Moving to the Front of the Lines:

The Economic Impact of Independent Power Plant Development in Louisiana

David E. Dismukes
Associate Professor

With contributions from
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Baton Rouge, Louisiana
October 2001

URL: http://www.enrg.lsu.edu

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EXECUTIVE SUMMARY OF RESULTS

Estimated Economic Impacts For Typical and Announced Independent Power Projects

Economic Impacts From Announced Combustion Turbine Projects

Impact Type	Construction	O&M	Construction Jobs	O&M Jobs
Direct Impact	$247,302,219	$177,221,669	568	82
Indirect Impact	$19,415,101	$2,118,575	240	22
Induced Impact	$20,389,629	$5,103,086	300	76
Total Impact	$287,106,949	$184,443,330	1,108	180

Economic Impacts From Announced Combined Cycle Projects

Impact Type	Construction	O&M	Construction Jobs	O&M Jobs
Direct Impact	$2,236,946,771	$1,551,873,456	4,265	592
Indirect Impact	$146,167,074	$15,332,101	1,718	158
Induced Impact	$155,119,385	$36,931,006	2,291	553
Total Impact	$2,538,233,229	$1,604,136,564	8,274	1,303

Total Potential Impacts From the Currently Announced Independent Power Projects

Impact Type	Construction	O&M	Construction Jobs	O&M Jobs
Direct Impact	$2,484,248,990	$1,729,095,125	4,833	674
Indirect Impact	$165,582,175	$17,450,676	1,958	180
Induced Impact	$175,509,014	$42,034,093	2,591	629
Total Impact	$2,825,340,179	$1,788,579,894	9,382	1,483

Taxation Implications for Louisiana

Power generation projects in Louisiana pay a considerable amount of taxes. In the past, these taxes were passed along by regulated utilities to their ratepayers. On a forward going basis, the recovery of these taxes will be determined by market conditions. Thus, the implications of tax policies will have greater importance for the developers of independent power.

- Power generation facilities pay a host of taxes including property taxes, taxes on fuel used for power generation, income taxes, sales taxes, and franchise taxes.

- We estimate that if the current number of announced independent facilities in Louisiana are realized, state and local government could collect close to $1.9 billion in taxes over the next 30 years. These figures represent the net present value of the future stream of taxes in today's dollars. The future dollar amount of these taxes is $5.5 billion.

- We estimate that if the current number of announced independent facilities are realized, local government could receive as much as $430 million in property taxes. This is the net present value of the future stream of taxes from these project based upon an assumed 30 year project life. These figures are net of the allowed 10 year exemption. Ty taxes. o Tc f1ostimatee5 12 Tig2.2 -1

Rate Implications for Louisiana Households and Businesses

The impact that energy cost increases can have on Louisiana households should not be overlooked.

- Louisiana currently pays below national average electricity rates. However, Louisiana pays considerably higher than national average electricity bills as a result of our state's energy intensity.

- In 1999, Louisiana households paid 7.1 cents per kilowatt-hour (kWh) for electricity compared to the national average of 8.1 cents per kWh.

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Competitive Issues Associated with Independent Power Generation in Louisiana

Louisiana has a number of unique attributes that make it attractive to independent power generation.

- Louisiana is the second largest producer of natural gas and we have significant natural gas transportation resources.
- Louisiana sits between two important regions for wholesale power trade.
- Louisiana sits in a region experiencing relatively healthy electricity growth with a considerable number of large volume industrial customers.

However, two of our neighboring states, Texas and Mississippi, also have considerable resources and can effectively compete for these new sources of power. Consider that:

- Texas is the largest producer of natural gas in the U.S.;
- Texas and Mississippi both have considerable natural gas transportation infrastructure;
- Texas is moving forward with more competitive retail markets;
- Mississippi sits between 3 important power regions and has the ability to serve as the "cross-over" region for wholesale power trade;
- Mississippi is phasing out its tax on the use of fuel for power generation which, other things being equally, will provide an opportunity for increased profitability for plants locating in that state as opposed to Louisiana;
- Mississippi offers property tax exemptions for merchant power facilities provided a fee in lieu is paid for local schools and counties;
- There will be increasing pressure, given the diffuse and rapid development of independent power, to eliminate the ERCOT bottleneck that separates a good portion of Texas from the rest of the eastern interconnection. One plant located on the ERCOT border now has the ability to toggle its power flows between the two systems within a 24 hour notice.

EXECUTIVE SUMMARY OF REPORT

The economic impacts associated with upgrading Louisiana's electric generation infrastructure are considerable. This investment represents close to $7.8 billion over the next few years. These projects create high paying jobs in both their construction and operation phases. Typical p site for independent power projects is considerable. Louisiana is the second largest producer of natural gas, it has an impressive natural gas transportation infrastructure, and has a number of power transmission lines to move electrical output within Louisiana and to its neighboring regions. One of the potential travesties of failing to capture our merchant power opportunities could be that Louisiana natural gas could be shipped to other regions, converted to electrical energy, and shipped back to our state and its customers.

The third section of our report examines the current state of electric power markets in Louisiana. This section was presented to put the current state of the industry and independent power development into perspective. Our analysis begins with an overview of past sales and usage trends in Louisiana. While Louisiana has increased its energy efficiency over the past several years, the state's households and businesses still use a significant amount of electricity. Our customers use a greater than national average amount of electricity on a per household, business, and industrial basis. Growth of electricity intensity over the past several years has been strongest among reside Tc 4o0i1ur.133 Tw currentTj T* -t controls for those “direct” expenditures that remain in the state and are associated with the development of an independent power project; and (2) to estimate the “indirect” and “induced” economic impacts that are often referred to as the “multiplier” impacts. The model results indicate that:

- The total economic impacts associated with a typical 350 MW CT project amount to approximately $52 million while the total economic impacts associated with the construction of a typical 600 MW CC project amount to $128 million;

- The total economic impacts associated with the operation of a 350 MW CT project amount to approximately $33 million annually, while the total economic impacts associated with the operation of a 600 MW CC project amount to $81 million annually; and

At this time of this analysis, some 13,758 MWs of independent power generation projects were identified as potentially locating in Louisiana. If the results of our economic impact analysis were generalized to all of these potential sources of power generation, Louisiana, by 2005, could realize:

- Close to $7.8 billion in power generation investments.

- The total economic impacts of close to $1.8 billion in the construction of the announced independent power facilities in Louisiana;

- The total number of employment opportunities could be as high as 9,382 jobs associated with the construction of these announced facilities;

- The total economic impact associated with the annual operation of these facilities would be close to $1.8 billion per year; and

- The total employment opportunities associated with the annual operation of these facilities could be close to 1,483 jobs.[1]

The impact that energy cost increases can have on Louisiana households should not be overlooked. As noted in the report, Louisiana currently pays below national average electricity rates. However, Louisiana pays considerably higher than national average electricity bills as a result of our state’s energy intensity. In 1999, Louisiana paid 7.1 cents per kilowatt-hour (kWh) for electricity compared to the national average of 8.1 cents per kWh. Louisiana households, however, pay an average of $87.26 per month in electricity bills compared to the national average of $83.26 per month.

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[1]These employment and operation figures do not include the net operating impacts of

considerable investments, as required by the FERC, on the state's power transmission grid.

- Since the California energy crises, a number of states have realized the importance of power generation as means to support their economic development and business recruiting measures. Most high technology firms require reliable, cost effective power of very high quality. It will be difficult to recruit these types of firm without having the necessary power industry infrastructure.

- The increased efficiency opportunities associated with these new power

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ACKNOWLEDGMENTS

The initial research for this study was conducted while the author was employed with Econ One Research, Inc. The report and additional analyses were completed at the LSU Center for Energy Studies. The author would like to thank the LSU Center for Energy Studies Industry Associates and the Louisiana Mid-Continent Oil and Gas Association for financial support for this study.

The author would also like to thank Barbara Kavanaugh, Beth Downer, Jeff Burke, Steve Chriss, Ric Pincomb, and Bob Bradley for their assistance in preparing this report. The comments of Allan Pulsipher, Dave Roach, and Loren Scott are also appreciated.

SECTION 1: INTRODUCTION

One of the pressing challenges in today's energy industry is the development of supporting infrastructure. Nowhere is this more readily apparent than in the electric power industry. Years of upheaval, uncertainty, and regulatory change have clearly had consequences that are taking their toll today. What is unique about today's energy industry revival, is the development of competitive, as opposed to regulated, forces for driving the nature and the direction of energy infrastructure investments.

The power generation sector, in particular, has seen a virtual explosion in announced construction activity over the past several years. This increase in industry activity is the result of a confluence of different factors including the following:

- *Technological:* over the years, smaller more modular and more efficient power generation technologies have emerged.

- *Economic:* the nature of wholesale[3] power markets has changed from one in which pricing and market conditions were determined by regulation to one in which the market determines the amount and prices of electricity to be offered.

- *Public Policy:* Transmission systems have been legally opened to support open access and non-discriminatory transportation of power across utility power grids.

- *Institutional:* new market mechanisms and institutions have arisen that facilitate the trade of bulk (wholesale) power as a commodity.

[3] This report will focus exclusively on the impact that merchant facilities have on wholesale power markets. Here, wholesale power markets are defined as bulk power markets where purchasers are not the ultimate end users of electricity. A wholesale power market transaction is one where a utility that is short on capacity, purchases electricity from another utility (or merchant plant), in order to supply power to its own customers. Wholesale competition allows these trades to occur outside regulation with prices being negotiated between the two utilities. Retail markets, on the other hand, are defined as markets where the customers are the ultimate end users of the energy being purchased.

An increasingly important consideration in the energy industry is the role it plays in securing economic growth opportunities. The relationship between energy and economic growth over the past 50 years has been well established by academic literature.[4] Figure 1.1 shows this relationship for the U.S. economy quite clearly.

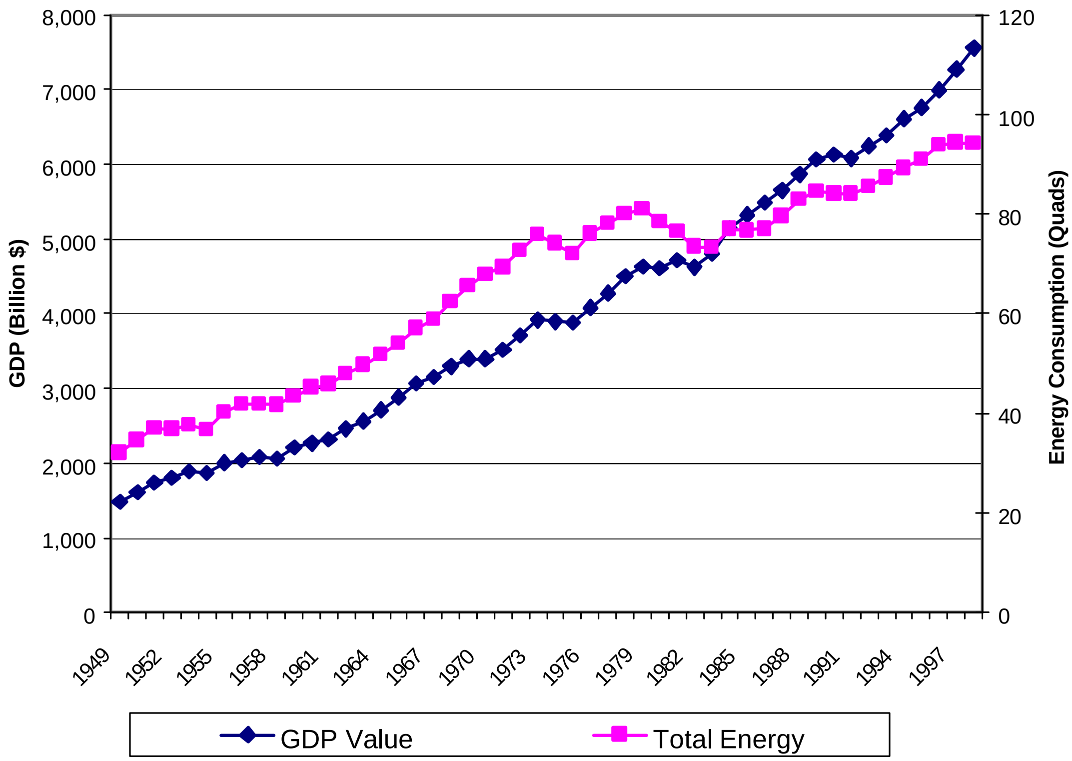

Figure 1.1: U.S. Gross Domestic Product and Total Energy Consumed

The electric power industry has transformed the relationship between energy and economic growth even further. Throughout the post-war period, the U.S. economy has undergone a dramatic transformation from one based upon primary-fuel driven, mechanical industries to one that increasingly emphasizes high technology, digital and computer applications, and increased complexity.

[4]See Dale R. Jorgenson (1984). "The Role of Energy in Productivity Growth." *American Economic Review* 74 (2): 26-30 for a seminal discussion on this relationship. A more contemporary article was prepared by John R. Moroney, (1990). "Energy Consumption, Capital and Real Output: A Comparison of Market and Planned Economics. *Journal of Comparative Economics* 14(2): 199-220.

generator availability, and environmental implications of widespread development. The purpose of this report is to address a number of these issues.

Our report is organized into five additional sections. Section 2 discusses the past and present development of wholesale markets and the relationship of independent power to this development. Section 3 presents an overview of Louisiana power markets, both past and present. Section 4 discusses the methods and results associated with our economic impact models of independent development in Louisiana. Section 5 provides an overview and discussion of a number of other issues associated with independent development in Louisiana including transmission issues, economic development issues, and natural resource issues. Section 6 presents our conclusions.

SECTION 2: PAST AND PRESENT DEVELOPMENT OF COMPETITIVE WHOLESALE MARKETS

The Origins of Competitive Wholesale Markets: One important factor changing the nature of electric power markets has been the advent of competitive opportunities for new sources of power generation. Quickly fading is the past regime of regulated prices, as well as limited opportunities for trading, profits, and energy efficiency. The origins of competition, however, are not new and can be dated to the late 1970s when the energy crises changed public policy and began challenging the notion that utilities were "natural monopolies" and should be the only regulated providers of electricity in the marketplace.

In 1978, Congress passed the National Energy Act, which comprised five different statutes: (1) the Public Utilities Regulatory Policy Act (PURPA); (2) the National Energy Tax Act; (3) the National Energy Conservation Policy Act; (4) the Power Plant and Industrial Fuels Act (PPIFA); and (5) the Natural Gas Policy Act. The general purpose of the National Energy Act was to ensure sustained economic growth during a period in which the availability and price of future energy resources were becoming increasingly uncertain. The two major themes of the legislation were as follows: (1) promote the use of conservation and renewable/alternative energy and (2) reduce the country's dependence on foreign oil.[7]

While all aspects of the National Energy Act affected the electric power industry, PURPA was probably the most significant, because it was designed to encourage more efficient use of energy through non-utility cogeneration. The statute requires utilities to interconnect and purchase power from any qualifying

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Since the 1980s, the power generation business continued its trek towards greater levels of competition and efficiency. By the early 1990s, Congress decided to take the unintended policy consequences of PURPA one step further by enacting the Energy Policy Act of 1992 (EPAct). The legislation is important for two reasons. First, EPAct created a whole new class of power providers called “exempt wholesale generators,” or EWGs, that are essentially competitive independent power plants and not subjected to traditional ratemaking regulation. Second, the EPAct allowed the Federal Energy Regulatory Commission (FERC), to require regulated electric utilities to “wheel” (transport) power across their regulated power transmission grids.

These two developments, taken together, created a new class of generation market participants, a new market for the generation of electricity, and a new means of transporting (or wheeling) electricity to these markets across the entire U.S. The FERC promulgated the final rules outlining the terms and conditions for the open and non-discriminatory use of the electric power grid in 1996 in its industry-renowned Order 888.

Order 888 was instrumental in opening the wholesale power market to competition and facilitating independent or what is commonly referred to as “merchant” power. - Without the Order.derluTw (Th4ulator48nd non) T 0 -1d to as58Tj 0 T Tw fil

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abuses. As monopolies, utilities are allowed to recover their prudently incurred costs, and to have the opportunity to earn a reasonable rate of return on prudently incurred capital investments. In return for their monopoly status, utilities are required to provide safe, reliable, and economic service to their customers.

Other non-utility power generating sources, primarily qualifying facilities or cogenerators under PURPA, are not in the primary business of producing electricity. These facilities typically produce some product, and generate electricity as a secondary endeavor. If these types of non-utility cogenerators power markets, the importance of having physical supplies of electricity (i.e., power plants) cannot be underestimated. Paper transactions are limited in their ability to keep the lights on. Eventually, these trades and transactions will have to be delivered. Recent events in California have shown that in the absence of physical power generation, strong demand for electricity can only be met in two

Who are Independent Power Developers? Independent generators, unlike regulated utilities, do not have a guaranteed retail customer base for their electrical output. These providers must market their output and, as a result, are allowed to charge market-based rates and earn market-based returns on their investments. Independent generators differ from such other non-utility sources of power as cogeneration in two important ways. First, they are not end users of electricity and do not use their electrical output on site. Second, regulated utilities are not obligated to purchase any of the competitive independent power provider's output.

Independent providers come from a variety of corporate backgrounds. A listing of the top independent power developers has been provided in Table 2.1. A number of these developers arose to take advantage of the business opportunities offered by the restructured power business. These include companies like Calpine, Cogentrix, and Panda Energy.

Several others, however, are the unregulated affiliates of companies traditionally associated with utility operations. These include TECO Energy, Duke, and FPL Group. Other independent developers are companies that were originally started by utility holding companies, and have been, or are in the process of being spun off into successful stand alone companies. These include Mirant (formerly part of Southern), Reliant Resources (Reliant Energy) and NRG (Xcel Energy).

Lastly, there are a group of players that have been traditionally associated with various aspects of the oil and gas industry that have now diversified into power generation. These include companies such as Enron, Dynegy, Williams Energy, El Paso, and Kinder Morgan.

Table 2.1: Top 25 US Power Plant Developers

Rank	Company	Planned Capacity Minimum (MW)	Maximum (MW)	Minimum Percent of Total	Maximum Percent of Total
1	Calpine Corp.	30,186	31,283	15.9%	15.9%
2	Duke Energy	17,537	17,755	9.3%	9.0%
3	Cogentrix	12,265	13,431	6.5%	6.8%
4	Panda Energy	12,236	12,406	6.5%	6.3%
5	PG&E Corp.	12,202	12,202	6.4%	6.2%
6	Mirant Corp.	8,866	9,519	4.7%	4.8%
7	PSE&G	8,760	8,810	4.6%	4.5%
8	FPL Group	8,441	8,645	4.5%	4.4%
9	International Power	8,291	8,881	4.4%	4.5%
10	Tenaska	8,146	8,246	4.3%	4.2%
11	Constellation Energy	6,582	7,136	3.5%	3.6%
12	Southern Company	6,084	6,094	3.2%	3.1%
13	AES Corp	5,780	6,285	3.1%	3.2%
14	Reliant Energy/Resources	5,621	5,678	3.0%	2.9%
15	TECO Energy	5,473	5,758	2.9%	2.9%
16	Xcel Energy/NRG	4,923	4,930	2.6%	2.5%
17	Enron Corp.	4,025	4,134	2.1%	2.1%
18	PPL Corp.	3,938	4,060	2.1%	2.1%
19	Dynegy Inc.	3,928	4,058	2.1%	2.1%
20	Progress Energy	3,465	3,519	1.8%	1.8%
21	El Paso Corp.	3,285	3,290	1.7%	1.7%
22	Kinder Morgan	3,019	3,019	1.6%	1.5%
23	Allegheny Energy	2,338	2,338	1.2%	1.2%
24	Exelon Corp.	2,012	2,189	1.1%	1.1%
25	Orion	2,000	2,738	1.1%	1.4%
	Total	189,403	196,404		

Source: Christopher Ellinghaus (2001). *U.S. Electricity Supply & Demand Analysis: Tight Gas Supply Tells the Story*. New York: Williams Equity Research.

An important, but sometimes overlooked fact about independent power plant developers is that they, and their shareholders, incur the risks associated with their power plant investments. The rewards and penalties that are possible for incurring these risks are a double-edged sword. Investments in tight generation markets that yield high returns are clearly a benefit that is misunderstood as an exercise of market power. One need only look at the reactions to the current

California crisis as an indicator of how surrealistic the misperceptions of these market risks can be perceived.

What is often not considered is the probability that independent providers could also incur losses associated with their investments when markets become saturated with large numbers of highly efficient and low cost power plants. In cases like these, independent providers and their shareholders, will bear 100 percent of the risks associated with these failed investments. Such risks, and the participants who bear them, are in stark contrast to the stranded cost problem for traditional monopoly utilities during the retail choice process. In most instances, ratepayers were required to pay all, or most, of the costs of these uneconomic investments.

<u>Louisiana Independent Power Development:</u> Louisiana has not gone unnoticed by independent power developers. The state has a number of positive attributes that could support a vibrant competitive wholesale industry. 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 2.1 shows the relative gas production by state for 1999.

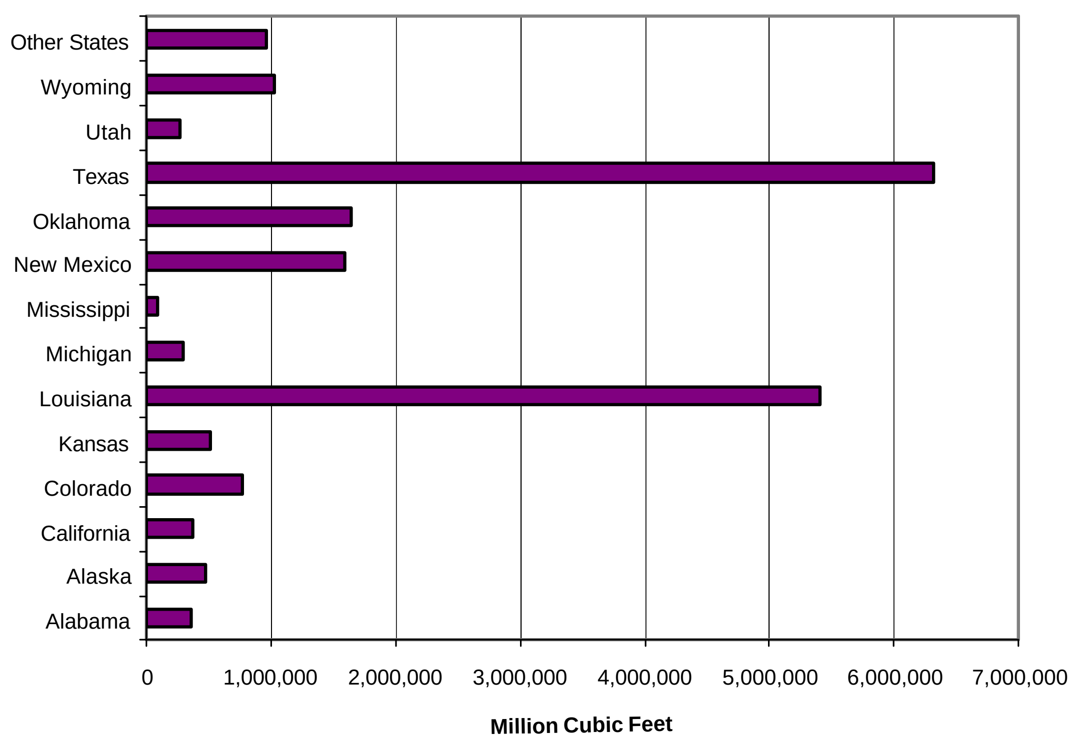

Figure 2.1: Natural Gas Production By State

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

Louisiana also has a very extensive network of pipelines to transport its large supplies of natural gas. As shown in Figure 2.2, a considerable amount of natural gas flows through Louisiana.

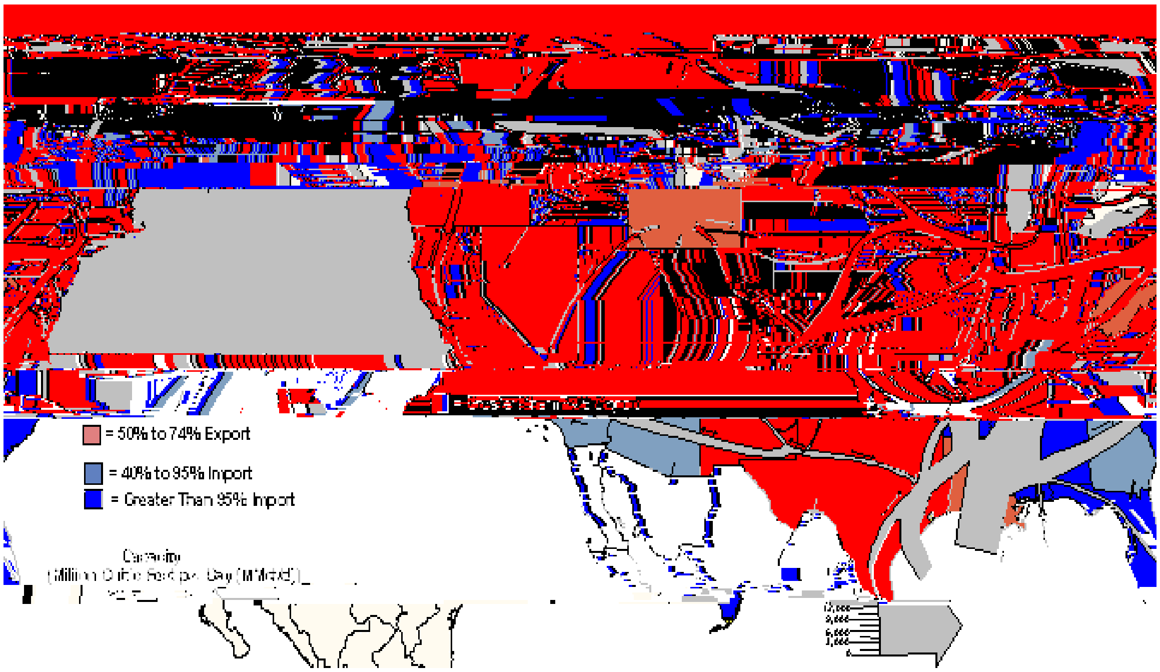

Figure 2.2: Natural Gas Flows in North America

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

Additionally, Louisiana's natural gas pipeline industry is marked by diversity of providers of transportation services. There are a 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. Figure 2.3 shows the extensive and diverse nature of the gas pipeline business in Louisiana. Lines indicated in blue are intrastate pipelines while lines marked in red represent the location of interstate pipelines.

Figure 2.3: Disposition of Louisiana Natural Gas Pipelines by Ownership Type

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

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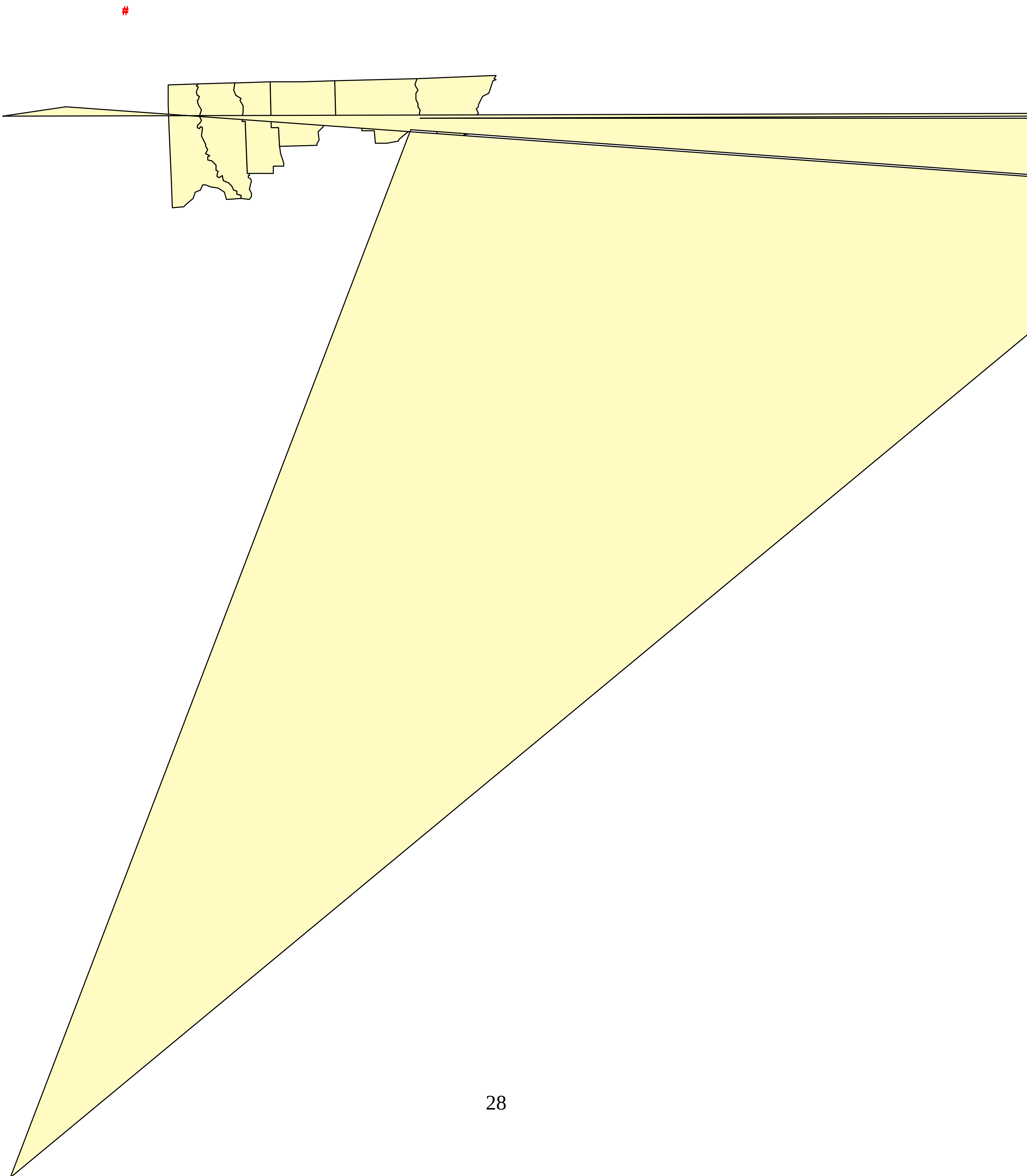
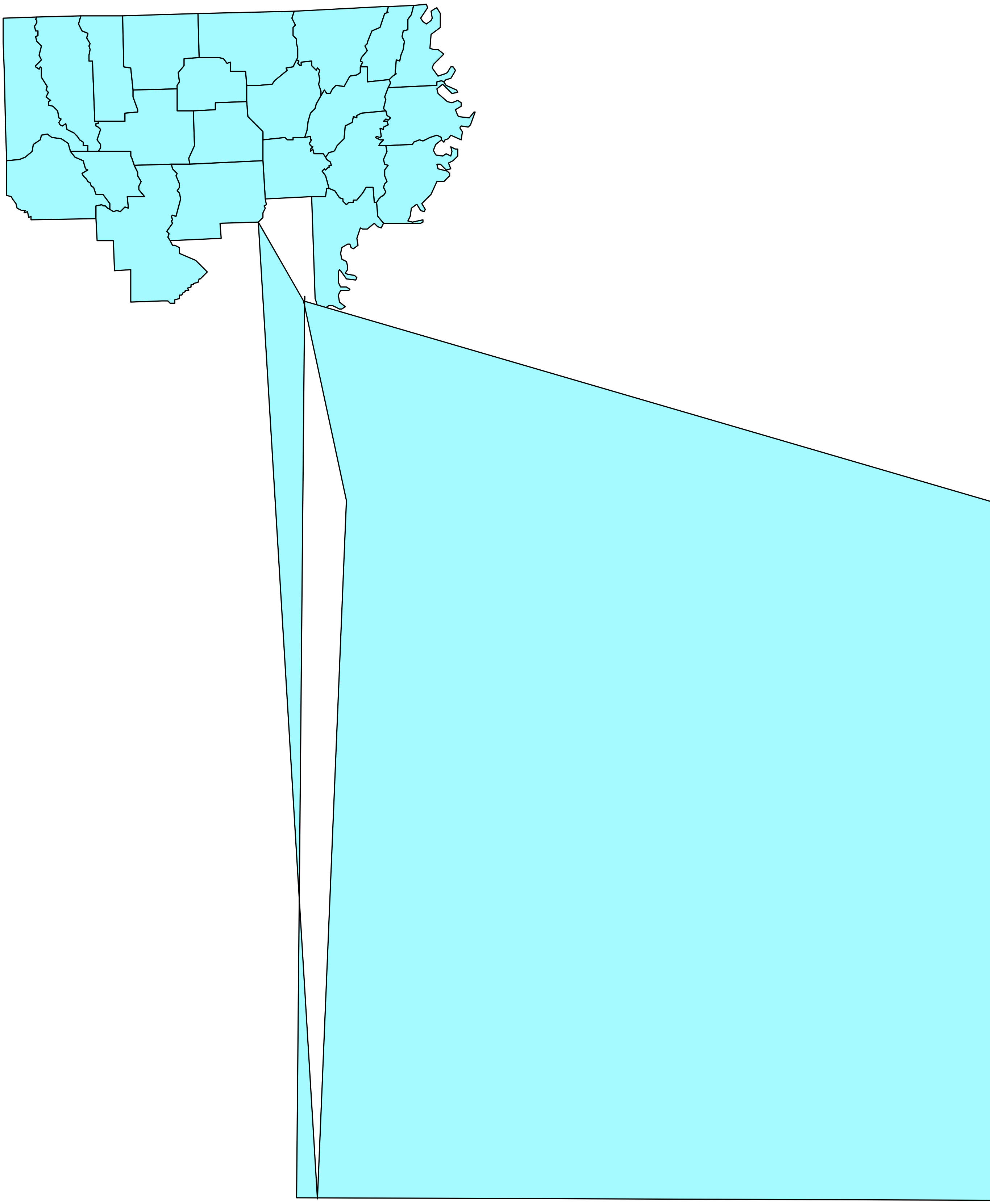
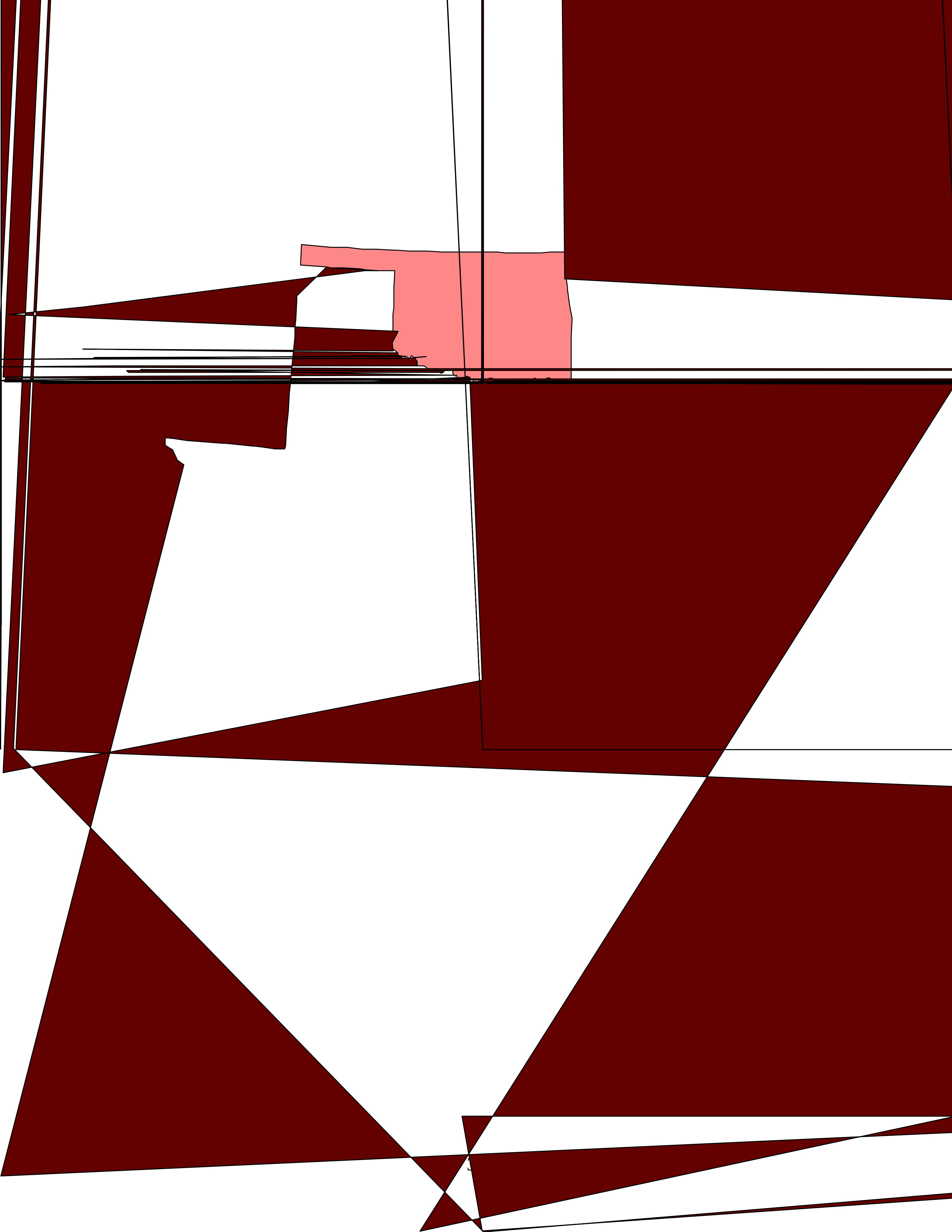
the right incentives for appropriate transmission system planning, upgrades/construction, governance, and pricing.

Figure 2.4 overlays a map of the natural gas industry infrastructure with the 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. Figure 2.5 provides a different representation by highlighting the intersections as points within the state.



The attractiveness of Louisiana for independent power has resulted in a number of operating, planned, and announced facilities. Figure 2.6 shows the location of these facilities throughout the state. New cogeneration facilities are also indicated by yellow dots.





SECTION 3: LOUISIANA POWER MARKETS

The purpose of this section of our report is to provide some historic context regarding the development of Louisiana electric power markets and the environment in which independent power developers are entering. This discussion will concentrate on the major areae majo

Table 3.1: Electrical Energy Intensity per State, 1999

State	KWh Per Customer	State	KWh Per Customer
Alabama	35,582	Mississippi	31,582
Arkansas	29,353	North Carolina	28,355
Florida	23,532	South Carolina	36,008
Georgia	29,666	Tennessee	33,388
Kentucky	38,088	Texas	33,732
Louisiana	38,060		

Source: U.S. Department of Energy, Energy Information Administration, Electric Power Annual

As noted in the introduction, the use of electricity in economic development is important. Over the past 20 years, considerable effort has been made to secure greater degrees of end-user efficiency through higher appliance and equipment standards as well as demand-side management programs. The result is that today, it takes less electrical energy to produce one dollar of output than it did in 1973 Figure 3.2 shows these trends for both the U.S. and Louisiana economies.

Two trends are noticeable from the figure. The first is that Louisiana has become increasingly more efficient in its electricity use over the past 20 years. The rate of change is dramatic, particularly in the late 1970s. The second trend is that while Louisiana has become more efficient over the years in its electricity usage, our economy still uses a great deal more electricity for every unit of output relative to the national average.

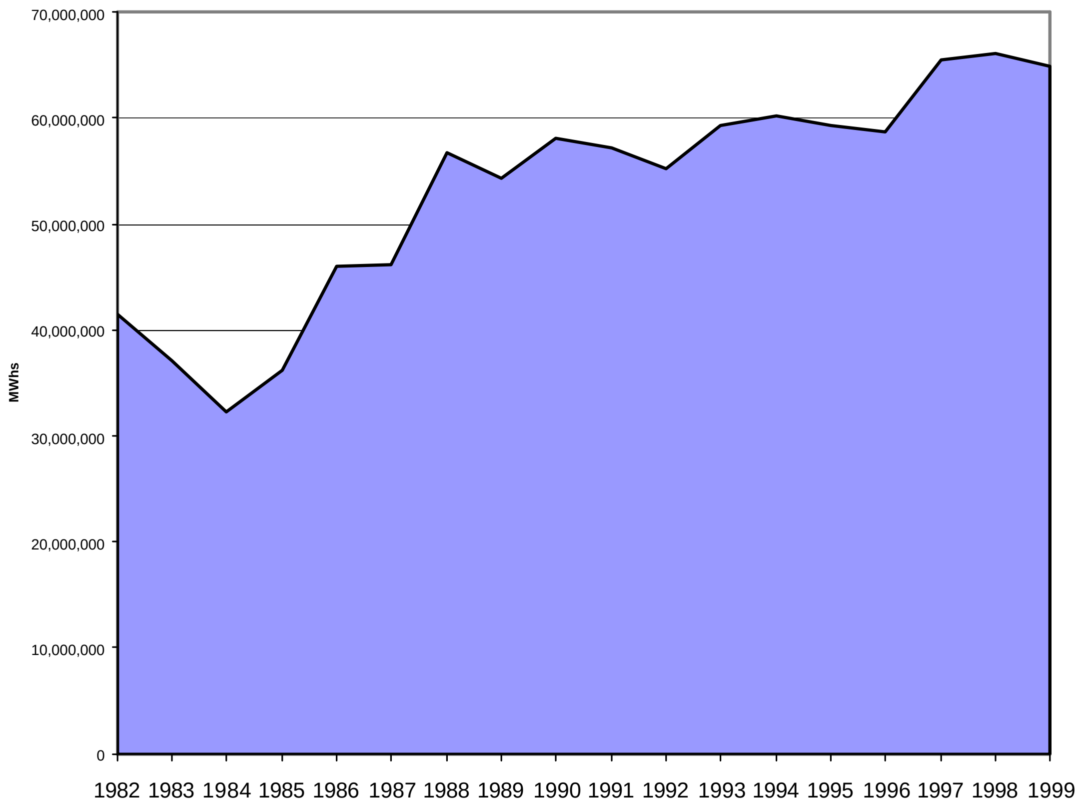


Figure 3.3: Louisiana Total Generation, 1982-1999

Source: U.S. Department of Energy, Energy Information Administration. Electric Power Annual.

Since 1982, generation associated with gas fired generators has declined 0.03 percent and petroleum-fired generation has fallen by 58 percent. Thus, an increasing amount of the load growth during the 1980s was met by nuclear and coal generating resources. Nuclear and coal generation during this period grew at 10 and 26 percent, respectively. Total generation by fuel type is presented in Figure 3.4.

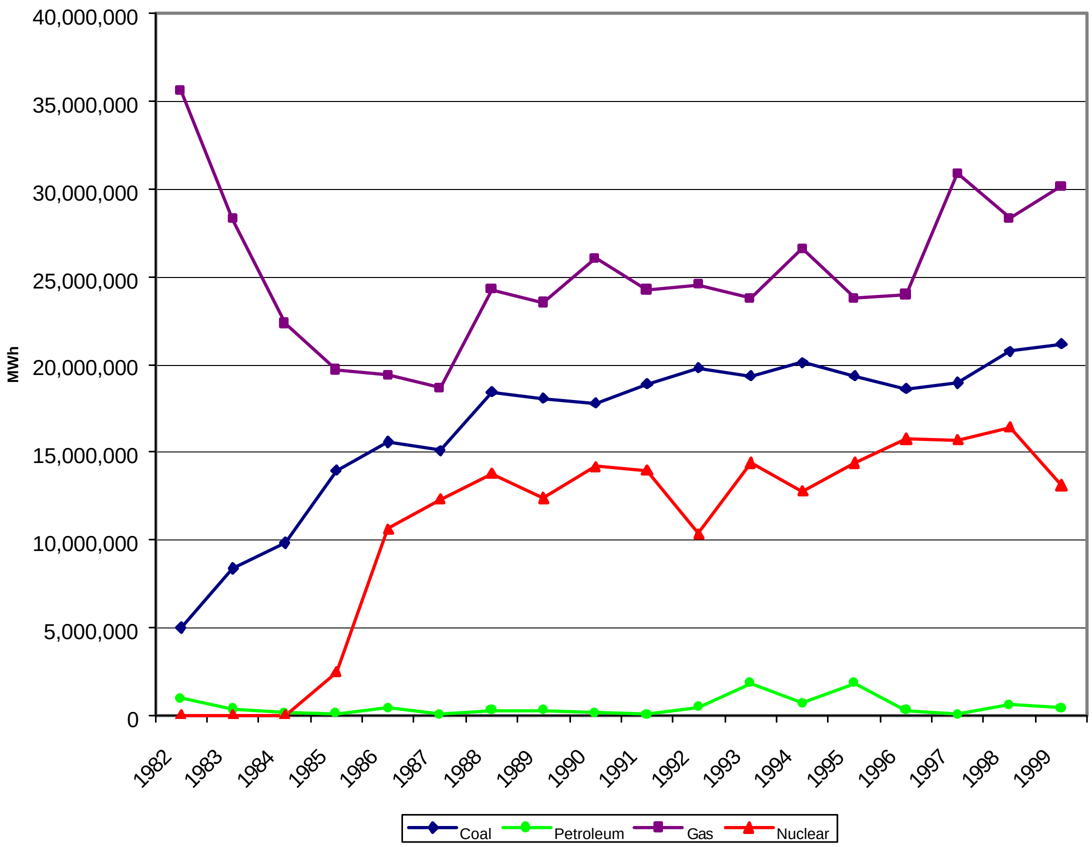


Figure 3.4: Louisiana Total Generation by Fuel Type, 1982-1999

Source: U.S. Department of Energy, Energy Information Administration. Electric Power Annual.

Power generation since the early 1980s has shifted from gas to nuclear and coal as Louisiana's utilities have diversified their fuel mix. For instance, in 1982 (Figure 3.5) the fuel mix for Louisiana generation was 86 percent gas, 2 percent oil and 12 percent coal. By 1999, however, this fuel mix had shifted to 42 percent gas, 1 percent oil, 23 percent nuclear, and 34 percent coal. Despite this shift in fuel mix, Louisiana still relies more heavily on natural gas than do its neighboring states. With 42 percent of its generation coming from natural gas, Louisiana is above the southern average of 12 percent (Figure 3.6).

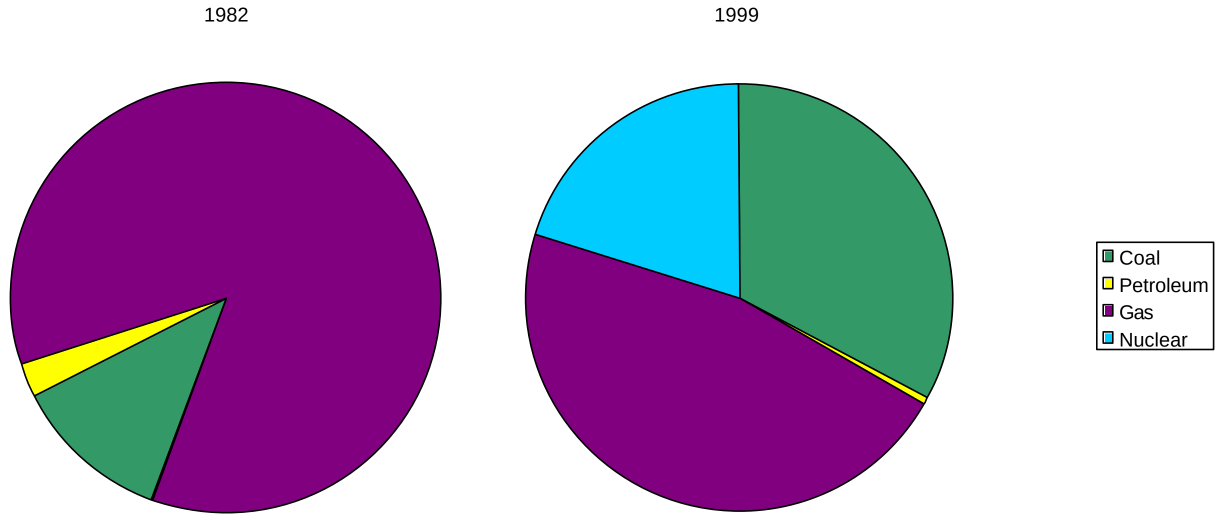


Figure 3.5: Louisiana Generation Fuel Mix, 1982 and 1999

Source: U.S. Department of Energy, Energy Information Administration. Electric Power Annual.

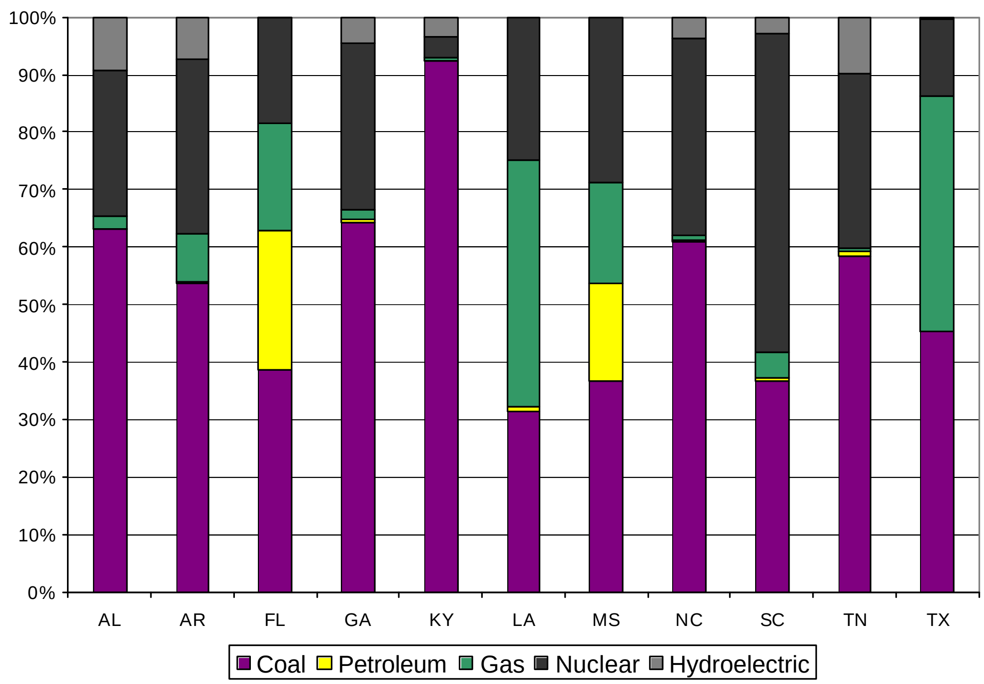


Figure 3.6: Generation Fuel Mix, Southeastern States

Source: U.S. Department of Energy, Energy Information Administration. Electric Power Annual.

Non-Utility Generation Trends: Non-utility generation in Louisiana has historically come from industrial cogeneration facilities. Cogeneration is defined as the combined production of heat and power. Cogeneration results in greater efficiency through the use of what was traditionally thought of as waste heat or energy. In many industries (petrole4cy 2y2on

Net imports[12] to Louisiana have shifted considerably over the past several number of southeastern states are net importers. The importing states within the southeast have net imports ranging between 4 percent of total regional generation to 24 percent of total generation. Louisiana is second to Mississippi in total net imports as a percent of total generation, and second to Florida in

Figure 3.10 shows the historic trends in reserve margins for the Southwest Power Pool (SPP) region, the Southeastern Electric Reliability Council (SERC) region, and the US average. These historic trends show the decrease in excess capacity for all regions as demand increased, and generating resource capacity additions held relatively constant.

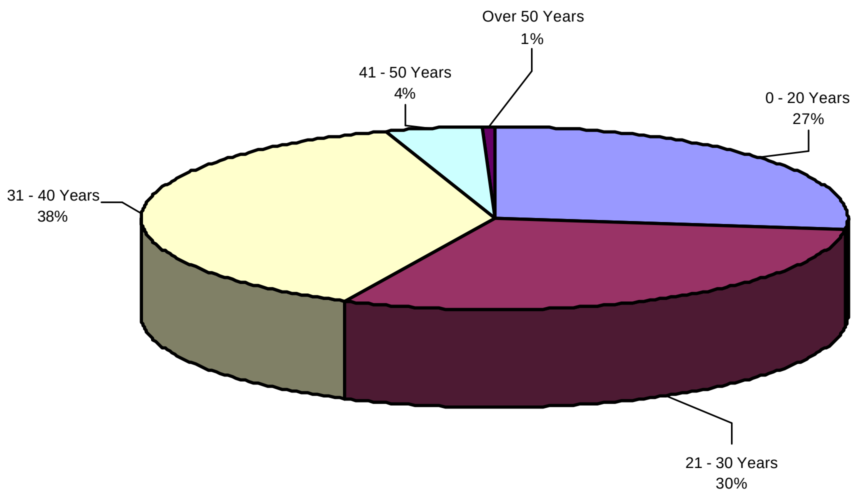


Figure 3.11: Disposition of Regional Generating Capacity by Age Category

Source: Utility Data Institute.

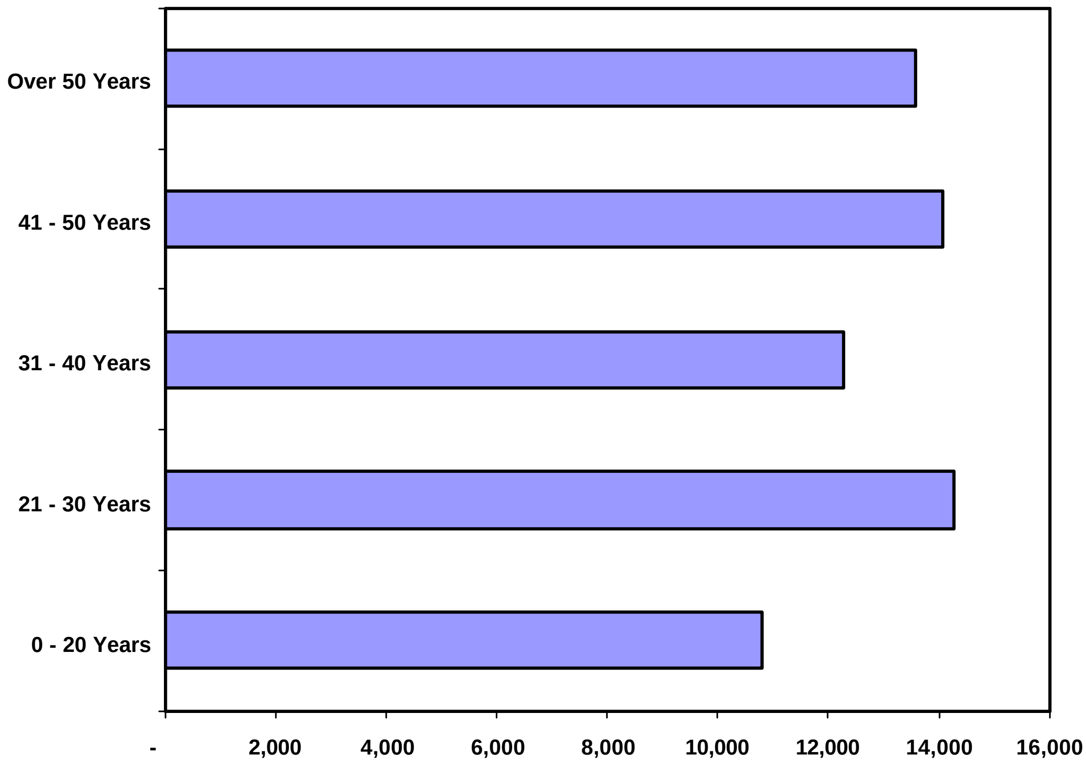


Figure 3.12: Efficiency Disposition of Regional Generating Capacity by Age Category

Source: Utility Data Institute.

The challenge for Louisiana are how future demand will be met, and whether it will be met by imports, or competitive in-state sources of capacity. Today, there is active competition among numerous states for new independent generating

In order to correct for all of the variations that can influence independent power plant development, we have chosen an approach that assumes a "typical" facility for modeling merchant economic impacts. This "typical facility" approach is premised upon the development of two types of projects based upon different technologies. We also separate our impact analysis into two broad categories: those impacts associated with the construction of the project and those associated with the operation of the project. We would characterize our approach as attempting to take a "snapshot" of each type of facility's economic impacts as it is built and operated.

The two "typical facilities" that we examined in our analysis are as follows: (1) a simple- cycle natural gas fired combustion turbine project and (2) a natural gas-fired combined-cycle project. The input assumptions associated with these two typical facilities are provided below.

Table 4.1 Independent Power Plant Capacity and Cost Assumptions

Facility Type	Assumed (MW) Capacity	Assumed Installed Cost/kW
Combustion Turbine	350	$400
Combined Cycle	600	$600

We examined the construction and the operation phases for each type of power plant technology. We have separated these phases to recognize the different economic impacts that can occur over the life cycle of a power plant. For instance, the academic and scholarly literature has long recognized the immediate and strong economic impacts associated with the construction of power plants, but not reflected the substantially decreased impacts associated with their annual operation and maintenance.[13]

The construction cost economic impact model was developed in a relatively straightforward manner. We used publicly reported information on recent power plant construction costs and employment to develop a direct shock, or impact, to our model. The model, in turn, calculates the indirect and induced impacts associated with the construction of the different types of merchant facilities. It is important to keep in mind that while these shocks are significant, they are

[13] Many of these studies have focused on the impacts of power projects internationally. For instance see S. Yamaguchi, and E. Kuczek. 1984. "The Social and Economic Impact of Large-Scale Energy Projects on the Local Community." *International Labour Review* 123(2): 149-165, D. Pijawka, and J. Chalmers. 1983. "Impacts of Nuclear Generating Plants on Local Areas." *Economic Geography*straightforward manner. .94826-7.8 T2326 Tc 1.829:g3d5:W.F. F -336. Pijawka, and

relatively short-lived and last only for the duration of the construction phase. Once the plant has been completed, the incremental economic and employment impacts are gone. Our model assumes that the economic impacts and construction period for each type of independent facility lasts for one year. Economic impacts associated with construction, while temporary, could last for a longer period to the extent that these construction phases last longer than one year.

In order to incorporate the impacts of independent power plant construction appropriately into our model, we developed a construction expenditure profile. This profile was developed for both technologies for two specific reasons. First,

(2) Introducing each merchant plant technology into the average wholesale market supply curve to estimate the efficiency change in the average wholesale supply curve and estimated average wholesale price. Narrow and broad markets were defined and equilibrium conditions were assumed to hold in each of the markets (i.e., supply equals demand). No imported power from other regions outside the narrow or broad markets was assumed.

(3) Developing an unbundled retail rate for each customer class. An unbundled rate was developed to correct for the fact that only the generation portion of the bill would be impacted by the development of merchant facilities. The transmission and distribution components were assumed not to change. Our unbundled rates were determined by using the current functional plant in service to allocate rates into generation, transmission, and distribution components.

(4) Typical bills for each customer class were developed. Base case rates were then compared to new rates with higher efficiency wholesale resources. The increase in disposable income was then assumed to be translated into increased spending opportunities for households and businesses.

Admittedly, the development of an average wholesale market supply curve is a simplification of the way complex wholesale markets actually work. However, time and budget constraints dictated that an expedient and straightforward approach be developed. The purpose of the market impact analysis was to develop illustrative numbers of the types of economic impacts that could result from new merchant development, and how disposable income could be diverted to other economic activities. More so.D -0.09

(2) These numbers are important in understanding the potential benefits (and beneficiaries) of wholesale competition. It is important to remember that the primary reason for introducing competition at the wholesale level is ultimately to increase efficiency and lower rates for retail customers.

(3) Few studies have examined the disposable income effects of any competitive power market (retail or wholesale).

Thus, our methods for estimating the economic impacts of independent power facilities can be summarized by the following matrix that maps each technology to a particular impact model, and also describes the purpose of the model for that given technology.

Table 4.2: Outline of Model Methodologies

Impact Model/ Technology	Combustion Turbine (CT)	Combined Cycle (CC)
Construction Impact Model	*Models impact of CT construction process*	*Models impact of CC construction process*
Plant Operation Impact Model	*Models impact of CT operations (annual average)*	*Models impact of CC operations (annual average)*
Market Impact Model	*Models impact of efficiency gain on rates by use of CT technology (annual average)*	*Models impact of efficiency gain on rates by use of CC technology (annual average)*

Empirical Estimates of the Economic Impacts of Independent Power Facilities: The empirical results from our analysis are presented in Table 2 through Table 17, provided after the conclusions of the report. Each of these tables is a summary of the output detail that was generated from our economic impact analysis. We have limited our presentation to the critical information provided in three major areas:

(1) ***Total Value Added:*** the estimates of the additional economic activity associated with core production including the returns to factors of production such as wages for workers, and rents paid on property and equipment.

(2) ***Output:*** this is the total economic activity, in terms of increased output, resulting from independent plant development.

(3) ***Employment:*** the estimated number of jobs that have been created as a result of the new merchant plant activity.

Each table has estimates of the direct, indirect and induced impacts associated with each type of merchant plant activity in each estimated metric (i.e., total value added, taxes, output, and employment).

Table 2 shows that there are substantial impacts associated with the construction of a 350 MW CT. Total value added to the state economy is estimated to be $9.5 million. A substantial amount (65 percent) of this value added is associated with new wages. Annual wage estimates for indirect and induced effects are somewhat lower at approximately $1.4 million, for both categories.

Output effects essentially measure the change in state economic activity created by our assumed new independent power plant. This direct output effect, in total dollars, is estimated to be $45.3 million. The output impact multiplier, which is measured as the ratio of total impacts to direct, is estimated to be 1.13. This means that for every dollar spent on constructing a independent power plant, there is another 13 cents generated in additional economic activity. The total economic output effect associated with this new construction activity is approximately $52 million.

Table 3 provides the disaggregate, per-sector output and employment impacts resulting from the construction of a typical 350 MW CT project. Seven different sectors are presented in this table. As shown in the table, there are obviously strong impacts in the construction sector of the Louisiana economy resulting from power plant development. The service sector of our economy, however, is one of the most impacted by the indirect and induced effects. There is a total of $2.6 million in service sector related output and 46 new employment opportunities created through these multiplier effects.

An important consideration in reviewing the results from our construction cost impact modeling is to recognize that these gains are temporary one-time gains associated with constructing a power plant. These impacts represent a one-time surge in economic activity associated with a major infrastructure project. We do not anticipate these employment impacts to last over a prolonged period of time. Once the plant is completed, employment opportunities associated with construction will effectively be eliminated.

In order to capture what we feel are “on-going” economic impacts of independent power facilities we generated two additional economic models. The first models the relatively small economic impacts associated with the annual operation of the typical merchant plants under investigation. The second models the disposable

$21.8 million increase in value added associated with this shift in prices that result in increasing effective disposable income for the state's ratepayers.

The economic impacts for a more narrow market are more pronounced. The potential 4.2 percent reduction in rates could yield 702 new jobs, $68 million in increased output, and $29 million in increased value added. The results from both assume market structures (narrow and broad) are presented in Table 13 for the 600 MW CC merchant facility. Tables 14 and 15 present the sector-specific detail associated with these impacts.

The economic impacts associated with these "typical" facilities can be extrapolated to the announced facilities that are planned for Louisiana. This extrapolation yields an interesting determination of how independent power facilities, if realized, could impact the Louisiana economy. In order to estimate these total impacts, we generalized our above results to an economic impact per MW of installed capacity for a CT and CC unit. Taking the announced plants, Mileage rate is assumed to be 100 mills. Ten-year exemptions are assumed in the estimation.

Fuel taxes are based upon the fuel costs associated with running each of the respective technologies. These are estimates based upon the assumed operating profile for each type of technology. Heat rates for the respective units are assumed to be 6,000 BTUs/kWh for CC units and 10,000 BTUs/kWh for CT units. Sales taxes paid by the respective units for ongoing maintenance and operation were based upon the operating profile for each type of unit. Income taxes are based upon assumed operating profiles for typical units provided by industry sources. Income taxes can be highly variable and depend upon the potential gain associated with sales from these units. While these estimates have been based upon the best available information, some caution should be given since market conditions can considerably impact these figures. The more profitable these plants are over time, the more they will pay in income taxes. The less profitable, the less they will pay in income taxes.

Figure 17 shows that a considerable amount of taxes could accrue to the state from the development of these independent power facilities. We estimate that the net present value of these potential streams are considerable. We estimate that approximately $3.1 billion could be paid in taxes over the next thirty years by these new independent facilities. This is the net present value of the future streams paid by independent generation facilities.

A considerable portion of this tax payment, some $1.7 billion, is associated with property taxes paid on these facilities. On the property tax side, these estimates are conservative since they exclude ongoing property and capital improvements that are typically made at these facilities. For instance, these estimates do not include close to $6 million made every 5 to 6 years for turbine improvements and upgrades that are typically added to the overall taxable property of these facilities.

In conclusion, we would like to note that all models are approximations of how the real world works. Our approach has attempted to use the more conservative estimates and assumptions about the potential economic impacts associated with merchant development. However, despite differing opinions about assumptions and methods, we believe our results provide relatively strong evidence that even under the more conservative of assumptions, independent power provides considerable benefits to the Louisiana economy.

SECTION 5: OTHER ISSUES ASSOCIATED WITH INDEPENDENT POWER DEVELOPMENT IN LOUSIANA

Over the past several years, a number of other important policy issues have arisen in response to increased independent power development in Louisiana. Three of the more important, and sometimes more controversial, issues will be discussed in this section: (1) what impact will independent power plants have on the state's power transmission system; (2) what impact can independent power have on economic development and growth in the state and should incentives be developed to facilitate these new power generation resources; and (3) what impact can these natural-gas fired facilities have on the state's natural resources.

Transmission Issues: The electric transmission grid is an important means by which power is moved between regions. The grid not only facilitates physical power flows, but it assures that competitive transactions between regions are possible. As a result, the grid is very important in promoting competition. Plants that cannot secure available transmission capacity to move their power will be limited in their market opportunities.

The power transmission grid facilitates competition in two important manners. When regional wholesale price differentials exist, transmission can serve as the means of equalizing these differentials as cheaper power moves to more expensive regions until prices between the two areas are close to equal. This movement assures that the "law of one price" will be closely approximated.

The second important role that the transmission system can play is in minimizing market power in a particular region. Consider for instance, an incumbent utility that, because of its past role as monopoly provider of utility services, owns a significant amount of regional generating capacity. It would be difficult for that incumbent utility to exercise market power, if power from other resources, in other regions, were able to flow into the region and under cut the potential market power pricing abuses of the incumbent.

The problem with the transmission system in the current competitive wholesale market, however, is twofold. First, the electric power transmission system has been developed over a number of decades under traditional utility regulatory practices and policies. In the past, the interrelated system of individual transmission systems was developed for reliability purposes. For instance, if one region found itself short on electrical generating capacity, it could draw upon the

Utility B, these two utilities would have opportunities for trade. In the past, these trades were limited, and were usually made on a “split the savings” basis. For instance, if Utility A had marginal costs or $25 per megawatt hour (MWh) and Utility B had marginal costs of $30 per MWh, then Utility B would ramp down its generation and purchase the cheaper resources. The differential ($5 per MWh) would be shared between the two utilities (i.e., $2.50/MWh apiece).

However, in the past, these opportunities for trade were somewhat limited and the traditional way to meet demand over the long term was to build new

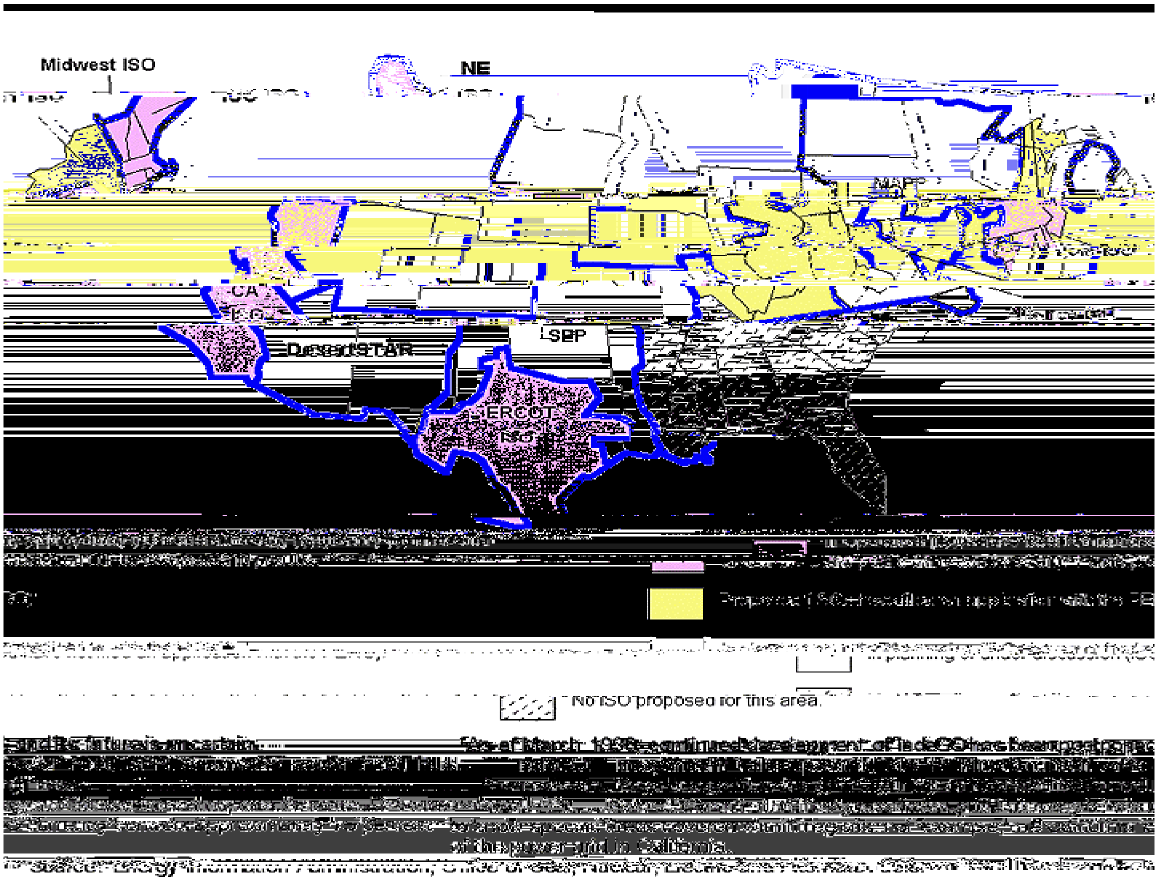


Figure 5.1: Independent System Operators In Operation, Proposed, or Under Development (March 1998)

From the onset of the electric restructuring debate, ISOs have been plagued by their detractors. One initial criticism laid upon the formation of ISOs rested with the enormous costs associated with creating a new bureaucracy to manage regional transmission grids. The experiences and costs associated with the creation of the California ISO and its associated power exchange (PX) provided justification for this criticism. Others argued that ISOs did not go far enough in removing incentives for cross dealings and potentially preferential treatment. However, one of the most significant criticisms leveled against the ISO ideal rests with concerns about its short- and long-run incentives as a non-profit organization.

ISO critics have questioned the motivations of non-profit organizations to plan for and manage the transmission system efficiently. This system will continue to be owned by utilities that have a fiduciary responsibility to their shareholders to maximize the profits that could be earned on these assets. However, a non-profit organization will be removed from fiduciary responsibility, and may even act at cross purposes with utility motivations for maximizing shareholder returns.

For instance, ISOs, it is argued, will have little or no incentives to reduce costs, introduce new technologies, or make management and operating innovations. The inability to earn profits could make ISOs relatively indifferent to such long-run planning issues as increasing transmission capacity or making substation upgrades and additions. The lack of incentives has led many critics, primarily transmission owning utilities, to call for an alternative means to organize and govern the transmission system.

One of the more recent proposals for transmission organization rests with an institution/corporation known as a Transco, which is short for transmission company. The Transco idea attempts to merge the concepts of independence and inclusiveness of an ISO with the profit-maximizing goals of a private enterprise. Recent Transco proposals envision a private corporation that would operate and manage utility transmission assets on a for-profit basis. The owners of these assets, in turn, would serve as shareholders in this new corporation. Management of a Transco would then be accountable to their shareholders. Transcos would be for-profit entities, but could include membership and (non-voting) input from non-transmission owning stakeholders like municipal utilities, rural distribution cooperatives, power marketers, and independent power producers.

While Transcos have appeared to become the preferred approach for encouraging investment in the transmission system, securing independent governance across regions, particularly the Gulf South, has been a more challenging issue. Figure 5.1 shows that, even after Order 888, the southern part of the U.S. avoided the trends in regional transmission governance and became balkanized into a system of unorganized entities run, or in part controlled, by incumbent transmission-owning utilities.

The challenge for federal regulators has been to encourage development of independent organizations, and to do so in a manner broad enough in scope to secure independence as well as potential operating efficiencies across regions. In a recent order the FERC took its most bold stand on the issue by forcing all parties to the table for 45 days of negotiations to bring the U.S. power transmission system into five major systems: West, South, Northeast, Midwest, and Texas. These systems will be organized into large regional transmission organizations (RTOs) that will handle a variety of different transmission operation, pricing, and planning issues. While it is still too early to tell, the promise of having a number of large regional RTOs, with a number of for-profit Transcos seems likely.

Another issue associated with the nexus between merchant power and transmission is how these competitive generators of electricity facilitate the power system. A common misperception about merchant generation is that it independent power plants somehow exploit the existing transmission system ignores a number of important technical and regulatory considerations.

First, when new generation or new load is added to a transmission system, the flows on the system change. The proper siting of new generation on the system can often eliminate the need for transmission upgrades and maximize the capability of the transmission system as a whole. For example, one location on the transmission system may be experiencing line overload or congestion, while another location may be experiencing low voltage. This problem could be solved by either building additional transmission to strengthen the grid or by strategically locating additional generation on the system. This additional generation would change load flow on the transmission system, improve voltage profiles on the system, and enhance overall reliability.

Second, the Federal Energy Regulatory Commission's (FERC) current policy for assigning costs for transmission services is summarized in its *Inquiry Concerning the Commission's Pricing Policy for Transmission Services Provided by Public Utilities Under the Federal Power Act; Policy Statement*. This policy requires, among other things, that rates for transmission services must ensure that "costs incurred in providing the wholesale transmission services … are recovered from the applicant … and not from existing wholesale, retail, and transmission service customers." This policy is contained in the current pricing rules for new generator interconnections and new requests for transmission service. Therefore, existing retail customers in Louisiana can be assured they will not be negatively impacted from a rate standpoint by the entry of new generation on the transmission grid within the state.

Third, independent power providers exist to take advantage of unique cost and demand characteristics in particular regions. The profit motive serves end-users well because as more of these generators enter a particular region, they displace older less efficient generating unit and/or supplement the regions' existing generating resources. However, in order to maximize the profit opportunities for these facilities, trade between regions must be facilitated. Restricting sales of merchant providers to a particular region can change the profit dynamics of the facilities, and could discourage certain generating projects. Merchant plants are no different than other large industrial and manufacturing facilities in Louisiana. If an automobile manufacturer were to locate in Louisiana, we would not require all, or some significant portion, of its output to be sold in the state. It seems unreasonable to expect the same from a independent power facility.

On a forward going basis, transmission may play out to be the single biggest issue in securing Louisiana's share of announced merchant capacity. In order to assure that we secure the projects that have been announced in this state, continued diligence will need to be exercised. Two areas where the state can facilitate this are through the regulatory process, and through the establishment of favorable economic environment for transmission investment.

Regarding regulatory issues, the Louisiana Public Service Commission has monitored power transmission issues with vigilance and continues to do so. After the major summer rolling blackouts in 1999, the LPSC initiated a number of stakeholder meetings that included the state's utilities and independent power developers. The Commission listened carefully to the stakeholder comments in the proceedings and moved forward with a number of measures to reduce interconnection backlogs and facilitate greater development of in-state generating resources. The LPSC is also carefully monitoring and participating in transmission policy issues at the FERC.

On economic incentive issues, state policymakers are recognizing the importance of merchant power and the important role that transmission plays in the process. At a recent meeting of the Louisiana Commerce and Industry Board's Rules Committee, including the representative from the Governor's

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facility proposed by Panda Energy. According to an 8 March, 2000 story on the "El Dorado: Arkansas' Original Boomtown" website, the Panda Energy facility amounts to a $1.1 billion investment for the 2,720 MW natural gas fired facility and will create 1,000 construction jobs with an $85 million payroll and 65 full-time operation jobs resulting in a $3.25 million annual payroll.[15] The project is estimated to purchase between $10 million and $15 million of materials locally during construction and an additional $5 million to $8 million a year after completion, and will provide $3 million annually in tax revenues[16]. In April, 2000, Panda signed a contract with Dynegy Inc. for the provision of 500 MW of capacity off-take from the plant for resale to investor-owned utilities, cooperatives, and municipalities throughout the southeast.[17]

Michigan is another example of a state vying for merchant plants to be built within its borders. According to a Detroit News story from March 1, 2001, Greg Kitts told the Michigan House Energy and Technology Committee that new deregulation laws make Michigan a "friendly place to build a generating plant." Kitts as well as John Stauffcher of Dynegy claim that it takes less time, about seven years, to build a power plant in Michigan.[18]

Elko, Nevada sees the building of a new 480 MW power plant along with a 290 mile natural gas pipeline as a way to attract new kinds of industry. Ursula Powers, former director of economic development for the city looks for manufacturing operations that require natural gas to see Elko as an attractive place to operate.[19]

Finally, Mississippi's government has attempted to attract power plants through SEC. 57-1-255 of the Mississippi Code also known as the Major Energy Project Development Fund. The law authorizes the Department of Economic and Community Development to act on behalf of the state in developing, financing,

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[15] El Dorado: Arkansas' Original Boomtown 2000 (1). "First Merchant Power Plant to Give $1.1 Billion Economic Boost to Union County." (http://www.boomtown.org/plant/money.html).

[16] El Dorado: Arkansas' Original Boomtown 2000 (2). "Project Facts." (http://www.boomtown.org/plant/facts.html).

[17] El Dorado: Arkansas' Original Boomtown 2000 (3). "Panda Signs Power Supply Contract with Dynegy." (http://www.boomtown.org/plant/dynegy.html).

[18] Franklin, A. March 1, 2001. "Michigan Right Place for Power Plants." (Detroit, The Detroit News/detnews.com).

[19] Edwards, J. February 14, 2001. "Energy Deal Could Boost Elko." (Las Vegas, Las Vegas Review Journal/lvrj.com).

and operating major energy projects and related facilities. It also authorizes the issuance of bonds to defray the costs of such projects.[20]

Because of the California power crisis, many states are also attempting to attract Silicon Valley firms with the promise of reliable and inexpensive power. Minnesota has placed a billboard with the phrase "White Outs – Occasional. Black Outs – Never." in San Jose, California. The billboard invites onlookers to the UpgradetoMinnesota.com website, which lists economic factors important to businesses, business assistance programs, and quality of life and demographic information. Of particular emphasis is the availability of low cost, reliable power.

Minnesota governor Jesse Ventura followed up the billboard campaign with personal letters to the presidents and CEOs of about 500 targeted high growth companies.[21] A press release from Ventura's office touts a 1999 commercial electricity price 37 percent lower than California's and an industrial electricity price 36 percent lower than California's.

Other marketing efforts made by states to woo high-tech California companies include the following:

- The Michigan Economic Development Corporation sent 4,500 glow-in-the-dark mouse pads to high-tech companies and aired ads of San Jose and San Francisco radio stations.[22]

- The Tennessee Department of Economic and Community Development has held business receptions in California and distributed "the lights are always on in Tennessee" flashlights to 1,000 executives at large automotive, technical, and steel fabrication companies.[23]

  The East Tennessee Economic Development Agency has services in place to assist companies who want to relocate to that section of the state. These services include information on labor and training,

[20] McCann, N. March 31, 1996. "Legislation Aimed at Helping Local Areas Attract Energy Production Plants." (Jackson, Mississippi Business Journal Online/msbusiness.com).

[21] Press Office March 19, 2001. "Billboard Campaign Launched in Silicon Valley." (Minneapolis, Office of Governor Jesse Ventura) and CNEWS March 20, 2001. "Minnesota Humor Coming to Silicon Valley." (Toronto, canoe.ca).

[22] Associated Press Report (1) March 12, 2001. "States Looking to Cash in on California Power Woes." (Reno, Reno Gazette-Journal/RGJ.com).

[23] Streisand, B. May 28, 2001. "Like a Moth to a Flame: Luring California Firms Out of State by Promising Cheap Power." (Washington D.C., U.S. News and World Report/usnews.com).

economic and demographic data, transportation contacts, and utility cost, availability, reliability, and capacity.[24]

- The Greater Raleigh Chamber of Commerce sent 9-volt batteries and letters to 89 Silicon Valley companies.[25]

- The Spokane Area Economic Development Council sent a letter to about 8,000 California companies with which it maintains regular contact.[26]

The strategies pursued by other states are certainly ones that can be implemented in Louisiana if similar "big welcome mat" philosophies are pursued. Given the public resolutions offered by the Louisiana Legislature, the Louisiana Public Service Commission, and the Rules Committee of the Louisiana Commerce and Industry Board, Louisiana seems well positioned to move forward in this direction.

Natural Resource Issues: One of the additional issues addressed in recent months, is that of the relationship between natural resource issues and independent power generation. One independent power project near Eunice, Louisiana raised a firestorm that pitted the state's agricultural interests against independent power developers. This debate resulted in a number of proposals that would have provided a number of disincentives for continued merchant development in Louisiana. However, through the Governor's intervention, a multi-stakeholder task force has been commissioned to deal with these water-related issues. The charge of the task force has been to develop a comprehensive water use policy that provides comparability across all of the state's industrial and agricultural users.

Another important natural resource issue is air quality and the emissions associated with power generation facilities. Most of the regulated power generating facilitates in Louisiana and its surrounding region are older and use less efficient technologies than those facilitated by independent developers, and even the unregulated projects of the state's investor-owned utilities. Efficiency gains from these new technologies can be translated into lower emissions for the same number of kWhs generated in the state. Improved air quality could be one of the important consequences of these new generation technologies.

A particular opportunity for reducing air emissions is associated with industrial cogeneration. These facilities, as defined and identified earlier in the report,

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[24] ETEDA. "Economic Development Services." (Knoxville, East Tennessee Economic Development Agency/eteda.org).

[25] Associated Press Report (1).

[26] Associated Press Report (2) January 27, 2001. "Business Recruiters Target California." (Honolulu, Honolulu Advertiser/honoluluadvertiser.com).

have the ability to improve air quality in two important ways. First, more efficient power generating technologies should, other things being equal, produce lower air emissions per kWh than the older power generation technologies. Second, there are opportunities to reduce certain air emissions at the state's petrochemical facilities if on-site reliability is improved. Today, every time a major petrochemical facility experiences outages or reliability related "hiccups," there are increased emissions associated with increased flares that result from these electrical-related problems. Cogeneration at these facilities will help minimize these hiccups and lower plant emissions associated with needless power outages and reliability problems.

In addition to water and air issues, many observers in the state, as well as other regions in the southeast, are concerned about our natural gas resources and whether they are abundant enough to facilitate the considerable number of merchant facilities that have been announced in Louisiana and the Gulf South region as a whole. There are a number of considerations, however, that need to be kept in mind during the course of this debate.

First, Louisiana is the second largest producer of natural gas in the U.S. The state is well positioned to provide the needed natural gas to run these facilities. However, an increasing amount of natural gas is coming from the offshore, and particularly the deep waters of the Gulf of Mexico. If Louisiana were to promote policies that restricted natural gas use for power generation, newer facilities, even those possibly constructed by the state's utilities, would find other states, like Mississippi, in which to operate. Thus, while natural gas issues are an important consideration that the nation should examine in regards to our national energy policies, there is little that Louisiana can do to encourage greater demand-side conservation.

Second, fuel use policies should be considered at the national level and not the state level. To date, most policies have facilitated open markets for making incremental fuel choice decisions and not regulation. The Power Plants and Industrial Fuels Use Act of 1978 is an excellent example of the unintended consequences of well-intentioned fuel use policies. This policy helped facilitate, in part, the power industry's costly experiment with nuclear power, the prudence disallowances resulting from those nuclear investments, and the stranded cost problem of recent times.

Lastly, the efficiency of new power generation facilities cannot be emphasized enough. Like air emissions, the amount of natural gas used to make one kWh is less for newer merchant technologies and cogeneration, than for older steam-fired power generation stations. What needs to be considered in this debate is the impact of net, and not cumulative, natural gas usage. Newer facilities will more than likely displace existing ones, other things being equal. The displacement of natural gas from these older facilities needs to be subtracted from the use of natural gas at new facilities to get a more appropriate understanding of how these fossil-fuel resources will be used. At the margin, it seems that allowing markets, rather than regulation, to make these considerations, is more fruitful. In the worst case scenario, increased natural gas prices will send the market strong incentives to develop alternative fuels such as clean-coal, renewables, and possibly even nuclear.

Table 1: Operating & Announced Independent Power Projects in Louisiana
September 2001

Company	Gross MW	City/ Parish	Type	Prime Mover	Fuel	Estimated Cost (000)	Status	Projected COD
AEP/Dow	900	Plaquemine	Cogeneration	CC	Gas	540,000	Planned	2003
Calpine Corporation	530	Carville	Cogeneration	CC	Gas	318,000	Under Construction	2001
Calpine Corporation	500	Bogalusa	Merchant	CC	Gas	300,000	Under Construction	2001
Calpine/Triad Nitrogen	530	Donaldsonville	Cogeneration	CC	Gas	318,000	Unknown	Unknown
CLECO/Calpine								

Table 2: Louisiana Power Plant Construction Impacts: Typical Combustion Turbine Project (350 MW)

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**5,263,250**	**2,006,611**	**2,282,891**	**9,552,751**
	a. Labor Income	3,564,539	1,383,664	1,341,619	6,289,822
	b. Other Property Income	1,444,757	452,289	699,394	2,596,440
II.	**Output ($)**	**45,317,161**	**3,557,741**	**3,736,319**	**52,611,221**
III.	**Employment[1] (Temporary Jobs)**	**104**	**44**	**55**	**203**

Notes: (1) Employment is "number of jobs"
(2) All values, except employment, are in 2000 dollars

Table 3: Louisiana Power Plant Construction Impacts
Detailed Summary of Typical Combustion Turbine Project Impacts

Detailed Per Sector Output Impacts

	Sector	Direct	Indirect	Induced

Table 4: Louisiana Power Plant Operations Impacts: Typical Combustion Turbine Project (350 MW)

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**4,784,081**	**199,665**	**571,358**	**5,555,105**
	a. Labor Income	1,097,519	140,910	335,778	1,574,207
	b. Other Property Income	3,013,214	45,301	175,043	3,233,559
II.	**Output ($)**	**32,475,175**	**388,221**	**935,121**	**33,798,516**
III.	**Employment[1] (Permanent)**	**15**	**4**	**14**	**33**

Notes: (1) Employment is "number of jobs"
(2) All values, except employment, are in 2000 dollars

Table 5: Louisiana Power Plant Operation Impacts
Detailed Summary of Typical Combustion Turbine Project Impacts

Detailed Per Sector Output Impacts

ConstructionConst($91,9229 Tc 0.-0.0 TD -0.0036 274 ($65,272293.0059 Wholesale/R

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$0	$61	$7,284
Construction	$0	$118,359	$21,513
Finance, Insurance, Real Estate	$0	$34,843	$196,993
Home Furniture/Appliances	$0	$44	$786
Services and Recreation	$0	$65,272	$324,994

U i78 0 TD -0.0036 Tc ($324,994) Tj -297.36 -21.6 TD -0.0059 Tc 0.0040036 ppliances

Table 6: Louisiana Power Plant Market Impacts:
Typical Combustion Turbine Project (350 MW)

Broad Market Impact

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**9,480,802**	**2,228,220**	**3,205,400**	**14,914,422**
	a. Labor Income	5,554,788	1,392,969	1,883,761	8,831,518
	b. Other Property Income	2,880,307	658,292	982,017	4,520,616
II.	**Output ($)**	**25,739,136**	**3,989,528**	**5,246,153**	**34,974,816**
III.	**Employment[1] (Permanent)**	**236**	**48**	**77**	**361**

Narrow Market Impact

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**6,746,105**			

Table 7: Louisiana Power Plant Market Impacts
Detailed Summary of Typical Combustion Turbine Project Impacts

Broad Market Impacts

Detailed Per Sector Output Impacts

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$37,085	$119,305	$40,864
Construction	$0	$438,291	$120,691
Finance, Insurance, Real Estate	$3,209,160	$707,779	$1,105,156
Home Furniture/Appliances	$14,225	$1,146	$4,411
Services and Recreation	$5,634,305	$1,169,796	$1,823,261
Utilities/Power Generation	$1,286,564	$668,790	$515,695
Wholesale/Retail Trade	$3,976,013	$277,327	$1,190,979
Total Output Impacts	***$14,157,352***	***$3,382,434***	***$4,801,057***

Detailed Per Sector Employment Impacts

Sector Description	Direct Impact (Jobs)	Indirect Impact (Jobs)	Induced Impact (Jobs)

Table 8: Louisiana Power Plant Market Impacts
Detailed Summary of Typical Combustion Turbine Project Impacts

Narrow Market Impacts

Detailed Per Sector Output Impacts

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$26,388	$84,892	$29,077
Construction	$0	$311,868	$85,878
Finance, Insurance, Real Estate	$2,283,491	$503,623	$786,379
Home Furniture/Appliances	$10,122	$816	$3,139
Services and Recreation	$4,009,113	$832,373	$1,297,349
Utilities/Power Generation	$915,460	$475,880	$366,945
Wholesale/Retail Trade	$2,829,148	$197,333	$847,446
Total Output Impacts	***$10,073,723***	***$2,406,785***	***$3,416,212***

Table 9: Louisiana Power Plant Construction Impacts:
Typical Combine Cycle Project (600 MW)

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**11,150,490**	**4,156,339**	**4,799,693**	**20,106,522**
	a. Labor Income	7,576,048	2,827,361	2,820,702	13,224,111
	b. Other Property Income	3,093,296	959,030	1,470,449	5,522,776
II.	**Output ($)**	**113,282,247**	**7,402,114**	**7,855,472**	**128,539,833**
III.	**Employment[1] (Temporary Jobs)**	**216**	**87**	**116**	**419**

Notes: (1) Employment is "number of jobs"
(2) All values, except employment, are in 2000 dollars

Table 10: Louisiana Power Plant Construction Impacts
Detailed Summary of Typical Combined Cycle Project Impacts

Detailed Per Sector Output Impacts

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$0	$2,419	$61,189
Construction	$9,452,040	$356,445	$180,720
Finance, Insurance, Real Estate	$2,640,210	$636,798	$1,654,836
Home Furniture/Appliances	$0	$5,872	$6,606
Services and Recreation	$0	$2,745,774	$2,730,110
Utilities/Power Generation	$0	$953,243	$772,189
Wholesale/Retail Trade	$0	$1,416,204	$1,783,345
Total Output Impacts	***$12,092,250***	***$6,116,754***	***$7,188,994***

Detailed Per Sector Employment Impacts

Sector Description	Direct Impact (Jobs)	Indirect Impact (Jobs)	Induced Impact (Jobs)
Agriculture and Natural Resources	0	0	1
Construction	106	6	3
Finance, Insurance, Real Estate	14	5	7
Home Furniture/Appliances	0	0	0
Services and Recreation	0	42	52
Utilities/Power Generation	0	7	4
Wholesale/Retail Trade	0	22	45
Total Employment Impacts	***120***	***82***	***113***

Table 11: Louisiana Power Plant Operations Impacts:
Typical Combine Cycle Project (600 MW)

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**9,568,164**	**399,332**	**1,142,717**	**11,110,213**
	a. Labor Income	2,195,040	281,820	671,556	3,148,415
	b. Other Property Income	6,026,430	90,603	350,087	6,467,120
II.	**Output ($)**	**78,589,135**	**776,440**	**1,870,240**	**81,235,815**
III.	**Employment[1] (Permanent)**	**30**	**8**	**28**	**66**

Notes: (1) Employment is "number of jobs"
(2) All values, except employment, are in 2000 dollars

Table 12: Louisiana Power Plant Operation Impacts
Detailed Summary of Typical Combined Cycle Project Impacts

Detailed Per Sector Output Impacts

Sector	Direct

Table 13: Louisiana Power Plant Market Impacts: Typical Combine Cycle Project (600 MW)

Broad Market Impact

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**13,895,629**	**3,265,811**	**4,698,024**	**21,859,464**
	a. Labor Income	8,141,428	2,041,618	2,760,953	12,944,000
	b. Other Property Income	4,221,549	964,832	1,439,302	6,625,683
II.	**Output ($)**	**37,724,809**	**5,847,290**	**7,689,074**	**51,261,174**
III.	**Employment[1] (Permanent)**	**345**	**71**	**113**	**529**

Narrow Market Impact

	Impact Item	Direct	Indirect	Induced	Total
I.	**Value Added ($)**	**18,445,747**	**4,335,200**	**6,236,390**	**29,017,338**
	a. Labor Income	10,807,337	2,710,145	3,665,026	17,182,508
	b. Other Property Income	5,603,894	1,280,766	1,910,601	8,795,261
II.	**Output ($)**	**50,077,787**	**7,761,984**	**10,206,859**	**68,046,630**
III.	**Employment[1] (Permanent)**	**458**	**94**	**150**	**702**

Notes: (1) Employment is "number of jobs"
(2) All values, except employment, are in 2000 dollars

Table 14: Louisiana Power Plant Market Impacts
Detailed Summary of Typical Combined Cycle Project Impacts

Broad Market Impacts

Detailed Per Sector Output Impacts

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$54,355	$174,861	$59,893
Construction	$0	$642,386	$176,892
Finance, Insurance, Real Estate	$4,703,535	$1,037,363	$1,619,783
Home Furniture/Appliances	$20,849	$1,680	$6,466
Services and Recreation	$8,257,973	$1,714,523	$2,672,280
Utilities/Power Generation	$1,885,665	$980,218	$755,833
Wholesale/Retail Trade	$5,827,481	$406,467	$1,745,570
Total Output Impacts	***$20,749,858***	***$4,957,497***	***$7,036,715***

Detailed Per Sector Employment Impacts

Sector Description	Direct Impact (Jobs)	Indirect Impact (Jobs)	Induced Impact (Jobs)
Agriculture and Natural Resources	1	2	1
Construction	0	10	3
Finance, Insurance, Real Estate	17	9	7
Home Furniture/Appliances	0	0	0
Services and Recreation	160	32	51
Utilities/Power Generation	10	6	4
Wholesale/Retail Trade	150	7	44
Total Employment Impacts	***339***	***66***	***110***

Table 15: Louisiana Power Plant Market Impacts
Detailed Summary of Typical Combined Cycle Project Impacts

Detailed Per Sector Output Impacts

Sector Description	Direct Impact ($)	Indirect Impact ($)	Induced Impact ($)
Agriculture and Natural Resources	$72,153	$232,119	$79,505
Construction	$0	$852,735	$234,815
Finance, Insurance, Real Estate	$6,243,706	$1,377,047	$2,150,180
Home Furniture/Appliances	$27,676	$2,230	$8,583
Services and Recreation	$10,962,043	$2,275,943	$3,547,317
Utilities/Power Generation	$2,503,125	$1,301,191	$1,003,330
Wholesale/Retail Trade	$7,735,688	$539,564	$2,317,156
Total Output Impacts	***$27,544,392***	***$6,580,828***	***$9,340,886***

Detailed Per Sector Employment Impacts

Sector Description	Direct Impact (Jobs)	Indirect Impact (Jobs)	Induced Impact (Jobs)
Agriculture and Natural Resources	1	3	1
Construction	0	13	4
Finance, Insurance, Real Estate	23	12	10
Home Furniture/Appliances	0	0	0
Services and Recreation	212	43	68
Utilities/Power Generation	14	8	6
Wholesale/Retail Trade	199	9	58
Total Employment Impacts	***450***	***88***	***146***

Table 17: Louisiana Power Plant Tax Impacts
Current Dollar and Net Present Value of the
Estimated Taxes Paid By Announced Facilities Over the Next 30 Years

Tax Category	Future Dollars	NPV Dollars
Property Taxes	$1,242,717,270	$429,549,612
Fuel Taxes	$1,604,532,904	$554,612,463
Sales Taxes	$370,757,276	$128,153,561
Income Taxes	$2,293,564,870	$792,778,795
Total Taxes:	$5,511,572,319	$1,905,094,431