COGENERATION IN LOUISIANA

AN UPDATED (2005) TABULATION OF INDEPENDENT POWER PRODUCER (IPP) AND COGENERATION FACILITIES

Prepared by
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THE TECHNOLOGY ASSESSMENT DIVISION

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LOUISIANA DEPARTMENT OF NATURAL RESOURCES

SCOTT A. ANGELLE
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UPDATE (2005)

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ABBREVIATIONS AND NUMERIC CODES USED IN EXHIBITS

TYPE OF COGENERATION PRIME MOVER

Prime Mover Type	Description
ST	Steam turbine, including nuclear, geothermal, and solar steam (does not include combined cycle)
GT	Combustion (gas) Turbine includes jet engine design)
IC	Internal Combustion (diesel, piston) Engine
CT	Combined Cycle Combustion—Turbine part
CA	Combined Cycle—Steam part
CS	Combined Cycle Single Shaft (combustion turbine and steam turbine share a single generator)
HY	Hydraulic Turbine (includes turbines associated with delivery of water by pipeline)
PS	Hydraulic Turbine—Reversible (pumped storage)
PV	Photovoltaic
WT	Wind Turbine
CE	Compressed Air Energy Storage
FC	Fuel Cell
OT	Other

ABBREVIATIONS AND NUMERIC CODES USED IN EXHIBITS

ENERGY SOURCE CODES

Fuel	Energy Source Code	Units	Description
Fossil Fuels			
Coal and Synfuel	BIT	tons	Anthracite Coal and Bituminous Coal
	LIG	tons	Lignite Coal
	SUB	tons	Sub-bituminous Coal
	WC	tons	Waste/Other Coal (includes anthracite culm, bituminous gob, fine coal, lignite waste, waste coal)
	SC	tons	Coal-based Synfuel, including briquettes, pellets, or extrusions, which are formed by binding materials or processes that recycle materials
Petroleum Products	DFO	barrels	Distillate Fuel Oil (Diesel, No. 1, 2, and 4 Fuel Oils
	JF	barrels	Jet Fuel
	KER	barrels	Kerosene
	PC	tons	Petroleum Coke
	RFO	barrels	Residual Fuel Oil (No. 5, 6, and Bunker C Fuel Oil)
	WO	barrels	Waste/Other Oil (including Crude Oil, Liquid Butane, Liquid Propane, Oil Waste, Re-Refined Motor Oil, Sludge Oil, Tar Oil, or other petroleum based liquid wastes)
Natural Gas and other Gases	NG	Mcf	Natural Gas
	BFG	Mcf	Blast Furnace Gas
	OG	Mcf	Other Gas
	PG	Mcf	Gaseous Propane
Nuclear			
Nuclear	NUC	N/A	Nuclear Fission (Uranium, Plutonium, Thorium)
Renewable Fuels			
Solid Renewable Fuels	AB	tons	Agricultural Crop Byproducts/Straw/Energy Crops
	MSW	tons	Municipal Solid waste
	OBS	tons	Other Biomass Solids
	TDF	tons	Tire-derived Fuels
	WDS	tons	Wood/Wood Waste Solids (paper pellets, railroad ties, utility poles, wood chips, bark, and other wood waste solids)
Liquid Renewable (Biomass) Fuels	OBL	barrels	Other Biomass Liquids (specify)
	BLQ	tons	Black Liquor
	SLW	tons	Sludge Waste
	WDL	barrels	Wood Waste Liquids excluding Black Liquor (BLQ) (includes red liquor, sludge wood, spent sulfite liquor, and other wood based liquids)

Fuel	Energy Source Code	Units	Description
Gaseous Renewable (Biomass) Fuels	LFG	Mcf	Landfill Gas
	OBG	Mcf	Other Biomass Gas (includes digester gas, methane, and other biomass gases)
All Other Renewable Fuels	GEO	N/A	Geothermal
	HY	N/A	Water at a Conventional Hydroelectric Turbine
	SUN	N/A	Solar
All Other Renewable Fuels	WND	N/A	Wind
All Other Fuels	PUR	MMBtus	Purchased Steam
	WH	MMBtus	Waste heat not directly attributed to a fuel source. Note that WH should only be reported where the fuel source for the waste heat is undetermined, and for combined cycle steam turbines that are not supplementary fired)
	OTH	N/A	Other
	NA	N/A	Not Available

COGENERATION IN LOUISIANA

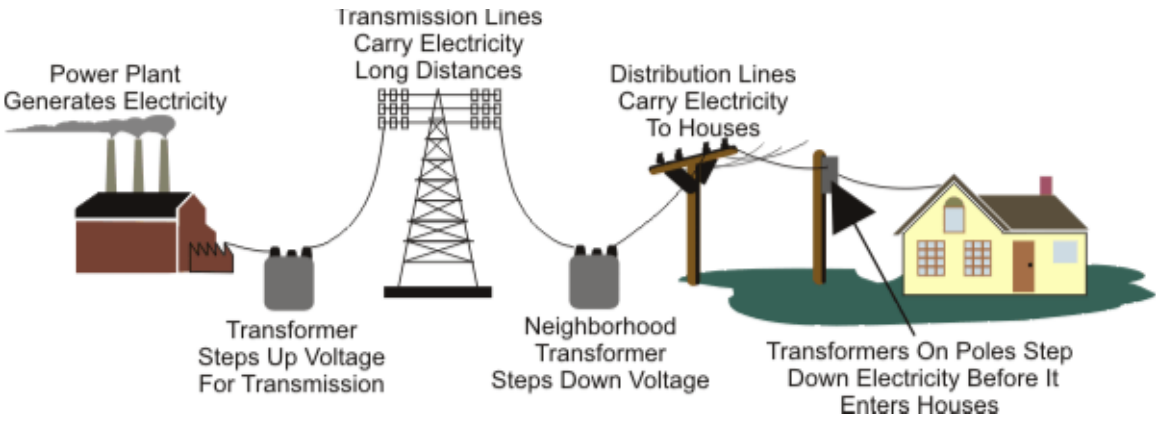
AN UPDATED (2005) TABULATION OF INDEPENDENT POWER PRODUCER (IPP) AND COGENERATION FACILITIES

Cogeneration, also known as combined heat and power, is not the quick fix for high energy costs but it can lower energy costs and increase electric reliability. Power is essential to our way of life – reliability has become paramount in the delivery of electricity. The American view of electricity reliability has been shaped by recent events. Since September 11th 2001 securing the electric power infrastructure against terrorism became a focus. Then on August 14, 2003 a massive outage occurred on a calm, warm day. Portions of the Midwest and Northeast United States and Ontario, Canada lost power. The blackout brought attention to the country's ageing transmission grid. Louisiana was forever changed on August 29th 2005 when Hurricane Katrina impacted many utilities and caused major damage to both the generating plants and the transmission infrastructure. Distributed generation, putting generators close to the loads they serve, is now being looked at as a hedge against power outages. Traditional users of distributed generation were operations which required absolute reliability of service. Today's dependency on electricity for our "way of life" broadens the scope of distributed generation. When the power goes out every class of customer is affected; basic services for health, communications, finance, cooling and water supply are no longer available.

Background

In the early days of electricity the generation and distribution were located close to each other. As this new phenomenon of electricity grew into a business, transmission was born to take advantage of the economies of scale in the industry. Electricity was generated in large centrally located facilities and transmitted over miles of high voltage transmission lines to its final destination, the homes and businesses that consume it.

Figure 1. Electric Power System Components



SOURCE: http://www.eia.doe.gov/basics/electricity_basics.html

The U.S.-Canada Power System Outage Task Force had this to say about the electrical infrastructure.

> "The North American electricity system is one of the great engineering achievements of the past 100 years. This electricity infrastructure represents more than $1 trillion (U.S.) in asset value, more than 200,000 miles—or 320,000 kilometers (km) of transmission lines operating at 230,000 volts and greater, 950,000 megawatts of generating capability, and nearly 3,500 utility organizations serving well over 100 million customers and 283 million people."

Cogeneration or combined heat and power (CHP) is a type of distributed generation that uses the waste heat produced in electricity generation. The heat or steam produced is used for industrial processes or heating/cooling applications. Cogeneration, unlike some of the other distributed generation technologies, is not experimental. Cogeneration in the form of turbines, micro-turbines, reciprocating engines, and steam-turbine systems has operated successfully for decades. One of the reasons for installing combined heat and power is independence from the grid and another reason is reliability. Some of the systems are connected to the utility's power grid and other's are used only for internal use and are stand alone systems.

Figure 2. Classification of Electricity Consumers

The **residential sector** includes private households and apartment buildings where energy is consumed primarily for:

- space heating,
- water heating,
- air conditioning,
- lighting,
- refrigeration,
- cooking, and
- clothes drying.

The **commercial sector** includes non-manufacturing business establishments such as:

- hotels,
- motels,
- restaurants,
- wholesale businesses,
- retail stores, and
- health, social, and educational institutions.

Sometimes the commercial sector includes small manufacturing facilities as well.

The **industrial sector** includes:

- manufacturing,
- construction,
- mining,
- agriculture,
- fishing, and
- forestry establishments.

An electric utility may classify commercial and industrial consumers based on either NAIC codes or demand and/or usage falling within specified limits, set by the electric utility based on different rate schedules.

The **other sector** includes:

- public street and highway lighting,
- railroads and railways,
- municipalities,
- divisions or agencies of State and Federal Governments under special contracts or agreements, and other utility departments, as defined by the pertinent regulatory agency and/or electric utility

SOURCE: http://www.eia.doe.gov/cneaf/electricity/page/prim2/toc2.html

The ideal co-generation application uses the same ratio of electricity and heat all the time. Many plants only 'co-gen' the amount of electricity they can use the heat from in their process and buy the rest. Quite often they can not start the plant with their own power, but they provide a very stable base load for the utility as they generate most of the varying load for the process.

Other plants require much more heat than electricity. If the local laws permit they can generate extra power and sell it into the grid. This provides lowest heat value electricity available – sometimes below the 4000Btu/kWh (1 kWh = 3412 Btu). They must be prepared to do something else with the extra heat if the grid does not need the power which adds capital cost to the operation.

Some utilities invite industry to locate near their generation station so they can sell them heat. Generally this is mutually beneficial, but the utility has to consider that the plant may close temporarily or permanently. If it is a merchant power plant then it is obligated to supply heat at times it may not be able to sell the power. This has given rise to the concept of 'power parks' – industrial parks that solicit industries on the basis of keeping their heat and electricity in balance and not being dependent on a utility. Generally speaking, all the businesses will have lower energy costs than if they were out on their own supplying their own steam and buying electricity. Specialization and economies of scale can be had in smaller packages than ever before from a few dozen KW up.

Impact of 2005 Hurricane Season in Louisiana

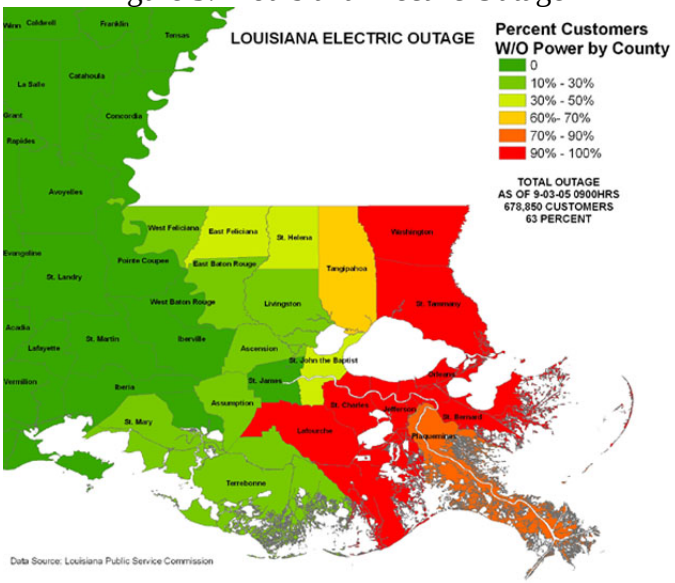
The 2005 Atlantic hurricane season was the most active on record. The season shattered many long standing records. 2005 produced twenty-six named storms which surpassed the old record of twenty-one set in 1933. The season produced 14 hurricanes breaking the previous record of 12 set in 1969 and of these 14 hurricanes three – Katrina, Rita, and Wilma - reached category 5 strength. The 107 billion plus dollars in hurricane damage costs that resulted from four major hurricanes making landfall in the U. S. was also a record breaker. Louisiana's coast was impacted by tropical storm Cindy, hurricane Katrina and hurricane Rita.

Hurricane Katrina was an unprecedented event for electricity in Louisiana. Katrina was a large storm which impacted many utilities and caused major damage to property. Both the generating plants and the transmission infrastructure were affected. In addition the flooding that accompanied the storm further worsened conditions by impeding access needed for recovery and restoration and damaging equipment that was sitting in the water. Difficulty in getting gasoline as well as the logistics of feeding and housing restoration crews in areas that were evacuated compounded the problems.

According to the situation reports from the Office of Electricity Delivery and Energy Reliability U. S. Department of Energy (August 29, 2005 (10:00 PM EDT) Louisiana had 966, 085 or 42% of customers without power. The following utilities were included in the report:

Entergy Louisiana : (409, 399 customers without power),
Entergy Gulf States (166,000 customers without power),
Cleco (71,399 customers without power),
Entergy New Orleans (215, 163 Customers without power),
Dixie Electric Membership Corp (69,050 customers without power),
Washington-St Tammany E C (20,000 customers without power),
South Louisiana Elec Coop Assn (13,874 customers without power), and
City of Morgan City (1,200 customers without power).

Figure 3. Louisiana Electric Outage



HURRICANE KATRINA

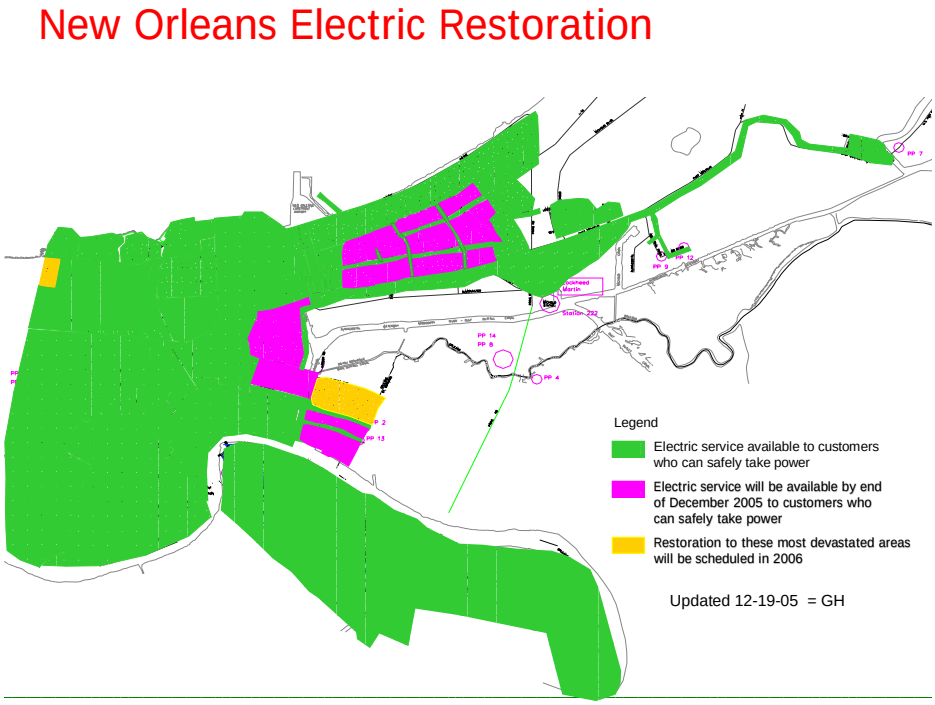
Entergy Transmission reported 181 lines and 263 substations out of service following Katrina's hit. More than 1.1 million Entergy customers lost power in Louisiana and Mississippi. "The outage total already has more than quadrupled the previous Entergy record of 270,000 set only last month during Tropical Storm Cindy. The record prior to that was 260,000 in Hurricane Georges in 1998." Then 26 days later with restoration still underway from Katrina Hurricane Rita knocked out 800,000 Entergy customers and damaged transmission lines from Lafayette to Conroe, Texas. Some portions of the Entergy system had to be restored more than once.

Power has been restored to all customers capable of receiving it except the 123,000 houses and businesses in and around New Orleans that need to be rebuilt. At this time no one knows when or even if the population will return to all of these areas. Entergy New Orleans (ENO) now becomes the focus. The company noted in the situation reports from the Office of Electricity Delivery and Energy Reliability U. S. Department of Energy

(December 5, 2005 (3:00 PM EST) that “Hurricane Katrina not only caused catastrophic and unprecedented damage to ENO’s electric and gas facilities, but also resulted in the loss of most of ENO’s customers, an unprecedented occurrence in the U. S. Utility Industry.”

Entergy New Orleans the utility that provides electric and natural gas service to the City of New Orleans filed for bankruptcy protection under Chapter 11 of the U. S. Bankruptcy code on September 23, 2005. Entergy and the City of New Orleans are requesting federal aid for the bankrupt New Orleans utility. Usually utility customers pay the costs of storm restoration. They fear that without federal aid increased utility costs in New Orleans would slow down the city’s recovery.

Figure 4.



Cogeneration In Louisiana

In Louisiana cogeneration has been largely confined to industrial users who needed process heat. Any time fuel is converted to electricity extra heat will be left to dispose of. The new reality created by the recent hurricane season opens the door for more applications of cogeneration at the agricultural, industrial and commercial customer levels. CHP systems may just be the mechanism to allow continued safe operations when the utility is out of service at hospitals, nursing homes, multifamily housing, perhaps even

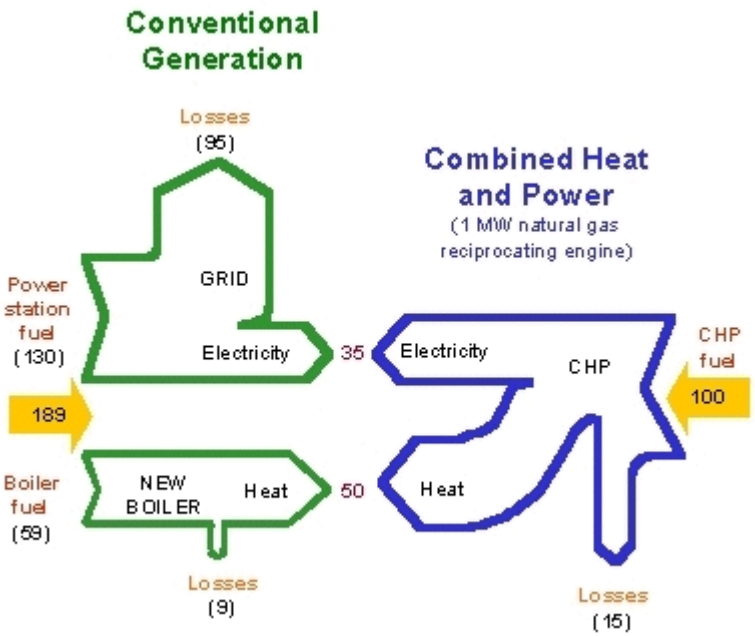
some food storage or preparation businesses. All projects have to be justified technically and financially but in some applications reliability which was an elusive quality in the past may have become a quantifiable service.

Hospitals are excellent candidates for CHP systems because they have high electrical and thermal energy needs that generally follow each other and have significant energy demands 24/7/365. More than 200 hospitals and healthcare facilities nationwide are using CHP to lower energy costs by up to 50% and decrease power outages and interruptions by up to 95%.

CHP can provide clean power and improved comfort from a single reliable source of both power and heat for buildings. Systems can provide winter space heating and utilize proven absorption chiller technology for summer cooling, while reducing overall electrical consumption and reducing NOx emissions. The overall efficiency of CHP can easily be related to the reduction of total energy use and can be correlated to reduced operating costs for the building owner. Using energy more efficiently always has a positive effect on the air and water.

The agricultural sector has significant CHP opportunities through waste management and opportunity fuels. Crop wastes or "energy crops" can be co-fired in existing generators. Animal and agricultural wastes can be converted to biogas through the process of anaerobic digestion.

Figure 5. This diagram compares the typical fuel input needed to produce 35 units of electricity and 50 units of heat using conventional separate heat and power. For typical electric and thermal efficiencies, CHP is nearly twice as efficient.



SOURCE: http://uschpa.admgt.com/CHPbasics.htm

The biogas can then be used in conventional engines or micro-turbines to produce electricity and heat for the farm. The following agricultural sites could make excellent hosts for CHP installations: dairy farms and feedlots; pulp mills, paper mills, sawmills, timber harvest operations; rice, cotton and sugar cane processing operations.

The U.S. DOE has established and funded regional centers to encourage adoption of Combined Heat and Power. Louisiana is affiliated with the GULF COAST CHP APPLICATION CENTER (http://www.gulfcoastchp.org/) located in Houston. Over 214 CHP installations are operating in Texas, Louisiana, and Oklahoma providing over 23 GW of electrical capacity. The center's purpose is to help companies evaluate whether CHP would enhance operations.

Table 1. Potential Benefits of Distributed Generation

- Smaller generator size can involve lower costs, lower risks, and a shorter lead time for construction and operation.
- Generation at or near the point of use can reduce transmission congestion or the need for transmission and distribution upgrades.
- Increased reliability and security, as n+1 generators provide more reliability than n generators. The increased efficiency of new DG and CHP technologies may reduce overall air emissions, particularly NOx and CO2 emissions
- DG investments can reduce peak load and increase reserve margins.
- DG can lead to the efficient use of resources; for example, the average grid efficiency may be 28-33 percent, while CHP efficiencies may exceed 80 percent.
- DG can lead to improved power quality and allows power quality and reliability to be tailored to specific users. DG and CHP can lead to low-cost additional electricity to the grid with lower marginal economic, technical and security risks.

Source: University of Texas at Austin staff. See also Amory Lovins, et al., "Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size," Rocky Mountain, 2002Institute

The Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct 2005) had major elements that related to the utility industry:

1. The Repeal of the Public Utilities Holding Company Act of 1935 (PUHCA);
2. The termination of the mandatory purchase and sale requirements of the Public Utility Regulatory Policies Act of 1978 (PURPA);
3. The requirement that DOE study potential benefits of cogeneration and small power production and rate impediments;
4. The addition of a new PURPA section "INTERCONNECTION" which requires each electric utility, upon request by any consumer it serves, to

interconnect onsite generation facilities to local distribution facilities. Interconnection services shall be offered based on IEEE standards.

5. The requirement that the Secretary of Energy conduct a nationwide study of electric transmission congestion and issue a report based on the study in which the Secretary may designate national interest electric transmission corridors.

The following are expected to result from the congestion study according to the Notice of Inquiry for the *Considerations for Transmission Congestion Study and Designation of National Interest Electric Transmission Corridors*. "In its initial electric transmission congestion study pursuant to FPA section 216, the Department expects to present an inventory of geographic areas of the Eastern and Western interconnects that have important existing or projected needs related to the electricity transmission infrastructure. Such needs may include relieving existing or emerging congestion, addressing existing or emerging reliability problems, enabling larger transfers of economically beneficial electricity to load centers or, enabling delivery of electricity from new generation capacity to distant load centers. The Department recognizes that in some cases it may be possible to address such needs through functional alternatives such as distributed generation, conventional generation sited close to load, and/or enhanced demand response capacity."

Table 2. PURPA Qualifying Facilities

PURPA was designed to encourage the efficient use of fossil fuels in electric power production through cogenerators and the use of renewable resources through small power producers. Because of amendments to PURPA in 1990, the term "small power producer" is now a misnomer. The amendments eliminated the original size criterion for all energy sources except hydroelectric, while maintaining the criterion for the type of energy used. (Under PURPA provisions, both cogenerators and small power producers cannot have more than 50 percent of their equity interest held by an electric utility.)

Cogenerators

Cogenerators are generators that sequentially or simultaneously produce electric energy and another form of energy (such as heat or steam) using the same fuel source. Cogeneration technologies are classified as "topping-cycle" and "bottoming-cycle" systems. In a typical topping-cycle system, high-temperature, high-pressure steam from a boiler is used to drive a turbine to generate electricity. The waste heat or steam exhausted from the turbine is then used as a source of heat for an industrial or commercial process. In a typical bottoming-cycle system, high-temperature thermal energy is produced first for applications such as reheat furnaces, glass kilns, or aluminum metal furnaces, and heat is then extracted from the hot exhaust stream of the primary application and used to drive a turbine. Bottoming-cycle systems are generally used in industrial processes that require very high-temperature heat.

For a nonutility to be classified as a cogenerator qualified under PURPA, it must meet certain ownership, operating, and efficiency criteria established by FERC. The operating requirements stipulate the proportion (applicable to oil-fired facilities) of output energy that must be thermal energy, and the efficiency requirements stipulate the maximum ratio of input energy to output energy.

Renewables

A renewable resource is an energy source that is regenerative or virtually inexhaustible. Renewable energy includes solar, wind, biomass, waste, geothermal, and water (hydroelectric). Solar thermal technology converts solar energy through high concentration and heat absorption into electricity or process energy. Wind generators produce mechanical energy directly through shaft power. Biomass energy is derived from hundreds of plant species, various agricultural and industrial residues, and processing wastes. Industrial wood and wood waste are the most prevalent form of biomass energy used by nonutilities. Geothermal technologies convert heat naturally present in the earth into heat energy and electricity. Hydroelectric power is derived by converting the potential energy of water to electrical energy using a hydraulic turbine connected to a generator.

For a nonutility to be classified as a small power producer under PURPA, it also must meet certain ownership and operating criteria established by FERC. In addition, renewable resources must provide at least 75 percent of the total energy input. PURPA provisions enabled nonutility renewable electricity production to grow significantly, and the industry responded by improving technologies, decreasing costs, and increasing efficiency and reliability.

SOURCE: EIA (http://tonto.eia.doe.gov/FTPROOT/electricity/056296.pdf) accessed April 4, 2006.

Conclusion

Cogeneration of electric power by industrial firms, both for internal process plant use and for the sale of excess power into the market, has grown. In this update we tabulate the cogeneration facilities available in the state as of January 1, 2005. All of this data was secured from the web site (http://www.eia.doe.gov) of the Energy Information Administration (EIA) and through interviews with many of the sites. Several sites have closed. A few sites have changed their capacity, notably Louisiana Tech University and Louisiana State University. Tulane University also has a turbine/chiller system. Given the rate of change in the power generation sector even this data is a work in progress. Publication of actual generation data lags by several months, and is the subject of revision as respondents complete their filing requirements.

The exhibits show the co-generation capacities as they are known at present and the megawatthours generated in 2004 as reported to EIA. Other data is shown for all generation for both the nation as a whole and for the state so that the relative capacities can be compared from a historic stand point and from a fuels distribution portfolio.

In subsequent reports the Technology Assessment Division will address issues that arise from EPAct 2005, any subsequent legislation, and the rebuilding efforts currently underway because of the damage caused by the 2005 hurricanes.

Abbreviations and Acronyms

CLECO	**Central Louisiana Electric Company, Inc.**
DNR	**Louisiana Department of Natural Resources**
DOE/EIA	**U.S. Department of Energy/Energy Information Administration**
EPAct 2005	**The Energy Policy Act of 2005**
FERC	**Federal Energy Regulatory Commission**
IPP	**Independent Power Producer**
KWH	**Kilowatt-hour (1 thousand watts)**
LPSC	**Louisiana Public Service Commission**
MW	**Megawatt (1 million watts)**
NUG	**Non-Utility Generator**
PURPA	**Public Utility Regulatory Policies Act of 1978**
QF	**Qualifying Facility as defined by PURPA**

Glossary

Avoided Cost - The incremental cost an electric utility avoids incurring by purchasing an equivalent amount of power from a qualifying facility (QF) instead of generating the power itself. This is the price electric utilities pay for a QF's output.

Capability – The maximum load that a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period of time without exceeding approved limits of temperature and stress.

Capacity – The full-load continuous load of a generator, prime mover, or other electric equipment under specified conditions as designated by the manufacturer.

Cogeneration – the sequential production of electrical energy and useful thermal energy from the same fuel source.

Cogenerator – A cogeneration facility designated as a qualifying facility (QF) under PURPA.

Electric Power Industry – The public, private, and cooperative electric utility systems of the United States taken as a whole. This includes all electric systems serving the public: regulated investor owned electric utility companies; Federal power projects; State, municipal and other government-owned systems, including electric public utility districts; electric cooperatives; jointly owned electric utility facilities, and electric utility facilities owned by a lessor and leased to an electric utility.

Electric Utility – An enterprise that is engaged in the generation, transmission, or distribution of electric energy primarily for use by the public and that is the major power supplier within a designated service area. Electric utilities include investor-owned, publicly-owned, cooperatively-owned, and government –owned (municipals, Dederal agencies, State projects, and public power districts) systems. An entity that operates qualifying facilities under the Public Utility Regulatory Policies Act of 1978 (PURPA) is not considered and electric utility.

Fuel – Any substance that can be burned to produce heat; also, materials that can be fissioned in a chain reaction to produce heat.

Grid – The layout of an electrical distribution system.

Gross Generation – The total amount of electric energy produced by the generating units at a generating station or stations, measured at generator terminals.

Hydroelectric Plant – A plant in which the turbine generators are driven by falling water.

Independent Power Producer (IPP) – A class of non-utility generator that builds power plants to supply and sell power to electric utilities.

Investor-Owned Electric Utility – A class of utility ownership that is privately owned and organized as a tax paying business, usually financed by the sale of securities in the capital market.

Kilowatt (KW) – One thousand watts.

Kilowatt-hour – One thousand watt-hours.

Load (Electric) – The amount of electric power delivered or required at any specific point or points on a system. The requirement originates at the energy-consuming equipment of the customers.

Megawatt (MW) – One million watts.

Megawatt-hour (MWH) – One million watt-hours.

Net Generation – Gross generation less the electric energy consumed at the generating station for station use.

Net Summer Capability – The stead hourly output which generatin equipment is expected to supply to system load exclusive of auxiliary power, as demonstrated by tests at the time of summer peak demand.

Non-Utility Generator (NUG) – Cogenerators, small power producers, and other non-utility companies that produce power for their own use and for sale to electric utilities. They do not have a designated franchised service area and do not file forms listed in the Code of Federal Regulations, Title 18, Part 141.

Operable – a generating unit is operable when it is available to provide power to the grid. For a nuclear unit, this is when it receives its full power amendment to its operating license from the Nuclear Regulatory Commission.

Power – The rate at which energy is transferred. Electrical energy is usually measured in watts. The term is also used for a measurement of capacity.

Privately-Owned Electric Utility – A class of ownership found in the electric power industry that includes those utilities operated by municipalities, the State and Federal power agencies.

Publicly-Owned Electric Utility – a class of ownership found in the electric power industry that includes those utilities operated by municipalities, and State and Federal agencies.

Qualifying Facility (QF) – This is a cogenerator, small power producer, or non-utility generator that meets certain ownership, operating and efficiency criteria established by the Federal Energy Regulatory Commission (FERC) pursuant to PURPA, and has filed with the FERC for QF status or has self-certified.

Renewable Energy Source – An energy source that is regenerative or virtually inexhaustible. Typical examples are wind, biomass, geothermal and water power.

Small Power Producer – According to PURPA a facility limited to a capacity of 80 MW and generating electricity using renewable energy as a primary source. In 1990 the capacity limit was removed fro certain specific energy sources.

Selected Bibliography:

Richard Munson, *From Edison to Enron* (Westport, Connecticut: Praeger 2005)

U.S.-Canada Power System Outage Task Force, "Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations," April 2004.

Ed Ritchie, "The Energy Policy Act: It's All About the Incentives," *Distributed Energy*, September/October 2005.

Lynn Merrill, "Big-Time Blackout Banishment," *Distributed Energy*, July/August 2004.

Siobhan Bennett, "A Barometer Reading on Distributed Energy," *Distributed Energy*, July/August 2004.

National Council on Electricity Policy, "Electricity Transmission A Primer," June 2004.

David Engle, "Is Cogen Right for You," *Distributed Energy*, July/August 2004.

Anne Carlson and Bruce Hedman, Energy and Environmental Analysis, Inc., "Assessing the Benefits of On-Site Combined Heat and Power during the August 14, 2003 Blackout," June 2004.

EXHIBIT I

ALPHABETICAL LISTING OF LOUISIANA COGENERATION SITES

Louisiana Co-generation sites

Parish	Owner	Plant Name	City	Name plate Cap MWs	Sum Cap MWs	Win Cap MWs	Start Year	Prime Mover	FUEL 1	Unit Status
Ascension	Air Liquide America Corp	Shell Chemical	Geismar	80.0	64	80	02	GT	NG	OP
Orleans	Air Products & Chemicals Inc	New Orleans-Cogeneration	New Orleans	31.2	26.8	31.2	84/95	ST	NG	OP
St Bernard	American Sugar Refining Inc.	Domino Sugar -Arabi Plant	Arabi	14.0	14	14	49/03	ST	NG	OP
Calcasieu	BASELL USA INC	Originally Hercules Plant	WESTLAKE	13.5	13.5	13.5	78	GT	NG	OP
Ascension	BASF	Geismar	Geismar	76.9	72.9	80.9	85/98	GT/CT	NG	OP
Beauregard	Boise Packaging & Newsprint LLC	DeRidder Mill	DeRidder	61.5	61.5	61.5	69	ST	BLQ	OP
Ascension	Borden Chemicals & Plastics	Borden Chem (Monochem)	Geismar	103.6	79.7	89.6	85/86	GT	NG	OP
Cameron	BP America Production Co	Grand Chenier Gas Processing Plant	Grand Chenier	1.8	1.8	1.8	66	ST	NG	OP
Iberville	Calpine-NewSouth Energy LLC	Carville Energy Center-St. Gabriel	St. Gabriel	570.0	570.0	570.0	03	GT/CT	NG	OP
Plaquemines	Chevron Oronite Co LLC	'Oak Point Cogen	Belle Chasse	23.5	20	25	99	GT	NG	OP
St Bernard	CII Carbon LLC	CII Carbon - Chalmette	Chalmette	46.0	46	46	51	ST	PC	OP
Calcasieu	CITGO Petroleum Corp	CITGO Refinery Powerhouse	Lake Charles	75.0	39.5	42.7	42/69	ST	NG	OP
Plaquemines	ConocoPhillips Alliance Refinery	Alliance Refinery	Belle Chasse	25.0	25	25	71/90	ST	Refinery Gas	OP
Iberville	Dow Chemical Co	LaO Energy Systems (Chlor Alkali II)	Plaquemine	682.0	676.4	676.4	58/62/78/79/82/83	CT	NG	OP
Iberville	Dow Chemical Co	'Plaquemine Cogeneration Plant	Plaquemine	987.0	843.7	843.3	04	CT/CA	NG	OP
St Charles	Dow Chemical Co	Union Carbide Corp., St Charles Ops	Hahnville	343.2	291.6	323.6	80/87/96/97/02	GT/ST	NG	OP
EBR	DSM Copolymer	Baton Rouge Plant	Baton Rouge	6.0	4	5	59	ST	NG	OP/OS
Cameron	Dynegy Midstream Services	Stingray Facility	Cameron	0.0	2.5	2.3	77	GT	NG	OP
St Mary Parish	Enterprise Products Optg LP	Neptune Gas Processing Plant	Houston	4.5	3.1	3.5	04	OT	NG	OP
St Bernard	Enterprise Products Optg LP	Toca Plant	Toca	2.8	2.8	2.8	58	IC	NG	SB
EBR	Exxon Mobil Corp	Baton Rouge Turbine Generator	Baton Rouge	85.3	76.7	83.9	90	GT/ST	NG	OP
EBR	Exxon Mobil Corp-Chem	ExxonMobil Baton Rouge Cogen	Baton Rouge	336.8	336.8	336.8	50-99	(multiple)	NG	OP
St Bernard	Exxon Mobil Oil Corp	Chalmette Refinery LLC	Chalmette	5.7	5.7	5.7	90	OT/ST	OTH	SB
Iberia	Exxon Mobil Production Co	Blue Water Gas Plant/Exxon Cyrogenic	Morse	6.0	6.0	6.0	78	IC	NG	OP
Jefferson	Exxon Mobil Production Co	Grand Isle Gas Plant	Grand Isle	18.0	18.0	18.0	65	IC	NG	OP

Source: EIA Electricity spreadsheets
and personal conversations

Technology Assessment Division
Department of Natural Resources

Louisiana Co-generation sites

Parish	Owner	Plant Name	City	Name plate Cap MWs	Sum Cap MWs	Win Cap MWs	Start Year	Prime Mover	FUEL 1	Unit Status
EBR	Formosa Plastics Corp	Formosa Plastics #1,2	Baton Rouge	138.0	115	127	85/90/96	GT/ST	NG	OP
Iberville	Georgia Gulf Corp	Georgia Gulf Corporation Plaquemine Div.	Plaquemine	306.0	240	270	97	GT	NG	OP/SB
Ouachita	Graphic Packaging International	Plant 31 Paper Mill	West Monroe	63.0	63	63	28/30/48/64/77	ST	NG	OP
St James	Imperial Sugar Co., Inc	Colonial Sugar Refinery	Gramercy	7.4	5.9	5.9	30/57/69/77	ST	NG	OP
Morehouse	International Paper Co	Louisiana Mill	Bastrop	62.5	62.5	62.5	60/67	ST	BLQ	OP
De Soto	International Paper Co	Mansfield Mill	Mansfield	135.0	96.44	93.94	81/95	ST/GT	NG	OP
Rapides	International Paper Co	Pineville Mill	Pineville	25.0	22	28	68	ST	NG	OP
St James	Kaiser Alum & Chem Corp	Kaiser Alum-Grammercy	Gramercy	117.3	106	115	74/69/58	GT/ST	NG	SB
EBR	Koch Industries	Georgia Pacific - Port Hudson	Zachary	67.7	62.96	63.64	86	ST	NG	OP
Lincoln	Louisiana Tech University	Louisiana Tech University Power Plant	Ruston	12.5	11	12.2	83/'04	ST/GT	NG	OP
EBR	LSU A&M	LSU Co-Gen Project	Baton Rouge	17.5	20	20	05	GT	NG	OP
Iberia	M A Patout & Sons Ltd	M A Patout & Sons Ltd	Jeanerette	3.0	2.79	3	81	ST	AB+NG	SB/OP
St James	Mosaic Phosphates Co.	IMC Agrico Company Uncle Sam Plant	Uncle Sam	22.0	20.46	20.68	68	ST	Sulphur Comb.	OP
Calcasieu	Nelson Industrial Steam Co	Nelson Industrial Steam Company	Westlake	1413.0			59/60/70/82	ST	NG/PC	OP
Iberville	PCS Nitrogen Fertilizer L P	Arcadian	Geismar	26.0	19	23	86	GT	NG	OP
WBR	Placid Refining Co LLC	Port Allen Facility	Port Allen	7.6	6.9	6.1	90	GT	NG	OP
Calcasieu	PPG Industries Inc	Plant C Caustic	Lake Charles	3.4	2.7	2.7	77/78/86	ST	OTH	OP
Calcasieu	PPG Industries Inc	Powerhouse A	Lake Charles	52.5	52.5	52.5	57/78	ST	PUR	OP
Calcasieu	PPG Industries Inc	PPG Powerhouse C	Lake Charles	357.7	303.2	335.2	86	CT	NG	OP
Calcasieu	PPG Industries Inc	PPG Riverside	Lake Charles	162.0	154	168	47/50/69/78	ST	NG	OS
Calcasieu	RS Cogen	RS Cogen (PPG and Entergy)	Lake Charles	493.0	395.6	432.4	02	CT+CA	NG	OP
Jackson	Smurfit-Stone Container Enterprises	Hodge Louisiana	Hodge	74.4	74.4	74.4	38/52/57/72/78	ST	NG	OP
West Feliciana	Tembec USA, LLC	James River -St Francisville Mill	St Francisville	57.5	16.5	16.5	66	ST	BLQ	SB/OP
Washington	Temple-Inland Corp	Bogalusa Mill	Bogalusa	99.5	92.54	93.53	79/81/99	ST	WDS	OP
Orleans	Tulane University	NewOrleans Campus	New Orleans	5.3	5.3	5.3	99	GT	NG	OP

Source: EIA Electricity spreadsheets
and personal conversations

EXHIBIT II

LOUISIANA GENERATION IN 2004 (MEGAWATTHOURS) AND UNITED STATES TOTAL GENERATION IN 2004 (MEGAWATTHOURS)

LOUISIANA GENERATION in 2004 (Megawatthours)

	Coal	Hydroelectric Conventional	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total	Louisiana Generation as % of US Total
'Combined Heat and Power, Commercial Power			19,655						0	19,655	0.24%
Combined Heat and Power, Electric Power			4,995,845			237,372		84,785	0	5,318,002	2.89%
Combined Heat and Power, Industrial Power	39,362		20,328,280		703,537	2,589,850	2,706,118	137,938	0	26,505,085	17.22%
Elec Generators, Electric Utilities	11,324,239		15,138,928	17,079,981		366,934		3,693,520	0	47,603,602	1.90%
Elec Gens, Independent Power Producers	12,289,357	1,098,825	5,334,742				73,373	14,453	0	18,810,750	1.68%
Total Electric Power Industry in Louisiana	23,652,958	1,098,825	45,817,450	17,079,981	703,537	3,194,156	2,779,491	3,845,911	0	98,172,309	2.47%
Total State Generation % based on fuel	24.1%	1.1%	46.7%	17.4%	0.7%	3.3%	2.8%	3.9%	0.0%	100.0%	
Louisiana as % of US Totals by Fuel Sources	1.20%	0.41%	6.46%	2.17%	10.53%	19.05%	3.07%	3.19%	0.00%	2.47%	

UNITED STATES TOTAL GENERATION in 2004 (Megawatthours)

	Coal	Hydroelectric Conventional	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum		Total
Combined Heat and Power, Commercial Power	1,323,425	104,967	4,050,535	0	1,004	0	2,321,147	468,609		8,269,686
Combined Heat and Power, Electric Power	36,134,334		136,330,701	0	363,659	2,644,668	3,577,604	5,208,195	0	184,259,161
Combined Heat and Power, Industrial Power	20,103,235	3,248,493	77,408,605	0	4,848,560	13,740,440	28,965,453	5,610,394	0	153,925,180
Electric Generators, Electric Utilities	1,513,640,806	245,545,963	199,662,043	475,682,277	97,546	374,012	4,061,017	73,693,695	-7,526,206	2,505,231,152
Electric Generators, Independent Power Producers	407,418,419	19,517,886	291,526,722	312,846,110	1,367,791	6,970	51,483,240	35,664,951	-962,004	1,118,870,083
Total US generation by energy source	1,978,620,218	268,417,308	708,978,606	788,528,387	6,678,560	16,766,090	90,408,461	120,645,843	-8,488,210	3,970,555,263

EXHIBIT III

LOUISIANA GENERATION (MEGAWATTHOURS) – COMBINED HEAT AND POWER, COMMERCIAL POWER AND COMBINED HEAT AND POWER, ELECTRIC POWER

UNITED STATES TOTAL GENERATION (MEGAWATTHOURS) - COMBINED HEAT AND POWER, COMMERCIAL POWER AND COMBINED HEAT AND POWER, ELECTRIC POWER

LOUISIANA GENERATION (MEGAWATTHOURS) – COMBINED HEAT AND POWER, INDUSTRIAL POWER AND ELECTRIC GENERATORS, ELECTRIC UTILITIES

UNITED STATES TOTAL GENERATION (MEGAWATTHOURS) – COMBINED HEAT AND POWER, INDUSTRIAL POWER AND ELECTRIC GENERATORS, ELECTRIC UTILITIES

LOUISIANA GENERATION (MEGAWATTHOURS) – ELECTIC GENERATORS, INDEPENDENT POWER PRODUCERS AND TOTAL ELECTRIC POWER INDUSTRY IN LOUISIANA

UNITED STATES TOTAL GENERATION (MEGAWATTHOURS) – ELECTIC GENERATORS, INDEPENDENT POWER PRODUCERS AND TOTAL US GENERATION BY ENERGY SOURCE

LOUISIANA GENERATION (Megawatthours) 1992-2004

Combined Heat and Power, Commercial Power

			Natural Gas						
1990			30,669						
1991			27,529						
1992			30,669						
1993			25,052						
1994			26,250						
1995			28,109						
1996			26,635						
1997			31,554						
1998			28,405						
1999			16,806						
2000			31,710						
2001			64,890						
2002			32,000						
2003			23,321						
2004			19,655						

Combined Heat and Power, Electric Power

			Natural Gas			Other Gases		Petroleum	
1990			1,603,665					MISSING	
1991			1,580,946					MISSING	
1992			482,450					471,545	
1993			46,066					1,532,947	
1994			MISSING					1,605,817	
1995			MISSING					1,404,266	
1996			MISSING					1,377,364	
1997			MISSING					1,567,758	
1998			MISSING					1,663,546	
1999			8,877					1,512,796	
2000			9,903					1,411,036	
2001			MISSING					MISSING	
2002			3,683					1,551,176	
2003			1,759,808					1,646,229	
2004			4,995,845			237,372		84,785	

UNITED STATES TOTAL GENERATION (Megawatthours) 1992-2004

Combined Heat and Power, Commercial Power

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum		Total
1990	795,682	137,628	3,272,170	0	0	120,987	921,949	588,703		5,837,119
1991	775,201	131,196	3,213,024	0	615	115,654	1,009,940	413,394		5,659,024
1992	748,818	122,436	3,867,218	0	615	105,060	1,082,451	301,533		6,228,131
1993	863,845	99,740	4,471,142	0	31	99,552	1,131,728	334,382		7,000,420
1994	849,630	92,790	4,929,383	0	0	114,547	1,216,374	416,603		7,619,327
1995	997,742	118,304	5,162,174	0	169	0	1,575,242	378,573		8,232,204
1996	1,050,901	125,714	5,249,023	0	104	4	2,235,181	368,787		9,029,714
1997	1,039,823	120,192	4,725,001	0	12	3,114	2,385,222	427,178		8,700,542
1998	985,467	120,468	4,879,214	0	0	7,423	2,372,765	382,749		8,748,086
1999	995,281	114,663	4,607,031	0	17	11	2,412,456	433,597		8,563,056
2000	1,097,334	99,749	4,261,723	0	61	44	2,011,871	431,992		7,902,774
2001	995,160	66,484	4,434,315	0	21	6	1,481,629	438,330		7,415,945
2002	992,232	12,797	4,309,561	0	83,924	13	1,584,673	431,311		7,414,511
2003	1,205,801	72,245	3,898,808	0	2,024	0	1,893,807	423,492		7,496,178
2004	1,323,425	104,967	4,050,535	0	1,004	0	2,321,147	468,609		8,269,686

Combined Heat and Power, Electric Power

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total
1990	11,947,298		44,808,251	0	11,913	620,789	2,593,013	1,294,185	0	61,275,449
1991	16,921,357		49,997,498	0	402,581	716,099	3,314,502	589,718	0	71,941,755
1992	20,653,109		63,403,429	0	479,806	1,209,337	3,411,418	2,161,814	0	91,318,913
1993	23,408,874		75,013,447	0	407,651	959,431	3,360,267	4,826,730	0	107,976,400
1994	26,413,560		85,971,348	0	239,129	1,085,409	3,198,694	6,591,513	0	123,499,653
1995	28,097,589		101,736,522	0	213,275	1,921,213	3,371,698	6,139,216	0	141,479,513
1996	29,207,279		105,923,142	0	201,222	1,336,877	3,631,772	6,266,654	0	146,566,946
1997	27,611,427		108,464,747	0	62,807	1,502,751	4,299,299	6,169,702	0	148,110,733
1998	27,174,404		113,412,865	0	158,942	2,259,679	4,233,917	6,550,214	0	153,790,021
1999	26,551,097		116,350,971	0	138,942	1,571,067	4,088,137	6,704,074	0	155,404,288
2000	32,535,983		118,550,571	0	124,885	1,846,840	4,330,467	7,216,971	0	164,605,717
2001	31,002,767		127,965,611	0	0	575,656	3,987,856	5,983,563	0	169,515,453
2002	29,408,016		150,889,028	0	615,105	1,733,896	4,565,326	6,458,269	0	193,669,640
2003	36,935,029		146,096,554	0	233,218	2,391,936	4,821,714	5,195,258	0	195,673,709
2004	36,134,334		136,330,701	0	363,659	2,644,668	3,577,604	5,208,195	0	184,259,161

LOUISIANA GENERATION (Megawatthours) 1992-2004

Combined Heat and Power, Industrial Power

	Coal		Natural Gas		Other	Other Gases	Other Renewables	Petroleum	
1990	56,603		11,771,238		1,292,819	440,700	2,223,538	12,215	
1991	56,623		10,509,687		1,583,053	955,600	2,342,071	10,455	
1992	44,308		11,881,918		702,002	1,162,816	2,534,094	21,477	
1993	45,855		12,508,108		716,315	700,587	2,593,536	20,022	
1994	38,253		11,800,776		677,566	1,335,124	2,546,554	16,338	
1995	35,210		12,218,791		600,648	982,181	2,559,300	14,203	
1996	68,368		12,453,374		293,542	844,588	2,832,919	33,454	
1997	54,126		14,411,554		177,798	1,088,279	3,064,568	53,222	
1998	19,639		16,503,569		318,093	918,066	2,797,909	27,533	
1999	15,944		17,671,561		403,454	1,651,269	2,779,062	20,455	
2000	30,353		17,888,542		452,055	1,598,632	2,728,685	22,254	
2001	44,752		17,830,633		847,096	440,544	2,687,493	42,627	
2002	25,531		16,673,826		597,490	1,294,140	2,803,704	31,266	
2003	49,854		21,942,002		743,656	2,450,434	3,114,102	48,344	
2004	39,362		20,328,280		703,537	2,589,850	2,706,118	137,938	

Electric Generators, Electric Utilities

	Coal		Natural Gas	Nuclear		Other Gases		Petroleum	
1990	17,800,084		26,041,280	14,196,784				130,260	
1991	18,911,856		24,244,619	13,956,196				45,305	
1992	19,795,693		24,554,198	10,355,520				482,819	
1993	19,365,873		23,750,752	14,398,103				1,837,844	
1994	20,125,159		26,586,147	12,778,635				679,969	
1995	18,954,264		30,866,507	15,685,900				48,558	
1996	18,632,666		23,972,316	15,764,823				273,308	
1997	20,952,995		26,010,452	13,511,008				645,547	
1998	20,761,891		28,318,004	16,427,501				600,078	
1999	21,166,160		30,162,489	13,111,604				396,857	
2000	14,484,315		26,695,995	15,795,739				625,093	
2001	10,917,220		20,402,402	17,336,135				1,722,244	
2002	12,258,694		25,085,994	17,305,328		203,484		68,460	
2003	11,020,325		15,093,742	16,126,322		236,796		1,007,874	
2004	11,324,239		15,138,928	17,079,981		366,934		3,693,520	

UNITED STATES TOTAL GENERATION (Megawatthours) 1992-2004

Combined Heat and Power, Industrial Power

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total
1990	21,106,875	2,975,094	60,006,633	0	3,603,750	9,640,731	26,327,946	7,168,510	0	130,829,539
1991	21,001,912	2,843,550	60,566,634	0	4,335,653	10,500,865	26,790,561	6,540,015	0	132,579,190
1992	22,743,402	2,949,883	65,933,032	0	3,239,466	11,952,702	28,847,266	7,614,718	0	143,280,469
1993	23,742,233	2,870,605	68,233,827	0	3,079,474	11,889,738	29,449,520	7,028,473	0	146,293,870
1994	23,568,143	6,028,117	69,599,974	0	3,427,796	12,112,481	29,633,461	6,807,762	0	151,177,734
1995	22,372,407	5,304,009	71,717,179	0	3,890,364	11,943,119	29,768,260	6,029,641	0	151,024,979
1996	22,171,701	5,877,513	71,049,259	0	3,369,953	13,014,669	29,273,886	6,259,574	0	151,016,555
1997	23,214,152	5,685,141	75,077,847	0	3,549,171	11,814,154	29,107,498	5,648,645	0	154,096,608
1998	22,336,919	5,348,573	77,085,312	0	3,412,468	11,169,911	28,572,250	6,206,334	0	154,131,767
1999	21,474,219	4,758,308	78,793,140	0	3,884,814	12,518,998	28,746,698	6,088,114	0	156,264,291
2000	22,055,972	4,135,155	78,798,437	0	4,668,968	11,926,758	29,491,149	5,596,850	0	156,673,289
2001	20,134,647	3,145,269	79,755,122	0	4,689,910	8,453,676	27,703,049	5,293,001	0	149,174,674
2002	21,525,308	3,824,648	79,012,939	0	3,573,886	9,492,821	30,747,367	4,402,817	0	152,579,785
2003	19,817,123	4,222,424	78,705,341	0	4,546,116	12,952,927	29,000,869	5,284,950	0	154,529,750
2004	20,103,235	3,248,493	77,408,605	0	4,848,560	13,740,440	28,965,453	5,610,394	0	153,925,180

'Electric Generators, Electric Utilities

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total
1990	1,559,605,707	283,433,659	264,089,401	576,861,678	0	0	10,651,344	117,016,961	-3,507,741	2,808,151,009
1991	1,551,166,838	280,060,621	264,171,598	612,565,087	0	0	10,137,177	111,462,979	-4,541,435	2,825,022,865
1992	1,575,895,394	243,736,029	263,871,508	618,776,263	0	0	10,200,231	88,916,308	-4,176,582	2,797,219,151
1993	1,639,151,186	269,098,329	258,915,301	610,291,214	0	0	9,565,451	99,538,857	-4,035,572	2,882,524,766
1994	1,635,492,971	247,070,938	291,114,905	640,439,832	0	0	8,932,675	91,038,583	-3,377,825	2,910,712,079
1995	1,652,914,466	296,377,840	307,306,050	673,402,123	0	0	6,408,988	60,844,256	-2,725,131	2,994,528,592
1996	1,737,453,477	331,058,055	262,729,781	674,728,546	0	0	7,214,276	67,346,095	-3,088,078	3,077,442,152
1997	1,787,806,344	341,273,443	283,624,806	628,644,171	0	0	7,461,633	77,752,652	-4,039,905	3,122,523,144
1998	1,807,479,829	308,843,770	309,222,404	673,702,104	0	0	7,205,997	110,157,895	-4,441,208	3,212,170,791
1999	1,767,679,446	299,913,955	296,381,322	725,036,130	0	0	3,715,971	86,929,098	-5,982,372	3,173,673,550
2000	1,696,619,307	253,154,717	290,715,178	705,432,806	0	0	2,241,015	72,179,917	-4,959,564	3,015,383,376
2001	1,560,145,542	197,803,985	264,433,673	534,207,221	0	0	2,151,888	78,907,846	-7,704,482	2,629,945,673
2002	1,514,669,950	242,302,069	229,639,287	507,379,828	0	206,469	3,568,503	59,124,871	-7,433,807	2,549,457,170
2003	1,500,281,112	249,621,997	186,966,798	458,828,821	0	242,655	3,940,661	69,930,457	-7,531,885	2,462,280,615
2004	1,513,640,806	245,545,963	199,662,043	475,682,277	97,546	374,012	4,061,017	73,693,695	-7,526,206	2,505,231,152

LOUISIANA GENERATION (Megawatthours) 1992-2004

Electric Generators, Independent Power Producers

	Coal	Hydroelectric Conventional	Natural Gas				Other Renewables	Petroleum	
1990		656,492	28,014				91,646	89,623	
1991		656,492	600				91,661		
1992		656,492	28,563				79,937	89,623	
1993		1,231,946	25,247				80,529	96,753	
1994		971,978	98,412				80,714	18,269	
1995		952,144	104,340				86,116	19,187	
1996		963,924	112,450				70,843	19,322	
1997		1,035,961	123,002				74,202	19,617	
1998		1,062,824	125,218				73,972	2,363	
1999		801,826	138,986				81,254	2,353	
2000	8,974,196	532,290	1,503,093				63,767	17,977	
2001	11,006,174	732,217	2,074,829				60,053	133,892	
2002	9,766,681	891,441	6,105,344				59,087	118,581	
2003	11,818,751	891,991	6,615,325				60,663	1,796,945	
2004	12,289,357	1,098,825	5,334,742				73,373	14,453	

Total Electric Power Industry in Louisiana

	Coal	Hydroelectric Conventional	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	
1990	17,856,687	656,492	39,474,866	14,196,784	1,292,819	440,700	2,315,184	232,098	
1991	18,968,479	656,492	36,363,381	13,956,196	1,583,053	955,600	2,433,732	55,760	
1992	19,840,001	656,492	36,977,798	10,355,520	702,002	1,162,816	2,614,031	1,065,464	
1993	19,411,728	1,231,946	36,355,225	14,398,103	716,315	700,587	2,674,065	3,487,566	
1994	20,163,412	971,978	38,511,585	12,778,635	677,566	1,335,124	2,627,268	2,320,393	
1995	18,989,474	952,144	43,217,747	15,685,900	600,648	982,181	2,645,416	1,486,214	
1996	18,701,034	963,924	36,564,775	15,764,823	293,542	844,588	2,903,762	1,703,448	
1997	21,007,121	1,035,961	40,576,562	13,511,008	177,798	1,088,279	3,138,770	2,286,144	
1998	20,781,530	1,062,824	44,975,196	16,427,501	318,093	918,066	2,871,881	2,293,520	
1999	21,182,104	801,826	47,998,719	13,111,604	403,454	1,651,269	2,860,316	1,932,461	
2000	23,488,864	532,290	46,129,243	15,795,739	452,055	1,598,632	2,792,452	2,076,360	
2001	21,968,146	732,217	40,372,754	17,336,135	847,096	440,544	2,747,546	3,449,939	
2002	22,050,906	891,441	47,900,848	17,305,328	597,490	1,497,624	2,862,791	1,864,536	
2003	22,888,930	891,991	45,434,198	16,126,322	743,656	2,687,230	3,174,765	2,937,948	
2004	23,652,958	1,098,825	45,817,450	17,079,981	703,537	3,194,156	2,779,491	3,845,911	

UNITED STATES TOTAL GENERATION (Megawatthours) 1992-2004

Electric Generators, Independent Power Producers

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total
1990	555,917	6,319,465	588,699	0	0	323	23,877,974	552,783	0	31,895,161
1991	757,440	5,958,822	3,604,263	0	0	2,975	27,527,084	745,467	0	38,596,051
1992	1,165,316	6,279,655	6,999,185	0	0	3,138	30,228,456	1,159,790	0	45,835,540
1993	2,904,094	8,425,334	8,293,081	0	0	7,077	32,706,316	1,059,738	0	53,395,640
1994	4,369,560	6,933,888	8,603,072	0	0	6,614	33,553,939	1,046,522	0	54,513,595
1995	5,044,264	9,032,595	10,136,020	0	0	5,619	32,841,197	1,162,379	0	58,222,074
1996	5,312,235	10,100,781	10,104,371	0	0	4,263	33,440,489	1,170,115	0	60,132,254
1997	5,343,990	9,374,519	7,506,269	0	0	30,615	33,929,167	2,556,696	0	58,741,256
1998	15,539,071	9,022,850	26,657,309	0	0	55,217	34,703,477	5,502,981	-26,072	91,454,833
1999	64,387,181	14,749,103	60,263,663	3,217,994	0	35,516	40,459,740	17,905,955	-114,527	200,904,625
2000	213,956,000	18,182,976	108,712,250	48,460,134	0	181,116	42,831,472	25,795,235	-579,296	457,539,887
2001	291,677,827	15,945,306	162,540,399	234,619,087	0	10,135	42,660,635	34,257,482	-1,118,963	780,591,908
2002	366,534,847	18,189,318	227,154,931	272,684,259	1,441,076	29,486	46,456,223	24,150,126	-1,309,121	955,331,145
2003	415,497,685	21,889,662	234,240,040	304,903,874	1,339,469	12,502	47,753,418	38,571,483	-1,003,180	1,063,204,954
2004	407,418,419	19,517,886	291,526,722	312,846,110	1,367,791	6,970	51,483,240	35,664,951	-962,004	1,118,870,083

Total US generation by energy source

	Coal	Hydroelec Conventionl	Natural Gas	Nuclear	Other	Other Gases	Other Renewables	Petroleum	Pumped Storage	Total
1990	1,594,011,479	292,865,846	372,765,154	576,861,678	3,615,663	10,382,830	64,372,226	126,621,142	-3,507,741	3,037,988,277
1991	1,590,622,748	288,994,189	381,553,017	612,565,087	4,738,849	11,335,593	68,779,264	119,751,573	-4,541,435	3,073,798,885
1992	1,621,206,039	253,088,003	404,074,372	618,776,263	3,719,887	13,270,237	73,769,822	100,154,163	-4,176,582	3,083,882,204
1993	1,690,070,232	280,494,008	414,926,798	610,291,214	3,487,156	12,955,798	76,213,282	112,788,180	-4,035,572	3,197,191,096
1994	1,690,693,864	260,125,733	460,218,682	640,439,832	3,666,925	13,319,051	76,535,143	105,900,983	-3,377,825	3,247,522,388
1995	1,709,426,468	310,832,748	496,057,945	673,402,123	4,103,808	13,869,951	73,965,385	74,554,065	-2,725,131	3,353,487,362
1996	1,795,195,593	347,162,063	455,055,576	674,728,546	3,571,279	14,355,813	75,795,604	81,411,225	-3,088,078	3,444,187,621
1997	1,845,015,736	356,453,295	479,398,670	628,644,171	3,611,990	13,350,634	77,182,819	92,554,873	-4,039,905	3,492,172,283
1998	1,873,515,690	323,335,661	531,257,104	673,702,104	3,571,410	13,492,230	77,088,406	128,800,173	-4,467,280	3,620,295,498
1999	1,881,087,224	319,536,029	556,396,127	728,254,124	4,023,773	14,125,592	79,423,002	118,060,838	-6,096,899	3,694,809,810
2000	1,966,264,596	275,572,597	601,038,159	753,892,940	4,793,914	13,954,758	80,905,974	111,220,965	-5,538,860	3,802,105,043
2001	1,903,955,943	216,961,044	639,129,120	768,826,308	4,689,931	9,039,473	77,985,057	124,880,222	-8,823,445	3,736,643,653
2002	1,933,130,354	264,328,833	691,005,745	780,064,087	5,713,990	11,462,686	86,922,092	94,567,394	-8,742,928	3,858,452,254
2003	1,973,736,750	275,806,328	649,907,541	763,732,695	6,120,827	15,600,020	87,410,469	119,405,640	-8,535,065	3,883,185,205
2004	1,978,620,218	268,417,308	708,978,606	788,528,387	6,678,560	16,766,090	90,408,461	120,645,843	-8,488,210	3,970,555,263