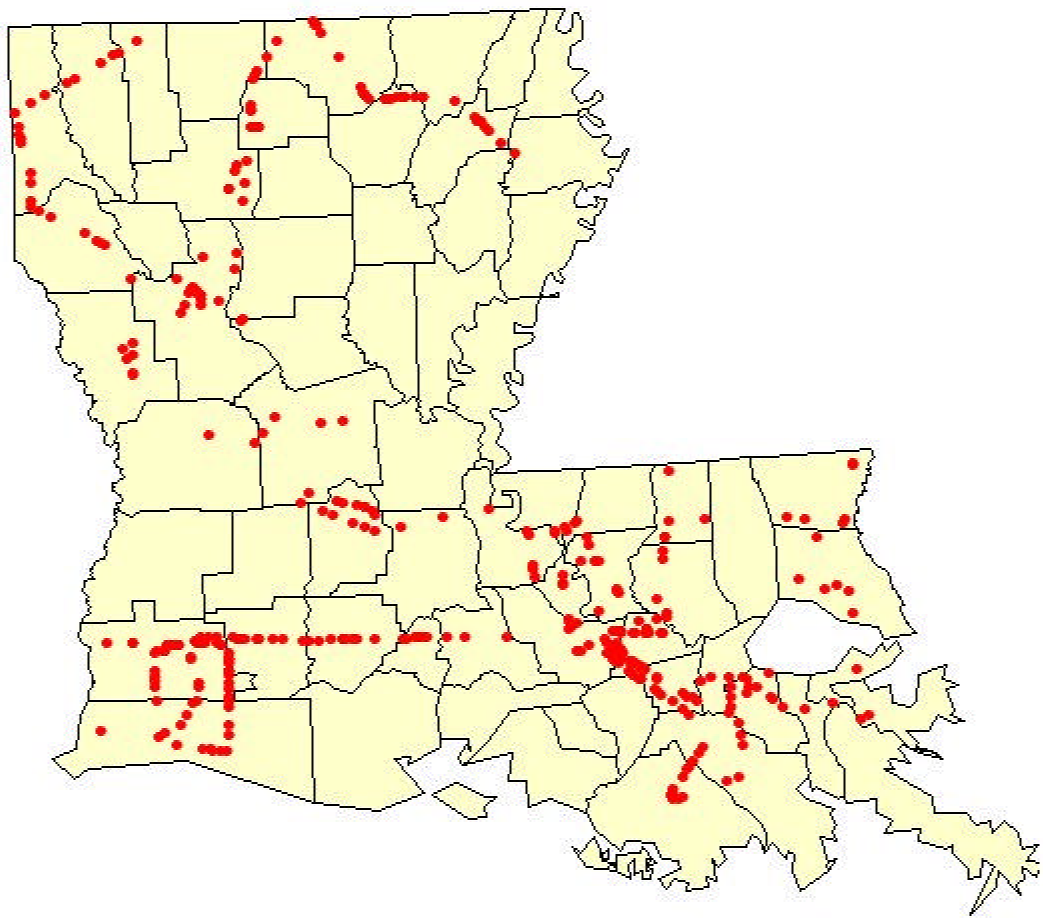

Figure 6: Louisiana Gas and Power Transmission Infrastructure

Source: LSU Center for Energy Studies

Figure 6 presents a map outlining all of the intersections between the natural gas and electric power industry transmission infrastructure. This map is an interesting representation of the confluence between these two important energy industries. Intersections between gas and power transmission lines reveal potential opportunities for siting an independent generating facility.

[10]As noted in the earlier CES IPP Study, despite the extensive nature of the existing transmission system, there is still a need to upgrade transmission systems through many areas of the southeast to facilitate the growing amount of wholesale trades on the system. One of the ongoing challenges associated with wholesale competition is associated with providing the right incentives for appropriate transmission system planning, upgrades/construction, governance, pricing, and cost recovery.

Another important reason for independent power generators locating in Louisiana is the competitive opportunities these companies have for indirectly serving the state's retail load. Under Louisiana law, and the rules and regulations of the Louisiana Public Service Commission (LPSC), competition for retail end users is prohibited. However, utilities in the state have the obligation to serve their customers in the most least cost, reliable manner. If purchases from the wholesale market result in lower cost resources, utilities are generally expected to procure those resources as opposed to operating their own, less efficient facilities.

One idea that has made the Gulf South region so attractive to IPPs has been the perceived possibilities of displacing older, less efficient, high-cost utility generation. Figure 7, for instance, shows the age profile of the generating facilities serving Louisiana. Figure 8, shows the efficiency of these generating facilities. Older facilities do not compare favorably with either newer gas fired turbines, which use 10,000 Btus of energy for every kWh generated, or with combined cycle generating facilities which use between 6,000-7,000 Btus for every kWh generated.

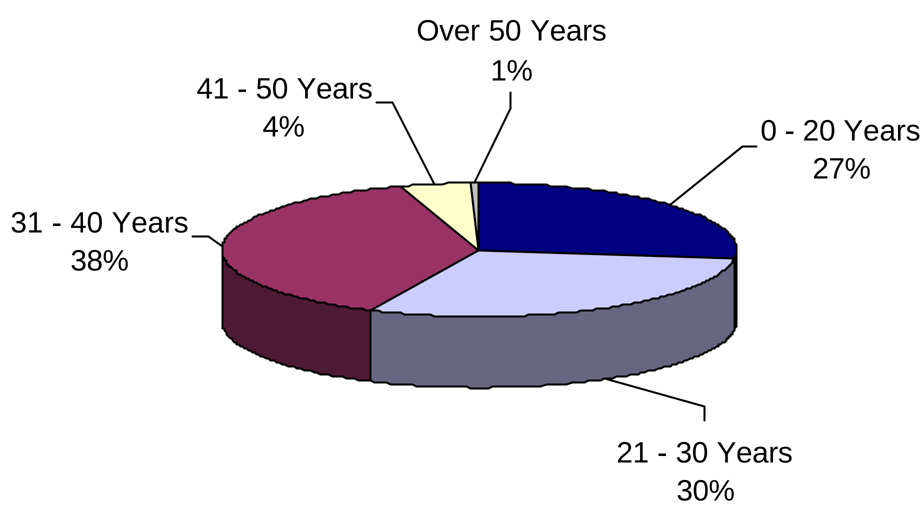

Figure 7: Disposition of Regional Generating Capacity by Age Category

Source: Utility Data Institute.

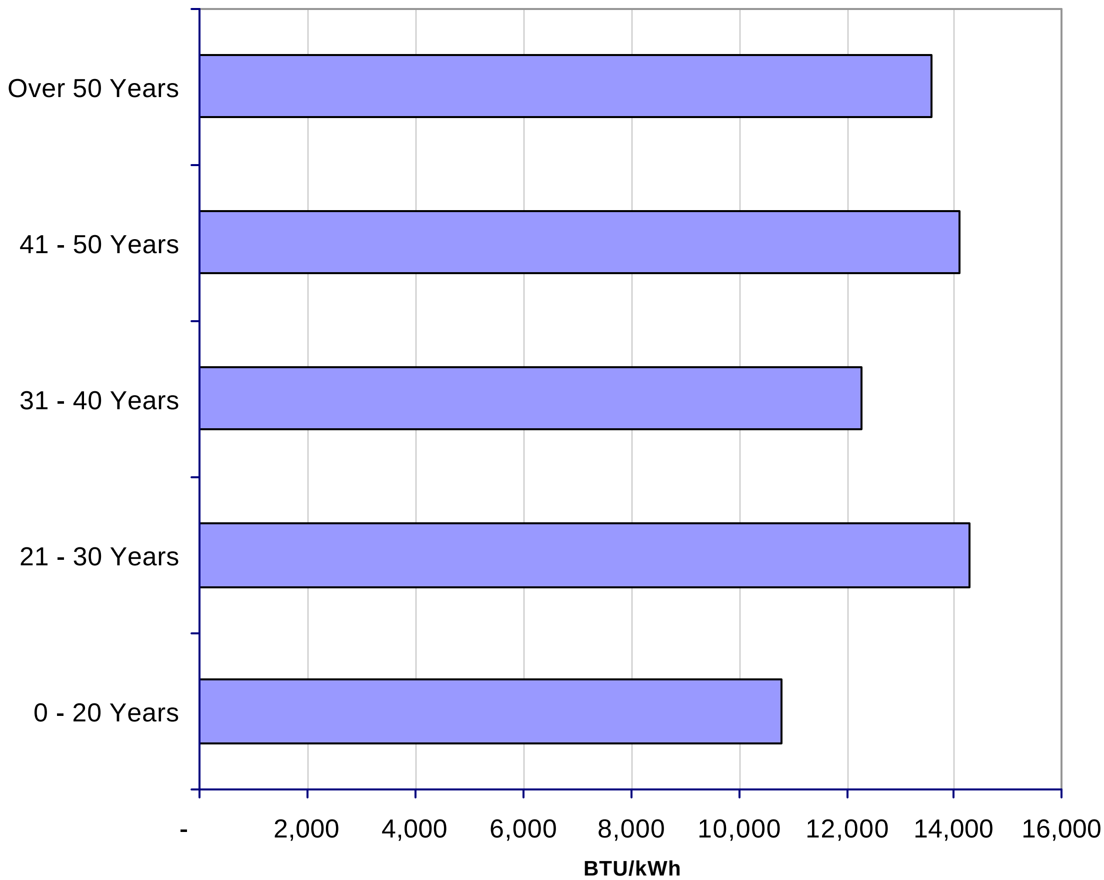

Figure 8: Efficiency Disposition of Regional Generating Capacity by Age Category

Source: Utility Data Institute.

All of these attributes – availability of natural gas, extensive gas pipeline infrastructure, power transmission infrastructure, and an older, antiquated regulated utility generating fleet – have made Louisiana an exceptionally attractive place to locate competitive independent power generation facilities. Figure 9 shows the location of these facilities throughout the state by their current operating status.

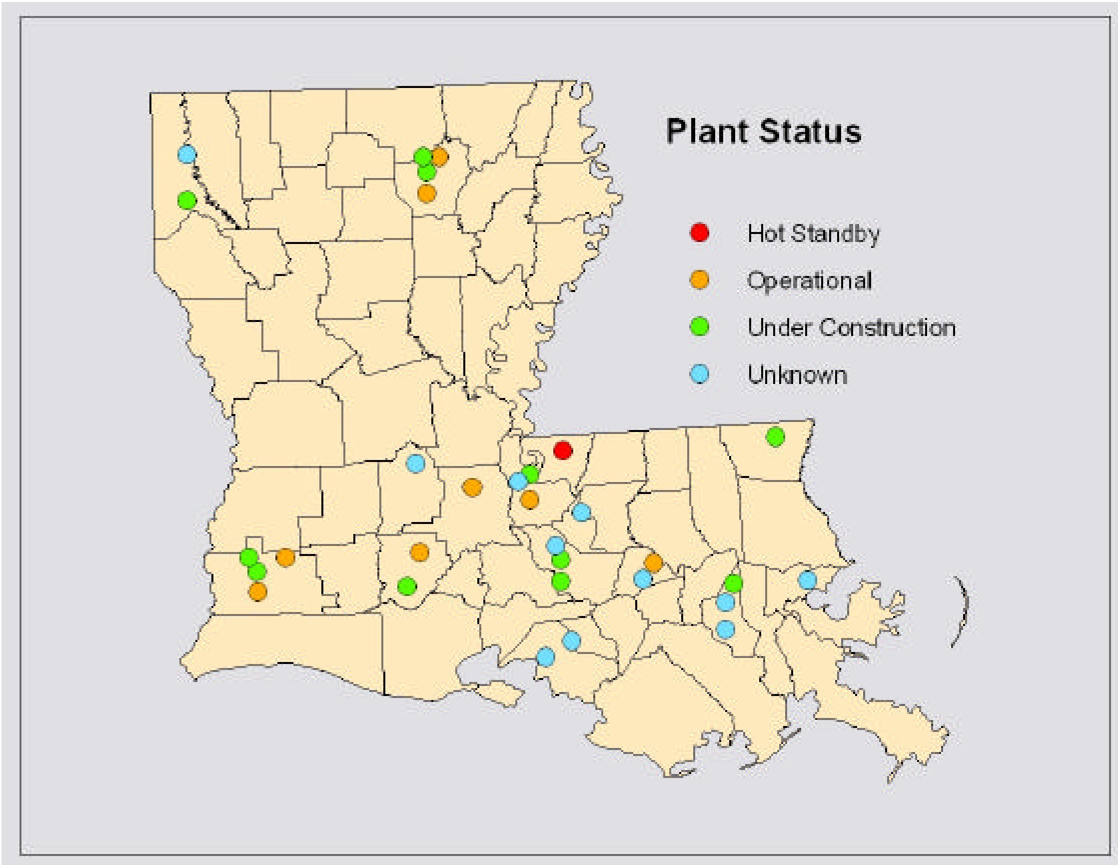

Figure 9: Announced Independent Power Facilities in Louisiana

Despite what appears to continue to be a significant amount of development in the state, Louisiana has also felt the pinch of the recent industry downturn. New capacity development in the state has come to a halt. At the time of the last CES IPP Study, the important issue under investigation was determining how much independent power development would occur in the state, and the economic consequences of this development. Today, the issue under investigation is the determination of how much announced development will be maintained, rather than how much new capacity will be developed.

The high degree of relatively late regional power plant development, in addition to the existing instability in the energy industry, creates considerable uncertainty for ongoing IPP development in Louisiana. The southeastern region, also known as the SERC region,[11] has an extensive amount of capacity slated for development over the next decade. Table 4 breaks this development out on an

[11]SERC stands for the Southeastern Electric Reliability Council and is the regional reliability planning institution associated with the North American Electric Reliability Council (NERC) that oversees and governs many transmission and reliability operations and procedures.

annual basis for each NERC sub-region including the Entergy sub-region (ENT) that includes Louisiana. As seen from the table, the Entergy sub-region is one of the most active in the southeast, accounting for 29 percent of all announced developed over the 2002-2010 period.

Region	2002	2003	2004	2005	2006	2007	2008	2009	2010	Total
SERC	21,943	24,713	23,034	20,486	3,625	2,645	0	0	-683	95,763
Subregions:										
ENT	8,956	8,537	4,225	4,028	3,075	0	0	0	-683	28,138
SOU	6,016	8,763	6,542	3,990	0	0	0	0	0	25,311
TVA	4,406	3,110	2,730	6,098	0	2,065	0	0	0	18,409
VAC	2,565	4,303	9,537	6,370	550	580	0	0	0	23,905

Table 4: Regional Independent Power Plant Development in SERC

Source: RDI International

Table 5 shows that, to date, approximately 13,736 MWs of independent power development in Louisiana since 2000. Currently, there is approximately 6,508 MWs in operation, or very close to operation. Another 900 MWs are currently under construction. From these figures, it is probably safe to assume that the state will see a total of 7,408 MWs of firm capacity development. This represents about 54 percent of the originally announced capacity.

Status	2000	2001	2002	2003	2004	2005	2006	Total
Total Announced Development	417	686	5,405	900	1,505	1,748	3,075	13,736
Operational	417	686						1,103
Cancelled Development						1,000		1,000
Under Construction			5,392	900				6,292
Planned or Early Development			13		1,505	748	3,075	5,341
Likely Development	417	686	5,405	900				7,408
Shortfall from Announced								6,328
Percent of Announced								46%

Table 5: Louisiana Independent Power Development (2000-2006)

Source: RDI International

Unfortunately, there is an almost equally large percent of announced capacity that is "at risk" of not being developed. To date, 1,000 MWs of capacity has officially been cancelled or tabled. Another 5,341 MWs is planned or under early development. The continued development of these projects in the current energy industry environment is questionable. Thus, 46 percent of the previously announced capacity slated for development in the state may never materialize. As shown in Figure 10, Louisiana has the highest levels of capacity "at risk" relative to its neighboring states.

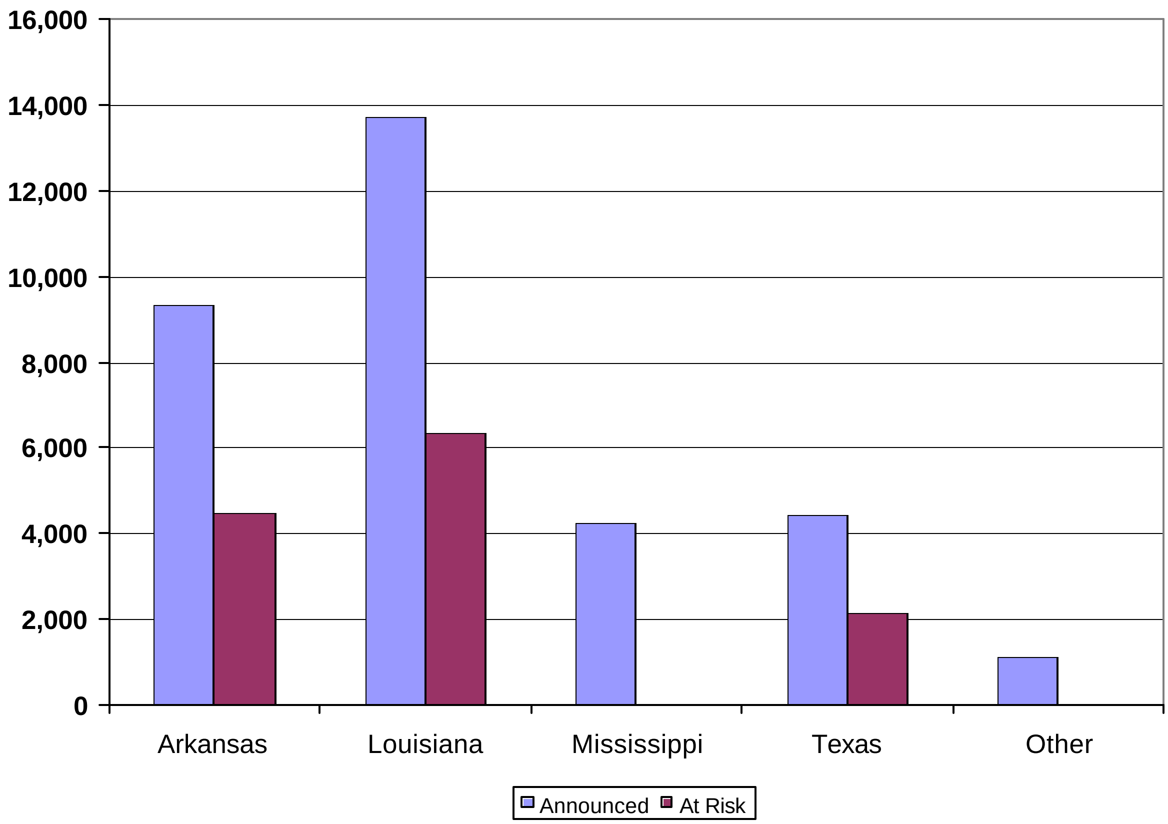

Figure 10: Regional Independent Power Capacity At Risk from Not Being Developed (Entergy Sub-region)

Source: RDI International

As noted above, capacity identified as being "at risk" probably has very little chance of development, and as a consequence, will not result in an economic impact on Louisiana. Since the economic impact figures included in the earlier CES IPP Study were based upon announced capacity additions, some adjustment seems to be in order. Table 6 presents a revised estimate of the overall economic impacts associated with IPP construction in Louisiana, while Table 7 presents the economic impacts of the operation and maintenance of these facilities. As seen from both tables, independent power generation in Louisiana will still impart a significant impact on the state's economy.

	Original Impacts	Potential Losses	Net Impacts
Direct Capital Investment	**$7,872,800**	**$3,796,800,000**	**$4,076,000,000**
Construction Impacts			
Output Impacts			
Direct Impact	$2,484,248,990	$1,194,750,098	$1,289,498,892
Indirect Impact	$165,582,175	$78,067,627	$87,514,548
Induced Impact	$175,509,014	$82,849,043	$92,659,970
Total Impact	**$2,825,340,179**	**$1,355,666,769**	**$1,469,673,410**
Employment Impacts (Number of Jobs)			
Direct Impact	4,833	2,278	2,555
Indirect Impact	1,958	918	1,041
Induced Impact	2,591	1,223	1,367
Total Impact	9,382	4,419	4,963
Value Added			
Direct Impact	$248,907,310	$117,600,499	$131,306,812
Indirect Impact	$93,024,200	$43,835,520	$49,188,680
Induced Impact	$107,235,981	$50,620,753	$56,615,228
Total Impact	**$449,167,491**	**$212,056,772**	**$237,110,720**
Wages			
Direct Impact	$169,053,896	$79,902,056	$89,151,841
Indirect Impact	$63,381,802	$29,819,230	$33,562,572
Induced Impact	$63,020,873	$29,749,007	$33,271,866
Total Impact	**$295,456,572**	**$139,470,293**	**$155,986,279**

Table 6: Revised Economic Impacts Associated with the Construction of Independent Power Generation

O&M Impacts	Original Impacts	Potential Losses	Net Impacts
Output Impacts			
Direct Impact	$1,729,095,125	$828,853,412	$900,241,713
Indirect Impact	$17,450,676	$8,188,854	$9,261,823
Induced Impact	$42,034,093	$19,724,798	$22,309,295
Total Impact	**$1,788,579,894**	**$856,767,064**	**$931,812,830**
Employment Impacts (Number of Jobs)			
Direct Impact	674	316	358
Indirect Impact	180	84	95
Induced Impact	629	295	334
Total Impact	1,483	696	787
Value Added			
Direct Impact	$215,046,759	$100,912,235	$114,134,524
Indirect Impact	$8,975,078	$4,211,621	$4,763,457
Induced Impact	$25,682,839	$12,051,858	$13,630,981
Total Impact	**$249,704,677**	**$117,175,714**	**$132,528,962**
Wages			
Direct Impact	$49,334,033	$23,150,350	$26,183,683
Indirect Impact	$6,333,960	$2,972,256	$3,361,704
Induced Impact	$15,093,385	$7,082,679	$8,010,706
Total Impact	**$70,761,379**	**$33,205,286**	**$37,556,093**

Table 7: Revised Economic Impacts Associated with the Operation and Maintenance of Independent Power Generation

Independent power developers will be responsible for a $4.1 billion capital infusion into the Louisiana economy. The construction impacts of these new generation facilities alone will result in a one-time $1.5 billion total economic impact. The value added associated with this construction activity will amount to approximately $237 million. Total wages created by this expansive construction initiative are estimated to be $156 million. Estimated construction jobs are to be close to 5,000.

The operation and maintenance (O&M) of these independent power generation facilities will also have a considerable impact on the Louisiana economy, albeit to a lesser extent than construction. The total economic impact of running all these facilities, in a typical year (once total development has been completed) will be about $1 billion. The total value added from operating these facilities is around

$133 million. Total wages are estimated to be around $38 million with some 787 jobs created.

While the economic impacts associated with constructing and operating these competitive independent power facilities are considerable, they are only one part of the overall benefits associated with more vibrant wholesale competition. These new highly efficient generators have the ability to displace older less efficient utility generation. These efficiency enhancing opportunities create lower cost wholesale electricity, which, in turn, lowers the cost of purchased power for regulated utilities. These lower purchased power costs, in turn, can be passed along to ratepayers who benefit from this enhanced wholesale competition. The next section of this report examines the opportunities for efficiency improvements and estimated the potential implications for Louisiana ratepayers.

SECTION 5: EFFICIENCY OPPORTUNITIES ASSOCIATED WITH INDEPENDENT POWER DEVELOPMENT

The earlier CES IPP Study noted that there were essentially three different types of economic impacts associated with independent power development. The first two sets of economic impacts are associated with the construction and operation of these large capital intensive investments. The previous section of this report provided an updated estimate of these impacts. However, there are a third set of economic impacts that are associated with regional power generation efficiency improvements. These efficiency improvements are created by replacing older, less efficiency incumbent utility generation with electricity from newer, more efficient independent power facilities.

Efficiency improvements associated with wholesale competition was arguably one of the earliest and most powerfully motivating arguments for moving forward with electric restructuring. As noted in the earlier CES IPP Study, independent power generators have been interested in this region primarily because of their competitive opportunities to beat out older, oil and gas fired steam generation facilities. The competitive implications of this displacement is a tendency to lower the regional wholesale supply curve, and for a fixed level of demand, a reduction in overall regional wholesale prices. An example of this effect has been provided in Figure 11.

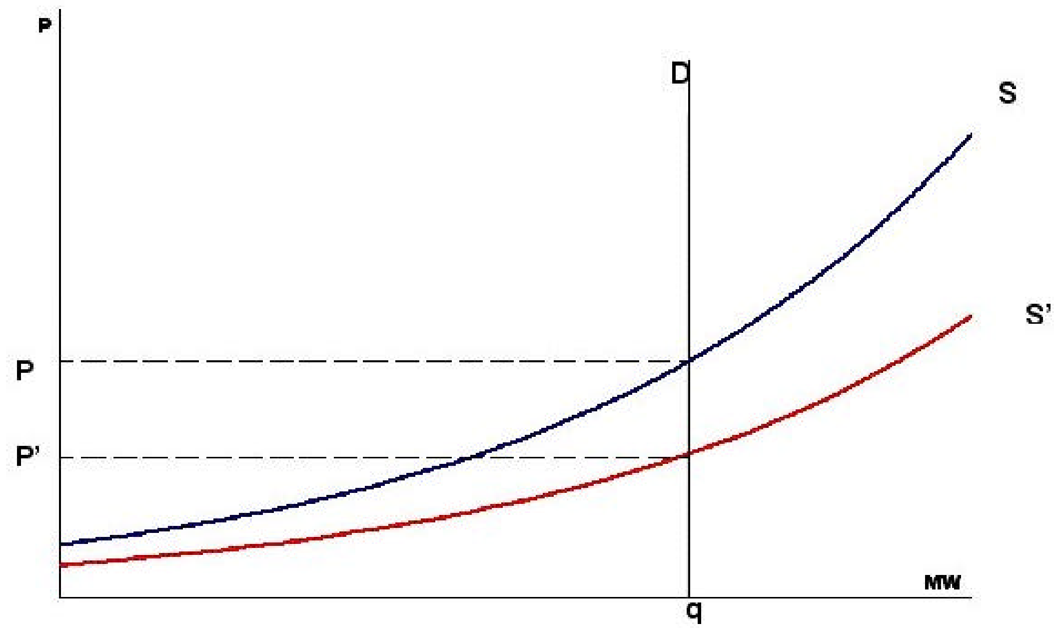

Figure 11: Hypothetical Example of Efficiency Enhancing Opportunities of Competitive Generation Markets

Two supply curves have been illustrated in Figure 11. The shift from the first supply curve (S) to the second supply curve (S') is meant to represent the introduction of newer, more efficient independent power generators. The supply curve shifts out because costs are lower throughout the better part of the range of the curve. Demand is represented by the curve D, and at a fixed level (q). As seen in the figure, the displacement of older resources with newer ones, causes the supply curve to shift outwards (from S to S'). As a result, prices are lowered from P to P'. Even without retail competition, these highly efficient resources will lower purchased power costs for incumbent utilities serving regulated load, and thereby lower bills for consumers. Lower bills result in increased disposable income that households can spend on other goods and services.

One may ask that if these benefits are so obvious, what is preventing them from occurring in Louisiana. To a certain extent, Louisiana customers have already seen some benefits associated with these lower cost independent power resources. The sheer abundance of these resources has helped lower regional power prices to very competitive levels. However, there are still a number of barriers that prevent the complete realization of these benefits. Some of the primary constraints limiting the benefits of wholesale competition are associated with transmission, reliability, and market structure.

Transmission Constraints: Electric power is moved over a host of high voltage power transmission lines that have traditionally linked generation to load centers. This complex system of intertwined lines has been developed over several decades under a traditional regulatory framework. As these lines were being developed, there were few commercial transactions between utilities (i.e., wholesale power trades). The linkages between utilities were traditionally developed for the purpose of reliability – namely, having the ability to temporarily pull generation resources from a neighboring utility system should there be an unanticipated surge in demand or generation outage. Some commercial transactions did take place, but were generally limited in nature.

Since the passage of Order 888, the transmission system in the U.S., has been asked to move an ever increasing share of electricity in wholesale, for-profit, commerce. While this new system of wholesale power commerce has created significant opportunities for consumers, it has also put an increasing amount of physical pressure on a system that was not entirely designed for widespread commercial purposes. Transmission limitations have resulted in several instances where lines have become 'tied-up" and unable to move electricity engaged in interstate commerce. These constraints limit the opportunity to access lower cost resources, even within a single state. As a result, customers may have to be served by a higher cost local generation resource that is not subject to the transmission constraint.

Reliability Constraints: Another common and practical problem that can limit opportunities associated with wholesale power can be constraints associated with trying to maintain a reliable and stable electric power network. In many instances, voltage support, backup, and other system reliability requirements must be provided locally. This can prevent lower cost power, located outside the immediate vicinity, to be utilized. Again, this prevents the supply curve from reaching the full benefits illustrated in Figure 11.

Market Structure Constraints: Another potential limiting constraint to attaining an optimal region-wide least cost dispatch is associated with market structure in many parts of the U.S. These market structure problems can be the result of poor market design and potential market manipulation, as seen in the Western U.S. during the 1999-2000 time period. Another equally important market structure issue is associated with the vertically integrated utility market structure that exists throughout most of the southeastern U.S., including Louisiana.

A vertically integrated structure entails that generation, transmission, and distribution are all owned by one company. Many competitors find themselves in the position of having to compete with utilities that, in addition to owning generation, also control the monopoly transmission system used to move competitive wholesale electricity.

Many competitors argue that incumbent utilities' investments in generation can provide a powerful economic incentive to operate their monopoly transmission systems to favor their own utility affiliated generation, and to discriminate against non-affiliated generators. In addition, an incumbent utility's significant investments in its own generation can also lead to distortions in the purchased power decisions that it makes on behalf of its captive customers. In this instance, incumbent utilities can have strong economic incentives to preference their own, or affiliate-owned, generation over competitors to maintain their generation market share.

This inherent conflict of interest, a common characteristic of vertical market power, is the primary reason that regulators insist upon independent operation of the transmission grid. Many utilities would argue that since the passage of Order 888, and the implementation of Open Access Transmission Tariffs (OATTs), open and nondiscriminatory access has been the rule of the day for vertically integrated utilities. However, in its recent Standard Market Design (SMD) Notice of Proposed Rulemaking (NOPR), the FERC noted that, despite these competitive policies, vertically integrated utilities have still exercised their ability to manipulate power flows and discriminate against competitive providers. The FERC recently stated that:

> Order No. 888 and Order No. 2000 set the foundation upon which to build regional transmission institutions and competitive electricity markets. However, as events have transpired, there remain significant impediments to competitive markets and to the infrastructure needed to meet our electric energy demand. *Unduly*

discriminatory transmission practices have continued to occur…[FERC, Notice of Proposed Rulemaking, Docket Number RM01-12-000 at 15, emphasis added.]

5.1 Methods for Estimating Wholesale Market Efficiency Opportunities

One of the primary means of estimating efficiency opportunities for wholesale markets is by developing an economic dispatch model that simulates how power plants are actually run in a region. This baseline is then compared to a simulation based upon the most optimal solution. Here, "optimal," or the most "efficient," is defined as the least cost resource. Under an optimal dispatch, generators are essentially ranked, or "stacked" based upon their costs, with the lowest cost unit being utilized first, and the highest cost unit being utilized last.

Our method for developing an economic dispatch model for the region[12] was relatively straightforward. The steps followed include:

(1) Developing a regional baseline wholesale electric supply curve to determine a baseline level of generation and production costs;

(2) Estimating an optimal wholesale electric supply curve based upon least cost dispatch regardless of the type of provider; and

(3) Taking the difference between the baseline and optimal supply curves to estimate the economic efficiency opportunities.

The data used in this analysis came from a variety of sources that included FERC Form 1s, Form EIA-411, RDI International Power Generation Database, Utility Data Institute, and the Environmental Protection Agency's EGRID air emissions database. The economic dispatch, or rank ordering, of facilities was based upon fuel costs as a measure of marginal costs. Thus, the savings estimated in the models are fuel-related only and do not include such items as capacity payments for securing the resources on a longer term basis.

Admittedly, this development of a wholesale power market is a simplification of the complex methods by which electricity markets work. In addition, this approach does not take into account the potentially considerable transmission or reliability constraints discussed earlier. This approach does, however, present a generalized estimate of forgone opportunities for expanded wholesale trade in the region. More sophisticated power market modeling approaches, which are virtually infinite in their assumptions and detail, could develop more detailed results. Nevertheless, the basic premise that more efficient generation can lead to lower wholesale prices, which in turn, can lead to lower prices for customers, remains unchanged even with a more sophisticated approach.

[12] Throughout the remainder of this section, "region" is defined as the Entergy sub-region of the Southeastern Electric Reliability Council (SERC).

5.2 Empirical Estimates of Efficiency Opportunities From Expanded Wholesale Markets

The main efficiency opportunity examined in this study are the opportunities for new competitive power facilities to displace older incumbent utility generation. These older technologies usually consist of oil and gas steam generation facilities. Table 8 breaks out the capacity associated with these older oil and gas fired steam units by major heat rate category. The table presents capacity figures for those oil and gas fired units that were generating power in 2000 (active), as well as those that were inactive but operational.

Heat Rate Category (Btu/kWh)	Active Capacity[13] (MW)	Operational Capacity (MW)
6,000 - 6,999	369	899
7,000 - 7,999	0	0
8,000 - 8,999	233	493
9,000 - 9,999	6,057	6,057
10,000 - 10,999	8,969	8,975
11,000 - 11,999	2,286	2,387
12,000 - 12,999	780	824
13,000 - 13,999	528	816
14,000 - 14,999	164	846
15,000 - 15,999	92	92
16,000 - 16,999	30	30
17,000 - 17,999	36	55
18,000 and above	16	16
Total	**19,560**	**21,490**

Table 8: Oil and Gas-Fired Generating Capacity by Major Heat Rate Category

What is striking about this table is the fact that the older less efficient capacity currently in operation is not far in magnitude to the independent power generation capacity that is currently in operation, or under construction, in the region today. The older inefficient generation capacity ranges from 19,560 MW to 21,490 MW, while the announced merchant development for the region is around 28,138 MWs.

[13] Active capacity is defined as those plants that had positive generation in the base year, 2000.

Table 9 shows, individually, the number of large (over 100 MW), high heat rate units that are currently in operation in the Entergy sub-region of the southeast.[14] This figures are based upon each unit's "full loaded test heat rate" which is an estimate of its best operating efficiency under full load conditions. In other words, it is the outer boundary of operational efficiency these units can meet. Their actual 2000 reported heat rates have been presented in an adjoining column of the table.

Plant Name	COD	Fully Loaded Test Heat Rate	Actual Heat Rate	Capacity	Age	Annual Capacity Factor
Big Cajun 1, Unit 1	3/1/1972	10,322	10,700	115.0	31	11.0%
Lewis Creek 1	1/1/1962	10,352	10,810	271.4	41	60.2%
Lewis Creek 2	1/1/1962	10,352	10,590	271.4	41	59.9%
Robert E. Ritchie 1	6/1/1961	10,372	12,420	359.0	42	11.9%
Nelson 4	7/1/1970	10,419	11,660	591.8	33	35.8%
Willow Glen 1	3/1/1960	10,431	12,060	163.2	43	29.7%
Sabine 5	12/1/1979	10,442	11,160	507.4	24	51.9%
Nelson 3	3/1/1960	10,476	11,880	163.2	43	32.2%
Baxter Wilson 1	2/1/1967	10,480	10,220	544.6	36	38.2%
Rex Brown 4	9/1/1959	10,499	15,900	238.7	44	12.0%
Willow Glen 5	7/1/1976	10,622	12,820	591.8	27	18.4%
Big Cajun 1, Unit 2	4/1/1972	10,635	11,140	115.0	31	11.3%
Willow Glen 3	12/1/1968	10,698	11,130	591.8	35	16.5%
Willow Glen 2	1/1/1964	10,813	15,590	239.4	39	26.3%
McClellan 1	1/1/1972	10,868	--	136.0	31	32.9%
Michoud 2	2/1/1963	10,997	8,730	261.8	40	35.3%
Ninemile Point 2	7/1/1953	11,135	12,950	112.5	50	30.6%
Delta 1	11/1/1953	11,141	15,540	112.5	50	15.5%
Michoud 3	8/1/1967	11,288	11,020	582.3	36	47.5%
Harvey Couch 2	8/1/1954	11,372	14,480	156.3	49	9.7%
Michoud 1	5/1/1957	11,427	12,660	115.2	46	22.8%
Delta 2	12/1/1953	11,710	16,790	112.5	50	12.1%
Lake Catherine 4	4/1/1970	11,870	10,760	552.5	33	27.6%
Cecil Lynch 3	6/1/1954	12,012	20,400	156.3	49	3.2%
Lake Catherine 3	4/1/1953	12,208	13,660	119.5	50	12.1%

Table 9: Top 25 High Heat Rate Units (Units 100 MW and Greater)

[14] A number of utilities operate in the Entergy sub-region other than the operating companies of Entergy Corp. Thus, the units presented in Table 11 include those of other utilities operating in the Entergy subregion.

The first step in the analysis was to develop two separate regional supply curves. The first supply curve can be thought of as the baseline, and reflects an estimate of how power generation units in the region are currently being utilized. The base year for the analysis was 2000.

The second supply curve developed in the analysis is an approximation of the "optimal" least cost dispatch for the region. This curve treats all units equally, and runs the least cost power plant first, and the most expensive power plant last. Since a number of independent power facilities have, or will, come on line after 2000, similar curves have been developed for the year 2003 and 2005. Electricity demand was also forecasted for this period based upon information provided by the North American Electric Reliability Council ("NERC").

The results from the 2000 test year analysis have been presented in Figure 12. The higher supply curve displayed in the analysis represents the estimated baseline dispatch of generating units in the region, while the lower supply curve represents the simulated optimal dispatch. As seen from the analysis, there appears to be a number of efficiency enhancing opportunities throughout the system. The source of these efficiencies include greater utilization of independent power facilities.

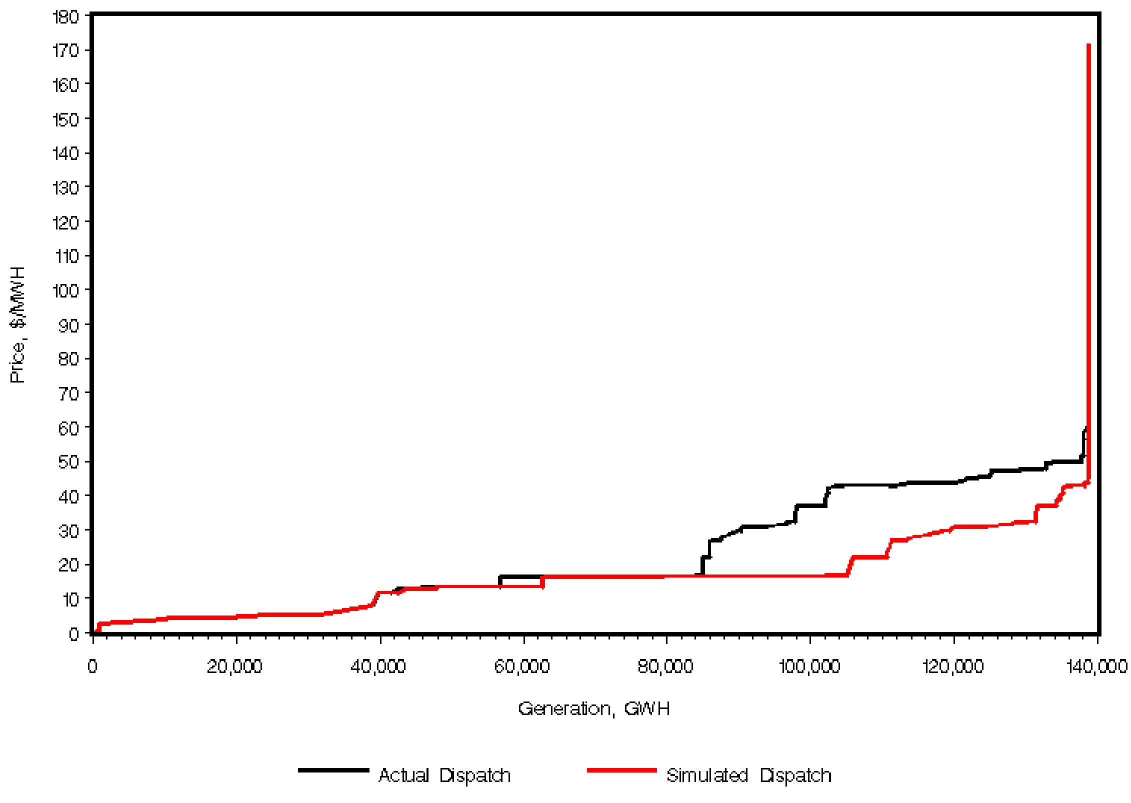

Figure 12: Estimated Base Case and Revised Least Cost Dispatch

One of the main reasons for the efficiency improvements in the region comes from the displacement of older, less efficient utility generation facilities. Table 10 shows the trade-off between merchant and incumbent utility generation utilized in both the base case and the optimal case. In the estimated base case, incumbent generation is estimated to supply some 95 percent of the region's electricity. Competitive generation, on the other hand, accounts for only 5 percent of the region's estimated electricity supply. For the later years under the optimal dispatch scenario, the estimated competitive generation share of the region's generation increases moderately to approximately 27 percent while the estimated utility share falls to 73 percent.

	Base Case		***Simulation Case***	
Year	**Percent Utility Generation**	**Percent Merchant Generation**	**Percent Utility Generation**	**Percent Merchant Generation**
2000	94.55%	5.45%	95.42%	4.58%
2003	94.65%	5.35%	72.46%	27.54%
2005	94.79%	5.21%	73.17%	26.83%

Table 10: Shifts in Generation Shares

Perhaps the most important estimate associated with this optimal dispatch analysis is the potential regional savings associated with regional efficiency improvements. Figure 13 presents these estimates savings for the entire region for three separate years: 2000; 2003; and 2005. The savings become greater as we move out to later years since more low-cost/high efficient generation comes on line.

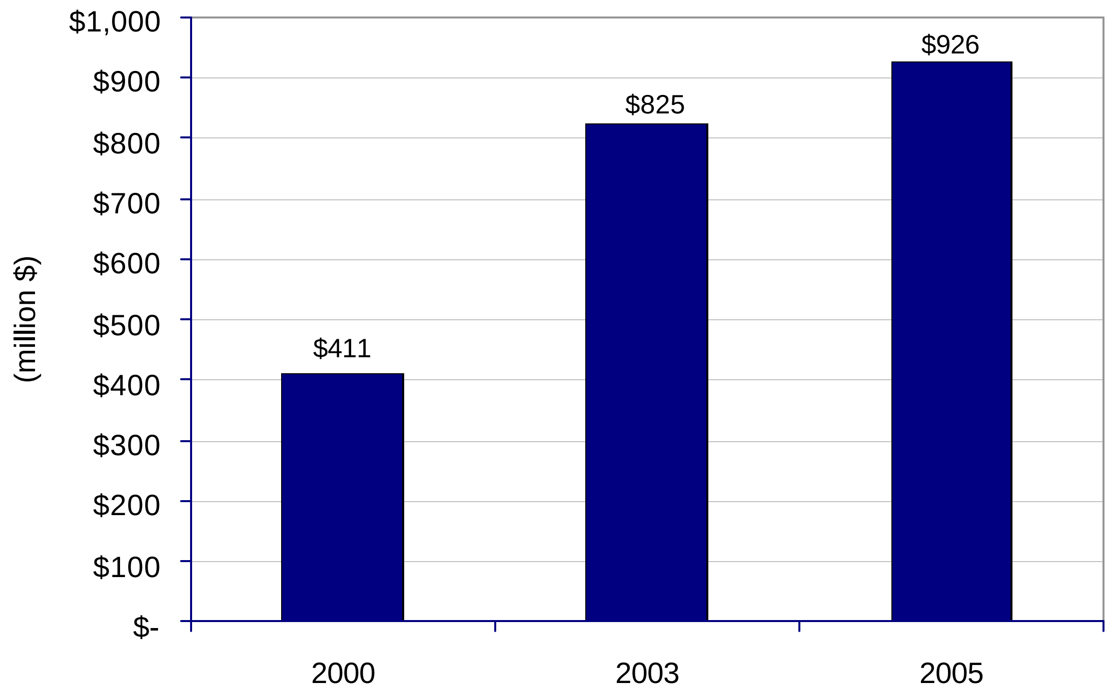

Figure 13: Estimated Total Regional Savings Associated with Efficiency Gains ($ Millions)

Perhaps the most important issue associated with these savings is what they could possible mean to ratepayers. We estimated that if all of these efficiency gains could be achieved for customers, there would be a sizable one time benefit for the region, in general, and Louisiana, more specifically.

Table 11 shows the total regional savings associated with more efficient generation in 2000, 2003, and 2005. Three different sets of saving estimates are presented in the table. The first column identifies total estimated regional savings for the entire Entergy sub-region area of the southeast. The second column presents the estimated savings for the Entergy operating companies within the overall Entergy sub-region. The third column provides an estimate of the savings that would accrue to Louisiana operating companies and their customers.

Year	Estimated Regional Savings	Estimated Entergy Savings	Estimated Louisiana Savings
2000	$ 410,502,359	$ 360,630,040	$ 177,634,433
2003	$ 824,994,006	$ 724,764,706	$ 356,995,129
2005	$ 926,245,723	$ 813,715,256	$ 400,809,229

Table 11: Break out of Estimated Regional Savings from Efficiency Gains

A rough approximation of the benefits per customer class in Louisiana can be developed by allocating total Louisiana savings based upon the total sales share for each class. Table 12 breaks these savings out on per customer basis for each major customer class.

Year	Estimated Savings Per Customer Residential	Estimated Savings Per Customer Commercial	Estimated Savings Per Customer Industrial
2000	$ 48.12	$ 299.86	$ 7,386.36
2003	$ 96.71	$ 602.64	$ 14,844.50
2005	$ 108.58	$ 676.60	$ 16,666.37

Table 12: Break out of Estimated Louisiana Per Customer Savings by Customer Class

It is important to keep in mind that the estimates presented in Tables 10 through 12 are based upon a generalized economic dispatch model that does not take into account transmission or reliability constraints. In addition, these estimates do not include capacity payments to generators which would be required to secure this capacity over longer periods of time. Both factors would tend to dampen the total savings estimates. As a result, these estimates should be thought of as the outer limit, or "book ends" of savings possible from increased wholesale competition, and the displacement of older utility generation.

SECTION 6: CONCLUSIONS

The purpose of this report has been to update Louisiana stakeholders about the ongoing development of competitive independent power generation in the state. Beginning in 1999, and moving throughout most of 2000-2001, these independent power developers began the process of upgrading and modernizing the state's energy infrastructure. The opening and development of competitive markets in the mid to late 1990s, create a new opportunity for these competitive developers. Louisiana's abundance of natural gas, natural gas pipelines, power transmission lines, a large industrial load, and a region lacking in new power generation development, were considerable attributes the state offered for these developers. Competitive developers reacted favorably by announcing the construction of almost 14,000 MWs of capacity in Louisiana.

Over the past year, however, the industry has been rocked by a souring economy, industry scandals, regulatory uncertainty, and declining access to capital markets for continued development. As a result, a number of the projects that were originally envisioned for development in Louisiana, and around the U.S., have been cancelled. Despite the industry set-back, there is still a considerable amount of new development likely to come on-line in Louisiana over the next several years. This development represents a capital infusion into the Louisiana economy of $4 billion. As noted in this report, the economic impacts associated with the construction and operation of these facilities expands the direct investment dollars even further.

The ongoing challenge for competitive independent power facilities in Louisiana will be their access to markets. As noted in this report and the earlier CES IPP Study conducted over a year and half ago, independent power facilities locate close to the loads they would like to serve. There have been some claims that IPPs are here to serve loads in areas as remote as the northeast and California. The argument by many of these critics has been that these developers are here to take the state's natural resources, and its generous tax breaks, and export power to far and sundry places with little to no economic benefit to the state. Even if IPPs were to sell their power to remote locations in the continental U.S., this report, and its earlier counterpart, have shown quite clearly that Louisiana would still reap significant economic benefits even if every kWh were exported.

However, IPPs have located in Louisiana to serve Louisiana, and nearby loads (i.e., neighboring state). Existing incumbent utility generation in this region rests heavily upon a large number of old, inefficient oil and gas fired power generation facilities that should be retired. These older units create an economic and profit opportunity for independent power developers; that is, to earn a profit serving loads formerly served by these old, less efficient generators. However, to date, the ability to capitalize on this inefficiency has been illusive. Independent power plants still struggle to find a home for their power despite the fact that units that are decades old, and orders of magnitude less efficient, are still running.

There are a number of legitimate reasons why these competitive facilities may not be getting a greater piece of the region's generation pie. As noted elsewhere in this report, there may be significant transmission and reliability constraints that prevent these facilities from being used. As some incumbent utilities have noted, some of these facilities may simply be in the wrong place given existing infrastructure constraints. In addition, one of the largest potential purchasers of wholesale energy, Entergy and its regional operating companies, has been soliciting bids from competitive providers over the past several years. In addition, over the past year, the Louisiana Public Service Commission has instituted a competitive bidding requirement on utilities that requires them to issue their resource requirements out to competitive bid. Given this framework, one would think that if the capacity and energy bids from these merchant providers were competitive, awards would have been offered and accepted.

Many in the independent power community, on the other hand, recognize that all of these benefits may be difficult to attain in the short run due to legitimate infrastructure constraints. If there were an independent authority governing the transmission system, and making decision about the economic utilization of the region's power grid, constraints associated with transmission and reliability may be easier for many competitors to accept. However, many competitive merchants believe that market structure problems associated with vertically integrated incumbent utilities controlling the grid is the source of the problem, and resulting in a significant number of economic opportunities being unattained. Many have also complained about the competitive bidding practices of the region's incumbent utilities and the fairness of these processes.

Our report has provided a number of estimates of the potential savings that could accrue from a more vibrant regional power market in which newer sources of power were able to be utilized in a fashion comparable to existing utility generation. We recognized that this approach is based upon empirical modeling, which by its definition, is an approximation of the real thing. As noted elsewhere in this report, these estimates should be thought of as the "book-ends" of the economic opportunities for the region. We hope that this analysis will open further discussion about why so many older, uneconomic units continue to run in this region, when more efficient, environmentally sensitive resources located in Louisiana fail to be utilized.