POWER GENERATION WATER USE IN TEXAS FOR THE YEARS 2000 THROUGH 2060

FINAL REPORT

PREPARED FOR THE TEXAS WATER DEVELOPMENT BOARD

BY REPRESENTATIVES OF INVESTOR-OWNED UTILITY COMPANIES OF TEXAS

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EXECUTIVE SUMMARY

The objective and purpose of the research project is to develop improved methodologies for projecting water demands by the steam electric generation water use sector for a 50 year planning horizon, as well as actual projections for this sector on a regional and county specific basis throughout the state of Texas. Such projections and methodologies will be utilized by the Texas Water Development Board (TWDB) and the Regional Water Planning Groups (RWPGs) for state and regional water planning purposes.

This research was conducted pursuant to a contract executed by and between the TWDB and a research project team comprised of representatives of major investor-owned electric generating utilities in Texas. The actual contracting entity for the project team and project team leader was the Austin-based law firm of Lloyd, Gosselink, Blevins, Rochelle, Baldwin & Townsend, P.C. Lloyd, Gosselink is a leading environmental services law firm with a proven track record of success on water-related project leadership. The other project team members included representatives of the three largest generators of electricity in the state of Texas: American Electric Power, TXU Energy, and Reliant Energy.

The project team was uniquely qualified to undertake research for the development of electric generation water demand projection methodologies, as team members were selected on the basis of their training, institutional knowledge, and understanding of long-term trends in electric generation in Texas, trends in generation technologies, and related water usage. Members of the project team have already been intricately involved in the regional water planning process as members of various RWPGs, and as alternates, technical support, and liaisons to other RWPGs. In those capacities, they have also already been involved in the calculation of demand projections for the steam electric sector utilized in the first regional water planning cycle (post-Senate Bill 1 of 1997, which created the RWPG process).

This paper describes various types of current electric generation technologies, such as gas turbines, steam turbines, and others, and the water-utilizing processes within each technology. Estimates of the varying amounts of water consumed by each generation technology in the production of electricity are also provided. The paper then evaluates the various cooling technologies, such as once-through cooling and cooling towers, in combination with the above generation technologies and derives estimations of the amount of water that each of them consumptively use per unit of electricity generated. These consumption factors allow an accurate determination of the total annual water consumption at a particular facility based upon its reported actual generation, once its generation and cooling technologies have been identified.

The project team first developed a methodology and specific water demand projections for the power generation on a statewide basis. The statewide approach was deemed to be more reliable than any localized approach for two primary reasons: (1) the availability of statewide electric generation data projections; and (2) the fact that, because of electric transmission technologies and other regulatory constraints unrelated to water, the location of the generation facility (and, thus the location of the steam-electric water demand) is not necessarily related to the location of the demand for the electricity.

In order to develop statewide water demand projections for power generation, it was first necessary to develop projections for statewide electric demands, assuming once again that generation to meet those demands would occur in Texas. The project team developed two different methodologies for projecting statewide electric demand: (1) derivation of an electric demand growth factor from the electric demand projections developed by the Public Utility Commission of Texas (PUCT), and extrapolation of the factor across the 50-year planning horizon; and (2) derivation of a per capita electric use factor from existing population and total electric use data from the past two decades, and utilization of that per capita factor with the TWDB population projections to project total electric use through the year 2060. The two methodologies proved to yield significantly similar results, although the first methodology and its projections were selected as the most reliable and were used for the remainder of the research effort.

Utilizing those statewide electric demand projections and the consumptive water use factors associated with the various types of generation and cooling technologies, water use demand projections were developed using low-, medium-, and high-use scenarios through the year 2060. Each scenario was defined according to a combination of various assumptions related to the continuation or retirement of existing facilities and the percentage of future statewide electric generation that would be met by various generation and cooling technologies. The medium-use scenario was selected as the most probable predictor of future statewide water demand for power generation.

To determine the water demand for electric power generation on a county and regional basis, the statewide water demand projections derived under the medium use-scenario were utilized in combination with an exhaustive assimilation of actual fuel-type and cooling technology generation data for 214 electric utility and independent power producer plants in Texas, with 79 of those plants being placed in service, constructed or announced since 2000. The methodology utilized does not lend itself to summary explanation, although a few general descriptions of it may be proffered for summary purposes.

The water demand for each electric generating plant in Texas was estimated as a percentage of the statewide demand. For the baseline year 2000, the water demand for each plant was calculated by taking the actual generation by fuel type and applying the water use factor for the generating units at that plant for each fuel type.

Once the baseline year 2000 water demand was determined for each generation unit, water demand projections for the years 2010 though 2060 were also calculated on a unitby-unit basis. Because of the availability of specific electric generation projection data by fuel type from other governmental agencies for the period of 2001 through 2020 and the lack of such data thereafter, these unit-specific water demand projections were derived by one methodology for the years 2010 and 2020 and a separate methodology for years 2030 through 2060. The methodologies utilized are discussed in greater detail in Section VI with illustrative examples provided.

For the years 2010 and 2020, the estimated water demand for coal-fired, nuclear, and conventional natural gas units was based on the 2000 water demand and was adjusted by a correction factor based upon a linear trending of the unit based upon its fuel type and projections of generation based on fuel types. Projections for natural gas fired combined cycle generation were also derived by taking the difference in the statewide totals and the trended totals from the conventional generation types, which was then apportioned to individual combined cycle plants.

For the decades 2030 through 2060 the water demand for each plant was projected to increase at the same rate throughout the state regardless of fuel type and generation type.

In order to calculate the county water demand projection for a given year, simply sum the total of all the individual plant projections located in that county for the same year. Similarly, to determine the water demand projection within a RWPG in a given year, sum the county totals for all of the counties included within the water planning region.

Other than the specific decadal water demand projections and methodologies, other results of the research may be of particular interest to the water resource planner. For example, while the research clearly indicates that the statewide electric demand is projected to increase by two percent annually for a total increase of 234 percent in 2060 over the year 2000 electric generation demand, the corresponding water demand would increase by only 162 percent over the same planning horizon due to the utilization of more efficient generation technologies. Also of interest is that the statewide water demand projections developed indicate that all surpluses of water currently held for steam electric generation will be exhausted by 2037.

With the number of indeterminable variables associated with the development of statewide steam-electric water demand projections on a 50-year planning horizon, no methodology can be developed that will result in a perfect, predictive tool. The lack of a necessary correlation between the location of the water demand and the location of the demand for the electricity generated with that water, which is particularly acute in the steam-electric sector, renders attempts to localize or regionalize such demand projections even less reliable. Nonetheless, the research, methodologies, and projections developed and presented in this report represent the most comprehensive effort to date to establish such generalized methodologies and to assimilate such information for the steam-electric sector in Texas.

Respectfully submitted,

Brian L. Sledge Lloyd, Gosselink, Blevins, Rochelle, Baldwin & Townsend, P.C. W. Greg Carter American Electric Power Chris A.Bissett American Electric Power

Kerry M. Whelan Reliant Energy

Jason Fluharty Reliant Energy Joseph Simecek TXU Energy

Paul Zweiacker TXU Energy

SECTION I: TYPES OF ELECTRIC POWER GENERATION PLANTS AND THEIR WATER NEEDS

A. Introduction

There are a number of technologies employed throughout the state of Texas to generate electricity. The various processes associated with these generation technologies consumptively use varying amounts of water, with water that is utilized in the cooling process consuming the largest percentage of that water. Because the amount of cooling necessary for the power generation facility is largely dependent on the type of device used to power the electric generator and because additional amounts of water for purposes other than cooling are consumed in some generation processes, a basic understanding of these generation technologies and their water-consuming processes is integral to this research and is set forth below.

B. Types of Power Plants

Steam Turbines

Many of the electric generation facilities in Texas use steam turbines as the prime mover to drive the electric generators. Boilers, which are fueled by natural gas, fuel oil, coal, or in some cases, nuclear reactors, produce the steam for the turbines. Steam turbines are commonly used because they are efficient, reliable, and available in the large sizes necessary for powering large electric generators. Steam turbines and boilers are also used because the working fluid is water, which is relatively easy to purify and relatively abundant. Due to the need to condense the steam, the cooling requirements of steam turbines can be greater than those of other types of power systems. A basic process diagram of a power plant utilizing a steam turbine is set forth in Figure 1-1.

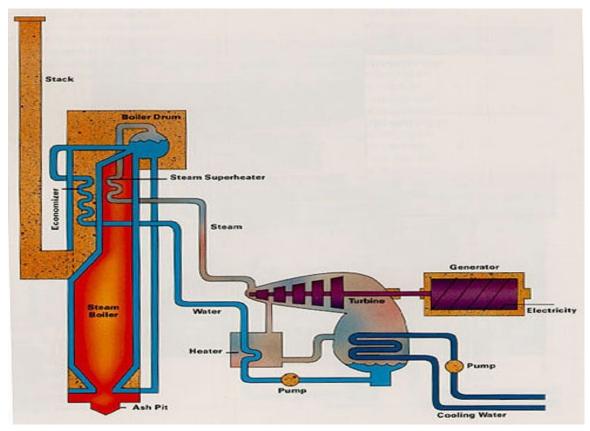


Figure 1-1 Steam-Electric Power Plant

Gas Turbines

Other generation facilities use gas turbines as the prime mover to drive the electric generators. Gas turbines are large aircraft derived jet engines and are usually fueled by natural gas. Gas turbines have relatively small cooling systems when compared to steam turbines. Many gas turbines use water or steam injection to control emissions of nitrogen oxides. The water or steam is injected into the combustion area of the turbine to drop the flame bundle temperature and reduce the amount of nitrogen oxide (NOx) produced. The water or steam injected must be very pure with minimal amounts of contamination.

Combined Cycle

Many of the newer generation facilities in Texas are a combination of gas turbine and steam turbine generation called "combined cycle" power plants. In this type of power plant, one or more gas turbines exhaust hot gases from the gas turbine through a heat recovery steam generator that uses the waste heat to generate steam. The steam is then used to power a steam turbine. Each gas turbine drives an electric generator and the steam turbine also drives an electric generator. Combined cycle power plants are more efficient than either gas turbine or steam turbine generators operated independently.

Nuclear

Nuclear-fueled power plants are very similar to natural gas, oil, or coal fired steam turbine power plants. A nuclear-fueled power plant uses a nuclear reactor to generate

steam to power a steam turbine. The steam turbine, as well as the rest of the power plant, is very similar in design to a gas or coal-fired steam electric power plant. A diagram of a typical nuclear-fueled plant configuration is set forth under Figure 1-2.

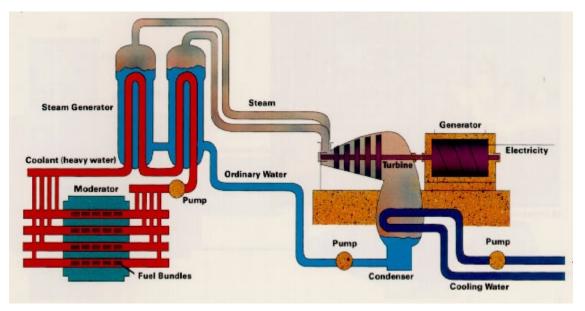


Figure 1-2 Nuclear-Fueled Power Plant

Hydroelectric

Some of the electric generation in Texas is produced through hydroelectric facilities. As shown in Figure 1-3, these facilities produce power when water is released from a reservoir and the water passes through a water turbine, which in turn drives an electric generator. In most cases in Texas, the release of water from a reservoir through a water-powered turbine occurs only when the release from the reservoir is required by downstream use or for flood control measures. In this case, the power generation is secondary to another need for the release. In addition, there are also several small run-of-the-river hydroelectric facilities throughout the state. These facilities do not rely on the release of water from a reservoir, but instead utilize the force of a river current to drive the water-powered turbine.

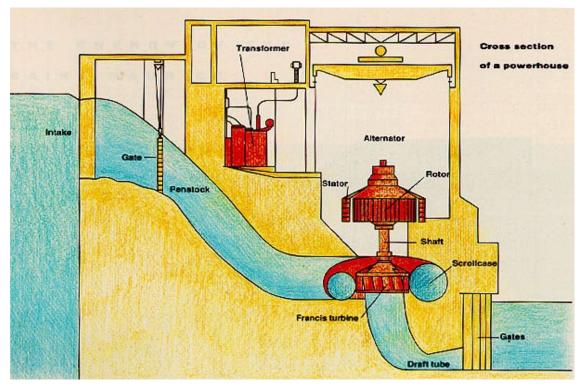


Figure 1-3 Hydroelectric Power Plant

Alternate Technology

Some generation facilities use little or no water to generate power. Wind turbine (see Figure 1-4) and solar panel power generation are two types of electric generation with little water demand. However, this type of power generation is currently only a very small percentage of the power produced in Texas. Internal combustion engines powered by diesel fuel generally use small amounts of cooling water because of their smaller sizes and alternate cooling mechanisms. Finally, fuel cells have the potential to generate electric power with very little consumption of water if they can be produced and maintained in an economically viable manner.



Figure 1-4 Wind Turbine Farm

C. Steam Electric Plant Water Needs

Boiler Turbine Cycle

The use of water for the dissipation of heat is a necessary part of the thermodynamic cycle of all modern steam electric power plants. Its value for this purpose lies in its high specific heat, its general abundance and its ability to consume heat in the evaporation process.

In the modern steam electric power plant, whether nuclear or fossil fueled, steam from the boiler flows through the turbine giving up energy to the turbine rotor and cooling in the process. At the exhaust of the turbine, the steam must be condensed and returned to the boiler. This is accomplished in the condenser using cooling water and in the process the cooling water temperature is increased. Although some water is also used in other processes in the power plant, particularly for boiler make-up, the quantities are insignificant when compared with that consumed for condensing the used steam. The increase in the temperature of the cooling water flowing through the condenser depends upon the design of the condenser, but it is usually between 15 and 25 degrees F.

For a given rate of heat removal, the temperature rise in the cooling water is inversely proportional to the amount of water pumped through the condenser. The size of the condenser and the amount of water circulated can vary substantially. The design values are selected on the basis of a complex economic analysis which takes into account factors such as the cost of fuel, the cost of money, expected operating schedules, water temperature, meteorological data and site conditions, all being part of the optimization process in plant design which will result in a plant with the lowest production cost. The range in water flow rates for modern plants is between 20 and 60 gallons per kilowatt hour (kWh) generated, the lower rate being associated with very efficient plants and the higher rate being that of the larger commercial nuclear plants now in operation.¹

Power plant efficiencies are expressed in terms of the plant heat rate, which is the British Thermal Units (BTU) required to generate each net kWh at the terminals of the plant generator. A "perfect" plant would have a heat rate of 3413 BTU/kWh, meaning that all of the heat energy that went into the system was converted into electrical energy. The most efficient technology available today can achieve a heat rate of approximately 6500 BTU/kWh, which is equivalent to an efficiency of about 53 %. There are many older plants with much higher heat rates, but the national average heat rate is about 10,300 BTU/kWh.² Most of the inefficiencies that occur in the generation of electricity come from the need to dissipate heat in the cooling process. In fossil-fueled plants, between 10% and 15% of the heat entering with the fuel is lost in the boiler, while the remainder is lost in the cooling process. In nuclear plants, which do not lose heat through combustion emissions, cycle cooling accounts for almost the entire loss. In the "average"

¹ Water and Sustainability (Volume 3): U.S. Water Consumption for Power Production –The Next Half Century, Electric Power Research Institute, Palo Alto, CA: 2002 at pages 3-1 to 3-2. Also Figures 2-1, 2-2, and 2-3 were utilized from the EPRI report.

² Information provided by the National Electric Reliability Council.

United States electric generating plant, possibly 8800 BTU of the 10,300 BTU/kWh entering in the fuel would reach the turbine. Of this, 3413 BTU leaves as electricity and the balance, about 5400 BTU, is removed in the condenser. If this were a nuclear plant, the heat removed in the condenser would be about 7000 BTU/kWh. This is indeed typical of "first–generation" nuclear plants. In the latest, most efficient supercritical fossil-fueled units, on the other hand, the heat removal in the condenser may be as low as 3600 BTU/kWh. Thus the range of heat removal rates in the condensers of large modern plants is between about 4000 and 7000 BTU/kWh generated.³

The heat added to the water as it flows through the condenser must be allowed to dissipate externally from the system in some way. The process of "once-through cooling" occurs where cooling water is pumped from a water body through a condenser and subsequently returned to a receiving body. Where the cooling water is returned to a natural watercourse, reservoir, bay, or other water body, this dissipation of heat is accomplished by evaporation, radiation, conduction, convection, and advection.⁴ If the heat is dissipated in a wet-type cooling tower, it is almost entirely by the evaporation of water. In a dry-type cooling tower, the heat dissipation is almost entirely by conduction and convection.⁵

It is advisable to make a distinction between the terms "consumption" and "use" as applied to water. As noted, the removal of heat in the condenser requires the circulation of large quantities of water, but except for its increase in temperature this water is unchanged in quality and is therefore still useable for other purposes. If the heat that is added, however, is dissipated partly by evaporation, the evaporated water cannot be reused and must be considered as having been consumed.

An alternative to using once-through cooling systems or cooling towers is use of a radiator system. This closed-loop system works in the same way that a radiator cools an automotive engine. Airflow through the radiator cools the water inside the radiator system. The cooled water flows back through the plant systems and collects heat from those systems. The warm water returns to the radiator and is cooled by airflow again. Although the radiator system is very conservative of water, it is not nearly as efficient at heat removal as a once-through or cooling tower system. This loss of efficiency results in a reduction in the amount of electric power available from a plant cooled by radiators and also reduces the thermal efficiency of the plant. However, the water demand of the plant is reduced to 10% of the cooling water requirement of a wet cooling tower. Water use is not totally eliminated, but it is greatly reduced.

³ See generally Drew, H.R., <u>A Projection of Per Capita Water Use for Electric Power Generation in Texas</u>, prepared for the Texas Water Commission, May 15, 1965.

⁴ See Harbeck, Koberg, and Hughes, <u>The Effect of the Addition of Heat From A Power Plant On The</u> <u>Thermal Structure And Evaporation of Lake Colorado City, Texas</u>, Geological Survey Paper 272-B, U.S. Department of the Interior, 1959, at page 25.

⁵ See description of wet-type and dry-type cooling towers in Section II, *infra*.

Pollution Control Systems – Sulfur Oxide (SOx Systems)

Coal-fired power plants are required to use various pollution control systems to improve the quality of boiler emissions to the atmosphere. One pollution control strategy requires control of sulfur oxide (SOx) emissions. Sulfur oxides are removed from coal-fired boiler gases by passing the gases through a spray of limestone slurry. The gases react with the limestone and the chemical and physical reaction removes SOx from the gas stream. Much of the moisture in the slurry is evaporated and carried out of the boiler stack by the gas stream. This results in a consumption of water.

The U.S. Department of Energy has estimated⁶ the amount of water used by a 500 megawatt (MW) coal-fired boiler burning bituminous coal with a sulfur content of about 2% for three types of scrubber systems⁷. In a magnesium lime-based process, a total of about 666 gallons per minute (gpm) of water leaves the system. Most of this (587 gpm) is evaporation to the flue gas. If the process is limestone-inhibited oxidation, the evaporation to the flue gas is also 587 gpm. If the process is limestone forced-oxidation, the evaporation to the flue gas is 668 gpm. Measurement data at several coal-fueled generating plants has yielded a water use factor of 1 gallon per minute per megawatt of generation for SOx pollution control systems. For example a 500 MW unit would evaporate 500 gpm when scrubbing at full load. This equates to 0.06 gallons/kWh.

Pollution Control Systems – Nitrogen Oxide (NOx Systems)

Nitrogen oxide (NOx) control for fossil-fueled boilers is accomplished with a variety of methods applied to the furnace area of the boiler. Most of these methods do not use water, but instead use air and gas circulation to accomplish NOx reduction.

As NOx emission limits are pushed ever lower, new technology for NOx reduction has evolved. One of the newer methods being used is selective catalytic reduction (SCR). This method of NOx reduction involves injection of either urea or ammonia into the exhaust from a gas turbine or boiler to activate a catalytic process. The water consumption rate for SCR technology that utilizes a urea conversion system and sparge steam is 0.0121 gallons/kWh. It should be noted that this is only one type of system and the water consumption rates for other types of systems may be different. Technology exists that uses a specific burner design to limit nitrogen oxides (NOx) without the use of water or steam injection. This is termed dry NOx combustion. The water consumption for this type of technology is essentially zero. There may be some water use associated with equipment cooling, but it is minimal.

Particulate Control Systems – Coal Ash

Particulate control at a coal-fired plant is concerned with fly ash, economizer ash, and bottom ash products. Several power stations handle fly ash and economizer ash in a dry

⁶ U.S. Department of Energy, Pittsburgh Energy Technology Center entitled Electric Utility Engineer's FGD Manual; prepared by Radian International LLC; Grant No. DE-FG22-94PC94256; May 1996.

⁷ Ibid. at Table 3-1 ("Typical Terms in a Lime/ Limestone Flue Gas Desulferization (FGD) Process Water Balance); page I.3-35.

form and no water loss is associated with these systems. Bottom ash is normally handled in a slurry, which results in some water use. Water use for a 600 MW coal-fired unit is estimated to be approximately 2,500 acre-feet per year.⁸ This equates to approximately 0.155 gallons per kWh.

Particulate control at gas or oil-fueled generating plants is very minimal, and no appreciable water use is associated with particulate control at these plants. Minimal amounts of water are used at coal-fired power stations for dust suppression at their coal stock pile.

Solid Waste Disposal Systems

In addition to ash by-products, the only other appreciable solid waste that occurs at some coal-fired generation facilities is flue gas desulfurization (FGD) solids. Normally, this material is placed in landfills or ponds, which are capped after they are full. The water loss associated with these ponds can be estimated by referencing the Texas Water Development Board (TWDB) evaporation/precipitation data for Texas.

Solid waste disposal at gas and oil-fired power stations is minimal and associated water loss is negligible.

Other Electric Generation Water Usage

Generation facilities utilize minimal amounts of water for a variety of other purposes. For example, some amounts of water may be consumed in the process of purifying the water needed for boiler-makeup. Facilities also use minimal amounts of water for potable purposes, which is often supplied through contract with municipalities and other water suppliers, or by a private water well. For purposes of this research and the determination of steam-electric water demands, consideration of this usage will be omitted.

D. Gas Turbine Electric Plant Water Needs

Nitrogen Oxide (NOx) Control Systems

Gas turbine driven electric generators are limited by State and Federal law to specific levels of nitrogen oxide emissions to the atmosphere. NOx can be controlled in several ways. Injecting water or steam into the combustion area of the gas turbine can control NOx emissions. The water or steam reduces the maximum combustion temperature of the fuel and air mixture and thereby reduces the emission rate of NOx. The water or steam used for injection must be of extremely pure quality, which requires rather elaborate purification equipment. The water consumption rates for NOx control systems on gas turbines have been measured in the range of 0.05 to 0.07 gallons of water consumed per kilowatt-hour of electric power produced.⁹ For a 172 MW gas turbine, this equates to a water consumption rate of approximately 10,837 gallons per hour or 0.063 gallons per kWh produced.

⁸ Internal estimates of electric generating utilities on project team.

⁹ Ibid.

Cooling Systems

Gas turbine powered generating systems require water for equipment cooling, but because there is no need to condense large amounts of steam, the cooling systems are much smaller than those found in steam electric generating plants. The most common method of cooling the equipment is a cooling tower, and occasionally a reservoir. Water use associated with this process is relatively small.

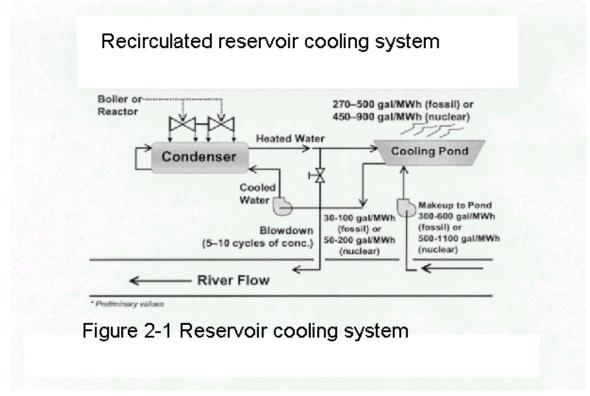
SECTION II: ESTIMATING ELECTRIC POWER GENERATION WATER USE

A. Estimation of Water Used by Cooling Systems

Reservoir Use For Cooling

A pioneering study by G. Earl Harbeck at Lake Hefner, Oklahoma City, Oklahoma, utilizing energy budget and mass transfer analyses, demonstrated that the increase in evaporation from the lake was directly proportional to the amount of heat added to the lake by the power plant adjacent to it. The study indicated that the heat added to the lake was dissipated in the following manner:

1% by advection out of the body of water;
15% by long wave radiation emitted by the body of water;
54% by evaporation;
28% by conduction from the body of water as sensible heat; and
2% by energy advected by the evaporated water.¹⁰



¹⁰ See Harbeck, G. Earl, Jr., <u>The Use of Reservoirs and Lakes for the Dissipation of Heat</u>, Geological Survey Circular 282, U.S. Department of the Interior, 1953, at page 5.

For Lake Colorado City, Texas, Harbeck estimates that 58 % of total heat added is dissipated by evaporation, 25 % was conducted to the air above the reservoir, 3 % was carried away by the evaporated water, and 14 % was radiated to the atmosphere.¹¹

Dissipation of heat added to the reservoir varies with meteorological conditions, particularly wind speed, air temperature, and humidity. Therefore, while the results may be generally applied at other locations, the exact results of studies such as the one conducted at Lake Colorado City should be strictly applied only to the location where the research was conducted. However, a third Harbeck study permits an estimation of the increase in evaporation that would occur in other locations by making adjustments based upon the air temperature and wind speed measured at the nearest weather station.¹²

The following table was prepared using the foregoing study to illustrate the percentage of heat used in evaporation at different locations throughout the United States.

City	Mean	Mean Wind	Percent of heat added
	Temperature	Speed*	that is utilized to
	(°F)	(mph)	increase evaporation
Phoenix, Arizona	69.0	3.3	46
Sacramento, Calif.	60.4	6.2	49
Denver, Colorado	49.5	6.7	42
Atlanta, Georgia	61.4	6.6	50
Chicago, Illinois	50.8	7.3	43
Topeka, Kansas	54.9	7.9	49
Syracuse, New York	48.0	7.0	42
Portland, Oregon	52.9	5.4	44
San Antonio, Texas	68.7	6.4	55
Washington, D.C.	57.0	6.8	48
			Avg. = 46.8
*corrected to 2 meter speed			

TABLE 2-1 VARIOUS CITIES - EVAPORATION RATES

If 47 % of the heat added to a reservoir is dissipated by evaporation and assuming evaporation takes place at the rate of 1061 BTU per pound of water (the enthalpy of water at a saturation temperature of 57° F), the amount of water evaporated will be approximately 50 gallons per million BTU of heat added to the lake.

¹¹ See FN 4, supra, at page 26.

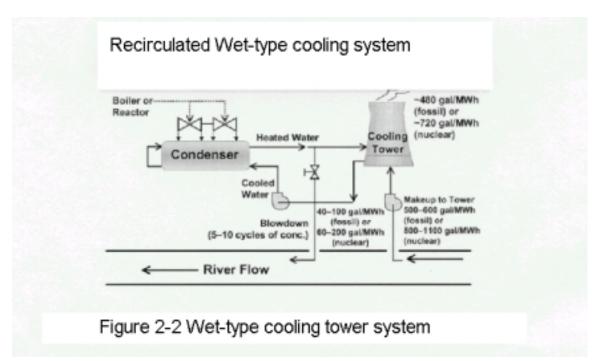
¹² Harbeck, G.E. Jr., <u>Estimating Forced Evaporation from Cooling Ponds</u>, Journal of the Power Division, Proceedings of the American Society of Civil Engineers, Vol. 90 No. PO 3, October 1964; also see generally FN4, supra.

The dissipation of heat from a lake is entirely a surface phenomenon. Therefore, the amount of surface area available is a critical factor in the use of lakes for cooling. A general rule used by electric generating utilities is that about one acre of lake surface area is required for each megawatt of generating capacity using the lake for cooling.

There is little information available as to the amount of water consumed due to heat that is added to flowing rivers. Although heat dissipation from a river involves some phenomena that are different from those which occur in ponds and reservoirs, this paper will assume that the percentage of heat added to a river, that is dissipated through evaporation, is the same as that for a reservoir. Although this assumption may have a probability of error, it should be adequate for the purpose of this paper until better research on heat dissipation in rivers becomes available.

Wet-Type Cooling Tower Use For Cooling

Wet-type cooling towers dissipate approximately 90 % of their heat load by evaporation. In addition, systems using wet-type cooling towers require an additional continuous replacement of water in order to prevent excess build-up of dissolved solids in the circulating water system due to the loss of water by evaporation. The water that is discharged from the system in this process is termed "blowdown." The amount of this blowdown varies, depending upon the salt content of the makeup water and the permissible concentration (from considerations of corrosion and scaling) in the circulating water system. For the generalized case, the total water consumption in the tower is equal to En/(n-1) where n is the ratio of the makeup water and E is the amount of water evaporated by the tower. A concentration ratio of 5, which is typical among generating facilities, results in a total water requirement approximately 25% greater than that needed to replace the evaporation loss alone.



Assuming that the typical cooling tower dissipates heat at the rate of 1061 BTU per pound of water evaporated, that 10% of the heat is dissipated by non-evaporative processes, and that makeup is 1.25 times the amount evaporated, the net amount of water required for the typical wet-type cooling tower is approximately 140 gallons per million BTU of heat dissipated.

Dry-Type Cooling Tower (Radiator) Use For Cooling

Dry-type cooling towers are very expensive and infrequently used, though they are becoming more common in desert climates where water supplies are severely constrained. Because the heat is dissipated directly to air by conduction and convection rather than by evaporation as in a wet-type cooling tower, much more air must be moved through the dry-type tower and the available heat transfer surface must be very great. Both of these factors greatly increase the power requirements of these towers, because of the power needs of the fans utilized to move air across the cooling coils. In addition, the minimum cooling temperatures achievable in dry-type towers are limited by the dry-bulb (rather than the wet-bulb) air temperature, which results in higher turbine exhaust temperatures. In the warmer parts of the country this places a severe penalty upon the efficiency and capability of the power plant. Because of their substantially greater energy and capital cost, it is unlikely that dry-type towers will be used to any great extent in this country in the near future. Hence, they are not considered as a factor in determining the water use estimates in this paper.

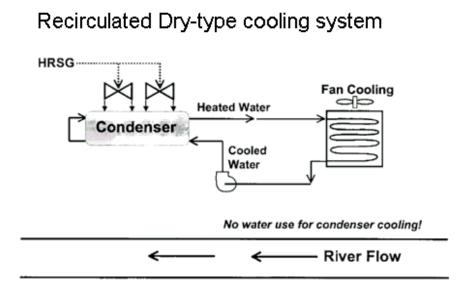


Figure 2-3 Dry-type (radiator) cooling system

B. Determination of Estimating Factors for Total Electric Generation Water Use

The estimated water use for various type of electric generation is listed in Table 2-2. A discussion of the various types follows and the sources and derivations of these water use factors is set forth under this section.

Type of Generation	Gallons of water evaporated / kWh
Steam Turbine	0.2 – 0.98 Range
Gas Turbine	0.05
Combined Cycle	0.23
Coal Fueled	0.35
Nuclear	0.4 – 0.72 Range
Gasified Fluidized Bed	0.51

Steam Turbine Electric Generating Plants

As has been shown earlier in this report, the bulk of the water consumed by a fossilfueled electric generating plant is that which is utilized for plant cooling and pollution control. Most other uses are considered to be minimal and can, for planning purposes, be disregarded. Since cooling water need is directly related to plant operation (i.e. that plant does not consume water when it is not operating) water consumption can be estimated when the following factors are known:

- Type of electric generating plant (steam turbine, gas turbine, etc.)
- Fuel type (natural gas, coal, nuclear)
- Type of cooling system used (once-through, cooling tower, radiator)
- Electric production of the plant (how much power will be produced)

By combining the foregoing estimates of water consumption rates with the ranges in heat rejection and circulating water flow, ranges of water consumption by type of generating facility can be estimated as follows:

- (1) For smaller, less efficient fossil-fueled plants and for currently operating nuclear units, the amount of heat rejected can be as high as 7000 BTU/kWh generated and the amount of water required to be circulated through the condenser for the removal of heat is about 50 gallons/kWh generated. The amount of water actually consumed is about 0.41 gallons /kWh in plants located on lakes or rivers and 0.98 gallons/kWh in plants using wet-type cooling towers.
- (2) Large, modern, highly efficient plants will typically reject heat at rates as low as 4000 BTU/kWh generated and will require the circulation of about 30 gallons/kWh generated. The actual water consumed will be as low as 0.20

gallons/kWh in plants located on lakes or rivers and 0.56 gallons/kWh in plants using wet-type cooling towers.

(3) Most plants operate between the above ranges. The "average" fossil-fueled unit would reject heat at a rate of 5300 BTU/kWh generated and would consume between 0.27 (lake or river) and 0.75 (wet-type tower) gallons/kWh. For purposes of this study, it is assumed that the "average" power plant using once-through cooling will consume water at the rate of 0.35 gallons/kWh and the "average" power plant using a wet-type cooling tower will consume water at the rate of 0.60 gallons/kWh.¹³

Gas Turbine Electric Generating Plants

A natural gas-fueled gas turbine will use much less water for cooling than a natural gasfueled steam turbine system. The water use factor for a gas turbine with wet NOx control is approximately 0.05 gallons of water evaporated/kWh of electricity produced. The water use factor for a gas turbine with dry type NOx control is negligible.

Combined Cycle Electric Generating Plants

Modern combined cycle electric generating plants generally have two units of gas turbine generation for each unit of steam turbine generation and use natural gas as a fuel. For example, a 300MW capacity combined cycle generating plant will have 200 MW of gas turbine capacity and 100 MW of steam turbine capacity. The gas turbines will consume about the same amount of water that a gas turbine would consume when operating alone or not in combined cycle. The steam turbine will consume about as much water as it would consume when operating alone. But the two systems operating in combined cycle will exhibit a lower water consumption rate than if the total capacity was produced by a steam turbine alone. For example, a 300 MW combined cycle power station using a surface reservoir (once-through) for cooling will have a water consumption factor as follows:

(200,000 kWh)(.05 gal/kWh) + (100,000 kWh)(0.35 gal/kWh) = (300,000 kWh) (x)

x = 0.15 gallons/kWh

If the 300 MW combined cycle power station uses a cooling tower for cooling, the water consumption factor is calculated as follows:

(200,000 kWh)(.05 gal/kWh) + (100,000 kWh)(0.60 gal/kWh) = (300,000 kWh) (x)

¹³ As noted earlier in the report, approximately 60 percent of the heat rejected to a reservoir being used as a source of once-through cooling for a power plant will be dissipated by evaporation of water from the surface of the reservoir. At standard atmospheric conditions, it takes approximately 970 BTUs to evaporate one pound of water. Therefore, in order to determine the amount of water evaporated, the amount of heat rejected to the reservoir as measured in BTUs should be multiplied by 60 percent and the product divided by 970 to determine the pounds of water that were caused to be evaporated by the addition of heat to the reservoir. The pounds of water can be converted to gallons by dividing pounds by 8.32 (i.e. the number of pounds in a gallon of water at standard atmospheric conditions).

x = 0.23 gallons/kWh

Coal-Fueled Electric Generating Plants

Because of the various pollution control devices used in a coal-fueled generating plant, the water use factor is higher. From water use measurements for various coal-fueled electric generating plants, the following water use factors are recommended:

- A coal-fueled plant cooled by a cooling tower -- 0.60 gallons of water consumed for each kWh of electric power produced.
- A coal-fueled plant cooled by once-through circulation from a surface reservoir -- 0.35 gallons of water consumed for each kWh of power produced.

Nuclear-Fueled Electric Generating Plants

From water use measurements taken at nuclear-fueled electric generation facilities cooled by once-through circulation within a closed pond system, water use can be estimated as 0.58 gallons per kWh. The Electric Power Research Institute (EPRI)¹⁴ derived the water consumption estimates for nuclear-fueled electric generation facilities shown below in Table 2-3.

Plant and Cooling System Type	Typical Water Consumption (gal/kWh)
Nuclear steam, once-through cooling	~0.400
Nuclear steam, pond cooling	0.400 - 0.720
Nuclear steam cooling towers	0.720

TABLE 2-3 NUCLEAR PLANT WATER CONSUMPTION

Gasified Fluidized Bed Generating Plants

Gasified fluidized bed generating units are still a relatively new technology. The number of generating units of this type in Texas is nominal. Because of the potential of this technology to minimize the emission of air pollutants from coal fuels, it may be utilized more in the future. The Electric Power Research Institute estimates¹⁵ that the water consumed by a coal/petroleum residuum-fueled combined-cycle generating plant utilizing cooling towers is approximately 0.51 gallons/kWh.

¹⁴ See FN 1, supra, at page viii.

¹⁵ See FN 1, supra, at page 3-7

SECTION III: STATEWIDE ELECTRIC GENERATION PROJECTIONS

Introduction

This section of the study attempts to establish statewide electric generation projections for Texas on a decadal basis that corresponds with the 50-year planning horizon to be utilized by the regional water planning groups during the next 5-year planning cycle (i.e. through 2060). These electric generation projections will be calculated utilizing two different methodologies, so that the results of each methodology can be compared for verification and calibration purposes. A final methodology will then be recommended.

Generally, the two methodologies used are as follows:

- 1. Derivation of a per capita electric use factor from existing population and total electric use data from the past two decades, and utilization of that per capita factor with the TWDB population projections to project total electric use throughout the 50-year planning horizon; and
- 2. Derivation of an electric demand growth factor from the electric demand projections developed by the Public Utility Commission of Texas (PUCT), and extrapolation of the factor across the 50-year planning horizon.

Once the total electric demand has been estimated for a given year, then the amount of statewide water consumption by electric generation facilities for that year can be estimated.

Derivation of Electric Demand Growth Rate Using PUCT Generation Projections

Table 3-1 presents data obtained from the PUCT that predicts annual statewide electric generation for the years 2000 through 2009.¹⁶ The table indicates a leveling of the electric generation growth rate at approximately 2% annually. This is a decline of approximately 1% from the electric growth rate experienced in the years 1994 through 1999.

¹⁶ See "2000 Annual Update of Generating Electric Utility Data," Public Utility Commission of Texas, 2001.

Year	Total Generation (GWh)	Growth Rate (GWh)
2000	337,582	0.7
2001	340,142	0.8
2002	350,129	2.9
2003	357,471	2.1
2004	366,511	2.5
2005	373,979	2.0
2006	383,482	2.5
2007	391,612	2.1
2008	401,228	2.4
2009	410,415	2.2
Decade Averages	22.45% increase (2000 – 2009)	2.0%

TABLE 3-1 PROJECTED GROWTH OF TOTAL ELECTRIC DEMAND FOR TEXAS

Derivation of Per Capita Electric Demand and Per Capita Demand Growth Rate

Table 3-2 presents statewide population estimates for the years 1981 through 1999¹⁷ and statewide generation estimates from the PUCT for those same years.¹⁸ The fourth column in the table presents the per capita power consumption for each person in the State, which is calculated by dividing statewide electric generation by the statewide population. The result is calculated in average kilowatt-hours used by each person each year and utilized to determine the average statewide per capita growth rate for electric generation demand.

¹⁷ Population information provided by U.S. Census Bureau (years 1981-1993) and Texas State Data Center (1994-1999). ¹⁸ See FN 16, supra.

Year	State Population	State Electric Generation (GWh)	Per Capita Electric Use (kWh/yr)	Per Capita Electric Demand Growth Rate
1981	14,746,318	194,685	13,202	
1982	15,331,415	195,753	12,768	-3.40%
1983	15,751,676	194,926	12,375	-3.18%
1984	16,007,086	206,410	12,895	4.03%
1985	16,272,734	208,953	12,841	-0.42%
1986	16,561,113	205,525	12,410	-3.47%
1987	16,621,791	207,698	12,496	0.68%
1988	16,667,022	217,553	13,053	4.27%
1989	16,806,735	221,624	13,187	1.01%
1990	16,986,510	227,387	13,386	1.49%
1991	17,339,904	228,699	13,189	-1.49%
1992	17,650,479	230,659	13,068	-0.93%
1993	17,996,764	240,288	13,352	2.12%
1994	18,378,185	283,679	15,436	*See FN 19
1995	18,723,991	293,307	15,665	1.46%
1996	19,128,261	309,637	16,187	3.23%
1997	19,439,337	319,639	16,443	1.55%
1998	19,759,614	337,363	17,073	3.69%
1999	20,044,141	335,159	16,721	-2.11%
Average				0.50%

TABLE 3-2 DERIVATION OF PER CAPITA ELECTRICITY DEMAND GROWTH RATE FACTOR

The average per capita use for electric generation in Texas for the years 1981 through 1999 indicated an average statewide per capita electric generation demand growth rate of 0.5%.¹⁹

¹⁹ When calculating the growth rate utilizing the data set forth from years 1981 to 1999 in Table 3-2 above, the project team discarded the jump in growth between years 1993 and 1994 as an inaccurate anomaly based upon a change in reporting requirements that led to the generation of the data used between those two years. The information on total electric generation for years 1981 through 1993 were taken from "1996 Statewide Electrical Energy Plan," Public Utility Commission of Texas, 1996. The information on total electric generation from "2000 Annual Update of Generating Electric Utility Data," FN 16, supra. A review of the data set forth under Table 3-2 indicate that the per capita electric demand growth rate during the 1993-1994 transition between the two sources of data set forth in this footnote is an anomaly resulting from the utilization of the two sources of information rather than an actual, reliable data point.

Comparison of Total Statewide Electric Demand Projections Using PUCT Growth Rate Factor Versus Using Per Capita Electric Demand Growth Rate and TWDB Population Projections

In an attempt to verify the accuracy of the 2% growth rate for total statewide electric demand obtained from the PUCT (see Table 3-1), future electric demand was calculated by extrapolating the 0.5% per capita growth rate into the future and multiplying the product by the TWDB's population projections over the 50-year planning horizon to obtain annual generation on a decadal basis. Column A of the following table presents the results of this calculation as compared to the PUCT projections, which are presented in Column B through the year 2060.

Year	<u>Column A</u> Annual generation assuming 0.5% increase in per capita electric demand and TWDB population estimates	<u>Column B</u> Annual generation assuming 2.0% increase in annual generation from PUCT
2010	438,829	418,623
2020	538,019	510,299
2030	641,308	622,052
2040	750,832	758,278
2050	877,157	924,337
2060	1,021,679	1,126,761

TABLE 3-3 COMPARISON OF TOTAL STATEWIDE ELECTRIC GENERATION DEMAND PROJECTIONS

The previous table shows remarkably similar results using both test methods for estimating statewide electric generation. There is only a 10 % difference in the 2060 generation estimate. It should also be noted that the United States Department of Energy (USDOE)²⁰ projected a 1.8% annual generation increase for the Electric Reliability Council of Texas (ERCOT) planning region (a large percentage of the State) for the next twenty years, which would yield a statewide generation estimate in general agreement with the other two estimates, considering that portions of the state are not included in the USDOE projections.

Recommendation of Methodologies for Projecting Statewide and Per Capita Electric Demands

Given the results of the test calculations under Table 3-3, the project team recommends the following assumptions and methodologies be used for purposes of this study:

1. Future statewide electric demand for the years 2000 through 2009 is assumed to be the same as the PUCT estimates. Electric demand in the year 2010 should be

²⁰ See "2002 Annual Energy Outlook," United States Department of Energy, Energy Information Administration, December 21, 2001.

assumed to be the 2009 PUCT number of 410,415 GWh increased by 2% (418,623 GWh). Statewide electric demand in future years should escalate the year 2010 demand by 2% per year, utilizing the 2% average annual electric demand growth rate derived under Table 3-1.

- 2. Utilize the TWDB population projections from the last approved State Water Plan when projecting population for a given year.
- 3. Per capita electric use for a given year should be calculated by dividing statewide electric demand for that year (utilizing the 2% extrapolation as set forth under Assumption 1) by the TWDB state population projection, rather than extrapolating the per capita electric demand growth rate derived under Table 3-2.

Statewide Electric Generation Demand Projections

Utilizing the methodology set forth above, projected statewide electric generation demand for the years 2000 through 2060 is presented on a decadal basis in the following table, while the projections for each year during that planning horizon are set forth individually in Appendix B1 of this study.

Year	Annual Electric Demand (GWh)
2010	418,623
2020	510,299
2030	622,052
2040	758,278
2050	924,337
2060	1,126,761

TABLE 3-4 ANNUAL ELECTIC DEMAND PROJECTIONS

Electric generation demand varies by regions for a number of different reasons. For example, significant manufacturing demand is not found in some regions and heavily concentrated in other regions. The areas that do not have the manufacturing electric demand still use the manufactured products and contribute to the demand, even though the demand is only realized in other regions. After an extensive search of various databases, it appears that there are no databases that predict electric demand on a county basis. Further, there do not appear to be any generally acceptable predictive tools that would allow a certain per capita electric demand to be applied to individuals that live in rural areas as compared to those who live in metropolitan areas. For those reasons, the project team chose to project electric demand on a statewide annual generation basis, assume that all generation to meet that electric demand would occur within the state of Texas, develop a methodology to determine the amount of water required on a statewide basis to meet that demand, and then develop a methodology to attempt to allocate that water demand by regional water planning group region and by county.

The types of electric generation facility predicted to supply the generation requirement for each county and each region is addressed in Section V of this study. Section V presents three planning scenarios for estimating statewide generation facility requirements.

SECTION IV: WATER SOURCES CURRENTLY IN USE

The objective of Section IV of this study is to identify water sources that are currently being used by power generation facilities in Texas. The electric generation facilities located in Texas as of the year 2002 have been identified and listed in a spreadsheet entitled "Electric Utility and Independent Power Producer Generating Units in Texas. This spreadsheet is included in Appendix A of this study. Within the spreadsheet, the project team assigned an "estimated water use factor" measured in gallons of water consumed per kilowatt-hour of energy produced to each listed unit using the project team's industry knowledge. The water use factor selection was based on the use factors presented in Section II of this study. The spreadsheet has a column entitled "Annual Capability at 100% Load Factor". This column indicates the yearly net electric power as measured in MWh that could be produced by each unit if the unit were operated at peak capability for an entire year. Another spreadsheet in Appendix A3 entitled "Future Water Demand for Steam Electric Generation in Texas by Plant or Unit" indicates the water that would be consumed by the unit if operated at peak capability for a year.

An estimate of the surplus water supplies available at each of the generation facilities currently identified was produced by examining the water plans developed by each Regional Water Planning Group. Each RWPG identified the electric generation water demand of electric generation facilities on a regional and county basis. The year 2000 electric generation water demand was compared to the water demand through the 2060 planning period. All claimed electric generation water supply in that the claimed water must have been based on an underutilized water contract or on an identified future need that was location specific and based on presumed availability. The spreadsheet can be further used to estimate a current statewide water consumption factor for electric generation. That factor was calculated and used in Section V of this study.

The data presented in the spreadsheet in Appendix A3 entitled "Future Water Demand for Steam Electric Generation in Texas by Plant or Unit" was obtained from several sources including the USDOE's Energy Information Administration (EIA) and the 2002 State Water Plan.

A list of all cogeneration power generation facilities in Texas was compiled from various sources and is presented in Appendix A4 as "Cogeneration Facilities in Texas". Although the water use associated with cogeneration facilities was not considered in this report, many newer cogeneration plants have been built with a significant excess over the industrial plant demand with the excess being sold into the electrical grid.

SECTION V: ESTIMATES OF FUTURE WATER USE AND STATEWIDE STEAM ELECTRIC WATER DEMAND PROJECTIONS

The objective of Section V is to estimate the future water use by the electric power generation sector utilizing "high use," "medium use," and "low use" scenarios.

There are a variety of factors that will affect the water requirements for electric power generation in the future, as has been pointed out in Section II of this report. If the current trend of using natural gas as a fuel for efficient combined cycle power plants continues, water consumption will be less than would be experienced if future generation is fueled by coal. Coal is not a fuel that is currently compatible with use of gas turbines unless the coal is processed into a low particulate gaseous fuel and that is currently very expensive. The price of various types of fuel (natural gas, coal, etc.) is a major factor in determining which generation technology will be utilized. The initiation of a State or Federal energy policy will affect the fuel choices and resultant water consumption. A State or Federal requirement to utilize wet-type cooling towers for electric generation would have the effect of greatly increasing future water use.

For example, in April 2002, the USEPA published newly proposed regulations under Section 316B of the Clean Water Act covering the entrapment and entrainment of aquatic organisms at power plants. If the proposed regulation is promulgated as published in draft form, future power plants would probably be required to install cooling towers rather than once-through cooling systems.

In Section III of this study, it was estimated that the demand for electric power will increase from 337,582 GWh in 2000 to 1,126,761 GWh in 2060. This is an increase of 3.34 times year 2000 electric demand (or a 234% increase). If the future water use rate by electric generation stays the same as the current rate, the need for water by electric generation will increase by the same 234% by the year 2060. However, there are technologies that can reduce the water consumption of electric generation. Use of some of these technologies will have the effect of increasing the cost of electric power because of capital requirements of water efficient generation, the loss of thermal efficiency, and/or the loss of generation capacity caused by in-plant energy uses necessitated by the water efficient equipment.

In order to establish some parameters that can be used to estimate the water needed for power generation through the year 2060, it was decided to establish three scenarios of water use by electric generation. These scenarios are a "high use" scenario, "medium use" scenario, and a "low use" scenario. All three are discussed in detail below.

Scenarios	Increase Multiplier over Year 2000
High Use	3.34
*Medium Use	*2.62
Low Use	1.40

TABLE 5-1 ESTIMATED INCREASE IN WATER USE BY 2060

*Recommended: Medium Use

High Use Scenario

Except for the Panhandle, Gulf Coast, and Far West regions of Texas, most of the current electric generation in the State uses once-through cooling from reservoirs for large central station generation. Historically, much of the electric power generated in Texas was generated with natural gas as a fuel. Changes in the Federal laws regarding fuel use, which resulted from the oil embargo of 1973, forced a change in fuel use for electric generation from natural gas to either coal or nuclear fuels. Political sentiment has currently removed the nuclear choice from the list of acceptable fuels for future power generation by changes in the Powerplant and Industrial Fuel Use Act of 1978. However, the use of natural gas as a fuel is still constrained by the Federal requirement that all gas-fired generation facilities be capable of switching to coal or another alternate fuel on the call to do so by the Federal government. So all current gas-fired generation must be "coal convertible". (See Powerplant and Industrial Fuel Use Act, U. S. Code; Title 42; Chapter 92; Subchapter II; Part A; Section 8311 (a)).

A review of Sections I and II of this report shows the water consumption rates inherent in fuel and generation technology selections. Fuel options currently available are oil, natural gas, coal, lignite, and some renewable resources such as wind, solar, and hydroelectric power. For large power producers, the fuel selection is generally limited to natural gas, coal, and lignite. Given the fuel and generation technology options currently available, a "high use" scenario was predicated on future generation being fueled by natural gas, oil, coal, or lignite and the generation being cooled by cooling towers. From the estimating factors outlined in Section II of this report, future generation will consume water at the rate of 0.60 gallons per kilowatt-hour.

Calculation of statewide water consumption by electric generation under a "high use" scenario rests on the following presumptions:

1. Electricity demand will increase by a factor of 3.34 (or 234%) from 2000 to 2060. 2000 generation = X and 2060 generation = 3.34 X (From Section IV);

2. Current generation uses water at a rate of 0.60 gallons/kWh;

3. Future generation will be steam electric powered by fossil-fueled boilers;

4. New generation will be cooled by cooling towers and will consume water at a rate of 0.60 gallons per kWh; and

5. Current generation will continue to operate through 2060.

The factor for estimating 2060 water use as compared to 2000 water use under the "high use" scenario is calculated as follows:

2000 generation = X2060 generation = 3.34X

water use rate for 2000 generation = 0.60 gallons per kilowatt-hour (gal/kWh)

water use rate for 2060 generation = (X)(0.60 gal/kWh) + (X)(2.34)(0.60) gal/kWh)

2000 generation water use = (X) (0.60 gallons per kilowatt-hour)

2060 generation water use = (2.34)(X) (0.60 gal/kWh) + (1.00)(X) (0.60 gal/kWh)

2060 generation water use = 1.404 X + 0.60 X = 2.004 X

2060 water use divided by 2000 water use = 2.004X / 0.60 X = 3.34

Thus for the high use scenario, water use by electric generation in Texas will increase by a factor of 3.34 times current use by the year 2060 (representing a 234% increase).

Medium Use Scenario

The "**medium use scenario**" presumes that half of the future generation will be fueled by coal and cooled by cooling towers and half will be combined cycle generation fueled by natural gas and cooled by cooling towers. This scenario assumes that none of the current existing generation will be retired or replaced.

As stipulated in the "high use" scenario, 2000 water use is presently at a consumption rate of 0.60 gallons per kWh. From Section II of this report, the water use rate for coal-fired generation cooled by cooling towers is 0.60 gal/kWh. The water use rate for combined cycle generation fueled by natural gas and cooled by cooling towers is 0.23 gal/kWh. Using those presumptions, the 2060 water use under a medium use scenario is calculated as follows:

2060 use = (1 X)(0.60 gal/kWh) + (1.17 X)(0.60 gal/kWh) + (1.17 X)(0.23 gal/kWh)

2060 use = 0.60X + 0.702 X + 0.2691 X= 1.5711X

2060 water use divided by 2000 water use = 1.5711X / 0.60 X = 2.6185

Thus, for the medium use scenario, water use by electric generation in Texas will increase by a factor of 2.62 times current use by the year 2060 (representing a 162% increase).

Low Use Scenario

The "**low use scenario**" assumes that all future generation will be fueled by natural gas and will be combined cycle generation operated on once-through circulation cooling from reservoirs. One fourth of the current generation will be retired and replaced with the same type of units assumed for future generation. It is further presumed that the oncethrough cooling reservoirs are preexisting and that no surface evaporation losses will be accounted to the electric generation source. As stipulated in the high use scenario, current generation consumes water at the rate of 0.60 gal/kWh. From Section II of this report, gas fired combined cycle generation using once-through cooling will consume water at the rate of 0.15 gal/kWh. Given these presumptions, the water use under the low use scenario for the year 2060 will be calculated as follows:

2060 water use = (0.75 X)(0.60 gal/kWh) + (0.25 X)(0.15 gal/kWh)+ (2.34X)(0.15 gal/kWh)

2060 water use = 0.45 X + 0.0375 X + 0.351 X = 0.8385 X

2060 water use divided by 2000 water use = 0.8385 X / 0.60 X = 1.3975

For the low use scenario, water use by electric generation in Texas will increase by a factor of approximately 1.40 times current use by the year 2060 (representing a 40% increase).

Adjustments to the Scenarios

The technology exists to control water use by electric generation without limiting the amount of generation. But the control must be accompanied by careful evaluation of the effects of cost on electricity prices. Obviously there are trade-offs. If water is relatively inexpensive and relatively available compared to fuel, there is little reason to require extreme water conservation and thereby assure more expensive electricity.

Many electric generation providers in Texas have surplus water supplies contracted or developed to provide for future generation. This is in conformity with the state goals manifest in Senate Bills 1 and 2 to engage in proper water resource planning before supplies are actually needed for such critical societal functions as the provision of electric power. This contracted or developed, but as yet unused, water will provide the cooling for an undetermined amount of future generation. It is estimated that this currently unused water is adequate for at least thirty-five years of generation growth, according to the calculations set forth herein. The data does not exist in any generally accessible database that would allow the project team to exactly quantify that water reserve. The reserve is hereby noted and provides a "cushion" that should be considered in planning for future water needs for electric generation. This contracted water may be reflected in Regional Water Planning Group data as the source of some specific future water use claims at some locations.

SECTION VI: STEAM ELECTRIC WATER DEMAND ON A REGIONAL AND COUNTY BASIS

Section III of this report derived and recommended annual electric generation demands for the State. Section V utilized those electric generation demand projections along with the water consumption use factors identified for each generation and cooling technology to derive estimates of statewide water use for electric generation and statewide steamelectric water demand projections. The objective of Section VI of this study is to recommend a water supply allocation method for power generation that can be used on a county or regional basis through the year 2060.

Difficulties in Allocating Steam Electric Water Demand on a Regional or County Basis

One of the premises of this study was that electric generation water consumption needed to be determined on a county basis. Electric generation facilities are built in large blocks of generation capacity in order to achieve economies of scale. Currently, generation units are being built in sizes that range from 25 to 200 MW for gas turbines and from 400 to 1300 MW for gas and coal-fired steam turbine units. A power generation facility is located where there is fuel, water, an allowable air quality regime, and access to electric transmission facilities. Areas that do not have adequate resources for electric generation will be supplied by electricity generated at a remote site. Where the appropriate mix of these other factors can be found, areas that also have water available for electric generation will have the ability to attract electric generation if desired.

The point of this discussion is that water for electric generation must be provided, but the water management strategy to supply those generation needs will not necessarily be located in every county or even in every Regional Water Planning Group (RWPG) region. This phenomenon may not be unique to the electric generation water demand sector, but is definitely more prevalent than in any other type of water use category maintained by the TWDB. Because electric generation can be transmitted across the grid for great distances to its point of use, the water supplies needed to provide generation for a particular user group do not have to be located even remotely close in proximity to the end user of the electricity that is generated. Thus, it is problematic to derive a methodology for determining water demand projections for power generation on a county or regional basis based upon the electric generation needs of the county or region. Therefore, while the statewide projections developed for both total electric generation and total water needed to supply that generation may be reliable, attempting to predict the individual counties in which those generation facilities may be developed 50 years into the future will be much less reliable.

With that disclaimer in mind, the project team recommends that the TWDB and the regional water planning groups utilize the following methodology and baseline projections for steam electric water planning for both county-specific and region-specific water demand allocation.

Methodology Recommended

To determine steam electric water demand on a county and regional basis, a top down (i.e. use the statewide information as a basis and then derive the regional and county needs) methodology was utilized. Table 6-1 summarizes the statewide generation and water demand based on the medium water use scenario discussed in Section V. The table clearly indicates that the statewide electric demand is projected to increase by two percent annually for a total increase of 234 percent in 2060 over the Year 2000 Baseline Electric Generation Demand figure, while the corresponding water demand would increase by only 162 percent.

Year	Electric Demand (GWh)	Percent of Year 2000 Baseline Electric Generation Demand	Increase Factor in Water Use over Year 2000 Based on Medium Use Scenario from Appendix B-1	Calculated Annual Statewide Steam Electric Water Use (Acre feet)	2002 State Water Plan Steam Electric Water Use
2000	337,582			621,601	607,527
2010	418,623	124%	1.166	724,814	831,301
2020	510,299	151%	1.354	841,572	917,994
2030	622,052	184%	1.583	983,900	1,007,424
2040	758,278	225%	1.862	1,157,396	1,057,929
2050	924,337	274%	2.202	1,368,887	1,134,644
2060	1,126,761	334%	2.618	1,626,692	

TABLE 6-1 STATEWIDE ELECTRICITY AND WATER DEMAND--2000 TO 2060

The water demand for each electric generating plant in Texas can be estimated as a percentage of the statewide demand. The county water demands can be summed to give either the regional or the state demand.

For the baseline year 2000, the water demand for each plant is calculated by taking the actual generation by fuel type as documented in the Energy Information Administration (EIA) database and applying the water use factor for the generating units at that plant for each fuel type. The total statewide water demand for the year 2000 can then be determined by adding the calculated demand for the individual units or plants. For the year 2000, the water calculated to be used by each facility was summed to obtain a statewide water demand of 586,664 acre feet, as indicated on the last page of Appendix A3. As indicated earlier in Section VI, statewide estimates for generation and water use are considered to be more reliable than regional and county estimates. Thus the estimated statewide generation (337,582 GWh) and water use (621,601 acre feet) was calculated for the year 2000 and each subsequent year as indicated in Appendix B1 and summarized by decade in Table 6-1. Finally the individual plant water demand estimates were normalized by taking a ratio of calculated statewide total for 2000 as shown in Table 6-1 and the summed statewide plant total from Appendix A3.

Potter County in Region A, which includes both a coal fired and a natural gas fired power plant, will serve as an example to illustrate the methodology used. As found in Appendix A1, Harrington, the coal fired plant, utilizes cooling towers for cooling and has a water use factor of 0.6 gal per kWh, while Nichols, a gas fired plant utilizing cooling towers, has a water use factor of 0.75 gal per kWh. The amount of electricity actually generated at Harrington and Nichols in the year 2000 was 8,028,946 and 993,701 MWh respectively, as indicated in Appendix A2.

So, the following illustrates the water use derivation for the Year 2000 and its corresponding decade at the two power plants:

Harrington Water Use = (Actual electricity generated 8,028.946 GWh) x (water use factor 0.6 gal per kWh) x (Conversion factor of 1,000,000 kWh per GWh times 1 acre foot per 325,851 gallons) x (Ratio of calculated water used statewide from Table 6-1 [621,601 acre feet] to summation of individual plant water estimates statewide for 2000 [586,664 acre feet]); thus

Harrington Water Use for 2000 = 15,664 acre feet as indicated in Appendix A3.

Nichols Water Use = (Actual electricity generated 993.701 GWh) x (water use factor 0.75 gal per kWh) x (Conversion factor of of 1,000,000 kWh per GWh times 1 acre foot per 325,851 gallons) x (Ratio of calculated water used statewide from Table 6-1 [621,601 acre feet] to calculated water used by summing individual plant water estimates statewide for 2000 [586,664 acre feet])

Nichols Water Use = 2423 acre feet, as indicated in Appendix A3.

The corresponding water demand for Potter County was then determined to be the sum of the demand for the two plants, or 18,087 acre feet. The corresponding water demand for the region was simply the summation of the demand for the individual counties.

Please note that for most plants on cooling reservoirs, the estimated annual makeup from a river to the cooling reservoir was included in the year 2000 plant water demand as the information was available. In addition, power plants that utilize salt water for cooling were considered to have a fresh water demand. The estimated salt water use is insignificant compared to the water demand for the entire state.

After the baseline year 2000 demand has been determined on a plant-specific basis, the future demand for the years 2010 though 2060 can be determined. The PUCT has estimated the generation demand by year and fuel type for 2000 to 2009^{21} with the data being summarized in Appendix E3. The EIA has estimated the generation demand by year and fuel type for the period of 2001 to 2020^{22} as found in Appendix E4. Both the PUCT and the EIA projections by fuel type can be trended to determine a rate of future

²¹ See FN 16, supra

²² See FN 20, supra

growth or decline in generation by fuel type. In general, both trends show that coal fired generation will remain relatively unchanged with a slight increase upward. The annual generation produced by nuclear plants in Texas is relatively unchanged as well, but has a slightly downward trend. The generation produced by conventional gas fired steam electric generating plants is projected to decrease over the next twenty years and has a downward trend. The generation produced by combined cycle gas fired steam electric plants is expected to rise sharply over the twenty-year period. Therefore, for the years 2010 and 2020, the estimated water demand was based on the 2000 water demand and was adjusted by a correction factor based on PUCT estimates of electricity generation by fuel type from 2000 to 2009.

Current economics indicate that electric generation from coal fired and nuclear steam turbines will operate at or near their full capability, which is defined as a base-loaded unit. Natural gas fired conventional steam turbine generation will operate more infrequently to meet peak demand. Natural gas fired combined cycle generation will operate somewhere between the base load and peak load extremes.

The decadal water demand for each conventional (nuclear, coal fired and natural gas fired) steam electric plant in the years 2010 and 2020 could then be estimated by assuming that water demand will increase or decrease according to the established generation trend as projected by the PUCT in Appendix E3 and compared to the baseline year 2000. The 2010 and 2020 water demand for coal fired, nuclear, and conventional natural gas fired is calculated by multiplying the demand in the year 2000 by a ratio of the linear trend in the fuel type for the 2010 and 2020 as compared to the trend in the fuel type for the 2010 and 2020 as compared to the trend in the fuel type for the baseline year 2000. The linear curve fit of the trends is provided in Appendix E3. Coal plants in 2010 are expected to generate approximately 1.2 percent more electricity than in 2000. Nuclear plants in 2010 are expected to generate approximately 1.2 percent more expected to generate 17 percent less electricity than the baseline year 2000. For 2020 the generation estimates for coal, nuclear, and conventional natural gas are +2.4, -2.4, and -34 percent respectively when compared to the year 2000 baseline.

This methodology will be illustrated again using Harrington as an example. For 2010 the water demand is estimated as 1.2 percent greater than the 2000 calculated demand of 15,664 acre feet. The demand for 2010 is therefore 15,664 acre feet times 1.012 (1.2 percent) to result in a 2010 demand of 15,854 acre feet. Similarly for 2020 the demand is estimated as 15,664 acre feet times 1.024 (2.4 percent) which results in an estimated 2020 demand of 16,043 acre feet. The same process would be applied to all coal, nuclear, and conventional natural gas fired plants.

The statewide water demand for natural gas fired combined cycle generation may then be estimated by taking the difference between the calculated annual statewide demand as shown in Table 6-1 and the total statewide demand estimated for the conventional steam electric plants, as found on the last page of Appendix A3. The plant-specific combined cycle demand was then assumed to be a percentage of the overall demand attributed to the combined cycle plants statewide. That percentage of the overall combined cycle

demand was determined by comparing the total water demand for a specific combined cycle plant at its maximum capability to the total water demand for all the combined cycle plants in the state at their maximum capability that will be operating during that decade. While this estimate may not accurately reflect the actual load and water demand for a specific unit, it was deemed the most expedient method for developing plant specific data in order to establish county and regional water demand requirements for 2010 and 2020.

The steam turbine for the Mirant plant in Wichita County will illustrate the methodology. For 2010 the estimate for combined cycle water needs is the difference of the statewide total water demand of 724,814 acre feet and the 580,388 acre feet demand estimated to be used by coal, nuclear, and conventional natural gas fired units, which results in 144,426 acre feet remaining for use by combined cycle gas turbine units. The portion of that 144,426 acre feet available to be allocated to the Mirant steam turbine would then be the calculated water usage at a 100 load factor (323 acre feet) for that unit divided by the 2010 water demand at 100 percent load factor for all combined cycle units in the state (180,899 acre feet). The resulting 2010 demand for the Mirant steam turbine would be 258 acre feet, as indicated in Appendix A3.

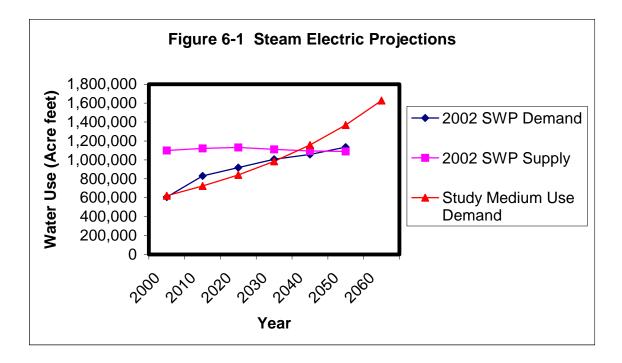
Please note that the PUCT information for new generating plants as presented in Appendix E was used to determine during which decade a new addition would be made. First, it was assumed that the water demand for all cogeneration facilities would be covered in the statewide manufacturing totals. Next, it was assumed that all of the independent power producing plants indicated in the table would be natural gas fired combined cycle plants and cooled by cooling towers. If the PUCT information indicated that a new plant was projected to be in service by 2010, then the water demand was shown in 2010. If an on-line date was not provided by the PUCT or a projected plant was delayed, it was assumed that the new generation would be added by the year 2020. These calculations were performed only for those counties that had existing or announced generation.

For the decades 2030 through 2060 the water demand for each plant was projected to increase at the same rate throughout the state regardless of fuel type and generation type. As detailed in the "Medium Use Scenario", it also assumes that none of the units existing today will be retired. While this is an unrealistic assumption, new units will replace existing units and continue to use the water that the existing units currently require. For the sake of simplicity it was assumed that generating units built after 2020 will be constructed at the same sites as those facilities identified in Appendix A3 or at least in the same counties. The individual plant estimates were calculated by multiplying the plant water demand in the year 2020 by a ratio of the future statewide water demand estimates for the year 2030 and the future statewide water demand estimates for 2020. The same procedure was used to estimate the regional and county demand for the years 2040 through 2060. For 2030 through 2060, those decadal estimates increased by the following percentages: 2030 - 16.9 %, 2040 - 17.6%, 2050 - 18.3%, and 2060 - 18.8%.

The method will again be illustrated for the decadal years 2030 through 2060 using Harrington as an example. In 2030 the Harrington demand is estimated as the 2020 demand of 16,043 acre feet multiplied by a ratio of the 2030 and 2020 statewide demands of 983,900 acre feet divided by 841,572 acre feet. The resulting demand for Harrington in 2030 is 18,756 acre feet. A similar process is used to calculate the demands at each plant for 2040, 2050, and 2060. To reiterate, each plant that was recognized to have a water demand in 2020 would see their corresponding water demand increase proportionally from 2030 to 2060. In reality each plant will not see their water demand increase at the same rate, but it was deemed the most expedient method that could be applied for long term planning purposes.

A summary of the estimated regional and county steam electric demand is presented in Table 6-2. It is recommended that each RWPG utilize and protect its regional steamelectric demand total as set forth in the table. Each RWPG should also use the county totals set forth under Table 6-2 as a baseline, and adjust them only based upon better site-specific information available to the county on steam-electric demand locations while protecting their regional total. It may be necessary to move the water out of the region to a location where other water supplies can be gathered together to support a generation facility of the size that achieves the economy of scale best suited to the asset, because high voltage transmission lines and future increases in transmission delivery efficiencies will likely mean that a sizable portion of the electricity demanded by a region could be imported from adjacent regions.

Many of the electric generation suppliers in Texas have water supply contracts that are not being fully utilized at this time. Many of these suppliers will fully utilize the water supplies in the future. Figure 6-1 shows the current water supply for steam electric generation needs as opposed to the steam electric demand per the 2002 State Water Plan (2002 SWP) and the medium water use demand from this study.



For that reason, this study assumes that additional water supplies for electric generation will not be needed, when the State is viewed as a whole, until around 2037. This does not mean that there will not be areas that are "water short" or "water long". It means that somewhere in the State there is adequate water to support additional generation through 2037. The 2002 State Water Plan estimated that statewide steam-electric water demand would exceed supply statewide in 2045. Based on the research performed in this study, it is anticipated that statewide demand will actually exceed supply by the end of 2037. Each region could develop a similar supply and demand curve in accordance with the data presented in Table 6-2 and Appendix C to determine at what point additional water is expected to be needed to support future steam electric generation in their region.

SECTION VII: CONCLUSIONS

The literature review and other research performed in the course of this study indicate that this is the most comprehensive effort to date in the state of Texas to derive methodologies for the projection of water demands for the steam-electric water use sector and to apply those methodologies on a statewide, regional, and county-specific basis for the derivation of specific water demand projections. Efforts to check and calibrate the methodologies indicate that they are generally satisfactory, especially when applied to the statewide numbers, and are likely the most accurate and reliable generalized methodologies to be developed on the subject in Texas. However, as set forth in the body of the report, these methodologies and the projections derived from them should serve only as the default baseline numbers when applied on a county or regional basis, and should be adjusted when actual county-specific data is available that indicates clear projections to the contrary.

In carrying this research forward for utilization on a rolling 50-year planning horizon, water planners should note the resources that were deemed by the project team to be the most reliable for predicting future water demand projections for power generation, including information from the PUCT, ERCOT, the EIS and others regarding existing, announced, and projected electric generation, to determine whether such records and data will continue to be collected and to work towards supporting such a continuation if the methodologies developed in this study should continue to be utilized in the future. The labor-intensive effort required to gather and assimilate the plant-specific data for each of the generation facilities in the state might prove implausible but for the availability of such centralized records.

As assumed by the project team at the onset of this research effort, the statewide methodology appears to be much more reliable as a predictive tool than the countyspecific methodology. However, the utilization of announced generation facilities, as available, and the trending of electric generation projections by fuel-type and their associated water use factors should prove to be more accurate than other alternatives in the absence of site-specific information.

Water planners will continue to be challenged to accurately predict future power generation water demands in Texas, especially on a localized basis. In large part, this stems from the fact that location of the demand for the water and the location of the end product of that demand, electricity, have little, if any, proximity requirements with modern advances in electric transmission technologies. Other factors unrelated to water supply that drive site selection considerations for future power generation, such as availability of transmission facilities and fuel supplies, emerging generation technologies, and other regulatory considerations such as air quality limitations, may be much more dispositive of the issue than water availability and, indeed, may lend more credence to the assignment by the project team of future generation and related water demand to existing and announced facilities .

Appendix A Electric Generating Units in Texas

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Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-906, and PUCT Report on New Electric Generating Plants in Texas Appendix A1

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Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806B, EIA-806B, and PUCT Report on New Electric Generating Plants in Texas

Appendix A1

1/27/2003

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		+		NIN	500	8 760	5		
Fort Davie	Leff Davis		6600	MIND	1996	57.816		:	
Dreeman	Presidio	·	1136	DEO	1967	19.903			
Presidio	Presidio	ບ 9	1,136	DFO	1967		· · · · · · · · · · · · · · · · · · ·		
				9	, E	667 MM	Core theorem		
Oak Creek	Coke		000'e/	2	1302	000/200			
Coleman	Coleman	2 2 2 2	85	5	1955	14/,054			
Coleman	Coleman		000	9 V	1959				
Coleman	Coleman		8	5	1951			-+	-
Coleman	Coleman		No.	52	1961				
Coleman	Coleman		007'Z	2	1908				
Coleman	Coleman			2	0701				
Coleman	Coleman		8	2	19/8				

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806B, and PUCT Report on New Electric Generating Plants in Texas

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Water Use Factor (gal/KWhr)		0		0.75	900	900	06	005	8	0.6		3	-				0.35				0	0	0	0 0	5	0 23	0	0	0	00	500	}			30	8	0		0.23	0.05	2010	90	0.23	0		0.75	:		-0
Water Source		•	Groundwater	Groundwater													Lake			Lake Lake						Lake		-							Constant	Grownwater						Brazos River				Groundwater	Groundwater	Groundwater	
Cooling Type	and the second second second second second		Cooling Tower	Cooling Tower							and and the second				· · · · ·		Once Through	Once Through	Once Finougn	Once Through						Once Through									Continue Trauser	Control Tower	P				:					Cooling Tower	Cooling Tower	Cooling Tower	Bunn Bunnn
Capability at 100% Load Factor (MWhrs)		43,800		1,068,440	1,287,720	1,287,720	1,953,480	1,287,720	1,287,720	1,953,480	308,409 4 707 064	toc'70 / t					7,247,630				1,314,000	43,800	876,000	1,401,600	m/77/	963 600	665,760	1,752,000	22,776	65/ 000	3 919 136	22.12.25			5 607 077	110'100'0	700,800	+	4,555,200	1,489,200	1,409,200	876.000	4 415 040	262,800		1,016,160			100 700
Year in Service	1986	1998	1959	1969	2001	2001	2001	2001	2001	2001	666	866	1988	1988	1968	1988	1950	205	1040	986	2001	1958	2003	5.5	1005	8 8 8 8 8 8 8	2001	2001	2001	6661	198	1988	1968	1990	1990	1973	delayed		delayed	2000		200	2001	1953	1953	1955	1958	98 98 98 98 98 98 98 98 98 98 98 98 98 9	9204
Fuel Source	S	ŊŊ	ÿ	Ŷ	Ŷ	9 S	Ŋ	Ŷ	Ű	9NG		2 92	g	NG	Ŷ	ÿ	2	202		D N	QNW	Ŷ	QNIM	ONM	NIC	202	QNM	QNW	ONM	MIND	SN	9 2 2	Ű	Ű		22	ONIM		9 V	9 Q	202	202	UN N	WAT	WAT	Ű Z	U C	U U	2
Nameplate (KW)	4,000	5,000	33,000	896,968	147,000	147,000	223,000	147,000	147,000	223,000	40,920 80,478	89.47B	89.478	89,478	89,478	89,478	18,400	4000 2000 2000	120,466	517,500	150,000	5,000	100,000	160,000	25,000	85,000	76,000	200,000	2,600	000'97	89.478	89,478	89,478	89,478	09,4/8 114 054	535,500	80,000		520,000	1/0,000	170,000	000001	504 000	15,000	15,000	13,000	24,000	72 000 74 000	386
Prime Mover	<u>ා</u>	G	ST	ST	5	5	3	5	5	S.	¥ ا	5 5	GT	ન	GT	5	5	7	55	S1	Μ	5	5	TV TV	<u>ة</u> ا	55	ž	WT	ž	N	5	وا ز	GI	5	5	212	M	-	8	5 t	5 5	58	ទ	È	¥	ST	ST S	2 10	58
Chit	6 <u>0</u>	ŧ	2	9							Ę	CT2	СTЗ	CT4	CT5	CT6	2		a u	о		~			-	- ~				5	E	C12	CT3	5	ŝ	, u				55	7 7 51 7	215	5	-	2	ε	4.		
County	Coleman	Crockett	Crockett	Crockett	Ector	Ector	Ector	Ector	Ector	Ector	Michal	Mitchell	MICTER	Mitchell	Pecos	Pecos	Pecos	Pecos	Tom Creen	Tom Green	Upton	Upton	Upton	Upton	Ward	Ward	Ward	Ward	Ward	Ward	Winkler		Bell	Bosque	Bosque	Bosoue	Bosoue	Bosque	Bosque	Brazos	Brazos	Brazos							
Plant	Coleman	Rio Pecos	Rio Pecos	Rio Pecos	Odessa-Ector Generating Station	Big Spring wind Power Facility	Morgan Creek	Morgan Creek	Morgan Craek	Morgan Creek	Morgan Creek	Morgan Creek	Morgan Creek		Moraan Creek	Desert Sky	Fort Stockton	Capital Hill	Woodward Mountain Wind Ranch	San Annah	San Anoelo	King Mountain Wind Ranch	King Mountain Wind Ranch 1		West lexes Wind Energy LLC - SW Mesa	Permian Basin	Permian Basin	Permian Basin	Permian Basin	Permian basin Demian Racio		Notrees		Bell Energy Facility	Mirant Texas LP Bosque County Plant	Mitart Texas LP Bosque County Plant	Mirant Texas LP Bosous County Plant	Mirant Texas LP Bosoue County Plant	Whitney	Whitney	Atkins	Atkins	Atkins						
n Company		AEP WTU			Panda				:		YORK Kesearch										AEP	AEP WTU	Cielo	FP&L			FP&L	FP&L	FP&L	FP&L	TXU Erteigy / CIERO VVIN						York Research		Duka	Mirant				USCE		Bryan			
Region	Ŀ	 	: LL .	L	L .	u.	ч	ıد ا	L	u ļi	L U		Ŀ	Ŀ	Ŀ	u.)	u l	- L	- 4			Ŀ	ш.	ᄕ	lu	L	. ц.	Ŀ	u.		- -	. 46	Ľ	: بد ا	⊾¦⊔ ¦⊔	-	Ŀ		0	0	50	<u>ອ</u> ແ	0	00	С	G	0	00	9

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-906, and PUCT Report on New Electric Generating Plants in Texas

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Water Use Factor	(III AAN / TOPA	0.27	0.35	0.6	80	800	0.05	0.35		-		0.23	0.05		:		0.35	3	0.6		0			0.35		7.0	0.35	8	> 0	0.05	005	0.05	0.6		0.27		!	0.05		0.0	0.50	058	96 0	0.35		-	0	0	02	-	0.33	67 O
Water Source		Lake	Lake	Lake Livingston				Lake	Lake	Lake	Lake					L aba	i aka	Lake	Surface	Surface		-		Lake	Lake	Lake	Land	Latra	•					-	Lake	Lake	Lake		, ,	Groundwater	GIGUTOWAIK	Lake	Surface	Lake	Lake				Sat	Salt	Nai L	_
Contino Tvos	arti: Autom	Once Through	Once Through					Once Through	Once Through	Once Through	Once Through					Cores Three with	Orea Thready	Orea Thranch	Cooling Tower	Cooling Tower				Once Through	Unce Inrough	Chee Integr	Once Through								Once Through	Once Through	Once Through		ł	Cooting tower	County Lower	Once Through	Cooling Tower	Once Through	Once Through			-	Once Through	Once Through	Unce Inrough	
Capability at 100% Load Factor (MWhra)	lenum	919,800	3,869,177	3,417,285	1,604,832	1,604,832	1,604,832	1,910,950				7,267,296	3, 135, 309			7 000 000	7 0054 041		14 250 768		52,560			2,764,875	17 000 170	12,000,172	5 17A DDS	1 314,000	3.504.000	291.270	637,378	637 378	/63,8/2	713,000	3,206,160			2,081,691		766,900,5	24 70C BOD		131.400	5,560,629			47,584	43,800	20,104,200		7 000 000	
Year in Service	B314 60	1978	1983	2000	700	200 200	200	1953	1965	1959	1971	2002	1990	1990	1990	1990	197.01	1977	385	396	1966	1966	1966	1953	ROS	0/61	10.81	1000	delaved	1989	1989	1980	1969	ţ,	1968	1972	1975	<u>8</u>	1994		R C	1993	1949	1960	1969		2002	unknown	1970	1972	19/4	362
Fire Spurce		Ű	SUB	Ŷ	Ŷ	ÿ	ÿ	Ŋ	9 2	NG	NG	Ŷ	ŰN N	ÿ	2 2 2	2 S	2 4		9		DFO	DFO	DFO	92	9 (J	29	29	2 MMD	ONM	ÿ	Ŋ	Ű	DNG.	WAT	9X	9N N	Ŷ	Ŷ	9 C	200	2 2	NIN	U N N	UN N	SN NG		LFG	LFG	2	9 X	9 () 2 2	5
Namepiate (L/W)	+	105,000	443,970	390,101	183,200	183,200	183,200	30,000	33,000	50,000	105,145	829,600	89,478	89,478	69,478 50,478	59,4/8 700,200	100,000	100,862	813,400	813,400	2,000	2,000	2,000	79,625	236,000	000'000	133,200 500 640		400,000	33,250	72,760	72,760	87,200	12 500	000	100,000	200,000	118,818	118,818	1/4/600	1/4/000	1 215 000	15,000	247,775	387,000		5,432	5,000	765,000	765,000	/62/000	
Prime		ST	ST	\$	5	5	5	ST	ST	ST	ST	ខ	5	5	55	55	0 L	5	ST.	ST	2	ບ	2	5	50	10	55	55	5	CT	сı	ដ	53	ĒŻ	st	ST	ST	5	55	5	<u>,</u> 5	5	ST	ST	ST		_от	01	ST	ST 24	12	3
t I	5	-	-	STG1	6183 61	GIG	GT62	-	2	e	4		CI	5	55	5-			-	2	δ	62	8	LI S	212		v •	4		GTOI	GT02	GTB	s161	- ^		7	e	4	، د	- (N •	- ^	4	-	2				-	~ ~	m	
County	Annon	Brazos	Grmes	Grines	Grimes	Grimes	Grimes	Haskell	Haskell	Haskell	Haskell	Hood	Hood	Poot	Hood	HOOH	2000		1=	<u> </u>	McLennan	McLennen	McLennen	McLeman	McLennan	McLennan Mol concer	MCLERTER	TIENT	Nolan	Notan	Notan	Nolan	Noian	Palo Pinto	Palo Pinto	Palo Pinto	Palo Pinto	Palo Pinto	Palo Pinto	Kobertson	NOOBITSON	Somervelt	Tawlor	Young	Young		Brazoria	Chambers	Chambers	Chambers	Chambers	
Blant		Dansby	Gibbons Creek	Frontier Generation Station	Frontier Generation Station	Frontier Generation Station	Frontier Generation Station	Paint Creek	Paint Creek	Paint Creek	Paint Creek	Wolf Hollow LP	DeCordova	DeCordova	DeCordova	DeCordova				Limestone	Lake Creek	Lake Creek	Lake Creek	Lake Creek	Lake Creek	Iradinghouse	1 rading rouse	Sandow Territ Maria	Free Wind	Encoden One	Encogen One	Encogen One	Encogen One	Morris Sheppard	RW Miler	RW Miller	RW Miller	RW Miller	RW Millor	TNP One	INP COR	Comarcha Paak		Graham	Graham		Coastal Plains	Atta Loma	Cedar Bayou	Cedar Bayou	Cedar Bayou	Brazos Valley Generating Facility
	Company	Bryan	MPA	Tenaska				AEP WTU				AES	TXU						Relian		TXU					IXO				TXII				BKA	Brazos Electric					TNM			AFP WTI I	TXU			Reliant Enerov Renewables	Energy Developments, Inc	Reliant			Avista / NRG Energy
					ю	σ			ა	ю	σ	۹ ع		J	5	00	T	T	- <u>u</u>		0		g	0	i		1		<u>ر</u>	1		U			00		თ	σ	9	-		- 9 0			0		T			I	T	ļ

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Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-906, and PUCT Report on New Electric Generating Plants in Texas

Water Use Factor	(IIIAAY/IRA	0.27				80	ű	2	0.2			ę	20	0.05	0.05	0.05	9.0	950	30					c	0				¢	 	0.27				0.05	}	0.75	0.23									0	-	
Water Course	Marter Source	Lake	Lake	Lake	Lake	Lake	C. ufaco	Surface	Sat	Salt	Salt	Salt					400	Surface				······		Counterburger	Groundwater			L			Sat	Salt	salt	Sall			Groundwater	Groundwater				Groundwater						:	
Cooline Tune	addir fillinoon	Once Through	Once Through	Once Through	Once Through	Once Inrough	Coding Tough	Coloring Tower	Once Through	Once Through	Once Through	Once Through					the second second	Contine Trouge	A DEC A												Once Through	Once Through	Once Through				Cooling Tower	Cooling Tower				Cooling Tower							
Capability at 100% Load Factor	(emm)	10,997,304				12,001,432	10 767 700	701 101 01	20,275,020			10 77 000	23 652	350,400	350,400	350,400	350,400	3 910 464	3 784 320					040 050	040,500				020 023	878 ¹ 10	7,238,388		_		1.545.264		2,170,728	5,671,224						+		1 610 663	4,010,503		
Year in Service		1958	1968	1961	896	19//	10001	366	1966	1967	1968	1973 Helonor	unknown	2001	2001	2001	2001	1973	1976	1976	1976	1976	1976 4076	1050	800	1968	1968	1968	306	1961	1958	1956	1959	1900	1995	1995	1960	1974	1972	1972	1972	1974	1972	1972	1974	1974	1975	1975	1975
		S S	Ű	Ŷ	D C	SUB SUB		SIB	ŰŽ	g	ŰŽ	9 g	LFG	9 N	ŊĊ	9 g	20		D N	ÿ	Ŋ	Ű V	Ű Z	202	202	Q.	Ŷ	9	5 U	202	NG N	Ŷ	9 V	2 Z	202	NG NG	Ŋ	М	9 Z	D C	2 DN	Ŧ	Ű	Э <mark>Р</mark>	S N	ŰZ Z	2 S	29	9 2
Namepiate	-	187,850	187,850	299,200	560,500		614 EM	614 600	484 500	484,500	580,500	765,000	2 700	40,000 0000	40,000	40,000	40,000	446 400	72 000	72,000	72,000	72,000	72,000		16,000	16,000	16,000	16,000	16,000	16.320	187,850	187,850	225,300	16.300	88,200	88,200	247,800	113,100	51,300	00213	51 300	113,100	51,300	51,300	56,700	56,700 56,700	85,000	85,000	85,000
Prime		ST	ST	ST I	5	7	55	51	ST	sı	ST	rs L	36	G	ન	59	55	5 LS	55	GT	ច	5	5	55	5 5	61	6	5	55	5 5	ST	ST	LS LS	<u>ہ</u>	<u>م</u> و	5	ST	S	5	5 C	55	S	ដ	ن	5	55	56	5	55
1	5	-	2	ო	4	n - u		- œ	-	2	en :	4					•	- v .	2	74	8	8	83	8 F	619	GT3	GT4	Ś	ωĘ	612	ST1	ST2	m -	ي م	SJS1	SJS2	2	m	<u>ب</u>	88	3 3	4	41	4	4	4 1	5.6	ងន	3 1
	Autom A	Fort Bend	Fort Bend	Fort Bend	Fort Bend	For Bend		Fort Band	Galveston	Galveston	Galveston	Galveston	Hamis	Hamis	Harris	Harris	Hams	Harris	Harris	Harris	Harris	Harris	Hams		Hamis	Harris	Hamis	Harris	Hams	Harris	Harris	Harris	Hamis	Hamis	Harris	Harris			Harris	Hams	Hamis	Harris	Hamis	Harris	Harris	Hams	Harris	Harris	Hams
		WA Parish	WA Parish	WA Parish	WA Parish	WA Parsh	WA Falst		PH Robinson	PH Robinson		PH Robinson License Economic Econities	Whispering Pres	LaPorte Generating Station	LaPorte Generating Station	LaPorte Generating Station	LaPorte Generating Station	Greens Bavou	Greens Bavou		Greens Bayou	Greens Bayou	Greens Bayou	Uters Dayou	High Clark High Clark	Hiram Clark	Hiram Clark	Hiram Clark	Hiram Clark	Sam Bertron	Sam Bertron	Sam Bertron	Sam Bertron	Sam Bartron Sam Ratron	San Jacinto SES	San Jacinto SES	TH Wharton		TH Wharton	TH Whaten	TH Whaton	TH Wharton	TH Wharton	TH Wharton	TH Wharton	TH Wharton	TH Whaten	TH Whatton	TH Wharton
	3								Rekant		A COMPANY OF A COM		Finercy Developments Inc	Exelon			Defeat	Reliant						Deficient	Keliart										Reliant		Reliant												
and and a second se		Ŧ	: I I I	I	I.	I 13	- 3	Ţ	: I	I	I	IJ	: 1	I	I	I	I I	! = 1	: 1	Ŧ	Ŧ	I	I	z 3	L.I	: I	Ŧ	I	I	c I	T	I	I.	I I	T	I	I	I	r	I.I	c x	Ŧ	I	I	I	I 1	I I	Ţ	'±::

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Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-906, and PUCT Report on New Electric Generating Plants in Texas

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				Ei d	Namenjata		Yoar in	Capability at 100% Load Factor			Water Use Factor
Company	Plant	County	Cnit	Mover	(wy)	Fuel Source	Service	(WMhrs)	Cooling Type	Water Source	(gal/Mmhr)
	TH Wharton	Hamis	8	લ	85,000	ŷ	1975				
	TH Wharton	Harris	61	5	16,320	9	1961				
Reliant	Webster	Hams	5	5	16,320	g g	1967	142,963			0
telfant Canal Canal	Webster	Nams And	n	55	410,040	2 Z	200	3,591,900			
Kenami Energy Kenewaldies	Auascosita LF			55	240	26	2002	100 /1			
Reliant Energy Kenewables	Baytown Dit is Docred	Hame	+	5 5	204 C	2 3	2002	17 853			
Keliara criengy Kenewades		1 marts		5 5	240,000	22		2 102 400			
Raliant Friamu Renewahlee	San ritu	Liberty		55	4 074	591	2003	35.688	reprinted and a state of a second second state from the second state of		
Concession in the second se Second second se	Certer Rinff Dower Dmiact	L marty	-	58	600 000	ט (ע נ	2005	5 256 000			0.23
Company Cult States	I autic Creak	Montonerv	-	ST	271 400	ž	1970	4 754 928	Orce Through	1 aka	0.27
	t awis Creak	Montcomerv		S1	271.400	UN SN	1971		Once Through	Lake	
Reliant Energy Renewables	Carroe	Mongomery	,	5 10	3,067	5 5 1	2003	26,779	B		0
Semora	Montgomery County Energy Project	Montgomery		ខ	600,000	9y	2006	5,256,000			0.23
Warren	Warren Peaking Power Facility	Mongomery		ខ	373,000	ŋ	unknown	3,267,480			0.23
			Ī	!			:				
Newport	Palestine Power Project	Anderson		ខ	1,600,000	g	delayed	14,016,000			0.23
TXU	Siryker Creek	Cherokee	δ	2	5 ⁰ 00	DFO	1 <u>96</u> 6	87,600			•
	Stryker Creek	Cherokee	8	ల	2,000	DFO	1966				
	Stryker Creek	Cherokee	8	Q	2,000	DFO	1966				
	Stryker Creek	Cherokee	32	29	2 ^{,000}	040	1966				
	Stryker Creek	Cherokee	3 5	25	30,2	2	005	C 401 40E	Once Theorem		30.0
	SUTAGE CROOK	Chambee	50	<u>,</u>	1/0,000	222	1001	0,102,403	Once Through		8
	Dovod D Mallie	Cristukes Isenar	1015	<u>,</u>	3600	WAT	966 080	63.072			c
300	Detroit D Millio	Jashar Isenar	- 0	È	2600	WAT	1080	1000		-)
USCE	Sam Ravburn	Jasper	4-	: ` £	26,000	WAT	1965	455,520			•
	Sam Rayburn	Jasper	2	۲Y	26,000	WAT	1965				
Calpine	Amelia Energy Center	Jefferson		ິວ	000'006	Ŋ	delayed	7,884,000			0 23
Port of Port Arthur	Sabine Power	Jefferson		8	1 000 000	ÿ	delayed	8,760,000			0.23
Steag Power	Steme Electric Generating Facility	Nacogdoches	+-	8	9/8/000	DN I	2006	8,567,280		Angelina River	0.23
Entergy Gut States	Loledo Bend	Newton		23	40,200	WAI	1060	NOC SOL			>
Harthun	Harthurn Prover I P	Newton	•	8	000 008	C UN	delawed	7 008 000			0,23
Intergen	Cottonwood Energy Project	Newton		ვ	1,200,000	Ð	2003	10,512,000			0.23
Gulf States	Sabine	Orange	-	ST	239,400	Ű	1962	17,968,512	Once Through	Sat	0.27
	Sabine	Orange	~	ST ST	239,400	9 Z	1967		Once Through	Salt	
	Sabre	Orange	-	7	4/3,400	24	7051		Once Inrough		
	Sabre	Orange	4 u	- - -	201,000		19/4	,			
	Joanne Martin Lake	Rusk	, -	sT S	793.250	297	1977	20.846.610	Once Through	Lake	0.35
2	Martin Lake	Rusk	. ~	sT	793,250	10	1978		Once Through	Lako	
	Martin Lake	Rusk		ST	793,250	FIG	1979		Once Through	ake	
Tenaska	Gateway Generating Station	Rusk		5	179,000	9 Z	2001	1,568,040		Toledo Bend	0 09
	Gateway Generating Station	Rusk		51	179,000	ÿ	2001	1,568,040		Toledo Bend	0.05
	Gateway Generating Station	Rusk		5	179,000	9 V	2001	1,568,040	and a second	Toledo Bend	900
	Gateway Generating Station	Rusk		5	400,000	Ű	2001	3,504,000		Toledo Bend	0.6
		Viel Verde		3	33 000	TAAT	1001	670 1EO			
IBWC	Amistad	Val Verce Val Verce	- ~	ξž	33,000	TAW	1081				>
			•		2002/200						
FP&L	Bastrop Energy Center	Bastrop		85	540,000	9 Z	2002	4,730,400		· · ·	023
Gentex / Calpine	Lost Pines I Power Project	Bastrop				C Z		1 717 580			

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806B, and PUCT Report on New Electric Generating Plants in Texas

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Recion	Company	Pant Part	County	ĬŠ	Prime Mover	Nameplate (KW)	Fuel Source	Year in Service	100% Load Factor (MMhrs)	Cooling Type	Water Source	Water Use Factor (gal/kWhr)
		Lost Pines Power Project	Bastrop	•	55	199,400	22	2001	1 /46 /44	Once Thread		90.0
<u>م</u>	LCHA		Bestrop		5		2 2			Once Through		0.21
2 2		Sim Gideon	Rastron		5	351 000		1972		Once Through	Lake	
		Buchanan	Burnet		÷	18,300	WAT	1938	419,166	b	-	0
: ¥		Buchanan	Burnet	5	¥	18,300	WAT	1938				
- ¥		Buchanan	Burnet	3	¥	11,250	WAT	1938			•	
	LCRA	Granite Shoats	Burnet	-	₹	22,500	WAT	1961	394,200			0
-		Granite Shoals	Burnet	2	È	22,500	WAT	1951				
L X	LCRA	Inks	Burnet	-	₹	15,000	WAT	1938	131,400			•
	LCRA	Marbie Falts	Burnet	-	₹	15,000	WAT	1951	262,800			0
'		Marble Falls	Burnet	7	¥	15,000	WAT	1951				
۲ ۲	LCRA	Fayette	Fayette	-	ST	615,000	SUB	1979	14,804,400	Once Through	Lake	0.35
-			Fayette	7	ST	615,000	SUB	1980		Once Through	Lake	-+
			Fayette	e	ST	460,000	SUB	1988		Once Through	Lake	:
	LCRA	Thomas C Ferguson	Liano	-	ST	446,000	Ŷ	1974	3,906,960	Once Through	Lake	0.27
	Ridge Energy Storage	Markham Energy Storage Center	Matagorda		5	2/0/000	OIH 0	2004	2,365,200			0
¥	Reliant	STP	1	- (S1	1,354,320		1998	23,(27,000	Once Ihrough		88
			Transie	•	53	0.000	MUC	506	141 364			8.0
	LUNA		Travis		23	800	TAM					
4 2 4	Austo	Derie	ť	٩, ۱	GT	51 570	UNC.	1988	1 807 013			0 05
		Decker	Travis	612	55	51.570	U N	1988		· · ·		
: : ¥		Decker	Travis	613	6	51,570	S	1988				:
: ¥		Decker	Travis	GT4	5	51,570	9 V	1988				
×		Decker	Travis	PV3	۲	30	NUS	1987	2,628			0
×		Decker	Trævis	-	ST	321,000	9v	1971	6,359,760	Once Through	Lake	0.27
¥		Decker	Travis	2	ST	405,000	g	1978		Once Through	Lake	
*	Austin	Hoty	Travis		ST	100,000	S S	1960	4,868,080	Once Through	Lake	0.35
¥		Holly	Travis	~	ST ST	100,000	IJ.	1964		Once Through	Lake	
-+		Holly	Fravis	-	5	185,000	2	1961		Once Irrough	Lake	-
ſ		Holly	Iravis	4.	7	195,000	2 9	4/61	2 110 020	Upport action	Lake	100
۹ ۲ ک	Austin		Travis	- ~	5 5		2 2		070'011'7			3
÷		Sand He	Travis	6	5	60,500	9 V	2001				
1		Sand Hill	Travis	4	G	60,500	NG	2001				
	Austin Energy	Sand Hill	Travis		<u>റ്റ</u>	300,000	Ŋ	2003	2,628,000	Cooling Tower	Reuse	0.23
		Sand Hill	Travis		ខ	250,000	Ŷ	2007	2,190,000			0.23
	Ecogas	Ecogas	Travis		5	5,000	LFG	unknown	43,800			0,0
=	CRA	Marshall Ford	Iravis	- (E 3	35.20	WAI		H67'060			2
+		Marshall Ford	Travis	2	EŻ		WAT V	i j				
-	AFP		Wharton	GEN	5	78.750	NG	1984	689,850			0.05
		Newgulf	Wharton	GEN2	5	12,500	NG	1988	109,500			9.0
+ +												
	San Micuel	San Miguel	Atascosa	-	ST	410,000	LIG	1982	3,591,600	Cooling Tower	Groundwater	0.6
	CPS San Antonio			-	сı	174,690	Ŋ	2000				
+ 		A Von Rosenberg	Bexar	7	5	174,690	Ŷ	2000				
		A Von Rosenberg	Bexar	e	8	200,250	У Ч	2000	4,814,759	Once Through	Reuse	0.15
Ľ	CPS San Antonio	JK Spruce	Bexar	-	sı	546,000	SUB	1992	4,782,960	Once Through	Reuse	0.35
	CPS San Antonio	JT Deely	Bexar	**	ST	446,000	SUB	1977	7,813,920	Once Through	Reuse	0.35
		JT Deely	Bexar	N (L I	446,000	SUB	1978		Once Through	Reuse	
-	CPS San Antonio	Leon Creek	Bexar		<u>5</u> 5		22	1993		Cooling Tower	Groundwater	e/ n
-	CDC Can Antonin	Leon Urbek Mission Brad	Rexar	4 0	5.		20	600 F			COURTWALE	
- .					5	14 (10)	ź	002	998 640	Cooling Lower	Groundwater	c/ n

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806, and PUCT Report on New Electric Generating Plants in Texas

Appendix A1

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Bear A KC Bear C Bear C Bear C Bear C Bear C Bear C Bear C Bear C Bear Bear C C Bear C Bear C C Bear Bear A K K Bear C Bear A K Comal C Comal T K	446,000	Ŋ	1974		Once Through	Reuse
Bearar D C Bearar D D Bearar	2,500	DFO	1974	87,600	Once Through	Reuse
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n Cambon 1 FT rdro of Texas Inc. Comel 1 FT rdro of Texas Inc. DeWitt 01 HY rdro of Texas Inc. DeWitt 03 HY rdro of Texas Inc. DeWitt 1 HY rdro of Texas Inc. DeMatalupe 1 HY rdro of Texas Inc. Caratalupe	5,200		٤	45,552		
An of Texas Inc. Comal 1 HY An of Texas Inc. DeWith 01 HY An of Texas Inc. DeWith 03 HY An of Texas Inc. Contales 1 HY An of Texas Inc. Contales 1 HY <tr< td=""><td>234,874</td><td>Ű</td><td>+</td><td>2,057,496</td><td>Once Through</td><td>Salt</td></tr<>	234,874	Ű	+	2,057,496	Once Through	Salt
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The set of the s	283	MAI	1993	5,160		
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s Gonzales 2 HY P 3 Gonzales 3 HY P 3 Gonzales 1 HY Conzales 1 HY P 3 Gonzales 1 HY Conzales 1 HY Gonzales 1 HY Gonzaleupe 2 HY R HY Guadatupe 2 HY Guadatupe 1 HY Guadatupe 1 HY Guadatupe 2 HY Guadatupe 1 HY Guadatupe 2 HY Guadatupe 1 HY Guadatupe 2 HY Guadatupe 2 HY Guadatupe 2 HY Guadatupe 2 C C Guadatupe 2 C C C Guadatupe C C C C C Guadatupe C C C C C C C C C C C C C C C C C C C	200	WAT	+	13.140		
s Gorzales 3 HY P 3 Gorzales 1 HY P 3 Gorzales 1 HY P 3 Gorzales 1 HY P 1 Gorzales 1 HY P 2 Gorzales 1 HY P 3 Guadaupe 2 HY P 1 Guadaupe 1 HY P 2 Guadaupe 1 HY P 3 Guadaupe 1 HY P 4 Guadaupe 1 HY P 5 Guadaupe 1 HY P 6 Garatupe 1 HY Garatupe 1 HY Guadaupe P 9 Garatupe 1 HY	2005	WAT	1981			
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P 3 Garcales 1 HY P 3 Gardatupe 1 HY P 1 Gardatupe 1 HY P Gardatupe 1 HY HY P Gardatupe 1 Gardatupe C1 P Gardatupe 1 HY HY P Gardatupe 1 HY P Gardatupe C1 C1 P Gardatupe C1 C1 P Gardatupe C1 C1	2,400	WAT	1931	21,024		
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Reservative 1 HY Adduce 1	1800	WAT	1927			
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All control of the co	200	NA I	9751	2,190		
ales Power Project Guadalupe 1 HY pe Generating Station Guadalupe STG1 CK pe Generating Station Guadalupe STG3 CA pe Generating Station Guadalupe CTG3 CT pe	520	0 <u>+</u> 0	1900	+		
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pe Generating Station Guadalupe CTG3 C1 Pe Generating Station Guadalupe CTG4 CC 1 Hays Project Hays 4 ST 1 Victoria 5 ST	184,600	5		1,617,056		
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2.0 	185.000	D cr	ł	1 620 600		

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806B, and PUCT Report on New Electric Generating Plants in Texas

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AEP CPL	Plant	County	Cuit	Prime Mover	Nameplate (kW)	Fuel Source	Year in Service	100% Load Factor (MWhrs)	Cooling Type	Water Source	Factor (gal/kWhr)
PUB Brownsville	La Palma	Cameron	4	ST	20,000	NG	1947	1,692,651	Cooling Tower	Surface	0.75
PUB Brownsville	La Paima	Cameron	5	ST	20,000	ŷ	1949		Cooling Tower	Surface	:
PUB Brownsville	La Paima	Cameron	9	ST	153,225	ŷ	1970		Cooling Tower	Surface	
PUB Brownsville	La Peima	Cameron	~	ы С	49,100	Ŷ	1975	430,116			0
	Silas Ray	Cameron	s.	ST	25,000	ÿ	1952	219,000	Cooling Tower	Surface	0.75
	Silas Ray	Cameron	9	\$	22,000	ğ	1959	657,000	Cooling Tower	Surface	0.23
	Silas Ray	Cameron	80	5	45,000	g	1973	394,200			•
	Sitas Ray	Cameron	თ	5	53,000	Ŷ	1996				
AEP CPL	JL Bates	Hidalgo	-	ST	80,000	Ű	1958	1,454,160	Cooking Tower	Surface, Groundwater	0.75
	Jt. Bates	Hidalgo	7	ST	100 0000	ÿ	990		Cooking Tower	Surface, Groundwater	
Calpine	Hidalgo Energy Center	Hidalgo	CIG	5	162,300	ÿ	2000	1 421 748			800
	Hidalgo Energy Center	Hidalgo	CIG	5	162,300	Ŷ	2000	1,421,748			0.05
	Hidalgo Energy Center	Hidalgo	STG1	₹	175,400	9 Z	2000	1,536,504			000
Calpine	Magic Valley Generating Station	Hidalgo		5	265,000	9 Z	2001	2,321,400			8.0
	Magic Valley Generating Station	Hidaigo		5	265,000	g	2001	2,321,400			900
	Magic Valley Generating Station	Hidalgo		ડ	265,000	ÿ	2001	2.321,400			90
TECO	Frontera Generation Facility	Hidalgo	GENI	<u>כ</u>	164,000	ŷ	1999	1.436,640			8
	Frontera Generation Facility	Hidalgo	S S S S S	5	164,000	ÿ	1999	1,436,640			0.05
	Frontera Generation Facility	Hidalgo	GEN3	ర	183,000	g	2000	1,603,080			0.6
AEP CPL	Eagle Pass	Mavenck	-	₹	4,000	WAT	1932	105,120			0
	Eagle Pass	Maverick	~	≩	400	WAT	1932	i			
	Eagle Pass	Maverick	en	È	8	WAT	1932				
IBWC	Falcon	Starr		₹	10,500	T AN	1994	2/5,940			-
	Falcon	Start	2	È	005.01	WAI	5		a construction of the second		
	Falcon	Start	~ ~	H L		MA	1051	1 474 220	Continue Trateor	Surfana	0.75
AEP CPL		Webb	- c	7 5		2	1056	1,4/14,220	Coling Tower	Surface	2
	Laredo,	MeDD	N	2	20,000	29	225				-
	Laredo	MeDD		7		2	CIAL		Looning Lower		
Croectey	Diwa	Duval		0L	310.000	OTH	2005	2.715,600			•
AFP CPI	Ramev M Davis	Nueces	-	ST	323.449	ŊQ	1974	5,668,973	Once Through	Salt	0.27
15	Barney M Davis	Nueces	2	ST	323,694	ŊQ	1976		Once Through	Salt	
AFP CPI	lon C Hill	Nueces		ST	60,000	9y N	1954	4 475 256	Cooling Tower	Surface	0.75
	Lon C Ha	Nueces	2	ST	66,000	ÿ	1956		Cooling Tower	Surface	
	Lon C Ha	Nueces	e	ST	150,000	Ŷ	1959		Cooling Tower	Surface	
	Lon C Ha	Nueces	4	ST	234,874	ğ	1969		Cooling Tower	Surface	
AEP CPL	Nueces Bay	Nueces	5	ST	30,000	g	1949	4,499,969	Once Through	Salt	0.27
	Nueces Bay	Nueces	9	ST	160,000	ÿ	1965		Once Through	Salt	
	Nueces Bay	Nueces	2	ST	323,694	9 V	1972		Once Through	Salt	
Avista	Nueces Energy Project	Nueces	•	ខ	1,200,000	S	unknown	10,512,000			0.23
Robstown	Robstown	Nueces	9	<u>ں</u>	4,150	ÿ	1967	184,582			0
	Robstown	Nueces	= ,	<u>ں</u>	2,000	S C	19/2				
	Robstown	NUBCBS	n	219	242	24	020				
	Robstown	Nueces	4 4	<u>د</u> د	0,420	2.2	1070				
	KODSIOWN	NUMBER	7	2 C	000		1065				-
	Pohotore	Nueces	- α	2	38		1955				: :
		Niceree	- -	<u>ء</u> د	2615		500				
	Koosuwi	coroniu	5	2	2017	2	3				
0 Floydada	Floydada	Floyd	2	2	1,250	9 Z	1952	61,320			•
	Floydada	Floyd	m)	2	1,250	9 2	1958				
	Floydada	Floyd	4	: د د		2	19/4				
	Floydada	Floyd	n (29		202	19/4				
	rioydada		o : •	2:5	000 or	2	19/0	2 DOE 244	Contract Tourise	Groundwater	0.76

Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-906, and PUCT Report 1. New Electric Generating Plants in Texas

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	<u>Pirat</u>	County	iu I	Prime	Nameplate	Fire Source	Year in Sarvice	Capability at 100% Load Factor (MWhrs)	Cooline Twee	Water Source	Water Use Factor (gal/kWhr)
region company		A	5					la mana			
-	Plant X	Lamb	2	ST -	86,000	9 N	1953		Cooling Tower	Groundwater	
0	Plant X	Lamb	m •	5	98,000	202	881		Cooling Lower	Groundwater	-
0			ਚ ਂ ਦ	<u>, 1</u> 0	190,400	200	4000	0.061 260	Cooling Tower	Croundwater	e e
O XOBIANA		Larito Larito	- , c	55			1005			Crymonator	
O Cielo / Linhock P&I		1 ubbock	N.	55	2.640	MIND	2002	23.126			-0
1		Lubbock		5	21.000	9NG	1990	183.960		:	0.05
!	J Robert Massengale	Lubbock	4	ST	11,500	Ŷ	1962	201,480	Cooling Tower	Reuse	0.75
	J Robert Massengale	Lubbock	5	ST	11,500	9NG	1963		Cooling Tower	Reuse	
0	J Robert Massengale	Lubbock	\$	8	22,000	9 N	1997	735,840	Cooling Tower	Reuse	0.23
0	J Robert Massengale	Lubbock	2	\$	22,000	ğ	1959		Cooling Tower	Reuse	0.23
	J Robert Massengale	Lubbock	80	ر	40,000	ů N	2000		:	(
O Xcel SPS	Jones	Lubbock	- 0	S1	248,000	g Z	1971	4,344,960	Cooling Tower	Reuse	0.6
0	JORNES Tr. Crocka (Hadit, A.i.a.)	Luboock	, ₽	5	12 500	2 1	1064	AFA 280	iamo i Billinon	asheri	- u
	Tu Crocke (Huth: Ave)	Labork	6	515	18 500	C CN	1971	201-1			; , ;
	Tv Cooke (Holly Ave.)	Lubbock	ello ello	5 5	22 000	2 S Z	1974				
	Ty Cooke (Holly Ave.)	Lubbock	-	ST	44,000	NG	1965	855,414	Cooling Tower	Reuse	0.75
0	Ty Cooke (Holly Ave.)	Lubbock	7	ST	53,650	Ŷ	1978		Cooling Tower	Reuse	:
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Data from US DOE Energy Information Administration's Forms EIA-806A, EIA-806B, EIA-806B, and PUCT Report on New Electric Generating Plants in Texas

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Appendix A2

Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

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Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

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Data from US DOE Energy information Administration's Forms EIA-960A, EIA-960B, and EIA-906

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Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

1/27/2003

Appendix A2

					2002	2000 Net Generation (MMh)	(umu)					-
											2000 Total Generation for	Percent of State Total
Region Company	Plant	County	Chit	Coal	Lignite	Natural Gas	Nuclear	Fuel Oil	Combined Cycle	Hydro and Renewable	Plant / Region (MMh)	Generation for 2000
AEP WTU	Fort Phantom	Jones	-			1,267,324		59,275			1,326,599	0.43%
Defined	Fort Phantom	Jones	~- '~		11 230 031	78.834		:			0 11 309 765	364%
		Limestone	- ര								0	
TXU	Lake Creek	McLennan	5					740			740	%00.0
0 0	Lake Creek Lake Creek	McLennan	38							:	00	
	Lake Creek	McLennan	ST1			894,222		6,122			900,344	0.29%
TVII	Lake Creek	McLeman McLeman	ST2			5 331 11B		70.735	: .		0 5 401 353	1 7.4%
	Tradinohouse	McLeman	- 2					20,200			0	
TXU	Sandow	Milam	4		3,547,822			8,868			3,556,710	1.15%
AEP	-	Notan								00	00	
Enron TXII	Encoden One	Notan	GT01						257.411	>	257.411	0.08%
	Encogen One	Notan	GT02						551,532		551,532	0.18%
0	Encogen One	Notan	618 212						427,824		427,824	0.14%
BDA	Encogen Une Minnis Shemand	Pain Pinto	5-						18'00'4	3 520	3 520	%000 0
0	Morris Sheppard	Pato Pinto	- 2								0	
G Brazos Electric	RW Miller	Pako Pinto	-			1,520,085		8			1,520,144	0.49%
	RW Miller Duv Miller	Palo Pinto	N 6									•
	RW Miller	Paio Pinto	• 4			256,166		8,284			264,450	%60'0
0		Palo Pinto	2								0	
TNM	TNP Creations	Robertson			C399'7391'7	32,330		•			C12,C12,2	%L/n
TXU	Comanche Peak	Somervell					9,599,797				9,599,797	3.09%
	Comanche Peak	Somervell	2			5 C	8.857,071				8,857,071	2.85%
G AEP WIU	Ablene Graham	Young	4 -			2271.415		21.909			2,293,324	0.74%
+	Graham	Young	7								0	
G Totat											58,923,920	18.99%
H Reliant Energy Renewables	Coastal Plains	Brazona								0	0	
	1	Chambers						001 000		0	0	
Reliant	Cedar Bayou Cedar Bayou	Chambers	- 2			1,990,623		201 020			8,201,319 0	2.04%
	Cedar Bayou	Chambers									0	
	Generating Facility	Fort Bend							0		0	
H Reliant	WA Parish	Fort Bend	5	-		747 697					2,89/	0.00%
	WA Parist WA Parish	Fort Bend	- ~			2,4 12,001					0	
	WA Pansh	Fort Bend	.თ								0	
I	WA Parish	Fort Bend	4								0	
T	WA Parish	Fort Bend	n 4	1,/31,899							459 LC/ /	2.49%
	WA Parish WA Parish	Fort Bend	0 r-	7 731 899	ļ						7.731.899	2 49%
	WA Parish	Fort Bend	80								0	
H Reliant	PH Robinson	Galveston				9,308,940					9,308,940	3.00%
	PH Kobinson DH Pobinson	Galveston	NO	•								
	PH Robinson	1	4								0	
	Hams Energy Facility	Hamis							0:	, ,	00	
H Energy Levelopments, Inc. H Evelon	VVINSPERING PRICES	Hamis	1			0				>	0	
:	LaPorte Generating Station	Hams							:		0	
	LaPorte Generating Station	Hamis									0	:
H Retant	LaiPorte Jerneraung Stauon	Hamis	2			191,096		:	•		191,096	0.06%
Reliant	Greens Bayou	Hamis	5			687,984		14,349		• • • • • • • • • • • • • • • • • • •	702,333	0.23%

Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

1/27/2003

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Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

						2000	2000 Net Generation (MMh)	(WW)					
												2000 Total	Percent of
										Combined	Hydro and	Generation for Plant / Region	State Total Generation for
Region Company		Plant	County	Ť	Coal	Lignite	Natural Gas	Nuclear	Fuel Oll	Cycle	Renewable	(www)	2000
		Stryker Creek	Cherokee	ST2								0	
I USCE		Robert D Willis	Jasper	-							31,270	31,270	0.01%
-		Robert D Willis	Jasper	~		+	•					0	
I NSCE	:	Sam Rayburn	Jasper	ic							37,035	37,035	0.01%
		America Energy Center	Jahorenn	* *						•	•		
Port of P	Port of Port Arthur	Sahine Power	Jefferson				•			0		þ	
Stead Power	OWER	c Generating Facility	Nacodoches							0	:) a	
Entergy	Entergy Gulf States	Toledo Bend	Newton	-							102,942	102,942	0.03%
-		Toledo Bend	Newton	5								0	-
Hartburg		Hartburg Power LP	Newton							0		0	
Intergen		Cottonwood Energy Project	Newton					:		0		0	
Entergy	Entergy Gulf States	Sabine	Orange	÷- 6			8,531,873		22			8,531,948	2.75%
		Satina Satina		N 61	-								
		Sahira	Cange	- -									
-		Sabine	Oranoe	2			:					0	
ITXU		Martin Lake	Rusk		863,636	15.632.555			27,698			16.523,889	5.32%
-		Martin Lake	Rusk	2								0	
		Martin Lake	Rusk	3							:	0	
I Tenaska	-	Gateway Generating Station	Rusk						•	0		0	
-		Gateway Generating Station	Rusk				-			0		0	
-		Gateway Generating Station	Rusk							0		0	
_		Gateway Generating Station	Rusk							• • •		0	
i Total												27,601,205	8.89%
- IBWC		Amistad	Val Verde	-						:	B6 (124	86.024	0.03%
		Amistad	Val Verde	. 0		•						0	2
J Total												86,024	0.03%
		Bastrop Energy Center	Bastrop						:	0,1		0	
	Gentex / Catpine	Lost Pines I Power Project	Bastrop							0		0	
× •		LOST PINES POWER Project	Bastrop	-+			 			-			
i		LOST PILIES I POWER PTOJECT	Bastrop		-		2 214 828		-+-	5		0 014 020	0.748
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- -		Sim Gideon	Bastroo		-								
K LCRA		Buchanan	Burnet	•			:	:			26,710	26,710	0.01%
¥		Buchanan	Burnet	~					-			0	
		Buchanan	Burnet									0	
K LCRA		Granite Shoals	Burnet								40,644	40,644	0.01%
			Rumat	v r	:		+	+-		•	13 675	13,625	70000
		Martia Fails	Burnet								25.396	25.396	001%
		Marchie Fails	Burnet	2								0	
K LCRA		Fayette	Fayette	-	11,860,743				11,245			11,871,968	3.83%
×			Fayette	~								0	
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	Concerning and the second s	Inomas U reiguson	Matacado		+		1,446,102					1,448,102	0.47%
	Kkoge Energy Storage	Maintain Energy Scorage Center	Mateoorda	•				0 666 166	-		5	U 8 555 165	7 T. BAL
		STP	Maracorda	- ^	-			10.542 774				10 547 774	3 40%
K LCRA		Austin	Travis	-							27 773	27 773	0.01%
•		Austin	Travis	2								0	
K Austin		Decker	Travis	G			64,102		2			64,172	0.02%
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× ¥		Decker	Travis	58			-	-		· • ·	41	> 1	20 UU 0
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Appendix A2

Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

Vetter Fuel OII Combined Cycle Hydro and Rammable Camerolion (MM) Connection (MM) Conne- (MM) <thconnection (MM)</thconnection 							2000 N	2000 Net Generation (MMh)	(uwu)						
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K Bandal (not Titols Titols<	:		Marshall Ford	Travis	2		•						0		
N NB MAC MACI MACI<			Marshall Ford	Travis	9								0		
National Market Marke			Newgulf	Wharton	GENI		-				26,921		26,921	0.01%	
N Total Constrained Marketon Ma			Newgulf	Wharton	GENZ						2,992		2,992	0.00%	
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Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

1/27/2003

Appendix A2

an Company GBRA Segun Segun Constellation Panda AEP CPL AEP CPL AEP CPL											Generation for	State Total
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GBPA Segun GBRA Constellation ANP ANP Panda AEP CPL AEP CPL AEP CPL	Plant	County	Cark	Coal	Lignite	Natural Gas	Nuclear	Fuel Oil	Cycle	Renewable	(MWh)	2000
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GBRA Constellation AEP CPL STEC STEC AEP CPL AEP CPL	Segun	Guadalupe	ž								bo	
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ANP AEP CPL STEC Total AEP CPL PUB Brownsville		Guadalupe	STG1					I	38,646		38,646	0.01%
ANP AEP CPL STEC AEP CPL PUB Brownsville		Guadalupe	STG2						19,909		19,909	0.01%
ANP ANP ANP ANP ANP ANP ANP ANP ANP ANP		Guadakupe	CIG	_					27,228		27,228	0.01%
ANP AEP CPL STEC Fotal PUB Brownsville		Guadakupe	C162						30./41		30,741	%.00 %
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		Hidalgo	2								0	
Calpine		Hidalgo	CIG						329,566		329,566	011%
		Hidaigo	CIG2					İ	3/6 4/6		3/0,4/0	%7L0
			5						-02'22#			2
		Hidako	+								0	
	Magic Valley Generating Station	Hidalgo				• ·			0		o	
TECO		Hidalgo	GEN1						465,202		465,202	0.15%
		Hidalgo	GENZ						498,606 586 346		498,606 586 246	0.16%
AED COL	Frontera Generaturi Facariy Farda Pasa	Maverick	20-							48.593	48.593	0.02%
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1/27/2003

Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

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1/27/2003

Data from US DOE Energy Information Administration's Forms EIA-860A, EIA-860B, and EIA-906

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Appendix A3

Data Organal to this Report with Supporting Documentation from US DOE Energy Information Administration Forms EIA-860A, EIA-860B, and EIA-960 1/27/2003

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Appendix A3

Data Original to this Report with Supporting Decumentation from US DOE Energy information Administration Forms EIA-1860A, EIA-1860B, and EIA-905 1127/2003

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Appendix A3

Data Drigmai to this Report with Supporting Decumentation from US DOE Energy Information Administration Forms EIA-460A, EIA-460B, and EIA-40B 112/2003

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Estimated Water Use for 2060 (acre fiel)	8 013 0 0 0 0 216 3 107 2 0 0	1,710	8,556 73,468 70,846 39 3,344	0 0 9 9 9 9 9 9 9	10,927 0 3,052	87,696 29,962 7,757	30,048 30,048 119 119 279 279 0 0	o	0 2,096	524 1.855 8,842	Q
Estimated Water Use for 2050 (acre het)	6,743 0 0 182 182 2,615 2,615	1,438	7,200 61,842 59,616 33 2,814	25(342 0 5,751	9,195 2,568	73,789 25,129 6,528	25,286 0 100 100 100 1379 0 0	0	0.1,764	441 1,581 7,441	a
Estimated Water Use for 2040	0 0 0 0 2 5 5 1 5 0 0 0 0 2 5 5 5 5 0 0 0 0 0 0 0 0 0 0	1,217 502	6,087 52,287 50,407 28 2,379	4 863	2,171	62,389 21,247 5,519	21,379 0 85 85 85 85 196 1,196 1,196	0	1,491	373 6(291	0
Estimated Water Use for 2036 (acre feet)	4,847 4,847 0 0 80 131 131 131 131 131 0	1,034	5,175 44,448 42,851 24 2,023	000	6,609 0 1,846	53,037 18,062 4,692	18,175 0 72 72 72 72 72 72 72 72 86 981 981	0	t) - 588 	317 1,122 5,348	0
Estimated Water Use for 2020 (acre feel)	4,146 0 51 112 112 112 112 107	885 365	4,426 38,019 36,652 20 1,730	2536	5,653 0 1,579	45,364 15,449 4,013	61 61 61 61 61 61 61 61 61 61 61 61	0	0	271 960 4,572	0
Estimated Water Use for 2010 (acre feet)	4(8)/ 4(8)/ 78 78 78 78 78 78 78 78 78 78	1,110	4,374 38,496 37,102 25 2,170	6 0 0 4 4 35	3,949 0 1,880	44,629 15,267 5,034	0 0 0 4 4 4 9 0 0 0 1 9 1 9 1 9 1 9 0 0 0 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9 1 9	0	0	189 1,203 3,196	ō
Estimated Water Use for 2000	4 90 0 0 1 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0	1,336 43	4, 322 38, 953 37, 552 31 2, 610	146,524 0 5,334	0 2,382	44,294 15,085 6,054	- 0 0 0 217 217 0 0	0	1 636	222 1447 2,367	o
Annual Water Use et 100% Load Factor Using Weter Use Factor (acre feet)	5,557 0 86 88 88 88 88 88 88 88 0 7 0	2,857 319	5,633 18,945 18,945 18,945 385 5,973	0 0 12,340	4,947 0 9,112	13,015 19,827 12,444	13.603 6.720 6.720 6.720 0.720	•	0 5,988	237 2966 4,003	o
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Appendix A3

Data Orginal to the Report with Supporting Documentation from US DOE Energy Information Administration Forms EIA-860A, EIA-860B, and EIA-906 1727/2003

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ted tes addr 2000 Wetter thing Dhrverlad to texup Coolling Ponda (acre feet)			8			92	6		20,502	00 00 00 00 00 00 00 00 00 00 00 00 00
r 1900 Water Use D per TUWB 2002 da State Water Plan (acre Beet)			87.78	1,936	557	28,320		2.867	102.11	<u>937</u> 35,915
e 2000 Watar Use 2 per TDWB 2002 State Water 5 Plan (ecre feet)		88 9	8	88	88	80	4	4 ⁵ 500	15,000	1,000
Annual Water Use at 100% Load Factor Using Water Use Factor Use Factor	2.876 0.0	3 710 3 710 3 710 2 306	126,667 9,893 0	0 0	565 5,565 6,047 6,047 6,047 1,4,20 1,4,89	22,382	241 241 241 01,128 01,128	3 339 3 339 263 263 3 216 4 (38	0 0 0	21,117 0 1117 21117 2117 2117 2117
Estimated Water Use for 2000	0 <mark>%</mark> 0 0 0	0 2,507 0 0	2 0 0	2,700 0.00	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		29 00 00 29 801 00 00		35, 234	1 21 1 21 1 21 1 21 1 21 1 21 1 21 1 2
Estimated Water Use for 2010 (acre feet)	ၜၛၟႄၜၜႜ	2,962 2,962 2,084 2,084	0 0	2,245 0 0	0 4.826 0 0 0 6.228 6.228	19.033 192	192 192 43, 945	2,666 2,666 210 210 2568 1617 1617	0 0 35,860	1,067 28,09 31,996 31,996 221 221
Estimated Water Use for 2020 (acre teel)	08000	1 240 1 240 1 240 2 635 2 635	900 11 900 11	1790	6 360 6 911 6 911 6 913 9 866 9 479 9 866	19.260 275	275 275 7,373 7,900 79,900	3616 300 300 1,289 1,289	0 0 005	843 0 31,610 317 317
Estimated Water Use for 2030 (acre feet)		4,857 1,943 1,943 1,943 1,943 1,943	246,161 0 0	2,093	7 435 9 261 8 079 8 079 9 0 9 13 8 913 8 913	22,517	821 321 83516 93516	4461 351 351 1507 1507	2, 488 2, 488	965 965 30,956 90,956 93,956 93,956 93,00 93,00 93,00 93,00 93,00 93,00 94,000 94,0000000000
Estimated Water Use for 2040 (acre Met)		5,831 5,831 2,285 5,831 5,831 3,625	15,548	2462	8.746 9.718 9.504 0. 11,662 6.829	26,488	378 378 10,140 110,006	5248 5248 413 5055 5055 5055 1773	0 0 0 0 827	1,156 1,156
Estimated Water Use for 2050 (scre feet)	0.5000	6, 896 6, 896 6, 896 6, 896	18,390	2912 0 0	10,344 11,494 11,241 0 8,077 8,077	31,328	11 983 130,108 0 0	6,207 6,207 488 488 5,979 2,097 2,097	0 0 58,696	1,371 45,468 51,446 51,5 515
Eatimated Water Use for 2000 (acre feet)	୦ଞ୍ଚି୦୦୦	0 8,195 8,195 9,212 5,095	21,853 0 0	3460 D	12,292 13,658 13,356 0 0 10,927 16,390 9,598	<u>37</u> ,228 531	531 531 14 252 154 611	7,375 580 580 580 2,482 2,482	0 0052 689	1,029 0 64,031 64,099 612 612

Appendix A3

Data Original to this Report with Supporting Documentation from US DOE Energy information Administration Forms EIA-4600A, EIA-4600B, and EIA-906 1727/2003

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1980 Water Use 2002 BWdf Ped 2002 BWdf Ped 2005 BWdf	4,150										55,670	8,036		24,263											8				8	12,166						-	•		-			887	8		
2000 Water Uses per TDWB 2002 State Water Plan (sore teet)	13,500										\$1,000	12,000		36,000											8	<u>.</u>			Ş	15,000		10 780										8,000		-+ 	_
Annual Water Use at 100% Load Factor Using Water Use Factor (acre teet)	0 5,270	6 250		325			1,546	• •		8	£20,73	6,613		2,216 5,137	6,363	3,011	2,299	6			8.412	096 8		0	0 2310	0	0	50	1,331	5,364	0		09	0		0	00	5,101	3,257	248	246	678 678 0 207	767 6	0	
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Entimated Water Use for 2020 Jacre Seet)	4.022	qea		- 4E			2,120	•		121	115,759	5,954		2,533	6,451	147	8		,		1342	582				50		00	3 9	9.245	0	-		 		0	0 0	5,830	3722	284	284	7.631	744	-	
Estimated Water Use for 2030 (acre heet)	4,702						2,478			141	135,336	6,962		2,961 5,423	7.542	171	105	-	,		1569	680		0	0.5	0	0	0 0	8	10.806	0				• •	0	00	0 8,815	4,351	332	332	922 6,922	8	0	-
Estimated Water Use for 2040 (some feet)			*0*'i	1			2,429	0 0		8	154,201	6,169		3,483	8,672	201	124 2 063		2		1,845	800		0	0	50	0	0.0	117	12.714	0		, o. c		•	0	• •	0 8,017	5,118 5,118	396	38	10,495	HOR 1	0	-
Eatlminted Water Use for 2050 (acre heat)	0 6.542	1 5.0	895.1	35	66		3,448 2,873	00		197	375 184,292	9.685		4,120	10.493	238	146		>		2,182	946		-	0	80	0	00	139	15.038	0					0		0 9,462	6 054	199	.	12,413	96.7	0	
Estimated Water Use for 2060 (acre feet)	0 7.774		20	740			4,097 3,415	00		234	445 223,753	11,510		4, <u>896</u> 8,965	12,470	283	174	8	-		2,593	1,124		G		0	0	00	165	17.870	0			, .	3	0	0:0	1 266	9.7	5	83	548 14.751 3.788	5'/ 68	0	

Appendix A3

Date Original to the Report with Supporting Documentation from US DOE Energy information Administration Forms EIA-460A, EIA-460B, and EIA-408 1127/2003

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Estimated Water Use for 2060 (acre feet)	549 109.775	1,916	4	1,630	287 787	6,250 787	787 9,442 467	467 6,520 0	0	2,300	32,507	0	3,000		2,558	16,390 0			27,064	0	2,702	31,440	0	236	1,147	5,930	0	1_203	0
Estimated Water Use for 2050	462	1,612	0 % 8	1.372	- 4 06	5,259 662	562 7,946 410	410 5,487 0	0	1,935	164,75	0	4,063		2,153	13,782 0			23,280	Q	2,274	26.457	0	<u>201</u>	9 85	4,991	0	1,012	0
Eatimeted Eatimeted 2040 (ecre bed)	391 78.105	1,363	0 fr 62 c	1160	343	4,447	580 6.718 346	346 4 639 0	•	1,636	23,183	0	3,435		1,820	11,662			19,683	0	1,922	22,370	-	170	816	4,220	o	856	0
Estimated Veter Use for 2030	332	1,159	0 620	386	581	3,780	476 5,711 285	3.944	0	1,301	19,716	0	2,920		1,547	9,913 0			16,733	6	162	19,016	0 5	145	1	3,567	0	727	6
Estimated Estimated 2020 (scre test)	201 201 56,792	88	0 230	Ĩ	249 249 248	3,233 407	407 4,885 252	252 3,373 0	0	1 190	16,864	0	2,496		1,324	8,479 0			14,312	0	1.368	16,266	0 2	124	28	3,068	0	622	Ø
Estimuted Nates Use for 2010 (acre feel)	199 50,427	1,243	370 0	1,058	174	2,258	284 3,413 176	176 2.357 0	0	1 492	13,463	0	3,133		1,660	• •			7,316	0	1,753	16,074	23 0	155	415	3,648	0	780	0
Entimated Water Use For 2000 (acre feet)	0 35,378	1,486	9 10 0	1,272	3 5	80	0 Q	2 <mark>1</mark> 0	0	1,795	6,780	0	3,768		1,997	0			8,790	0	2,108	15,882	- 8	167	•	4,628	0	838	0
Annual Weter Luss at 100% Luss at 100% Use Factor Use Factor (acre teet)	249 01,274	3 696	0 90 0	3,347	218 218	2,629 356	220 220 220	220 2,952 0	0	3,393	992/62	0 4 607	10,301		3729	7,420			28,146	0	8,759	18,324	0 8	Ž	510	8,001	0	1 969	0
2000 Water Use per TDWB 200, State Water Plan (acre heat	82,280	2,400		4,700						2,000	9,100		3,300						3,300			18,000				2,000			
1990 Water Use 2000 Water Use Per TDMB 2002 Per TDMB 2002 Per TDMB 2002 Per TDMB 2002 Plan (scrs feet) Plan (scrs feet)	43,451	1,650		1,538						1.504	4,883		2,404						2,404			12,587				1,715			
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Data Original to this Report with Supporting Decumentation from US DOE Energy Information Administration Forms EIA-860A, EIA-860B, and EIA-906 1/27/2003 Future Water Demand for Steam Electric Generation in Texas by Plant or Unit

Estimated Water Use for 2060 (acre feed)	010	517 517 6,151 40,910	0 1,626,682	594 213	259 484 216,854	1,070,530	115,718 6,914	275,773 1,194 156,565	33,887
Estimated Water Use for 2050 (acre feet)	00	435 435 5,177 8,177	0	\$00,039	216,343 162,486	900,869 V Vasi 2000	97,377 5,018 Ver 2010	232.067 1,004 1,004 131,752	28,516
Estimated Water Use for 2040 (acre feet)	00	368 368 368 4,377 36	0 1,157,396	422,784	184,609 154,292	761,685	62.332 4.919	B49 B49 Pacity - Online b	24.111
Eatimated Water Use for 2010 (acm het)	00	313 313 313 3721 30,188	0 Mand Totals 943,800	359,408	156,936	647,507	Comment Cytome Filt (2000) Cytome Filt (2000) Filt (2000) <thfilt (2000)<="" th=""> Filt (2000) <thfilt (200<="" td=""><td>Comment of our many state of the state of th</td><td>emand 20.496</td></thfilt></thfilt>	Comment of our many state of the state of th	emand 20.496
Estimated Water Use for 2020 (acre heet)	00	268 3.182 25,821	0 0 0 Electric Generation Writer Demand Totals 724,184 041572 042,000 0400001 bt Trans of Characterion	Coel 303,721 307,417	134,234 Fired Capacity 112,190	553,941	3,577	616 618 0.986	Salt Water Consumed but shown as fresh water demand 26 446 21,969 17,531 20
Estimuted Water Use for 2010 (acre Med)	0 0	187 187 2,223 25,645	m Electric Gene 724,614	303,791	Nuclear 135,882 134,234 137,531 135,882 134,234 Steam Turbine Conventional Gas Field Capacity 169,236 140,715 112,190	mbined cycle 580,388	41,823 2,486	99.672 431 431 and Water Com	umed but shown 21,969
Estimated Water Use for 2000 (acre feet)	00	137 134 1,582 25,819	0 Statewide Steam	Coal 300,166	Nuclear 137,531 Steam Turbine (169,239	Total without combined cycle 606,936 560,368	383	Combined Cycle	Salt Water Coni 26.446
Annual Water Use at 100% Load Factor Using Weter Users Pector (sers Pect)	00	234 234 2,785 41,316	0 915,913				52,386 3,130	124,044 540 70 878	
2000 Water Use per TDWB 2002 State Water Plan (acre feet)		900	0 574,238						
1960 Water Use 2000 Water Use 2000 Water Use 2006 2005 2002 2002 2002 2002 2002 2002		14,302	0 424,824 227,387 GWh	gal / 100h) 0.400					
2000 Water Diverted to Cooling Ponds (acce teet)			210,725	Statewide Water Use Factor (gal / KWh) 0.616 0.616 0.600 0.600					
2000 Estimated Water Use Using Weter Use Factor and Cooling Pond Makeup (acre faet)	00	128 1,483 24,178	0 588,864 310,332 GWh	Statewide V 0.615					
Water Use Factor (gal/Whr)	00	80 80 80							
Tak C	∞~~∞∞E-~~~	GEN3 GEN3 GEN3 CEN3 CEN3 CEN3 CEN3 CEN3 CEN3 CEN3 C							
County	Swisher Swisher Swisher Swisher Terry Terry Terry Terry	Terry Yoakum Yoakum Yoakum							
1									
Plant	1 Ulaa Tuka Tuka Brownfiadd Brownfiadd Brownfiadd Brownfiadd	Brownfield Brownfield Mustang Station Mustang Station Mustang Station							
	Brownfeed	Golden Spread Coop							
Region Company	000000000								

_			Primary	llnit	Nameniate		Drime	Gross Generation in
Region	County	Facility Name	Fuel	Name	Rating (kW)	Unit Startup Date	Mover	Year 2000 (kWhrs)
4	Hutchinson	Black Hawk Station - Quixx	NG	UNT1	126.900	01-JUN-1999	GT	813.980.690
<	Hutchinson	Black Hawk Station - Quixx	9N NG	UNT2	126,900	01-JUN-1999	GT	702 235 980
<	Hutchinson	Boroer Plant - Sid Richardson Carbon	90	GEN1	37 500	01-FFR-1985	ST	238 877 000
4	Hutchinson	Envineered Carbons Borner Comenciation	50	CEN1	20.000	01.0CT-1082	ť	170 640 083
<	Moore	McKee Refinery - Diamond Shamrock	2 2	WO	2,000	01-MAY-1979	55	37,620
α	Wichita	DDG Industriae Inc. Worke A	DEO	110	000 6	01-11 IN-1075	د	260,000
	Wichita	PPG Industries inc. Works 4	DFO	126	2 000	01-JUN-1974	2 5	260,000
6	Wichita	IPPG industries Inc. Works 4	DFO	L2PG	1,100	01-OCT-1980	20	148 000
æ	Wichita	PPG Industries Inc. Works 4	DFO	L1PG	630	01-OCT-1980	<u>0</u>	138,750
с	Dallas	Rock Tenn Dallas Mil	SN	GEN1	6,250	01-JAN-1960	ST	42,291,000
ပ	Dallas	State Farm Ins Co ISC Central	Ű	₹	1,825	01-JAN-1998	<u>ပ</u>	26.313
o	Dallas	State Farm Ins Co ISC Central	SN	38	1,825	01-JAN-1998	<u>0</u>	26,313
с ,	Dallas	State Farm Ins Co ISC Central	NG	æ	1,825	01-JAN-1998	ပ္	26,313
ပ	Dallas	State Farm Ins Co ISC Central	NG	38	1,825	01-JAN-1998	<u>ں</u>	26,313
ပ	Dallas	State Farm Ins Co ISC Central	NG	4A	1,825	01-JAN-1998	<u>ں</u>	26,313
ပ	Dallas	State Farm Ins Co ISC Central	Ŋ	₽	1,825	01-JAN-1998	<u>ບ</u>	26,312
ں ا	Dallas	University of Texas at Dallas	ŊŊ	GEN1	3,500	01-JAN-1980	<u>ں</u>	2,937,200
υ	Dallas	Vitlage Creek Wastewater Treatment Plant		8	1,150	01-SEP-1972	<u></u>	5,497,407
0	Dallas	Vittage Creek Wastewater Treatment Plant		SO	850	01-APR-1994	<u>ບ</u>	883
0	Dallas	Village Creek Wastewater Treatment Plant		SD2	850	01-APR-1994	<u>ບ</u>	553
0	Dallas	Village Creek Wastewater Treatment Plant		m	1,150	01-SEP-1978	ບ	7,124,461
0	Tarrant	D/FW Airport	DFO		110,000	1-Jun-2005		
с,	Wise	Bridgeport Gas Processing Plant		325	380	2006	<u></u>	2,440,000
ן טופ 	Wise	Bridgeport Gas Processing Plant	ы. Б	326	380	01-JAN-1958	<u>ں</u>	1,700,000
י ויט	Wise	Bridgeport Gas Processing Plant		324	380	01-JAN-1958	<u></u>	1,940,000
ပ	Wise	Bridgeport Gas Processing Plant	BL	327	380	01-JAN-1958	Q	2,030,000
۵	Bowie	Texarkana Mill		GENI	25,000	01-NOV-1972	ST	324,929,000
٥	Bowie	Texarkana Mill		GEN2	40,000	01-DEC-1977	ST	149,291,000
0	Gregg	Eastex Cogeneration Facility - AEP	NG		467,700	1-Aug-2001		
Δ	Harrison	Norit Americas Inc Marshall Plant	OTH	8511	2,000	01-JAN-1921	ST	12,456,000
۵	Harrison	Snider Industries Inc	9y	WGN1	5,000	01-AUG-1983	sT	15,466,000
٥	Lamar	Tenaska III Texas Partners	ŷ	GENI	80,000	01-JUL-1989	сı	594,244,000
٥	Lamar	Tenaska III Texas Partners	Ŷ	GEN2	80,000	01-JUL-1989	сı	502,902,000
a;	Lamar	Tenaska III Texas Partners	Ŷ	GEN3	90,000	01-DEC-1989	ર	426,597,000
۵	Morris	Lone Star Steel Co	ÿ		15,625	01-JAN-1951	ST	317,000
٥	Morris	Lone Star Steel Co	ÿ	2	15,625	01-JAN-1964	ST	3,257,000
۵	Van Zandt	Morton Salt Co Grand Saline		1530	1,500	01-JAN-1949	ST	8,698,000
	poon	Excon Hawkins Gas Plant	DFO	UN73	3,000	01-JAN-1973	ບ 	0
٥	Doov	Excon Hawkins Gas Plant			3 410	01-SEP-1987	61	11,258,208
ם'מ	DOOM				2,200	U1-SEP-198/	59	4,156,992
2	0000	EXXON HAWKINS CAS Plant			061	0001-NAU-10	ים <u>ז</u>	
2	Mood		ירכ		200	01-JAN-1968	5	1,603,320

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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Region	County	Facility Name	Primary Fuel	Unit Name	Nameplate Rating (kW)	Unit Startup Date	Prime Mover	Gross Generation in Year 2000 (kWhrs)
	Mand	Etwas Haudring Cas Bland		11170		04 1441 4050	ţ	1 110 010
	Mood	Exvon Hawkins Cas Plant		LIN70		0061-NML-10	55	1,704,000
			2				5	000,127,1
•+ !								
	El Paso	ASARCO Inc El Paso TX	g	TRB1	5,000	01-JAN-1994	ST	0
	El Paso	Leviton Manufacturing Co	9 V	GEN1	1,850	01-MAY-2000	<u>ಲ</u>	36,500
	El Paso	Phelps Dodge Refining Corp	DFO	3002	4,270	01-JUN-1992	5	25,952,000
	El Paso	Phelps Dodge Refining Corp	DFO	2608	3,500	01-OCT-1986	GT	13,146,567
	El Paso	Phelps Dodge Refining Corp	DFO	2607	3,500	01-OCT-1986	GT	11,852,013
	El Paso	Phelps Dodge Refining Corp	DFO	3001	4.270	01-JUN-1992	GT	25 723 600
-	El Paso	Phelps Dodge Refining Corp	DFO	3003	4.270	01-JUN-1992	GT	17,164,100
	El Paso	Providence Memorial Hospital	UN N	9542	2.180	01-MAR-1987	<u>0</u>	71.280
	El Paso	Providence Memorial Hospital	S	9541	2,180	01-MAR-1987	<u>ບ</u>	54.000
	El Paso	The Hoover Company	S	0542	1,800	01-JUN-1997	<u>റ</u>	61,600
	El Paso	The Hoover Company	S	0543	1,800	01-JUN-1997	2	61,600
	Andrews	Fullerton Plant	NG	GEN7	200	01-OCT-1974	<u>0</u>	2,981,300
	Andrews	Fullerton Plant	NG	GEN8	500	01-OCT-1974	<u>ں</u>	2,801 750
	Andrews	Futlerton Plant	92 P	GEN9	500	01-OCT-1974	<u>ں</u>	2,545,900
	Andrews	Fullerton Plant	9NG	GN10	500	01-OCT-1974	2	2,949,800
	Andrews	Fullerton Plant	9 V	GN11	200	01-OCT-1974	C	2,894,500
	Andrews	Fullerton Plant	RG	GN12	500	01-OCT-1974	ບ	1,493,100
	Howard	Big Spring Texas Refinery - Alon USA	g	GENA	1,500	01-JAN-1986	ST	13,037,430
	Howard		S	GEN1	77,540	07-JUL-1987	СТ	577,114,495
	Howard	C R Wing Cogeneration Plant - Calenergy Power Resources	Q	GEN2	77,540	01-JUL-1987	5	483, 148, 747
	Howard	C R Wing Cogeneration Plant - Calenergy Power Resources	g	GEN3	75,000	01-APR-1988	\$	336, 138, 758
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		-	275	01-MAR-1953	ບ 2	0
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		7	270	01-MAR-1953	ല	766,500
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		9	280	01-MAR-1953	<u>ں</u>	1,149,750
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		4	280	01-MAR-1953	ల	1,331,520
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		5	300	01-FEB-1957	<u>ല</u>	1,456,350
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		9	265	01-JUN-1973	<u>ں</u>	1,456,350
	Howard	East Vealmoor Gas Plant - WTG Gas Processing		~	265	01-AUG-1991	ບ	1,456,350
	Howard	East Veatmoor Gas Ptant - WTG Gas Processing		80	265	01-AUG-1991	ບ ບ	1,116,900
	Pecos	Yates Gas Plant	NG	GEN1	2,800	01-APR-1986	GT	13,000,000
	Pecos	Yates Gas Plant	9 V	GEN2	2,800	01-APR-1986	GI	13,000,000
	Upton	Benedum Plant	90 NG	BG6	1,000	01-SEP-1998	ల	1,589,737
	Upton	Benedum Plant	Ű	BG3A	1,000	01-NOV-1996	റ	3, 128, 191
-	Upton	Midkiff Plant	9		1,200	01-MAY-1990	ౖ	6,268,724
	Upton	Midkiff Plant	9	0	1,200	01-MAY-1990	<u>ں</u>	6,113,815
	Upton	Midkiff Plant	9 T	ო	1,200	01-MAY-1990	<u>ບ</u>	6,251,351
	Brazos	Texas A&M	NG		40,000	1-Jan-1996		
	Johnson	Tenaska IV Texas Partners Ltd Cleburne Cogen	9 V	GT-1	178,200	01-SEP-1996	5	1,042,760,000
	Johnson	Tenaska IV Texas Partners Ltd Cleburne Cogen	g	ST-1	104,400	01-NOV-1996	8	551,883,000
	Mediae Md	Deulor Initiativ Constrant		•				

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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			Primary	Unit	Nameplate		Prime	Gross Generation in
Region	County	Facility Name	Fuel	Name	Rating (kW)	Unit Startup Date	Mover	Year 2000 (kWhrs)
Ċ	Milam	Sandruw - Alcoa	U N	GEN1	121,000	01-DEC-1953	ST	999,034,000
) e	Milam	Sandow - Alcoa	ŊQ	GEN2	121,000	01-FEB-1954	ST	931,686,000
י ט	Milam	Sandow - Alcoa	У V	GEN3	121,000	01-JUL-1954	ST	1,040,242,000
		Characteric Dicast Colisio	UN	GENO	1 200	01-OCT-1990	IS	13 848 300
I.	Brazona	•		SEN3	000 6	01-OCT-1990	51	7 536 200
 	Brazona	• !	29	CENA	A6 100	01-001-2000	5	47 148 000
I	Brazona		2			01 1001 1005	5 5	200 206 320
±¦	Brazona	Chocolate Bayou Works - BP	2	CEN	170,000	2005	5	200,001,002
I	Brazoria	Dow Chemical		CENI	000,001	01 144V 1000	<u>ل</u>	600 032 000
I	Brazoria	Freeport - BASF	5 (2 2		91,000	0001-11-10	58	51 221 000
= =	Brazona				200 020	01-JUN-1999	S	1 001 010 000
	Brazona	Oyster Creek Unit Vill - DOW		50	00 025	01-001-1994	55	635 255 000
I.	Brazona			5	99,025	01-001-1994	513	590 877 000
r :	Brazoria			585	99 025	01-OCT-1994	55	634.762.000
r :	Brazoria	Oyster Creek Unit VIII - DOW	22	GENI	115,000	01-AUG-1997	515	898,542,000
∔ ⊏ ⊐	Brazoria	Sweery cogeneration Facility - AFP	D UN	GEN2	115.000	01-SEP-1997	G	939,189,000
	Brazoria	Sweeny Coneneration Facility - AFP	9v V	GEN3	115,000	01-OCT-1997	GT	928, 155,000
= =	Brazoria		ŋŋ	GEN4	115,000	01-DEC-2000	GI	10,804,000
; I	Brazoria	The Dow Chemical Co Texas Operations	Ű	G-67	119,000	01-MAR-1984	СТ	593,061,000
	Brazoria	The Dow Chemical Co Texas Operations	g	6-34	71,400	01-DEC-1968	5	0
I	Brazoria	The Dow Chemical Co Texas Operations	Ŷ	G-35	119,000	01-FEB-1983	5	593,061,000
I	Brazoria	The Dow Chemical Co Texas Operations	Ű	G-36	119,000	01-FEB-1983	5	593,061,000
I	Brazoria	The Dow Chemical Co Texas Operations	g	G-37	75,000	01-APR-1978	5	373,778,000
Ŧ	Brazoria	The Dow Chemical Co Texas Operations	9 V	54	50,000	01-MAY-1958	53	249,185,000
I	Brazoria	The Dow Chemical Co Texas Operations	5 C	14	20,000	01-MAR-1954	53	243,100,000
- - :	Brazoria	The Dow Chemical Co Texas Operations		6-45	119,000	01-OCT-1983	55	593 061 000
I I I I I I	Brazona	The Dow Creatical Co Texas Operations		6-61	94,563	01-OCT-1982	55	471,274,000
	Brazoria	The Dow Chemical Co Texas Operations	Ű	G-62	94,563	01-SEP-1982	сı	471,274,000
 	Brazoria	The Dow Chemical Co Texas Operations	У Х	6-63 6	94,563	01-AUG-1982	С	471,274,000
: I	Brazoria	The Dow Chemical Co Texas Operations	Ŋ	G-64	64,800	01-SEP-1987	8	322,944,000
: I	Brazoria	The Dow Chemical Co Texas Operations	Ŋ	G-65	111,350	01-FEB-1984	8	554,935,000
 1	Brazoria	The Dow Chemical Co Texas Operations	Ő	99-9 9	119,000	01-DEC-1983	5	593,061,000
. .	Brazonia	The Dow Chemical Co Texas Operations	S	6-31	50,000	01-NOV-1952	Ş	249,185,000
I	Brazoria	The Dow Chemical Co Texas Operations	g	G-32	50,000	01-DEC-1952	8	249,185,000
I	Brazoria	The Dow Chemical Co Texas Operations	g	G-33	49,000	01-DEC-1953	8	244,201,000
I	Chambers	Baytown Energy Center LP - Calpine / Bayer	ÿ		825,000	1-Apr-2002		
Т	Chambers	Enterprise Products Operating LP	9 V	CENI	2,500	01-SEP-1984	5	18,089,626
I	Chambers	Enterprise Products Operating LP	9 V	GEN2	2,500	01-SEP-1984	5	19,772,874
I	Chambers	Enterprise Products Operating LP	9 Z	GEN3	3,400	01-NOV-1991	55	C97 709 C7
т	Chambers	Enterprise Products Operating LP	n S S	CENT	3,400	1661-AON-LO	58	20,470,049
Ŧ	Chambers	Enterprise Products Operating LP	92 2	GEN5	3,400	01-NOV-1991	58	25,152,385
T	Chambers	Enterprise Products Operating LP	5 C	GEN6	3,500	01-DEC-1996	5	20,802,450
T	Chambers	Enterprise Products Operating LP		GEN	002.0	01-UEC-1996	56	20,004,003
Ŧ	Chambers	Enterprise Products Operating LP	202		000 0	04 1111 1007	55	0000000
Т	Fort Bend	Fort Bend Utilities Co	NG	GENI	2,000	01-JUN-1937	5	9,320,000

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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Texas
2.
Facilities
Cogeneration

			Primary	Cuit	Nameplate		Prime	Gross Generation in
Region	County	Facility Name		Name	Kating (kw)	Unit Startup Uate	MOVEL	
	Fort Rend	Fort Bend Utilities Co	SN	GEN2	1,000	01-JUL-1941	ST	5,990,000
	Fort Bend	Fort Bend Utilities Co	9 Z	GEN3	3,000	01-OCT-1983	ST	12,710,400
	Fort Rend	Fort Band Utilities Co	DFO	ENGN	500	01-MAR-1995	ల	28,117
- 	Galvecton	Graen Power Unit 2 - Cinerov / BP	9V V		641,000	1-Apr-2004		
	Galveston	Prwar Station 3 - BP	99 N	307A	22,059	01-JAN-1964	Ş	31,232,135
 I	Galveston		SG	307B	22,059	01-JAN-1964	Ş	39,040,166
	Galvecton		Ð	307C	15,600	01-JAN-1964	CI	93,696,400
	Galveston	Prwar Station 3 - 8P	NG	307D	22,059	01-JAN-1966	Ş	101,504,433
	Cohreeton	. I	S N	307E	15,600	01-JAN-1966	с С	109,312,466
	Catveston	•	NG.	307F	20,750	01-JAN-1978	ក	2,016,000
	Galveeton	•	2	GENI	78,210	01-SEP-1986	CI	590, 332, 000
. 1	Galveston		2	GEN2	78,210	01-SEP-1986	C	590,332,000
. 1	Galveston		2	GEN3	34,703	01-SEP-1986	8	295, 166, 000
-	Galveston	S&I Comencation	S	GEN1	55,000	01-MAR-1992	5	299,250,910
	Galveston	Texas City Coorenation LP - Caloine	NG	GEN1	141,000	01-MAY-1987	Ş	922,000,474
	Galveston		NG	GEN2	103,000	01-MAY-1987	СТ	889,091,043
	Galveston	1	NG	GEN3	103,000	01-MAY-1987	сı	898,138,375
-	Galveston	Texas City Coopeneration LP - Calpine	NG	GEN4	103,000	01-MAY-1987	5	900,414,547
: I	Galveston	Texas City Plant Union Carbide Corp	NG	GTG	40,000	02-FEB-1996	C1	272,344,000
Ξ	Galveston	Texas City Plant Union Carbide Corp	NG	STG	56,000	01-MAR-1996	8	241,081,000
H	Galveston	Valero Refining Co Texas City Refinery		GEN1	7,160	01-APR-1963	G	34,119,852
. <u> </u>	Galveston	Valero Refining Co Texas City Refinery		GEN2	16,200	01-OCT-1991	61	112,254,810
Ŧ	Galveston	Valero Refining Co Texas City Refinery		GEN3	16,200	01-SEP-1991	61	105,516,492
I	Hams	AES Deepwater Inc	PC	GENI	184,000	01-JUN-1986	ST	1,333,570,180
 	Hamis	Bayou Cogeneration Plant - Air Liquide	NG	GENI	75,000	01-DEC-1984	5	650,472,000
I	Harris	13	S S	GEN2	75,000	01-DEC-1984	55	659,946,000
I	Harris	Bayou Cogeneration Plant - Air Liquide	NG	CENS	/9,000	C1961-140-10	56	000'600'000
I	Hamis	Bayou Cogeneration Plant - Air Liquide	S. S.	GENA	000'6/	C061-71AM-10	55	040,0/0,000
I	Harris	Baytown Turbine Generator Project - Excon Mobile	5	GENZ	31,333	UI-AFR-1309	5 5	211,233,000
I	Harris	Baytown Turbine Generator Project - Excon Mobile	92 UN		100,000	01-JAN-133/	5 5	200,056,000
 	Harris	Baytown I urbine Generator Project - Exxon Mobile			37 333	01-MAR-1989	6T	296,836,000
	Hams Lonio	Calcine - Channel	DNG.	2	180,000	delaved	5	
	Hamis	Calprine - Craining Channel Frierry Center - Catnine / Lyondell CITGO	ON N		560,000	1-Apr-2002	сı	
- -	Hamis	Clear I aka Coneneration Ltd - Calpine	NG	G102	103,670	01-JAN-1985	с	846,403,950
. 1	Harris		NG	G104	103,670	01-JAN-1985	5	889,429,520
	Harris	1.	S	S101	51,937	01-JAN-1985	₹	338,059,020
: I	Harris	4	Ű	S102	14,053	01-JAN-1985	\$	110,363,210
. I	Harris	•	NG	G103	103,670	01-JAN-1985	5	847,293,660
	Harris	CoGen Lyondell Inc - Dynegy	g	GENG	115,000	01-APR-1986	Ş	769,273,000
Ĩ	Harris	CoGen Lyondell Inc - Dynegy	NG	GEN7	000'64	01-JUN-1995	5	589,833,000
I	Harris	CoGen Lyondell Inc - Dynegy	9 V	GEN1	74,000	01-NOV-1985	CT	601,405,000
I	Harris	CoGen Lyondell Inc - Dynegy	ÿ	GEN2	74,000	01-DEC-1985	5	606, 164,000
. I	Harris	÷ .	S	GEN3	74,000	01-DEC-1985	5	504,909,000
Ξ	Harris	CoGen Lyondell Inc - Dynegy	ŷ	GEN4	74,000	01-MAR-1986	5	510,013,000
г	Harris	CoGen Lyondell Inc - Dynegy	9 N	GEN5	74,000	01-APR-1986	5	489,633,000
	Harris	Deer Park Energy Center - Calpine / Shell			773,000	1-Dec-2003		011 100 000
	Harris	Deer Park Plant - Occidental		GEN4	81,060	01-DEC-1985		6/6 /91 4 /3

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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Hein Der Parch Der	County	Facility Name	Primary Fuel	Unit Name	Nameplate Rating (kW)	Unit Startup Date	Prime Mover	Gross Generation in Year 2000 (kWhrs)
Der Fahr Mein Coldental Coldental <thcoldental< th=""></thcoldental<>	Harris	Deer Park Plant - Occidental		GEN1	10,000	01-APR-1948	Q	68 120 000
Dynagy License Concentral Concentra Concentra Conce	Harris	4		GEN2	10.000	01-APR-1948	5	75 270 000
Even Medic Cu USA Bayoani PP3 PP4 NS GT34 155,000 0.04,044 197 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 15,230 0.14,044 197 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 15,230 0.14,044 197 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 197 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 197 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 1957 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 1952 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 1952 GT Even Medic Cu USA Bayoani PP3 PP4 NS GT34 25,000 0.14,044 1952 GT T Even Medic Cu USA Bayoani PP3 PP4 NS GT3 7,000 0.14,044 1952 GT T T T T T T T T T	Harris	Deer Park Plant - Occidental		GEN3	10.000	01-APR-1948	S S	20 120 000
Evon Mobil Co UsA Baytom PF3 PF4 NG GT3 85.00 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 15.30 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 17.30 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 2000 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 2000 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 2000 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 2000 01.4MK1977 GT Evon Mobil Co USA Baytom PF3 PF4 NG GT3 7.500 01.4MK1977 GT Evon Mobil Co USA Baytom PT3 PF4 NG GT3 7.500 01.4MK1927 GT Hussion Chemical Complex Ballagound Ster - Coordental / Damoid Sharrook NG GT3 7.000 01.4MK1926 GT Hussion Chemical Complex Ballagound Ster - Coordental / Damoid Sharrook NG GT3 7.000 01.4MK1926 <	Harris	Dynegy / Lyondeil			155.000	delaved		
Exon Mobil Coust Bigriom P13 PP4 NG G T44 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 12.300 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 2000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 PP4 NG G T41 7.500 01-JAM11922 G T Exon Mobil Coust Bigriom P13 Damord Shamedix NG G T13 7.500 01-JAM11922 G T Exon Mobil Coust Bigriom P13 Damord Shamedix NG G T13 2.000 01-JAM11977 G T Exon Mobil Coust Bigriom P13 Damord Shamedix NG G T13 <t< td=""><td>Harris</td><td>Exxon Mobil Co USA Baytown PP3 PP4</td><td>9 Z</td><td>GT38</td><td>36,500</td><td>01-AUG-1989</td><td>GT</td><td>248.951.00</td></t<>	Harris	Exxon Mobil Co USA Baytown PP3 PP4	9 Z	GT38	36,500	01-AUG-1989	GT	248.951.00
Excon Mobil Couls Brytom PT3 PF4 NG G137 14.500 01.JJMH 1977 G1 Excon Mobil Couls Brytom PT3 PF4 NG G137 17.260 01.JJMH 1977 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 20000 01.JJMH 1977 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 20000 01.JJMH 1987 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 20000 01.JJMH 1987 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 20000 01.JJMH 1982 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 7.500 01.JJMH 1982 G1 Excon Mobil Couls Brytom PT3 PF4 NG G174 7.4000 01.JJMH 1982 G1 J Excon Mobil Couls Brytom PT3 PF4 NG G173 7.4000 01.JJMH 1982 G1 J<	Harris	Exxon Mobil Co USA Baytown PP3 PP4	9v N	GT44	20,000	01-JAN-1977	GT	165.574.00
Exono Mobil Co USA Bayrom PP3 PP4 NG G13 12.200 01.JAM 1972 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 20.000 01.JAM 1977 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 20.000 01.JAM 1977 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 20.000 01.JAM 1977 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 7.500 01.JAM 1982 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 7.500 01.JAM 1982 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 7.500 01.JAM 1982 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 7.500 01.JAM 1982 G1 Exono Mobil Co USA Bayrom PP3 PP4 NG G13 7.500 01.JAM 1982 C1 Hussion Chemical Complex Bathground Sile - Ocodental / Damod Sharrock NG G13 7.500 01.JAM 1982 C1 Hussion Chemical Complex Bathground Sile - Ocodental / Damod Sharrock NG G13 7.500 01.JAM 1982 C1 Hussion Chemical Complex Bathground Sile - Ocodental / Damod Sharrock NG G13 7.500 01.JAM 1982 C1 Hussion Chemical Complex Bathground Sile - Ocodental / Da	Hamis	Exxon Mobil Co USA Baytown PP3 PP4	9v V	GT35	14,500	01-JAN-1970	GT	125,837,00
Exon Model Co USA Bayroum PP3 PP4 MG G131 17.260 01-JAM+1977 G1 Exon Model Co USA Bayroum PP3 PP4 MG G143 20.000 01-JAM+1977 G1 Exon Model Co USA Bayroum PP3 PP4 MG G143 20.000 01-JAM+1977 G1 Exon Model Co USA Bayroum PP3 PP4 MG G174 20.000 01-JAM+1977 G1 Exon Model Co USA Bayroum PP3 PP4 MG G171 7.500 01-JAM+1977 G1 Exon Model Co USA Bayroum PP3 PP4 MG G171 7.500 01-JAM+1987 G1 Exon Model Co USA Bayroum PP3 PP4 MG G171 7.500 01-JAM+1987 G1 Exon Model Co USA Bayroum PP3 PP4 MG G171 7.4000 01-JAM+1987 G1 Pastelen Complex Batheground Sile<- Coordental / Damond Shannock	Hamis	Excon Mobil Co USA Baytown PP3 PP4	DNG	GT36	15,250	01-JAN-1972	GT	79 165 00
Exono Model Cu USA Baytom PF3 PP4 NG G1 41 20000 01-JAN1977 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 43 20000 01-JAN1917 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 43 20000 01-JAN1916 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 73 7,500 01-JAN1916 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 7 7,500 01-JAN19162 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 7 7,500 01-JAN19162 G1 Exono Model Cu USA Baytom PF3 PP4 NG G1 7 7,000 01-JAN19162 G1 Exono Model Complex Batelloground Sile - Occidental / Diamond Shamcok NG G1 7 7,000 01-JUN1982 G1 Huston Commention P - Calpine NG G1 7 7,000 01-JUN1982 G1 Practice Pasadera Cogeneration P - Calpine NG G1 7 7,000 01-JUN1982 G1 Practice Practice Practice Practice Practice Practice	Harris	Excon Mobil Co USA Baytown PP3 PP4	0N N	GT37	17,250	01-JAN-1976	GT	128.901.00
Econo Model Cursk Baytom PF3 PF4 NG 614.4 20000 01-MM+1977 01 Econo Model Cursk Baytom PF3 PF4 NG 614.4 20000 01-JMM+1977 01 Econo Model Cursk Baytom PF3 PF4 NG 617.3 7.500 01-JMM+1927 01 Econo Model Cursk Baytom PF3 PF4 NG 517.3 7.500 01-JMM+1926 01 Econo Model Cursk Baytom PF3 PF4 NG 517.3 7.500 01-JMM+1926 01 Econo Model Cursk Baytom PF3 PF4 NG 517.3 7.500 01-JMM+1926 01 Econo Model Curske Battleground Site - Occidental / Damond Shamock NG 517 7.4000 01-JMM+1927 01 Hussion Complex Battleground Site - Occidental / Damond Shamock NG 517 7.4000 01-JMM+1929 01 Passdena Cogeneration IP - Calpine NG 616.1 7.300 01-JMM-1989 01 Passdena Cogeneration IP - Calpine NG 616.1 7.300 01-JMM-1989 01 Passdena Cogeneration IP - Calpine NG 616.1 7.300	Harris	Excon Mobil Co USA Baytown PP3 PP4	Ű	GT41	20.000	01-JAN-1977	5	186.456.00
Exon Modi Cu USA Baytom PP3 PP4 NG GT43 Z0000 01-JMN1952 GT Exon Modi Cu USA Baytom PP3 PP4 NG GT33 7.500 01-JMN1952 GT Exon Modi Cu USA Baytom PP3 PP4 NG GT33 7.500 01-JMN1952 GT Exon Modi Cu USA Baytom PP3 PP4 NG GT3 7.500 01-JMN1952 GT Exon Modi Cu USA Baytom PP3 PP4 NG GT3 7.500 01-JMN1952 GT Houston Commeral Complex Battleground Sile - Occidental / Diamond Sharmock NG GT3 7.500 01-JML1952 GT Houston Charmed Complex Battleground Sile - Occidental / Diamond Sharmock NG GT3 7.500 01-JML1952 GT Houston Charmed Complex Battleground Sile - Occidental / Diamond Sharmock NG GT3 7.500 01-JML1952 GT Houston Charmed Complex Battleground Sile - Occidental / Diamond Sharmock NG GTG3 7.500 01-JML192 GT Pasadera Cogenetation IP - Calpine NG GTG3 7.500 01-JML192 GT 2.4000 01-JML192 GT <td>Harris</td> <td>Excon Mobil Co USA Baytown PP3 PP4</td> <td>Ű</td> <td>GT42</td> <td>20 000</td> <td>01-JAN-1977</td> <td>515</td> <td>190,864,00</td>	Harris	Excon Mobil Co USA Baytown PP3 PP4	Ű	GT42	20 000	01-JAN-1977	515	190,864,00
Exonn Motil Co USA Bayrown PP3 PP4 NG GT45 36500 01-JUN-1986 GT Exonn Motil Co USA Bayrown PP3 PP4 NG ST33 7.500 01-JAN1922 CT Exonn Motil Co USA Bayrown PP3 PP4 NG ST33 7.500 01-JAN1922 CT Houston Chemical Complex Battleground Site - Occidental / Damond Sharmock NG ST1 7.500 01-JAN1922 CT Houston Chemical Complex Battleground Site - Occidental / Damond Sharmock NG ST1 7.4000 01-JUN-1986 CT Houston Chemical Complex Battleground Site - Occidental / Damond Sharmock NG ST1 7.4000 01-JUN-1986 CT Houston Chemical Complex Battleground Site - Occidental / Damond Sharmock NG ST1 7.4000 01-JUN-1986 CT Pasadema Cogenetation LP - Calpine NG ST152 175,000 01-JUN-1986 CT Pasadema Cogenetation LP - Calpine NG ST152 175,000 01-JUN-1986 CT Pasadema Cogenetation LP - Calpine NG ST152 15000 01-JUN-1986 CT Pasadema Cogen	Harris	Exxon Mobil Co USA Baytown PP3 PP4	Ű V	GT43	20,000	01-JAN-1977	5 5	180.426.00
Exon Mobil Co USA Bayrown PP3 PP4 NG 5133 7,500 01.JMN1982 511 Houston Chemical Complex Batheground Site - Occidental / Damond Sharmock NG 617 74,000 01.JMN1982 517 Houston Chemical Complex Batheground Site - Occidental / Damond Sharmock NG 617 74,000 01.JUN1985 617 Houston Chemical Complex Batheground Site - Occidental / Damond Sharmock NG 676 173 2000 01.JUN1985 617 Pasadena - Ar Products NG 676 173 2000 01.JUN2000 61 Pasadena - Ar Products NG 6763 175 000 01.JUN2000 61 Pasadena - Ar Products NG 6763 175 000 01.JUN2000 61 Pasadena Paget Company NG 6763 175 000 01.JUN2000 67 Pasadena Paget Company NG 6763 175 000 01.JUN2000 67 Pasadena Paget Company NG 6763 17000 01.JUN2000 67 171.JUN2000 171 <	Harris	Excon Mobil Co USA Baytown PP3 PP4	Ű	GT45	36,500	01-JUN-1988	5	281 543 00
Exon Moli Co USA Battingorum PF3 PP4 NG ST34 7.500 01.4Mr:1952 ST Houston Chemical Complex Battingorum Site - Occidental / Damond Sharmock NG 671 74.000 01.4Mr:1932 CT Houston Chemical Complex Battingorum Site - Occidental / Damond Sharmock NG 671 74.000 01.4Mr:1932 CT Houston Chemical Complex Battingorum Site - Occidental / Damond Sharmock NG 6713 74.000 01.4Mr:1932 CT Pasaden actime IC complex Battingorum Site - Occidental / Damond Sharmock NG 6723 75.000 01.4Mr:1932 CT Pasaden actime IC complex Battingorum Site - Occidental / Damond Sharmock NG 6723 75.000 01.4Mr:1932 CT Pasaden actime IC - Calpine NG 6723 75.000 01.4Mr:1932 CT Pasaden actime IC - Calpine NG 773 7000 01.4Mr:1948 CT Pasaden actime IC - Calpine NG 773 1500 01.4Mr:1948 CT Pasaden actime IC - Calpine NG 773 1500 01.4Mr:1948 CT Pasaden a	Harris	Excon Mobil Co USA Baytown PP3 PP4	ÿ	ST33	7.500	01-JAN-1950	ST S	49.537.00
Houston Chemical Complex Battleground Sile Occidental / Diamond Sharmock NG GT1 74,000 0 MAY 1982 CT Houston Chemical Complex Battleground Sile - Occidental / Diamond Sharmock NG ST 28,000 01-JUH 1982 CT Houston Chemical Complex Battleground Sile - Occidental / Diamond Sharmock NG ST 28,000 01-JUH 1982 CT Pasadena Contraction Processon NG CTG3 175,000 01-JUH 2000 CT Pasadena Cogeneration LP Calpine NG CTG3 175,000 01-JUH 2000 CT Pasadena Cogeneration LP Calpine NG STG3 175,000 01-JUH 2000 CA Pasadena Cogeneration LP Calpine NG STG3 155,000 01-JUH 2000 CA Pasadena Peer Company NG STG3 155,000 01-JUH 2000 CA Pasadena Peer Company NG STG3 155,000 01-JUH 2000 CA Pasadena Peer Company NG STG3 150,000 01-JUH 2000	Harris	Excon Mobil Co USA Baytown PP3 PP4	ଅ	ST34	7,500	01-JAN-1952	510	41 398 00
Houston Chemical Complex Battleground Sile Constrained Complex Battleground Sile Constrained Complex Battleground Sile Constrained Complex Battleground Sile Constrained Complex Battleground Sile Constrained Complex Battleground Sile Constrained Sile	Harris	Site	S N	GTI	74 000	01-MAY-1982	515	560 154 1'
Houston Chemical Complex Battleground Sile Coldental / Damond Shemcok NG 51 52.000 01-JUI-1565 CA Pasadena Cogeneration LP - Calpine NG CTG2 175.000 01-JUI-1956 CT Pasadena Cogeneration LP - Calpine NG CTG2 175.000 01-JUI-1956 CT Pasadena Cogeneration LP - Calpine NG CTG2 175.000 01-JUI-1956 CT Pasadena Cogeneration LP - Calpine NG CTG2 175.000 01-JUI-1958 CT Pasadena Cogeneration LP - Calpine NG STG2 155.000 01-JUI-1958 CT Pasadena Cogeneration LP - Calpine NG ATB2 4.000 01-JUI-1959 CT Pasadena Paper Company P. Equistar NG ATB2 4.000 01-JUI-1939 ST Pasadena Paper Company P. Equistar NG ATB2 4.000 01-JUI-1939 ST Pasadena Paper Company P. Equistar NG ATB2 4.000 01-JUI-1939 ST Rooldi Inc Houston Plant Calpine	Harris	Site	U.C.N	619	74 000	01-111N-1087	55	5 10 281 2
Pasadera Ar Products No GEN1 4,000 01-JUL1685 GT Pasadera Cogeneration LP Calpine NG CTG3 175,000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG CTG3 175,000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG CTG3 175,000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG CTG3 175,000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG ATB 10000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG ATB 10000 01-JUN-2000 CT Pasadera Cogeneration LP Calpine NG ATB 10000 01-JUN-2000 CT Pasadera Commany NG ATB ATB 10000 01-JUN-2000 CT Relant Creation Plant NG ATB ATB 31600 </td <td>Harris</td> <td>Site</td> <td>9 V</td> <td>ST ST</td> <td>52,000</td> <td>01-411G-1982</td> <td>5</td> <td>449 563 6</td>	Harris	Site	9 V	ST ST	52,000	01-411G-1982	5	449 563 6
Pasadera Cogeneration LP Capine NG CTG1 173,400 01-JUN-1996 CT Pasadera Cogeneration LP Capine NG CTG2 175,000 01-JUN-1996 CT Pasadera Cogeneration LP Capine NG CTG2 175,000 01-JUN-1998 CT Pasadera Cogeneration LP Capine NG CTG2 175,000 01-JUN-1998 CT Pasadera Cogeneration LP Capine NG CTG2 175,000 01-JUN-2000 CT Pasadera Poet Company NG ATB2 4,000 01-JUN-1998 CA Pasadera Poet Company NG ATB2 4,000 01-JUN-1990 ST Roudin Refusion Plant Capine NG ATB2 4,000 01-JUN-1990 ST Rhodi Ref Feature OTH GEN 5,000 01-JUN-1990 ST Rhodi Ref Feature NG TG2 13,000 01-AN-1990 ST Rhodi Ref Feature 13,000 01-JUN-1990 ST </td <td>Harris</td> <td></td> <td>С У</td> <td>GEN1</td> <td>4 000</td> <td>01-111-1985</td> <td>55</td> <td>21 716 10</td>	Harris		С У	GEN1	4 000	01-111-1985	55	21 716 10
Pasadene Cogeneration LP Calpine NG CTG2 175,000 01-JUN-2000 CT Pasadena Cogeneration LP Calpine NG CTG3 175,000 01-JUN-2000 CT Pasadena Cogeneration LP Calpine NG STG3 175,000 01-JUN-2000 CT Pasadena Cogeneration LP Calpine NG STG2 150,000 01-JUN-2000 CT Pasadena Poper Company NG STG2 150,000 01-JUN-2000 CT Pasadena Poper Company NG ATB1 10,000 01-JUN-2002 CT Rodal Inc Houston Plant NG ATB1 10,000 01-JUN-1998 CA Rodal Inc Houston Plant OTH GEN1 3,160 01-JUN-1990 ST Rodal Inc Houston Plant Control OTH GEN1 3,160 01-JUN-1990 ST Rodal Inc Houston Plant Rodal Inc Houston Plant OTH GEN1 3,160 01-JUN-1990 ST Rodal Inc Houston Plant Rodan Texes - Abititi TGS <td< td=""><td>Harris</td><td>å</td><td>S S</td><td>CTG1</td><td>173.400</td><td>01-JUN-1998</td><td>55</td><td>1 243 605 5</td></td<>	Harris	å	S S	CTG1	173.400	01-JUN-1998	55	1 243 605 5
Pasadera Cogeneration LP - Capine NG CTG3 175,000 01-JUN-2000 C1 Pasadera Cogeneration LP - Capine NG STG1 87,500 01-JUN-2000 C1 Pasadera Cogeneration LP - Capine NG STG1 87,500 01-JUN-2000 C1 Pasadera Cogeneration LP - Capine NG ATB1 10,000 01-JUN-2002 C1 Pasadera Paper Company NG ATB2 4000 01-JUN-2002 C1 Pasadera Paper Company NG ATB2 40000 01-JUN-2002 C1 Pasadera Paper Company NG ATB2 4000 01-JUN-2002 C1 Pasadera Paper Company NG ATB2 4000 01-JUN-2002 C1 Rould Inc Houston Plant NG ATB2 4000 01-JUN-1948 S1 Rould Inc Houston Plant Company 07H GEN 3307 01-FBH398 G1 Rould Inc Houston Plant Readon Texas - Abitio TG1 3300 01-JAN-1947 S1 Steelon Texas - Abitio	Harris	. •	Ű	CTG2	175 000	01-JUN-2000	515	71 669 66
Pesaderia Cogeneration LP - Calpine NG STG1 87,500 01-JUN-1996 CA Pasaderia Cogeneration LP - Calpine NG STG2 150,000 01-JUN-2000 CA Pasaderia Cogeneration LP - Calpine NG STG2 150,000 01-JUN-1996 CA Pasaderia Poer Company NG ATB2 4,000 01-JUN-1996 ST Pasaderia Poer Company NG ATB2 4,000 01-JUN-1996 ST Pasaderia Poer Company NG ATB2 4,000 01-JUN-1996 ST Riodia Inc Houston Plant OTH GEN1 5,000 01-JUN-1997 ST Riodia Inc Houston Plant OTH GEN1 3,000 01-JAN-1970 ST Riodia Inc Houston Plant TG3 337 01-EEH396 GT ST Riodia Inc Houston Plant TG3 337 01-EEH396 GT ST Riodia Inc Houston Plant TG3 337 01-EEH396 GT ST Riodia Inc Houston Plant Stass - Abititi TG3<	Harms	•	Ű	CTG3	175,000	01-JUN-2000	55	89.048.33
Pasadera Cogeneration LP - Calpine NG STG2 15,000 01.JMN-2000 CA Pasadera Paper Company NG ATB2 10,000 01.JMN-2000 CA Rhodia Inc Houston Plant OH GEN1 3,160 01.JMN-1900 ST Rhodia Inc Houston Plant OH GEN1 3,160 01.JMN-1900 ST Rhodia Inc Houston Plant CEN2 3,337 01-FEB-1989 GT ST Rhodia Inc Houston Plant CEN2 3,300 01.JMN-1967 GT ST Sheldon Texas - Abititi Texas - Abititi TG2 3,300 01.JMN-1967 GT Sheldon Texas - Abititi Texas - Abititi TG2 3,300 01.JMN-1943 ST Sheldon Texas - Abititi Texas - Abititi	Hamis	Pasadena Cogeneration LP - Calpine	Ŋ	STG1	87,500	01-JUN-1998	5 5	461 395 3
Pasadera Paper Company NG ATB1 10,000 01-JMN 1948 ST Pasadera Paper Company NG ATB2 4,000 01-JMN 1910 ST Pasadera Paper Company NG ATB2 4,000 01-JMN 1970 ST Reladira Rengy Camelview IP - Equistar NG ATB2 1,500 01-JMN 1970 ST Rhodia Inc Houston Plant OTH GEN 3,169 01-JMN 1967 ST Rhodia Inc Houston Plant OTH GEN 3,169 01-JMN 1967 ST Rhodia Inc Houston Plant TG3 3,169 01-JMN 1967 ST ST Sheldon Texas - Abitibi TG3 3,000 01-JMN 1967 ST ST Sheldon Texas - Abitibi TG3 3,000 01-JMN 1967 ST ST St Sheldon Texas - Abitibi TG3 3,000 01-JMN 1967 ST ST St Sheldon Texas - Abitibi TG3 3,000 01-JMN 1967 ST ST St St St St <	Harris	1	NG	STG2	150,000	01-JUN-2000	55	73,535,61
Pasadena Paper Company NG ATB2 4,000 01-OCT-1943 ST Relatin Energy Chamelview LP - Equistar NG 918,000 1-Jul-2002 ST Rholia Energic Chamelview LP - Equistar OTH GEN1 5,000 01-JAN1-1970 ST Rholia Envisory OTH GEN1 3,169 01-JAN1-1966 GT Rholia Envisory TG1 3,169 01-JAN1-1966 GT ST Rholia Eventsiny TG1 GEN2 3,000 01-JAN1-1967 GT Sheldon Texas - Abitbi TG1 3,169 01-JAN1-1967 GT GT Sheldon Texas - Abitbi TG2 18,000 01-JAN1-1967 GT GT Sheldon Texas - Abitbi TG2 18,000 01-JAN1-1967 GT GT Sheldon Texas - Abitbi TG2 18,000 01-JAN1-1967 GT GT Sheldon Texas - Abitbi TG2 166 6.000 01-JAN1-1967 GT Sheldon Texas - Abitbi TG2	lamis		NG	ATB1	10,000	01-JAN-1948	ST	0
Reliant Energy Chamelview LP - Equistar NG 918,000 1-Jul-2002 ST Rhodia Inc Houston Plant OTH GEN2 1,500 01-Jul-1970 ST Rhodia Inc Houston Plant OTH GEN3 3,600 01-Jul-1970 ST Rhodia Inc Houston Plant OTH GEN3 3,600 01-Jul-1970 ST Rhodia Inc Houston Plant OTH GEN3 3,600 01-Jul-1970 ST Rhodin Texas - Abitbi TG1 33,000 01-Jul-1967 ST ST Sheldon Texas - Abitbi TG2 18,000 01-Jul-1967 ST ST Sheldon Texas - Abitbi TG3 18,000 01-Jul-1967 ST ST Sheldon Texas - Abitbi TG3 18,000 01-Jul-1974 ST ST Sheldon Texas - Abitbi TG4 46,250 01-Jul-1974 ST ST Shell Deer Park Shell Deer Park 5,000 01-Jul-1974 ST ST St Shell Deer Park Shell Deer Park St 5,0	Harris	Pasadena Paper Company	9v V	ATB2	4,000	01-OCT-1943	ST	0
Rhodia Inc Houston Plant OTH GEN2 1,500 01-JAN 1970 ST Rhodia Inc Houston Plant OTH GEN1 5,000 01-JAN 1970 ST Rhodia Inc Houston Plant OTH GEN1 5,000 01-JAN 1970 ST Reduntersity TG1 3,169 01-JAN 1967 ST Sheldon Texas - Abitibi TG1 3,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 16,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 16,000 01-JAN 1967 ST Shell Deer Park St TG3 5,000 01-JUN 1913 ST Shell Deer Park Shell Deer Park TG3 5,000 0	Harris		9 V		918,000	1-Jul-2002		
Rhodia Inc Houston Plant OTH GENI 5,000 01-JAN-1970 ST Red University GENI 3,166 01-JAN-1966 GT Red University GENI 3,166 01-JAN-1966 GT Sheldon Texas - Abitbi TG1 3,300 01-JAN-1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN-1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN-1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN-1967 GT Sheldon Texas - Abitbi CEN 75,000 01-JUN-1995 GT C Shell Deer Park Shell Deer Park CEN 75,000 01-APR-1995 CT C<	Harris	Rhodia Inc Houston Plant	OTH	GEN2	1,500	01-JAN-1970	ST	9,588,000
Rice University CEN1 3,165 01-JAN-1967 CT Rice University 760 3937 01-FEB-1989 GT Rice University 710 73,000 01-JAN-1967 ST Sheldon Texas - Abitbi 110	Harris	Rhodia Inc Houston Ptant	OTH	GEN1	5,000	01-JAN-1970	ST	44,365.00
Rice University GEN2 3,937 01-FEB-1989 GT Sheldon Texas - Abitibi TG1 33,000 01-JAN 1967 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 GT Sheldon Texas - Abitibi TG3 18,000 01-JAN 1967 GT Sheldon Texas - Abitibi TG3 18,000 01-JAN 1974 ST Sheldon Texas - Abitibi TG3 18,000 01-JAN 1974 ST Sheldon Texas - Abitibi Sheldon Texas - Abitibi TG3 18,000 01-JAN 1974 ST Sheldon Texas - Abitibi Shell Deer Park Shell Deer Park Si 000 01-JAN 1973 ST Shell Deer Park Shell Deer Park Si Si Si Si Si Si Si Shell Deer Park Shell Deer Park Si Si <td>Harris</td> <td>Rice University</td> <td></td> <td>GENI</td> <td>3,169</td> <td>01-JAN-1986</td> <td>GT</td> <td>443,710</td>	Harris	Rice University		GENI	3,169	01-JAN-1986	GT	443,710
Sheldon Texas - Abitbi TG1 33,000 01-JAN-1967 ST Sheldon Texas - Abitbi TG2 18,000 01-JAN-1967 GT Sheldon Texas - Abitbi TG2 18,000 01-JAN-1967 GT Sheldon Texas - Abitbi TG3 18,000 01-JAN-1967 GT Sheldon Texas - Abitbi TG3 18,000 01-JAN-1967 ST Sheldon Texas - Abitbi TG3 46,250 01-JAN-1974 ST Shell Deer Park GEN3 5,000 01-JUN-1943 ST ST Shell Deer Park Shell Deer Park 5,000 01-JUN-1943 ST ST Shell Deer Park Shell Deer Park 5,000 01-JUN-1943 ST ST ST	Harris	Rice University		GEN2	3,937	01-FEB-1989	61	33,207,50
Sheldon Texas - Abitbi TG2 18,000 01-JAN -1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN -1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN -1967 GT Sheldon Texas - Abitbi TG3 16,000 01-JAN -1967 GT Shell Oper Park GEN3 5,000 01-JAN -1913 ST Shell Deer Park GEN3 5,000 01-JAP -1995 GT Shell Deer Park GEN4 75,000 01-JAP -1995 GT Shell Deer Park Shell Deer Park 75,000 01-JAP -1995 GT Shell Deer Park Shell Deer Park 75,000 01-JAP -1995 GT Shell Deer Park Shell Deer Park 75,000 01-JAP -1995 GT Shell Deer Park Solvay Polymers 75,000 01-JAP -1995 GT Shell Deer Park Solvay Polymers 75,000 01-JAP -1995 GT Solvay Polymers Itaxas Petrochemicals Corp 17,148 01-DCC1 -1979 ST <td< td=""><td>Harris</td><td>Shetdon Texas - Abitibi</td><td></td><td>1G1</td><td>33,000</td><td>01-JAN-1967</td><td>ST</td><td>133,580,00</td></td<>	Harris	Shetdon Texas - Abitibi		1G1	33,000	01-JAN-1967	ST	133,580,00
Sheldon Texas - Abitbi TG3 18,000 01-JAN-1957 GT Sheldon Texas - Abitbi TG4 46,250 01-JAN-1974 ST Sheldon Texas - Abitbi TG4 46,250 01-JAN-1974 ST Sheldon Texas - Abitbi GEN2 50,000 01-JAN-1974 ST Sheld Deer Park GEN3 5,000 01-JUN-1933 ST Shell Deer Park GEN3 5,000 01-JUN-1943 ST Shell Deer Park GEN3 5,000 01-JUN-1943 ST Shell Deer Park GEN3 5,000 01-JUN-1972 ST Shell Deer Park GEN1 18,600 1-Aug-2001 GT Shell Deer Park Solvay Polymers 1G2 35,000 01-JUN-1972 ST Shell Deer Park Solvay Polymers 1G2 35,000 01-JUN-1972 ST Solvay Polymers Iexas Petrochemicals Corp 1G2 35,000 01-JUN-1972 ST I exas Petrochemicals Corp Valero Refining Co Texas Houston Refinency NG GEN1	Hams	Sheldon Texas - Abitibi		TG2	18,000	01-JAN-1967	GT	0
Sheldon Texas - Abitbi TG4 46,250 01-JAN -1974 ST Sheld Deer Park Sheld Deer Park 50.000 01-OCT -1979 ST Sheld Deer Park GEN3 5,000 01-JUN -1943 ST Sheld Deer Park GEN3 5,000 01-JUN -1943 ST Sheld Deer Park GEN3 5,000 01-JUN -1943 ST Sheld Deer Park GEN3 75,000 01-JNP -1995 GT Shell Deer Park GEN3 75,000 01-JNP -1995 GT Shell Deer Park GEN1 75,000 01-JNP -1995 GT Shell Deer Park GEN1 75,000 01-JNP -1995 GT Shell Deer Park GEN1 75,000 01-JNP -1995 GT Shell Deer Park Solvay Uretr 50,000 01-JNP -1995 GT Shell Deer Park Solvay Derrer 50,000 01-JUN -1972 ST Shell Deer Park TG2 35,000 01-JUN -1972 ST Texas Petrochemicals Corp NG GEN1 </td <td>Hams</td> <td>Sheldon Texas - Abitibi</td> <td></td> <td>TG3</td> <td>18,000</td> <td>01-JAN-1967</td> <td>GT</td> <td>80,710,00</td>	Hams	Sheldon Texas - Abitibi		TG3	18,000	01-JAN-1967	GT	80,710,00
Shell Deer Park Sciell Deer Park Sciell Deer Park ST	Hams	Sheldon Texas - Abitibi		2	46,250	01-JAN-1974	ST	38,370,00
Shell Deer Park Sciel Deer Park Sciel Deer Park Sciel Deer Park Strel Deer Park Sciel Deer	Hams	Shell Deer Park		GENZ	50,000	01-OCT-1979	ST	354,613,26
Shell Deer Park CGEN4 75,000 01-APR-1995 GT Shell Deer Park Shell Deer Park 75,000 01-APR-1995 GT Shell Deer Park Shell Deer Park 75,000 01-APR-1995 GT Shell Deer Park Shell Deer Park 50,000 01-APR-1995 GT Shell Deer Park Shell Deer Park 50,000 01-APR-1995 GT Solvay Polymerals Corp NG TG2 35,000 01-UU-1972 ST Texas Petrochemicals Corp NG TG2 35,000 01-UU-1972 ST Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Westholiow Technology Center - Shell NG 1 3,725 01-JAN-1981 IC Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Shell Deer Park		GEN3	5,000	01-JUN-1943	ST	0
Shell Deer Park Sciell Deer Park S5,000 01-APR-1995 GT Shell Deer Park Sinell Deer Park 50,000 01-OCT-1979 ST Shell Deer Park Sinell Deer Park 50,000 01-OCT-1979 ST Solvay Polymer Solvay Polymer 50,000 01-OCT-1979 ST Solvay Polymer Texas Petrochemicals Corp 18,600 1-Aug-2001 GT Texas Petrochemicals Corp NG TG2 35,000 01-ULN-1972 ST Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Westholiow Technology Center - Shell NG 1 3,725 01-JAN-1981 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Shell Deer Park		GEN4	75,000	01-APR-1995	GT	638,836,44
Shell Deer Park GEN1 50.000 01-OCT-1979 ST Solvay Polymers NG 18,600 1-Aug-2001 GT Texas Periochemicals Corp TG2 35,000 01-JUN-1972 ST Texas Periochemicals Corp TG2 35,000 01-JUN-1972 ST Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Shell Deer Park		GEN5	75,000	01-APR-1995	GT	596, 130, 05
Solvay Polymers NG 18,600 1-Aug-2001 GT Texas Petrochemicals Corp TG2 35,000 01-JUN-1972 ST Texas Petrochemicals Corp TG2 35,000 01-JUN-1972 ST Texas Petrochemicals Corp NG TG2 35,000 01-JUN-1972 ST Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Vesthollow Technology Center - Shell NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Shell Deer Park		GEN1	50,000	01-OCT-1979	ST	308,005,25
Texas Petrochemicals Corp TG2 35,000 01-JUN-1972 ST Texas Petrochemicals Corp Texas Petrochemicals Corp 900,000 2006 2006 7 7 Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT 7 7 7 7 148 01-DEC-1990 GT 7 8 01-DEC-1990 GT 17,148 01-DEC-1990 GT 7 17 18 01-DEC-1990 GT 17 148 01-DEC-1990 GT 17 148 01-DEC-1990 GT 18 01-DEC-1990 GT 17 148 01-DEC-1990 GT 17 148 01-DEC-1990 GT 18 16 10 3,725 01-JMN-1981 IC 16 10 Jameson Gas Processing Plant BL 620 350 01-JMN-1981 IC 17 10 10 10 10 10 10 10 10 10 10 10 10 10 10 10	Harris	Solvay Polymers	ő		18,600	1-Aug-2001	GT	
Texas Petrochemicals Corp 2006 201 17 148 01-DEC-1990 GT Vialero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT NG Usastrollow Technology Center - Shell NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Texas Petrochemicals Corp		TG2	35,000	01-JUN-1972	ST	307,085,95
Valero Refining Co Texas Houston Refinery NG GEN1 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Westhollow Technology Center - Shell NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Texas Petrochemicals Corp			000'006	2006		
Valero Refining Co Texas Houston Refinery NG GEN2 17,148 01-DEC-1990 GT Westhollow Technology Center - Shell NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Valero Refining Co Texas Houston Refinery	У С	GEN1	17,148	01-DEC-1990	GT	111,830,00
Westhollow Technology Center - Shell NG 1 3,725 01-JAN-1988 GT Jameson Gas Processing Plant BL 620 350 01-JAN-1981 IC	Harris	Valero Refining Co Texas Houston Refinery	Ŷ	GEN2	17,148	01-DEC-1990	GT	108,770,00
Jameson Gas Processing Plant 620 350 01-JAN-1981 IC	Harris	-	УQ	-	3,725	01-JAN-1988	G	34,464,000
	ntgomery	Jameson Gas Processing Plant	В	620	350	01-JAN-1981	<u>ں</u>	3, 130,000

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

1/27/2003

622 550 01-JAN-1986 IC 623 550 01-JAN-1986 IC 62N3 7,500 01-JAN-1949 ST 6EN3 15,625 01-JAN-1949 ST 6EN3 15,625 01-JAN-1949 ST 6EN3 15,625 01-JAN-1949 ST 6EN3 15,625 01-JAN-1946 ST 6EN3 15,625 01-JAN-1946 ST 6EN3 7,500 01-JAN-1946 ST 6EN4 10,000 01-JAN-1946 ST 6EN3 7,500 01-JAN-1946 ST	Region	County	Facility Name	Primary Fuel	Name	Nameplate Rating (kW)	Unit Startup Date	Prime Mover	Gross Generation in Year 2000 (kWhrs)
american Gas Processing Plant L EZ 560 01.4MV 1968 C Luffen Trans. Addition Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T Luffen Trans. Addition Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T Luffen Trans. Addition Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T Luffen Trans. Addition MS CENN 7.200 01.4MV 1968 T MS CENN CENN 7.200 01.4MV 1968 T C MS CENN CENN 2.200 01.4MV 1968 T C									
Jameson Gas Processing Plant Luken Teass - Ability Luken Teass - Ability <thluken teass<="" th=""> Luken Teass - Ability <th< td=""><td></td><td>1</td><td>Jameson Gas Processing Plant</td><td>В</td><td>622</td><td>550</td><td>01-JAN-1986</td><td><u>ల</u></td><td>4,060,000</td></th<></thluken>		1	Jameson Gas Processing Plant	В	622	550	01-JAN-1986	<u>ల</u>	4,060,000
Unfm Tesses - Ability Mode CERM 7500 01-JAM 1595 51 Luthm Tesses - Ability Luthm Tesses - Ability Luthm Tesses - Ability 0 CERM 75.00 01-JAM 1595 51 Luthm Tesses - Ability Luthm Tesses - Ability CERM 75.00 01-JAM 1595 51 01-JAM 1595 51 Luthm Tesses - Ability Multer Tesses - Ability CERM 75.00 01-JAM 1595 51 01-JAM 1595 51 Multer Tesses - Ability Multer Tesses - Ability Multer Tesses - Ability 00 01-JAM 1595 51 01-JAM 1595 51 Multer Tesses - Ability Multer Tesses - Ability Multer Tesses - Ability 01		Montgomery	Jameson Gas Processing Plant	B	623	550	01-JAN-1986	<u>0</u>	0
Lukin Teasa - Abilibi Nic CENR 7,500 01-Jukin 1999 51 Lukin Teasa - Abilibi Lukin Teasa - Abilibi Rein 12,500 01-Jukin 1996 51 Lukin Teasa - Abilibi Lukin Teasa - Abilibi Rein 12,500 01-Jukin 1996 51 Lukin Teasa - Abilibi Lukin Teasa - Abilibi Rein 12,500 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Mestivaca Ecable Mestivaca Ecable NG EENI 7,000 01-Jukin 1996 51 Beauront Reinery Beauront Reine									
Lukin Tease - Abibi Lukin Tease Lukin Tease - Abibi	•—•	Angelina	Lufkin Texas - Abitibi	Ű	GEN2	7,500	01-JAN-1939	ST	39 083 415
Luthin Tease - Addith Luthin Tease - Addith		Angelina	Lufkin Texas - Abitibi	92	GEN3	12 500	01-JAN-1949	5	76 851 481
Unform Teass - Abbits Nois GENS 1,5,53 01-MAR 1966 61 Unform Teass - Abbits Nois GENV 2,1,75 01-MAR 1966 61 Westsnoop Exadele Nois GENV 2,1,75 01-MAR 1966 61 Westsnoop Exadele Nois GENV 2,1,75 01-MAR 1966 61 Westsnoop Exadele Nois GENV 2,7,600 01-MAR 1966 61 Westsnoop Exadele Nois GENV 2,7,600 01-MAR 1966 61 Beaumont Refinery GENV 2,7,600 01-MAR 1966 61 01-MAR 1966 61 Beaumont Refinery GENV 2,7,600 01-MAR 1966 61 01-MAR 1966 61 Beaumont Refinery GENV 2,7,600 01-MAR 1966 61 01-MAR 1966 61 Beaumont Refinery GENV 2,600 01-MAR 1966 61 01-MAR 1966 61 Beaumont Refinery GENV 2,600 01-MAR 1966 61 01-MAR 1966 61	_	Angelina	Lufkin Texas - Abitibi	9 Z	GEN4	12.500	01-JAN-1949	5 5	74 905 385
Unfilm Teass - Ability Westvace E-adele Unfilm Teass - Ability Mestvace E-adele 15,523 01-Abril 1966 51 Westvace E-adele Westvace E-adele NG GENI 7,300 01-Abril 1966 51 Westvace E-adele Westvace E-adele NG GENI 7,300 01-Abril 1966 51 Westvace E-adele Westvace E-adele NG GENI 7,500 01-Abril 1966 51 Westvace E-adele Westvace E-adele NG GENI 7,500 01-Abril 1966 51 Beaurion Refresy Beaurion Refresy CENI 25,000 01-Abril 1966 51 Beaurion Refresy Beaurion Refresy CENI 25,000 01-Abril 1966 51 Beaurion Refresy CENI 25,000 01-Abril 1966 51 25,000 01-Abril 1966 51 Beaurion Refresy Beaurion Refresy CENI 25,000 01-Abril 1966 51 Beaurion Refresy Doudee Definition CENI 25,000 01-Abril 1967 51 Beaurion Refresy Doudee		Angelina	Lufkin Texas - Abitibi	UN N	GENS	15 625	01-MAR-1956	55	50 727 280
Wullkin Teess Ablib NG GENV 21/75 01-MM-1984 51 Wullkin Teess Ablib Wullkin Teess Ablib NG GENV 25.500 01-MM-1984 51 Wullkin Stepsore Evades Wullkin Teess Ablib NG GENV 25.500 01-MM-1984 51 Wullkin Stepsore Evades NG GENV 25.000 01-MM-1984 51 Beaumont Refress GENV 25.000 01-MM-1984 51 5000 01-MM-1984 51 Beaumont Refress GENV 25.000 01-MM-1984 51 25.000 01-MM-1984 51 Beaumont Refress GENV 25.000 01-MM-1984 51 25.000 01-MM-1984 51 Beaumont Refress GENV 25.000 01-MM-1984 51 25.000 01-MM-1984 51 Beaumont Refress GENV 25.000 01-MM-1984 51 25.000 01-MM-1984 51 Beaumont Refress MUL GENV 25.000 01-MM-1984 51 25.000		Angelina	Lufkin Texas - Abitibi	S S	GENG	15.625	01-APR-1956	55	09,132,300 FD F75 708
Westvace Exemption CENN 7500 01-UNIV-1965 51 Westvace Exemption Exemption 01-UNIV-1965 51 Westvace Exemption Exemption 01-UNIV-1965 51 Baumont Refresty Exemption 25.000 01-UNIV-1965 51 Lico Oxides Oritics Paint Hurthman 66 25		Angelina	Lufkin Texas - Abitibi	9y	GEN7	21,176	01IAN-1968	5	116 463 547
Westerons Evadale NG GEN2 75600 01-MAY-1965 ST Beaumont Refinery Beaumont Refinery CEM 75.600 01-MAY-1965 ST Beaumont Refinery CEM 75.600 01-MAY-1965 ST ST Beaumont Refinery CEM 75.600 01-MAY-1965 ST Beaumont Refinery CEM 75.600 01-MAY-1965 ST Beaumont Refinery CEM 75.600 01-MAY-1965 ST Beaumont Refinery CEM 75.000 01-MAY-1965 ST Beaumont Refinery CEM 75.000 01-MAY-1965 ST Beaumont Refinery CE 38.600 01-MAY-1965 ST LOC Ondes Offinis Plant - Hunisman NG GEC 38.600 01-SEP-1933 GT LOC Ondes Offinis Plant - Hunisman NG GEC 38.600 01-SEP-1932 GT NGC Objerention Fourity Refinery MONa GEC 38.600 01-SEP-1932 GT NGC Objerention Refinery MONA <t< td=""><td></td><td>Jasper</td><td>Westvaco Evadale</td><td>9y</td><td>GEN1</td><td>7,500</td><td>01-JUN-1954</td><td>ST S</td><td>68 160 000</td></t<>		Jasper	Westvaco Evadale	9y	GEN1	7,500	01-JUN-1954	ST S	68 160 000
Wastmoot Refinery NG GEHA 17,000 01-JAN 1996 ST Beaumont Refinery Beaumont Refinery GENA 10,000 01-EEH937 ST Beaumont Refinery GENA 55,000 01-JAN 1996 ST Locutomot Refinery GENA 75,000 01-JAN 1996 ST Locutomot Refinery GENA 75,000 01-JAN 1993 ST Locutomot Refinery Motiona MG GENA 75,000 01-JAN 1996 GT Locutomot Refinery Motiona MG GENA 76,000 01-JAN 1996 GT Locutomot Refinery Motiona MG GENA <td>:</td> <td></td> <td>Westvaco Evadale</td> <td>9 N</td> <td>GEN2</td> <td>32,640</td> <td>01-MAY-1965</td> <td>ST S</td> <td>256 320 000</td>	:		Westvaco Evadale	9 N	GEN2	32,640	01-MAY-1965	ST S	256 320 000
Beaumont Refinery CENN 10,000 01-LEB-1937 ST Beaumont Refinery Beaumont Refinery CENN 25,000 01-LEB-1937 ST Beaumont Refinery Beaumont Refinery CENN 25,000 01-LMN-1956 ST Beaumont Refinery Beaumont Refinery CENN 26611 28,000 01-LMN-1953 ST LCO Oxides Olefits Plant - Huntsmen NGC Cogeneration Facility - BASF NG CC32 28,600 01-LMN-1953 ST LCO Oxides Olefits Plant - Huntsmen NG CC32 28,600 01-LMN-1953 ST LCO Oxides Olefits Plant - Huntsmen NG CC32 28,600 01-LMN-1953 ST NGCC Cogeneration Facility - Motiva NG CC32 28,600 01-LMN-1953	-	Jasper	Westvaco Evadale	Ű	GEN3	17,600	01-JAN-1986	ST	151,200,000
Beaumont Refinery CEN 2000 01-LMH-1950 ST Beaumont Refinery Beaumont Refinery CEN 25.000 01-LMH-1950 ST Beaumont Refinery Beaumont Refinery CEN 25.000 01-LMH-1950 ST Beaumont Refinery Beaumont Refinery CEN 25.000 01-LMH-1950 ST Beaumont Refinery CEN 36.000 01-LMH-1950 ST CEN 35.000 01-LMH-1950 ST Beaumont Refinery CEN 36.000 01-LMH-1950 ST CEN 36.000 01-LMH-1950 ST LOD Oxides Officits Plant LUD Oxides Officits Plant MINCC Copreteration Facility - BASF MG CEN 36.000 01-LMH-1950 ST LOD Oxides Officits Plant MINCC Copreteration Facility - BASF MG CEN 37.000 01-LMH-1950 ST LOD Oxides Officits Plant MINCC Copreteration Facility - BASF MG CEN 37.000 01-LMH-1950 CT Port Afthur Port Afthur Refinery MONO CEN		1	Beaumont Refinery		GEN4	10,000	01-FEB-1957	ST	9,400,541
Beaumont Refinery CEN6 25000 01-AM-1976 ST Beaumont Refinery CEN6 25000 01-AM-1976 ST Beaumont Refinery CEN6 20000 01-AM-1976 ST Beaumont Refinery CEN6 26000 01-AM-1976 ST Beaumont Refinery Motes CEN 38670 01-AM-1976 ST JCO Oxdes Ordens Plant - Huntsman CE 75.000 01-AM-1976 ST MROC Cogeneration Facility - BAST NG CC31 38670 01-JUN-1993 ST Poil Afritur Refinery<- Motiva		!	Beaumont Refinery		GENS	10,000	01-JUN-1959	ST	43,937,571
Beaumont Refinery CEN7 25.000 01.JAM 1970 ST Beaumont Refinery CEN1 25.000 01.JAM 1970 ST Beaumont Refinery CEN1 30.000 01.JAM 1970 ST JCO Oxides Olefins Plant - Huntsman CEN1 30.000 01.JAM 1970 ST JCO Oxides Olefins Plant - Huntsman NG CCG1 38.600 01.JAM 1973 ST JCO Oxides Olefins Plant - Huntsman NG CCG1 38.600 01.JAM 1973 ST Port Arthur Port Arthur NG CGN1 30.000 01.JAM 1973 ST Port Arthur Port Arthur Refinery - Motiva NG CEN1 31.700 01.JUM 1993 CT Port Arthur Refinery - Motiva NG CEN1 37.60 1.JUM 1997 CT			Beaumont Refinery		GEN6	25,000	01-FEB-1978	ST	176.101.252
Beaumont Refinery CEN8 20.000 01:JJM+1966 ST Beaumont Refinery GE10 7.500 01:JJM+1933 ST Beaumont Refinery GE11 36.70 01:JJM+1933 ST Beaumont Refinery GE11 36.70 01:JJM+1933 ST JCO Oxdess Olefins Plant - Huntsman NG GC31 36.70 01:JJM+1933 ST JCO Oxdess Olefins Plant - Huntsman NG GC32 36.600 01:JJM+1933 GT JCO Oxdess Olefins Plant - Huntsman NG GER1 37.600 01:JJM+1933 GT JCO Oxdess Olefins Plant - Huntsman NG GEN1 75.000 01:JJM+1933 GT NNOC Cogeneration Facility - BASF NG GEN1 75.000 01:JJM+1932 GT Pont Arthur Refinery - Motiva NG GEN1 75.000 01:JJM+1972 GT Pont Arthur Refinery - Motiva NG GEN1 75.000 01:JJM+1972 GT Pont Arthur Refinery - Motiva NG GEN1 75.000 01:JJM+1972	+	+	Beaumont Refinery		GEN7	25,000	01-JAN-1970	ST	170,507,443
Beaumon Refinery CEN9 30.000 01.JMN-1987 ST Beaumon Refinery CET1 36.70 01.JMN-1933 ST Beaumon Refinery CET1 36.70 01.JMN-1933 ST JCO Oxides Oleffins Plant - Huntaman CCC2 36.70 01.JMN-1933 ST JCO Oxides Oleffins Plant - Huntaman NG CCC2 36.70 01.JMN-1933 ST JCO Oxides Oleffins Plant - Huntaman NG CCC3 36.70 01.JMN-1933 ST JCO Oxides Oleffins Plant - Huntaman NG CCC3 36.70 01.JMN-1933 ST Point Arthur Point Arthur NG CEN1 37.600 01.JMN-1932 CT Point Arthur Refinery - Motiva NG CEN2 37.600 01.JUN-1926 CT Point Arthur Refinery - Motiva NG CEN2 37.600 01.JUN-1926 CT Point Arthur Refinery - Motiva NG CEN2 37.600 01.JUN-1926 CT Point Arthur Refinery - Motiva NG CEN2 37.600			Beaumont Refinery		GEN8	20,000	01-JAN-1966	ST	165,180,312
Beaumont Refinery CE:10 7,500 01.JUN-1993 51 Beaumont Refinery JCO Oxides Collins Plant - Human NG GE:1 33,670 01.JUN-1993 61 JCO Oxides Collins Plant - Human NG GC:2 33,670 01.JUN-1993 61 JCO Oxides Collins Plant - Human NG GC:3 33,600 01.JUN-1993 61 JCO Oxides Collins Plant - Human NG GC:3 33,600 01.JUN-1993 61 JCO Oxides Collins Plant - Human NG GC:3 33,600 01.JUN-1993 61 Poil Arhur Refiney - Moliva NG GEN 7,600 01.JUN-1992 61 Poil Arhur Refiney - Moliva NG GEN 13,750 01.JUN-1997 61 Poil Arhur Refiney - Moliva NG GEN 13,750 01.JUN-1997 61 Poil Arhur Refiney - Moliva NG GEN 13,750 01.JUN-1997 61 Poil Arhur Refiney - Moliva NG GEN 13,750 01.JUN-1997 61 Poil Arhur Refinery - Moliva </td <td>-</td> <td>-</td> <td>Beaumont Refinery</td> <td></td> <td>GEN9</td> <td>30,000</td> <td>01-JAN-1967</td> <td>ST</td> <td>162,713,675</td>	-	-	Beaumont Refinery		GEN9	30,000	01-JAN-1967	ST	162,713,675
Beaumont Refinery GE11 36,70 01-JUN1933 31 Bounnont Refinery CGC 36,70 01-JUN1933 31 CO Oxdes Orefins Plant - Huntsman NG CGC1 36,600 01-JUN1933 51 UCO Oxdes Orefins Plant - Huntsman NG CGC3 36,600 01-JUN1933 61 NFOC Oxdes Orefins Plant - Huntsman NG CGC3 36,600 01-JUN1933 61 NFOC Oxdes Orefins Plant - Huntsman NG CGC3 36,600 01-JUN1933 61 Poit Arthur Refinery - Motiva NG CEN2 3,600 01-JUN1932 61 Poit Arthur Refinery - Motiva NG CEN2 3,000 01-JUN1932 61 Poit Arthur Refinery - Motiva NG CEN2 3,000 01-JUN1933 61 Poit Arthur Refinery - Motiva NG CEN3 17,2560 01-JUN1933 61 Poit Arthur Refinery - Motiva NG CEN3 10,3000 01-JUN1933 61 Poit Arthur Refinery - Motiva NG CEN3 1			Beaumont Refinery		GE10	7,500	01-JAN-1978	ST	35,473,445
Beaumont Refinery Discretion Constraint Discretion Constraint Constraint <thc< td=""><td>-</td><td></td><td>Beaumont Refinery</td><td></td><td>GE11</td><td>38,670</td><td>01-JUN-1993</td><td>ST</td><td>67,723,746</td></thc<>	-		Beaumont Refinery		GE11	38,670	01-JUN-1993	ST	67,723,746
UGC Oxdes Oferins Plant - Huntisman NG GCG1 38.600 01.5EP-1992 GT UCO Oxdes Oferins Plant - Huntisman NG 75.000 01.402-2000 CT UCO Oxdes Oferins Plant - Huntisman NG 6GC3 38.600 01.5EP-1992 GT Pot Arthur For Arthur Refinery - Motiva NG 6ENI 37.600 01.40V-2000 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 17.250 01.41NH-1975 CT Pot Arthur Refinery - Motiva NG 6ENI 10.0000 01.41NH-1975 CT Pot Arth	_	1	Beaumont Refinery		GE12	38,670	01-JUN-1993	GT	221,574,975
UGO Doxides Ofefine Plant - Huntsman NG GCQ2 38.600 01-SEP-1982 GT PNCO Cogeneration Facity - BASF NG GEN1 37.600 11-MQ22001 CT Point Arthur Fort Arthur Refinery - Moliva NG GEN1 37.600 01-MUV-2000 CA Point Arthur Fort Arthur Refinery - Moliva NG GEN1 37.600 01-MUV-2000 CA Point Arthur Refinery - Moliva NG GEN3 10.000 01-UUN-1925 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1925 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1925 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1925 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1925 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1926 CT Point Arthur Refinery - Moliva NG GEN3 13.750 01-UUN-1957 CT			JCO Oxides Olefins Plant - Huntsman	У V	GCG1	38,600	01-SEP-1992	GT	284,260,000
NROC Cogeneration Facility - BASF NG 75,000 1-Aug-2001 1-Aug-2001 Poil Arthur For Arthur Refinery - Motiva NG GENI 37,600 01-JUN-1975 CT Poil Arthur For Arthur Refinery - Motiva NG GENI 37,600 01-JUN-1975 CT Poil Arthur For Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1975 CT Poil Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1956 CT Poil Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1956 CT Poil Arthu			JCO Oxides Olefins Plant - Huntsman	Ű	GCG2	38,600	01-SEP-1992	GI	287.721.000
Poil Arthur Poil Arthur			NROC Cogeneration Facility - BASF	NG		75,000	1-Aug-2001	• 	
Port Arthur Arthur For Arthur Refinery - Motiva NG GEN2 3 000 01-MOV-2000 CA Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1925 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN3 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Ref			Port Arthur	NG	GEN1	37,600	01-NOV-2000	с <u>т</u>	41,006,000
Port Arthur Refinery - Motiva NG GENS 10,000 01-JUN-1928 CA Port Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GENI 17,250 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1975 CT Port Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1954 CA Port Arthur Refinery - Motiva NG GENI 10,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GENI 18,150 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GNI 18,150 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GNI 18,150 01-JUN-1957 CT Port Arthur Refinery - Motiva	_		Port Arthur	NG	GEN2	3,000	01-NOV-2000	5	120,000
Port Arthur Refinery - Motiva NG GEN1 17,250 01-JUN-1955 CT Port Arthur Refinery - Motiva NG GEN2 13,750 01-JUN-1966 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1966 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GEN3 10,000 01-JUN-1955 CT Port Arthur Refinery - Motiva NG GEN3 18,150 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN32 15,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1957 CT Port Arthur Refinery - Motiva <td></td> <td></td> <td>•</td> <td>NG</td> <td>GEN5</td> <td>10,000</td> <td>01-JUN-1928</td> <td>క</td> <td>24,981,000</td>			•	NG	GEN5	10,000	01-JUN-1928	క	24,981,000
Port Arthur Refinery - Motiva NG GEN2 13,750 01-JUN-1936 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GEN3 10,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN31 10,000 01-JUN-1957 CT Port Arthur Refinery - Motiva NG GN31 10,000 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN32 15,000 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva <td></td> <td></td> <td>•</td> <td>9 V</td> <td>GENI</td> <td>17,250</td> <td>01-JUN-1975</td> <td>cı</td> <td>124,112,000</td>			•	9 V	GENI	17,250	01-JUN-1975	cı	124,112,000
Port Arthur Refinery - Motiva NG GEN3 13,750 01-JUN-1972 CT Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1954 CA Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1957 CA Port Arthur Refinery - Motiva NG GEN5 10,000 01-JUN-1957 CA Port Arthur Refinery - Motiva NG GN31 10,000 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN31 10,000 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery - Motiva NG GN33 33,760 01-JUN-1978 CA Port Arthur Refinery - Motiva <td></td> <td></td> <td></td> <td>ğ</td> <td>GEN2</td> <td>13,750</td> <td>01-JUN-1966</td> <td>сı</td> <td>107,710,000</td>				ğ	GEN2	13,750	01-JUN-1966	сı	107,710,000
Port Arthur Refinery - Motiva NG GEN4 10,000 01-JUN-1954 CA Port Arthur Refinery - Motiva NG GEN7 10,000 01-JUN-1954 CA Port Arthur Refinery - Motiva NG GEN7 10,000 01-JUN-1951 CA Port Arthur Refinery - Motiva NG GN26 18,150 01-JUN-1957 CA Port Arthur Refinery - Motiva NG GN32 15,000 01-JUN-1957 CA Port Arthur Refinery - Motiva NG GN32 15,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1970 CT D Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1982 CT D Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1984 CA				ŷ	GEN3	13,750	01-JUN-1972	ст	69,798,000
Port Arthur Refinery Motiva NG GEN6 10,000 01-JUN-1954 CA Port Arthur Refinery Motiva NG GEN7 10,000 01-JUN-1951 CA Port Arthur Refinery Motiva NG GEN3 18,150 01-JUN-1957 CT Port Arthur Refinery Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery Motiva NG GN33 18,000 01-JUN-1957 ST Port Arthur Refinery Motiva NG GN33 18,000 01-JUN-1952 ST Port Arthur Refinery Motiva NG GN33 18,000 01-JUN-1952 ST Port Arthur Refinery Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery Motiva NG GN33 18,150 01-JUN-1957 ST Port Arthur Refinery Motiva NG GN35 33,750 01-JUN-1957 CT P Port Arthur Refinery Motiva			Port Arthur Refinery - Motiva	Ű	GEN4	10,000	01-JUN-1943	₹	0
Pront Arthur Refinery - Motiva NG GEN7 10,000 01-JUN-1951 CA Port Arthur Refinery - Motiva Notiva NG GN26 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN31 15,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1978 ST Port Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN35 33,750 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN35 33,750 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN27 12,300 01-JUN-1984 CA Port Arthur Refinery - Motiva NG GEN1 38,400 01-AUG-1984 CT Port Ar			OR ARTNUR KENNERY - MORIVA	9 Z	GEN6	10,000	01-JUN-1954	₹	55, 126,000
Port Arthur Refinery Motiva NG GN26 18,150 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN31 10,000 01-JUN-1952 ST Port Arthur Refinery Motiva NG GN33 18,000 01-JUN-1957 ST Port Arthur Refinery Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN33 18,150 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Refinery Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Texas Refinery Motiva NG GN33 38,000 01-JUN-1983 CT Port Arthur Texas Refinery Motiva	+	1	ort Arthur Kelinery - Motiva	9 N	GEN7	10,000	01-JUN-1951	Ş	53,415,000
Proti Arthur Refinery - Motiva NG GN31 10,000 01-JUN-1952 ST Port Arthur Refinery - Motiva Notadity Notadity Notadity Notadity Notadity Notadity Notadity ST ST Port Arthur Refinery - Motiva Notadity Notadity Notadity St ST ST ST Port Arthur Refinery - Motiva Notadity Motiva NG GN33 18,150 01-JUN-1978 CA Port Arthur Refinery - Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN33 33,750 01-JUN-1970 CT Port Arthur Texas Refinery - FINA NG GN33 33,750 01-NGG-1983 CT Port Arthur Texas Refinery - FINA NG GN33 33,750 01-NGG-1983 CT Port Arthur Texas Refinery - FINA NG GN33 33,750 01-NGG-1983 CT Port Arthur Texas Refinery - FINA NG GN33 5,000 01-AUG-19894 CT			Ε.	g	GN26	18,150	01-JUN-1970	5	81,093,292
Poit Arthur Refinery - Motiva NG GN32 15,000 01-JUN-1957 ST Poit Arthur Refinery - Motiva Poit Arthur Refinery - Motiva NG GN33 18,000 01-JUN-1978 CA Poit Arthur Refinery - Motiva NG GN33 18,150 01-JUN-1978 CA Poit Arthur Refinery - Motiva NG GN33 33,750 01-JUN-1978 CA Poit Arthur Refinery - Motiva NG GN33 33,750 01-JUN-1978 CA Poit Arthur Texas Refinery - FINA NG GN27 12,300 01-AUG-1988 GT Poit Arthur Texas Refinery - FINA NG GEN1 33,400 01-MAY-1984 CA Poit Arthur Texas Refinery - FINA NG GEN1 38,000 01-AUG-1999 GT Poit Arthur Texas Refinery - FINA NG GI 38,000 01-AUG-1999 GT The Goodyear& Tire Rubber Co BL 3860 14,877 01-MAR-1987 CA The Goodyear& Tire Rubber Co BL N803 5,000 01-AUG-1999 CT <		i	ŧ,	9 Z	GN31	10,000	01-JUN-1962	ST	57,858,969
Point Arthur Refinery - Motiva NG GN33 T8,000 01-JUN-1978 CA Point Arthur Refinery - Motiva Point Arthur Refinery - Motiva NG GN34 18,150 01-JUN-1978 CA Point Arthur Refinery - Motiva NG GN35 33,750 01-JUN-1970 CT Point Arthur Refinery - Motiva NG GN37 33,750 01-JUN-1978 CA Point Arthur Texas Refinery - Motiva NG GN27 12,300 01-AUG-1988 CT Point Arthur Texas Refinery - FINA NG GEN1 33,400 01-AUG-1988 CT Point Arthur Texas Refinery - FINA NG GEN1 38,000 01-AUG-1988 CT Precise Plant - Air Liquide 0G G1 38,000 01-AUG-1999 CT The Goodysers Tire Rubber Co BL 3N80 14,877 01-MAR-1987 CT The Goodysers Tire Rubber Co BL N803 5,000 01-AUG-1999 CT The Goodysers Tire Rubber Co BL N803 5,000 01-AUG-1999 CT	+		Ott Athur Definery - Motive	9 (2	GN32	15,000	01-JUN-1957	ST	113,409,267
Port Arthur Refinery - Motiva NG GN34 18,150 01-JUN-1970 CT Port Arthur Refinery - Motiva NG GN35 33,750 01-DEC-1983 CT Port Arthur Refinery - Motiva NG GN27 12,300 01-DEC-1983 CT Port Arthur Texas Refinery - FINA NG GN27 12,300 01-MG-1988 GT Port Arthur Texas Refinery - FINA NG GEN 38,000 01-AUG-1988 GT Pi Neches Plant - Air Liquide OG G1 38,000 01-AUG-19994 GT The Goodysar& Tire Rubber Co BL 2N80 14,877 01-MAR-1987 CA The Goodysar& Tire Rubber Co BL N803 5,000 01-AUG-1999 CT			Out Autur Defesser Motive	2	GN33	18,000	01-JUN-1978	5	75,301,086
Point Arthur Referency - Moura No. GN35 33,700 01-DEC-1983 CT Point Arthur Referency - Moura NG GN27 12,300 01-MAY-1984 CA Point Arthur Texas Refinery - FINA NG GEN1 33,400 01-MAY-1984 CA Point Arthur Texas Refinery - FINA NG GEN1 33,400 01-AUG-1983 GT Point Arthur Texas Refinery - FINA NG G1 33,400 01-AUG-1998 GT Print Point Arthur Texas Refinery - FINA NG G1 33,400 01-AUG-1999 GT The Goodysear&Tire Rubber Co BL 2N80 14,877 01-MAR-1987 CA The Goodysear&Tire Rubber Co BL N802 5,000 01-AUG-1999 CT The Goodysear&Tire Rubber Co BL N803 5,000 01-AUG-1999 CT	-	1	OLAURIA REPUBLICA - MOUVA	5 C	GN34	18,150	01-JUN-1970	5	153,427,191
Point Arbitrary - manual NG GNZ/ T2,300 01-MAY-1984 CA Point Arbitrary - mainteenergy - mode 6 GEN1 33,400 01-AUG-1988 GT Pri Neches Plant - Art Liquide 0G G1 33,400 01-AUG-1988 GT The Goodyear&Tire Rubber Co BL 2N80 5,000 01-AUG-1999 GT The Goodyear&Tire Rubber Co BL 3N80 14,877 01-MAR-1987 CA The Goodyear&Tire Rubber Co BL N802 5,000 01-AUG-1999 CT The Goodyear&Tire Rubber Co BL N802 5,000 01-AUG-1999 CT				2	GN35	33, /50	01-DEC-1983	CT	202,880,146
Prince Control review Find 38,400 01,40G-1988 GT Prince Prince 0G G1 38,400 01,40G-1988 GT Prince Prince 0G G1 38,000 01,40G-1984 GT The Goodyear&Tire Rubber Co BL 2N80 5,000 01,40G-1999 CT The Goodyear&Tire Rubber Co BL 3N80 14,877 01,MAR-1987 CA The Goodyear&Tire Rubber Co BL N802 5,000 01,AUG-1999 CT The Goodyear&Tire Rubber Co BL N803 5,000 01,AUG-1997 CT		-	BY Adding Town Defense By Adding Town Parts and Parts an	2 2 2	GNZ/	12,300	01-MAY-1984	8	39,712,543
F1 medias Tail Liguide OG G1 38,000 01-FEB-1994 GT The Goodyear&Tier Rubber Co BL 2N80 5,000 01-AUG-1999 CT The Goodyear&Tier Rubber Co BL 3N80 14,877 01-MAR-1987 CA The Goodyear&Tier Rubber Co BL N802 5,000 01-AUG-1997 CT The Goodyear&Tier Rubber Co BL N803 5,000 01-AUG-1997 CT	-		OILAUNUL LEXAS REINARY - FINA	9 C	GEN1	38,400	01-AUG-1988	G	270,398,400
Ine boodysaria Ine boo	:		I Necres Flant - Air Liquide	8	5	38,000	01-FEB-1994	G	277,557,152
Inter Goodyear&Time Kubber Co 01-MAR-1987 CA The Goodyear&Time Rubber Co 01-AUG-1997 CT The Goodyear&Time Rubber Co 01-AUG-1997 CT The Goodyear&Time Rubber Co 01-AUG-1999 CT	-		Ine Goodyear& Lire Rubber Co	8	2N80	5,000	01-AUG-1999	5	37,877,033
The Goodyear&Tire Rubber Co The Goodyear&Tire Rubber Co The Goodyear&Tire Rubber Co		1		B	3NB0	14,877	01-MAR-1987	5	101,005,422
		1	Ine coodyeard life Kubber Co	8:1	N802	5,000	01-AUG-1997	CT	37,877,033
				<u>ط</u>	N803	5,000	01-OCT-1999	5	37,877,033

Appendix A4

1/27/2003

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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County	Facility Name	Fuel	Unit Name	Nameplate Rating (kW)	Unit Startup Date	Prime Mover	Gross Generation in Year 2000 (kWhrs)
Orange	Engineered Carbons Echo Cogeneration	N	GEN1	10.000	01-MAY-1985	ST	22.018.000
Orange	Inland Paperboard and Packaging	D2	10	48,000	01-NOV-1967	55	287 935 000
Orange	Sabine Cogen LP - Air Liquide		CTG1	37.210	01-JAN-2000	5 5	297 068 557
Orange	Sabine Cogen LP - Air Liquide		CTG2	37,210	01-JAN-2000	CL:	295 682 654
Orange	Sabine Cogen LP - Air Liquide		STG	27,044	01-JAN-2000	5	101 887 384
Orange	Sabine River Works - du Pont	S	GEN4	6,250	01-JAN-1948	\$	26.041 125
Orange	Sabine River Works - du Pont	SN	GENI	006'68	01-MAR-1987	CT	679,700,000
Orange	Sabine River Works - du Pont	9v	GEN2	3.125	01-JAN-1948	S	17 001 350
Orange	÷ 4.	NG	GEN3	6.250	01-JAN-1948	5	36,006,250
Orange	SRW Cogeneration Limited Partnership - Conoco / duPont	NG		525 000	1-Nov-2001	5	0071000100
Panola	East Texas Gas Plant	UC NC	5	300	01-14N-1948	<u>_</u>	1 278 000
Panola	East Texas Gas Plant	9 N	6.5	300	01-JAN-1948	2 2	1 460 000
Panola	East Texas Gas Plant	9 N		300	01-JAN-1948	2	1 333 000
Panola	East Texas Gas Plant	SN SN	4	400	01-JAN-1965	2	2 598 600
Panola	East Texas Gas Plant	S N	90	300	01-JAN-1979	20	1 268 200
Panola	East Texas Gas Plant	Ŷ	6-7	300	01-DEC-1979		1 397 400
Panola	East Texas Gas Plant	9 N	8 0	300	01-DEC-1979	2	1,692,800
Hays	Southwest Texas State University Cogen	RG	GEN1	6.000	01-SEP-1989	<u> </u>	34 929 600
Travis	Austin State Hnemital	UN	CENT	000		ן ז ל	7 0.1 700
Travis	Central Utility Plant - 3M	D ON	EG1	6,080	01-JUL-1988	<u>5</u> 9	12 768 000
Travis	Central Utility Plant - 3M	SG	EG2	6,080	01-JUL-1988	<u>0</u>	18,600,000
Travis	Central Utility Plant - 3M	9V V	T G1	2,300	01-JUL-1988	ST	1.400.000
Travis	Sunset Farms - BFI	9N NG	-	1,010	01-DEC-1996	ల	5,983,308
Travis	Sunset Farms - BFI	9v	2	1,010	01-DEC-1996	ပ	6,093,900
Travis	Sunset Farms - BFI	NG	e	1,010	01-DEC-1996	<u>ں</u>	6,004,260
Travis	University of Texas at Austin	9 V	GEN1	1,500	01-OCT-1933	ST	0
Travis	University of Texas at Austin	Ŷ	GEN2	1,500	01-OCT-1933	ST	0
Travis	University of Texas at Austin	Ű	GEN3	2,500	01-JAN-1938	ST	0
Travis	University of Texas at Austin	S	GEN4	7,617	01-OCT-1951	\$	7,668,180
Iravis		S	GENS	6,000	01-SEP-1959	5	8,689,460
Travis		9	GEN6	12,500	01-JAN-1968	5	26,105,320
Travic	Uliversity of Texas at Austit	29	CEN	28,800	6/61-NAC-10	5	98,753,280
C10011		2	CCINO	000	01-NOV-1387	5	184,307,920
Bexar	University of Texas at San Antonio	NG	GEN1	3.470	01-JAN-1980	<u>ں</u>	4 462 080
Calhoun	BP Chemicals Green Lake Plant	90 	TG3	23 800	01-JAN-1997	ST	134 724 370
Calhoun	BP Chemicals Green Lake Plant	8	TG2	15.000	01-MAR-1989	sts	93 392 730
Calhoun	Formosa Utility Venture Ltd	Ű	BO3	37,400	01-MAR-1987	CL	168,826,000
Cathoun	Formosa Utility Venture Ltd	NG	ST1	33,500	01-MAR-1994	e e	229.507.000
Calhoun	Formosa Utility Venture Ltd	NG	ST2	66,300	01-MAR-1994	S	416,902,000
Calhoun	Formosa Utility Venture Ltd	NG	TBG1	103,000	01-APR-1993	CT	555, 124, 000
Calhoun	Formosa Utility Venture Ltd	SG	TBG2	103,000	01-JUL-1993	5	669 123 000

Appendix A4

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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County	Facility Name	Fuel	Name	Rating (kW)	Unit Startup Date	Mover	Year 2000 (kWhrs)
Calhoun	Formosa Utility Venture Ltd	NG	TBG4	103,000	01-MAY-1994	cT	627 764 000
Calhoun	Formosa Utility Venture Ltd	90 NC	TBG5	103,000	01-OCT-1994	CT	597,917,000
Calhoun	Pt Comfort Operations - Alcoa	NG	GEN1	16,000	01-JAN-1958	ST	97,274,276
Calhoun	Pt Comfort Operations - Alcoa	ŰN	GEN2	16,000	01-JAN-1958	ST	98,084,301
Calhoun	Pt Comfort Operations - Alcoa	UQN NC	GEN3	16,000	01-JAN-1958	ST	97,980,343
Calhoun	Pt Comfort Operations - Alcoa	NG	GEN4	15,100	01-JAN-1970	ST	94 578 080
Calhoun	Seadrift Coke LP	AB	GEN1	7 600	01-NOV-1983	ST.	42 130 000
Calhoun	Seadrift Plant Union Carbide Corp	NG	GENS	15 000	01-NOV-1987	S	63 251 710
Calhoun	Seadrift Plant Union Carbide Corp	NG	GENG	35,000	01-NOV-1987	5	277 847 764
Calhoun	Seadrift Plant Union Carbide Corp	NG	GEN7	6.000	01-NOV-1987	5	45 477 053
Calhoun	Seadrift Plant Union Carbide Corp	NG	GEN8	35.000	01-NOV-1987	512	295 280 886
Calhoun	Seadrift Plant Union Carbide Corp	ŰN	GEN9	15,000	01-NOV-1987	5 5	ER RU5 743
Calhoun	Seadrift Plant Union Carbide Corp	NG	GT	12.000	01-JAN-1969	513	48 711 949
Calhoun	Seadrift Plant Union Carbide Corp	NG	GEN3	15.000	01-JAN-1964	5	45 392 932
Calhoun	Seadrift Plant Union Carbide Corb	NG	GF11	35 000	01-NOV-2000	55	31 371 153
Victoria	Victoria Texas Plant - duPont		GEN1	80,000	01-APR-1987	GT	705,590,133
Cameron	Rio Grande Vallev Sugar Growers Inc	AB	GENA	2 500	01-0CT-1073	υ	7 000
Cameron	Rio Grande Vallev Sugar Growers Inc	AB	GENC	2500	01-1AN-1995	55	1 040 000
Cameron	Rio Grande Valley Sugar Growers Inc	AB	GENB	2.500	01-OCT-1973	ST	6 589 000
Live Oak	US Gen - Diamond Shamrock			700,000	2222	•	
Nueces	Celanese Engineering Resin Inc	Ű	GEN1	1,492	01-JAN-1982	OT	0
Nueces	Celanese Engineering Resin Inc	9v	GEN2	1,492	01-JAN-1982	5	0
Nueces	Celanese Engineering Resin Inc	9 N	GEN3	1,678	01-JAN-1982	0	0
Nueces	Celanese Engineering Resin Inc	ŰŻ	GEN4	8,200	01-JAN-1982	ર્સ	22,082,000
Nueces		9 Y	GENS	35,540	01-APR-1989	сı	269,232,000
Nueces	Corpus Christi Energy Center - Calpine / CITGO	ဗ		570,000	1-Aug-2002		
Nueces	Corpus Christi Plant - Equistar	9 V	GEN1	45,176	01-MAY-1989	5	292,238,000
Nueces	Corpus Christi Refinery - Koch East	9 V	Gent	20,000	01-SEP-1984	GT	164,824,784
Nueces	Corpus Christi Retinery - Koch East	90 N	GEN2	20,000	01-OCT-1984	5	142,576,817
NUECES		20	LCE LCE	9'700	01-MAY-1985	5	0
NUECES	Noch Perioleum Group LP Corpus Remery		92 - 22 -	55,000	01-MAY-1988	5	274,723,000
Nieres	Valero Refnery			12,000	01-261-1963	55	0
Nieces					04 NON 1000	55	110,340,000
Nueces	Valero Refinerv		161	7 500	01-NUV-1903	5 5	F8 785 000
San Patricio	1	NG	101G	182 000	01-111-2000	55	672 733 700
San Patricio	1	D. NG	102G	182 000	01-111-2000	513	679 550 800
San Patricio		90 N	ST -	100.000	01-JUL-2000	S	283 377 200
San Patricio	+	NG	STG	208 000	01-111-1999	S S	918 649 600
San Patricio			1010	160,000	01-101-1000	5	1012 002 200
San Patricio	1		CTC:	160,000	01-101-1939	5 5	008 668 600
San Patricio	1			6.000	01-JAN-1953	S S	48,886,967
San Patricio	+ i			6,000	01 IAN 1050	sia	
				200.0		A	

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

Appendix A4

1/27/2003

Region	County	Earlity Name	Primary	Unit Verro	Nameplate		Prime	Gross Generation in
In Revi	(mn)		5		(asy) Fumer			LEAL ZUUN (NWILS)
z	San Patricio	San Patricio Reynolds Metals Co Sherwin Plant		4	6,000	01-JAN-1958	Ş	50,456,493
z	San Patricio	Reynolds Metals Co Sherwin Plant		ŝ	7,500	01-JAN-1966	СТ	33,753,494
z	San Patricio	Reynolds Metals Co Sherwin Plant		ω	7,500	01-JAN-1966	5	29,739,910
-					1			
0	Gaines	North Riley	DN NG	GEN1	1,000	01-JAN-1990	ల	0
0	Gaines	North Riley	Ű	GEN2	1,000	01-JAN-1990	<u>ں</u>	8,054,635
0	Gaines	North Riley	U N	GEN3	1,000	01-JAN-1990	<u>0</u>	7,878,165
0	Yoakum	Wasson CO2 Removal Plant - Occidental		GEN1	23,400	01-FEB-1988	5	152,921,600
٩								
		Texas Cogen 2000 Generation (kWhrs)						71,308,408,901

Data from US DOE 2000 Energy Information Administration's Forms EIA-860B and EIA-906

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Acronyms for Appendix A

Prime Mover

ST	Steam Turbine
GT	Gas Turbines
СТ	Combined Cycle Gas Turbine
CA	Combined Cycle Steam Turbine
WT	Wind Turbine
IC	Internal Combustion Engine
ОТ	Other Turbine
CC	Combined Cycle Plant
HY	Hydroelectric Turbine
CS	Combined Cycle Unit on Common Shaft
PV	Photovoltaic

Fuel Supply

NG	Natural Gas
SUB	Subituminous Coal
WIND	Wind
WAT	Water
OTH	Other
DFO	Diesel Fuel Oil
LFG	Land Field Gas
LIG	Lignite
SUN	Sun
NUC	Nuclear
WH	Waste Heat
BIT	Bituminous Coal
OG	Other Gas
PC	Coke
BL	Natural gas liquids
AB	Bagasse

For those facilities that have no information in the Table, the information was not available or was not completed by the respondent to the FERC survey.

Appendix B Projected Electrical Demand and Population Growth in Texas

Projected Annual Statewide Steam Electric Generation and Water Demand

Year	Electric Demand (GWh)	Percent of Year 2000 Baseline Electric Demand		Calculated Annual Statewide Steam Electric Water Use (Acre feet)	2002 State Water Plar Steam Electric Water Use
2000	337,582			621,601	607,527
2001	340,142	1.0076	1.0052	624,862	
2002	350,129	1.0372	1.0257	637,581	
2003	357,471	1.0589	1.0408	646,932	
2004	366,511	1.0857	1.0593	658,445	
2005	373,979	1.1078	1.0746	667,956	
2006	383,482	1.1360	1.0940	680,059	
2007	391,612	1.1601	1.1107	690,414	
2008	401,228	1.1885	1.1304	702,660	
2009	410,415	1.2157	1.1492	714,361	
2010	418,623	1.2401	1.1492	724,814	831,301
2010	426,996	1.2401	1.1832	735,478	031,301
2012	435,536	1.2902	1.2007	746,355	· <u>-</u>
2012	444,246	1.3160	1.2185	740,355	
2013	453,131	1.3423	1.2367		
2015	462,194	1.3691	1.2553	768,764	
2015	471,438	1.3965	1.2555	780,306	
2010				792,079	
2017	480,867	1.4244	1.2936	804,088	
	490,484	1.4529	1.3133	816,336	
2019	500,294	1.4820	1.3334	828,830	
2020	510,299	1.5116	1.3539	841,572	917,994
2021	520,505	1.5419	1.3748	854,570	****
2022	530,916	1.5727	1.3961	867,830	
2023	541,534	1.6042	1.4179	881,353	
2024	552,365	1.6362	1.4401	895,147	
2025	563,412	1.6690	1.4627	909,216	
2026	574,680	1.7023	1.4858	923,567	
2027	586,174	1.7364	1.5093	938,206	
2028	597,897	1.7711	1.5334	953,136	
2029	609,855	1.8065	1.5579	968,366	
2030	622,052	1.8427	1.5828	983,900	1,007,424
2031	634,493	1.8795	1.6083	999,744	
2032	647,183	1.9171	1.6343	1,015,906	
2033	660,127	1.9555	1.6609	1,032,392	
2034	673,329	1.9946	1.6879	1,049,205	
2035	686,796	2.0345	1.7155	1,066,357	
2036	700,532	2.0751	1.7436	1,083,851	
2037	714,542	2.1166	1.7723	1,101,694	
2038	728,833	2.1590	1.8016	1,119,895	
2039	743,410	2.2022	1.8315	1,138,460	
2040	758,278	2.2462	1.8620	1,157,396	1,057,929
2041	773,444	2.2911	1.8930	1,176,711	
2042	788,913	2.3370	1.9247	1,196,412	
2043	804,691	2.3837	1.9571	1,216,507	
2044	820,785	2.4314	1.9900	1,237,004	

2000 through 2009 Generation Projections from PUCT's 2000 Annual Update of Generating Electric Utility Data

Projected Annual Statewide Steam Electric Generation and Water Demand

Year	Electric Demand (GWh)	Percent of Year 2000 Baseline Electric Demand	i	Calculated Annual Statewide Steam Electric Water Use (Acre feet)	2002 State Water Plan Steam Electric Water Use
2045	837,200	2.4800	2.0237	1,257,910	_
2046	853,944	2.5296	2.0580	1,279,235	
2047	871,023	2.5802	2.0930	1,300,987	
2048	888,444	2.6318	2.1287	1,323,174	
2049	906,213	2.6844	2.1651	1,345,804	
2050	924,337	2.7381	2.2022	1,368,887	1,134,644
2051	942,824	2.7929	2.2401	1,392,432	· · · ·
2052	961,680	2.8487	2.2787	1,416,446	
2053	980,914	2.9057	2.3181	1,440,943	
2054	1,000,532	2.9638	2.3583	1,465,928	
2055	1,020,543	3.0231	2.3993	1,491,414	
2056	1,040,953	3.0836	2.4411	1,517,408	
2057	1,061,772	3.1452	2.4838	1,543,923	
2058	1,083,008	3.2081	2.5273	1,570,968	
2059	1,104,668	3.2723	2.5717	1,598,554	
2060	1,126,761	3.3377	2.6169	1,626,692	

2000 through 2009 Generation Projections from PUCT's 2000 Annual Update of Generating Electric Utility Data

Projected Annual Electric Generation in Texas

Year	Statewide Generation at 2 Percent Annual Growth (GWh)	Statewide Population from TWDB	Per Capita Generation at 0.5% Annual Growth (kWh / person)	Generation Based on Per Capita Increases (GWh)
2000	337,582	20,851,820	16,805	350,408
2001	340,142		16,889	
2002	350,129		16,973	
2003	357,471		17,058	
2004	366,511		17,143	
2005	373,979		17,229	
2006	383,482		17,315	
2007	391,612	······································	17,402	······
2008	401,228		17,489	
2009	410,415		17,576	
2010	418,623	24,843,049	17,664	438,829
2011	426,996		17,752	100,020
2012	435,536		17,841	
2013	444,246		17,930	
2014	453,131		18,020	
2015	462,194		18,110	
2016	471,438		18,201	
2017	480,867	·····	18,292	
2018	490,484		18,383	
2019	500,294		18,475	
2020	510,299	28,976,537	18,567	538,019
2021	520,505	20,370,007	18,660	330,019
2022	530,916		18,754	
2023	541,534		18,847	
2024	552,365		18,942	
2025	563,412		19,036	
2026	574,680		19,131	
2027	586,174		19,131	
2028	597,897		19,323	
2029	609,855	··	· · · · · · · · · · · · · · · · · · ·	
2023	622,052	32,859,050	19,420 19,517	641,308
2031	634,493	02,003,000	19,615	041,300
2032	647,183		19,713	
2033	660,127		19,811	
2034	673,329		19,910	
2035	686,796		20,010	
2036	700,532	· · · · ·	20,010	
2037	714,542	<u>.</u>		
2037	714,542		20,210 20,311	
2038	· · · · · · · · · · · · · · · · · · ·			
2039	743,410	26 500 116	20,413	750 922
	758,278	36,599,116	20,515	750,832
2041	773,444	<u> </u>	20,618	
2042 2043	788,913		20,721	
2043	804,691		20,824	

2000 through 2009 Generation Projections from PUCT's 2000 Annual Update of Generating Electric Utility Data

Projected Annual Electric Generation in Texas

Year	Statewide Generation at 2 Percent Annual Growth (GWh)	Statewide Population from TWDB	Per Capita Generation at 0.5% Annual Growth (kWh / person)	Generation Based on Per Capita Increases (GWh)
2045	837,200		21,033	
2046	853,944		21,033	
2047	871,023		21,244	
2048	888,444		21,350	
2049	906,213		21,457	
2050	924,337	40,676,622	21,564	877,157
2051	942,824		21,672	011,107
2052	961,680		21,780	
2053	980,914		21,889	
2054	1,000,532		21,999	
2055	1,020,543		22,109	
2056	1,040,953		22,219	
2057	1,061,772		22,330	
2058	1,083,008		22,442	
2059	1,104,668		22,554	
2060	1,126,761	45,073,480	22,667	1,021,679

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2000 through 2009 Generation Projections from PUCT's 2000 Annual Update of Generating Electric Utility Data

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TWDB Population Projections

	39,617,389	36,413,817	32,774,870	28,792,303	24,537,141	2002 SWP
45,073,480	40,676,622	36,599,116	32,859,050	28,976,537	24,843,049	Total (proposed)
32,777	33,977	34,881	35,402	35,246	34,191	ס
527,210	537,255	535,967	528,437	512,405	486,311	0
885,665	853,964	810,650	758,427	693,940	617,143	N
3,826,001	3,337,618	2,854,613	2,401,223	1,973,188	1,581,207	3
4,287,988	3,974,576	3,634,543	3,284,171	2,885,282	2,468,426	
2,337,679	2,138,773	1,956,631	1,789,130	1,543,110	1,280,177	
205,910	198,594	190,551	178,342	158,645	135,723	. c
1,430,298	1,331,206	1,258,230	1,206,974	1,149,624	1,081,934	-
10,908,906	9,750,704	8,665,201	7,691,334	6,718,964	5,786,820	- - - - -
3,362,318	3,065,219	2,772,013	2,493,227	2,206,292	1,924,055	: G
724,094	714,045	700,806	682,132	656,480	618,889) -
1,520,758	1,399,011	1,276,770	1,154,277	1,012,003	849,410	
1,135,849	1,008,562	922,540	858,489	798,285	732,952	D
13,127,140	11,595,104	10,278,602	9,122,938	7,992,835	6,649,046	C
217,792	219,235	220,124	219,163	214,838	206,651	B
541,035	516,729	484,954	453,354	423,380	388,104	A
2060	2050	2040	2030	2020	2010	REGION
						-

1/27/2003

Appendix C Steam Electric Water Supplies, Demands, and Shortages per the 2002 State Water Plan

REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050	
State Total	; , ; ;	TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644	
	_	101070010	•	0	•	•	0	~	0	
A	6	ARMSTRONG	0	0	0	0 0	0 0	0	0 0	
A	33	CARSON CHILDRESS	0	0	0	0	0	0	0	
A A	38 44	COLLINGSWORTH	0	ŏ	0	ő	0	ő	õ	
Â	56	DALLAM	Ő	Ő	ŏ	ŏ	Ő	ő	Ő	
Â	65	DONLEY	Ö	ŏ	ŏ	õ	Õ	õ	Ō	
Â	90	GRAY	Ő	õ	ō	õ	ō	Ō	Ō	
Â	96	HALL	ŏ	Ō	Õ	Ō	ō	Ō	Ō	
Â	98	HANSFORD	õ	Ō	Ō	Ō	0	0	0	
A	103	HARTLEY	Ō	Ó	0	0	0	0	0	
A	106	HEMPHILL	0	0	0	0	0	0	0	
A	117	HUTCHINSON	0	0	0	0	0	0	0	
A	148	LIPSCOMB	0	0	0	0	0	0	0	
А	171	MOORE	359	200	200	200	200	200	200	
Α	179	OCHILTREE	0	0	0	0	0	0	0	
Α	180	OLDHAM	0	0	0	0	0	0	0	
Α	188	POTTER	3,528	18,300	22,432	25,387	26,804	28,408	30,011	
А	191	RANDALL	0	0	0	0	0	0	0	
Α	197	ROBERTS	0	0	0	0	0	0	0	
А	211	SHERMAN	0	0	0	0	0	0	0	
А	242	WHEELER	0	0	0	0	0	0	0	
			3,887	18,500	22,632	25,587	27,004	28,608	30,211	
в	5	ARCHER	0	0	14,000	14,000	14,000	14,000	14,000	
B	12	BAYLOR	0	0	0	0	0	0	0	
В	39	CLAY	0	0	0	0	0	0	0	
в	51	COTTLE	0	0	0	0	0	0	0	
в	78	FOARD	0	0	0	0	0	0	0	
в	99	HARDEMAN	2,856	1,000	1,000	1,000	1,000	1,000	1,000	
в	135	KING	0	0	0	0	0	0	0	
в	16 9	MONTAGUE	0	0	0	0	0	0	0	
в	243	WICHITA	0	360	360	360	360	360	360	
В	244	WILBARGER	7,876	8,100	12,000	16,000	20,000	20,000	20,000	
в	252	YOUNG (P)	0	0	0	0	0	0	0	
			10,732	9,460	27,360	31,360	35,360	35,360	35,360	
с	43	COLLIN	1,635	2,000	7,000	7,000	7,000	10,000	10,000	
С	49	COOKE	0	0	0	0	0	0	0	
С	57	DALLAS	18,214	18,000	20,000	25,000	25,000	25,000	25,000	
С	61	DENTON	0	0	4,500	4,500	4,500	6,000	6,000	
С	70	ELLIS	0	0	15,000	15,000	15,000	18,000	18,000 10,000	
С	74	FANNIN	6,726	5,000	6,000	7,000	8,000	9,000 33,192		
С	81	FREESTONE	13,834	16,000	27,000	29,000	29,000 0	-		
с с с с с с	91	GRAYSON	0	0	0	0 4,000	4,000	4,000		
C	107	HENDERSON (P)	2,299	4,000	4,000 0	4,000	4,000	4,000	_	
C	119	JACK	0	0 7,800	8,000	8,000	10,000	-		
c	129	KAUFMAN	0	7,800	a,000 0	0,000 0	0,000	_	_	
C	175		39	0	6,000	6,000	10.000	_	=	
C	184	PARKER ROCKWALL	39 0		5,600	6,000	6,000			
C C	199		4,212	7,000	8,000	10,000	10,000			
C C	220		4,212	000,7	11,200	11,200	11,200			
С	249	WISE	46,959		122,300	132,700	139,700			
-	40	DOWIE	•	0	0	0	0	0	0	
D	19	BOWIE CAMP	0		0	0				
D D	32 34	CAMP	0		ő	õ				
U	34		Ŭ	v	•	•	-			

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REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644
D	60	DELTA	0	0	0	0	0	0	0
Ď	80	FRANKLIN	Ō	Ō	Ō	Õ	Ō	ō	0
D	92	GREGG	465	1,251	1,251	1,251	1,251	1,251	1,251
		HARRISON	4,869	5,760	5,760	5,760	5,760	5,760	5,760
D	102		•	•	-	5,700	3,700	0,700	0,700
D	112	HOPKINS	0	0	0			_	516
D	116	HUNT	834	516	516	516	516	516	
D	139	LAMAR	0	12,209	12,209	12,209	12,209	12,209	12,209
D	158	MARION	1,953	2,868	2,868	2,868	2,868	2,868	2,868
D	172	MORRIS	8	48	48	48	48	48	48
D	190	RAINS	0	0	0	0	0	0	0
D	194	RED RIVER	1,494	1,500	5,000	7,000	10,000	10,000	10,000
D	212	SMITH (P)	0	0	0	0	0	0	0
D	225	TITUS	36,406	28,280	31,280	31,280	36,280	36,280	36,280
D	230	UPSHUR	0	0	5,601	5,601	5,601	5,601	5,601
D	234	VAN ZANDT	0	0	0	0	0	0	0
Ď	250	WOOD	Ő	Ó	7,500	7,500	7,500	7,500	15,000
U	200	nood	46,029	52,432	72,033	74,033	82,033	82,033	89,533
			40,020	JL,402	/2,000	,	01,000		
E	22	BREWSTER	0	0	0	0	0	0	0
E	22 55	CULBERSON	0	Ő	ŏ	Ő	ŏ	ŏ	ŏ
	55 71	EL PASO	5,517	6,000	6,000	6,000	6,000	6,000	6,000
E					0,000	0,000	0,000	0,000	0,000
E	115	HUDSPETH	0	0	+		0	ő	ō
E	122	JEFF DAVIS	0	0	0	0			
Е	189	PRESIDIO	0	0	0	0	0	0	0
ε	222	TERRELL	0	0	0	0	0	0	0
			5,517	6,000	6,000	6,000	6,000	6,000	6,000
F	2	ANDREWS	0	0	0	0	0	0	0
F	2		0	ő	Ő	ŏ	ŏ	Ō	Ō
F	17	BORDEN	0	0	0	ŏ	0	Ő	õ
F	25	BROWN			835	835	835	835	835
F	41	COKE	445	835			000	000	0
F	42	COLEMAN	0	0	0	0	-		ŏ
F	48	CONCHO	0	0	0	0	0	0	
F	52	CRANE	0	0	0	0	0	0	0
F	53	CROCKETT	1,509	1,914	4,280	4,280	4,280	4,280	4,280
F	68	ECTOR	0	6,700	6,700	6,700	6,700	6,700	6,700
F	87	GLASSCOCK	0	0	0	0	0	0	0
F	114	HOWARD	0	1,380	1,380	1,380	1,380	1,380	1,380
F	118	IRION	0	0	0	0	0	0	0
F	134	KIMBLE	Ū	0	0	0	0	0	0
F	151	LOVING	õ	ō	ō	ō	0	0	0
F	154	MCCULLOCH	ŏ	Ő	õ	Ō	Ō	0	0
	154	MARTIN	ŏ	Ő	õ	ō	ō	ō	
F			0	0	ŏ	ŏ	ő		
F	160	MASON	-	0	0	0	-		
F	164	MENARD	0	-	0	0			
F	165	MIDLAND	0	0	-	-		-	-
F	168	MITCHELL	3,682	4,000	4,400	5,280	_		
F	186	PECOS	0	6	6	6			
F	192	REAGAN	0	0	0				
F	195	REEVES	0	0	0	0			
F	200	RUNNELS	0	0	0				-
F	207	SCHLEICHER	0	0	0	-			
F	208	SCURRY	Ō	Ó	0	0	0	0	
F	216	STERLING	ō	ō	0	0	0	0	0
F	218	SUTTON	õ	õ	0	Ő	0	0	0
F	218	TOM GREEN	869	1,020	-	-	-		3,680
			0						
F	231	UPTON	5,570			-		-	=
	238	WARD	5.5/0	5.500	0,000	7,200	0,112	10,404	

REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050	
State Total		TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644	
F	248	WINKLER	0	0	0	0	0	0	0	
•	2.0		12,075	21,355	27,331	29,421	31,929	34,938	38,550	
G	14	BELL	0	0	11,200	11,200	11,200	11,200	11,200	
G	14	BOSQUE	0	0	5,600	5,600	5,600	5,600	5,600	
								5,000		
G	21	BRAZOS	3,953	5,000	5,000	5,000	5,000		5,000	
G	26	BURLESON	0	0	0	0	0	0	0	
G	30	CALLAHAN	0	0	0	0	0	0	0	
G	47	COMANCHE	0	0	0	0	0	0	0	
G	50	CORYELL	0	0	0	0	0	0	0	
G	67	EASTLAND	0	0	0	0	0	0	0	
G	72	ERATH	0	0	0	0	0	0	0	
G	73	FALLS	0	0	0	0	0	0	0	
G	76	FISHER	0	0	0	0	0	0	0	
G	93	GRIMES	11,088	10,000	20,000	20,000	20,000	20,000	20,000	
G	97	HAMILTON	0	0	0	0	0	0	0	
G	104	HASKELL	546	700	2,340	3,000	3,000	3,000	3,000	
Ğ	109	HILL	0	0	0	Ó 0	0	0	0	
Ğ	111	HOOD	4,212	4,500	6,700	6,700	6,700	6,700	6,700	
Ğ	126	JOHNSON	0	0	0	0	0	0	0	
G	120	JONES	2,041	2,340	3,556	10,324	10,324	10,324	10,324	
G	132	KENT	2,041	2,040	0,000	0	0	0,014	0,024	
			Ő	0	ŏ	0	0	Ő	ő	
G	138	KNOX		-	0	0	0	0 0	0	
G	141	LAMPASAS	0	0				0	0	
G	144	LEE	0	0	0	0	0	•	-	
G	147	LIMESTONE	4,692	18,000	20,000	20,000	20,000	20,000	20,000	
G	155	MCLENNAN	14,366	15,000	15,000	20,000	25,000	30,000	35,000	
G	166	MILAM	2,716	8,680	8,680	12,500	12,500	12,500	16,000	
G	177	NOLAN	0	0	0	0	0	0	0	
G	182	PALO PINTO	1,898	2,500	3,000	3,000	3,000	3,000	3,000	
G	198	ROBERTSON	0	15,000	28,000	30,000	30,000	35,000	40,000	
G	209	SHACKELFORD	0	0	0	0	0	0	0	
G	213	SOMERVELL	9,845	18,000	23,200	23,200	23,200	23,200	23,200	
G	215	STEPHENS	0	0	0	0	0	0	0	
G	217	STONEWALL	0	0	0	0	0	0	0	
Ğ	221	TAYLOR	0	300	300	300	300	300	300	
Ğ	224	THROCKMORTON	õ	0	0	0	0	0	0	
Ğ	239	WASHINGTON	ō	Ō	Ō	Ō	Ó	0	0	
Ğ	246	WILLIAMSON (P)	ŏ	ō	Ő	Ó	0	0	0	
G	252	YOUNG (P)	2,300	3,000	3,500	3,500	3,500	3,500	3,500	
9	252		57,657	103,020	156,076	174,324	179,324	189,324	202,824	
			,	,	,					
н	8	AUSTIN	0	0	0	0	0	0	0	
н	20	BRAZORIA	0	0	0	0	0	0	0	
н	36	CHAMBERS	1,103	1,100	1,100	1,100	1,100	1,500	5,000	
н	79	FORT BEND	62,805	70,000	70,000	70,000	70,000	70,000	70,000	
н	84	GALVESTON	1,229	1,500	1,500	1,500	1,500	1,500	1,500	
н	101	HARRIS	11,660	16,500	17,500	20,000	22,500	22,500	22,500	
Н	145	LEON	0	0	0	0	0	0	0	
Н	146	LIBERTY	0	0	0	0	0	0	0	
н	157	MADISON	0	0	0	0	0	0	0	
н	170	MONTGOMERY	5,921	6,000	6,000	6,000	6,000	6,000	6,000	
H	187	POLK (P)	0,021	0,000	0,000	0	0	0	0	
Н	204	SAN JACINTO	ő	Ő	Ő	õ	Ő	Ō	Ō	
	204		ő	0	ŏ	ŏ	õ	Ō	õ	
H		TRINITY (P)	0	Ő	0	ŏ	ő	Ö		
Н	236		0	0	ő	0	ŏ	ő		
н	237	WALLER	82,718	95,100	96,100	98,600	101,100	101,500	105,000	
			02,/10	53,100	30,100	55,000	101,100	.01,000	,	

REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644
I	1	ANDERSON	0	0	11,209	11,209	11,209	11,209	11,209
i	3	ANGELINA	ŏ	ŏ	0	0	0	0	0
ŀ	37	CHEROKEE	4,936	5,000	5,000	10,000	15,000	15,000	20,000
i	100	HARDIN	0	0	0	0	0	0	0
1	107	HENDERSON (P)	Ō	0	0	0	0	0	0
1	113	HOUSTON	Ő	Ō	Ō	Ō	Ó	0	0
i	121	JASPER	Ō	Ō	Ó	0	0	0	0
i	123	JEFFERSON	1,021	3,000	6,000	6,000	6,000	6,000	6,000
I	174	NACOGDOCHES	0	0	0	0	7,505	7,505	7,505
I	176	NEWTON	0	0	11,200	11,200	11,200	11,200	11,200
1	181	ORANGE	5,574	6,000	10,000	15,000	20,000	25,000	30,000
L	183	PANOLA	0	0	0	0	0	0	0
1	187	POLK (P)	0	0	0	0	0	0	0
1	201	RUSK	28,320	30,000	35,000	40,000	45,000	45,000	45,000
1	202	SABINE	0	0	0	0	0	0	0
I	203	SAN AUGUSTINE	0	0	0	0	0	0	0
1	210	SHELBY	0	0	0	0	0	0	0
1	212	SMITH (P)	0	0	0	0	0	0	0
1	228	TRINITY (P)	0	0	0	0	0	0	0
1	229	TYLER	0	0	5,000	10,000	15,000	20,000	25,000
			39,851	44,000	83,409	103,409	130,914	140,914	155,914
J	10	BANDERA	0	0	0	0	0	0	0
J	69	EDWARDS	0	0	0	0	0	0	0
J	133	KERR	0	0	0	0	0	0	0
J	136	KINNEY	0	0	0	0	0	0	0
J	193	REAL	0	0	0	0	0	0	0
J	233	VAL VERDE	0	0	0	0	0	0	0
			0	0	0	0	0	0	0
к	11	BASTROP	2,967	4,500	8,000	8,000	8,000	8,000	8,000
K	16	BLANCO	0	0	0	0	0	0	0
K	27	BURNET	0	0	0	0	0	0	0
K	45	COLORADO	0	0	0	0	0	0	0
K	75	FAYETTE	11,701	15,000	20,000	25,000	40,000	40,000	45,000 0
ĸ	86	GILLESPIE	0	0	0	0	0	0	ŏ
ĸ	105	HAYS (P)	0	1 000	2 000	0 2,000	0 2,000	2,000	2,000
K	150		937 25.015	1,000 47,000	2,000 47,000	47,000	47,000	47,000	47,000
ĸ	161		35,915	47,000	47,000	47,000	47,000		0
K	167	MILLS	0	0	0	0	0	0	0
K	206	SAN SABA	4,150	13,500	13,500	13,500	13,500	13,500	16,500
к к	227 241	TRAVIS WHARTON (P)	4,150	13,500	13,300	15,500	0	10,000	0
ĸ	241	WILLIAMSON (P)	0	0	ŏ	ŏ	ő	ő	ō
n	240		55,670	81,000	90,500	95,500	110,500	110,500	118,500
L	7	ATASCOSA	6,036	12,000	12,000	12,000	12,000	15,000	22,000
L	15	BEXAR	24,263	36,000	36,000	40,000	45,000	50,000	56,000
-	28	CALDWELL	0	0	0	0	0	0	0
L	29	CALHOUN	62	100	100	100	100	100	100
– L	46	COMAL	0	0	0	0	0	0	0
ī	62	DEWITT	Ō	ō	Ō	0	0	0	0
– L	64	DIMMIT	Ō	Ō	0	0	0	0	
-	82	FRIO	38	400	400	400	400	400	400
L					15,000	20,000	20,000	20,000	20,000
L L	88	GOLIAD	12,165	15,000	15,000	20,000	20,000	20,000	20,000
L L	88 89	GOLIAD GONZALES	12,165 0	15,000 0	15,000	20,000	20,000	0	

REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050	
State Total	-	TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644	
L	105	HAYS (P)	0	0	6,400	6,400	6,400	6,400	6,400	
L	128	KARNES	0	0	0	0	0	0	0	
L	130	KENDALL	0	0	0	0	0	0	0	
L	142	LA SALLE	0	0	0	0	0	0	0	
L	163	MEDINA	0	0	0	0	0	0	0	
L	196	REFUGIO	0	0	0	0	0	0	0	
L	232	UVALDE	0	0	0	0	0	0	0	
L	235	VICTORIA	887	8,000	10,000	10,000	10,000	10,000	10,000	
L	247	WILSON	0	0	0	0	0	0	0	
L	254	ZAVALA	0	0	0	0	0	0	0	
			43,451	82,260	90,660	99,660	104,660	112,660	125,660	
м	31	CAMERON	1,650	2,400	2,000	2,000	11,600	11,600	11,600	
м	108	HIDALGO	1,539	4,700	5,500	6,000	6,000	7,000	7,000	
м	124	JIM HOGG	0	0	0	0	0	0	0	
м	162	MAVERICK	0	0	0	0	0	0	0	
м	214	STARR	0	0	0	0	0	0	0	
м	240	WEBB	1,504	2,000	3,900	3,900	5,800	5,800	5,800	
М	245	WILLACY	0	0	0	0	0	0	0	
М	253	ZAPATA	0	0	0	0	0	0	0	
			4,693	9,100	11,400	11,900	23,400	24,400	24,400	
N	4	ARANSAS	0	0	0	0	0	0	0	
N	13	BEE	0	0	0	0	0	0	0	
N	24	BROOKS	0	0	0	0	0	0	0	
N	66	DUVAL	0	0	0	0	0	0	0	
N	125	JIM WELLS	0	0	0	0	0	0	0	
N	131	KENEDY	0	0	0	0	0	0	0	
N	137	KLEBERG	0	0	0	0	0	0	0	
N	149	LIVE OAK	0	0	0	0	0	0	0	
N	156	MCMULLEN	0	0	0	0	0	0	0	
N	178	NUECES	2,404	3,300	3,300	3,300	3,300	3,300	3,300	
N	205	SAN PATRICIO	0 2,404	0 3,300	0 3,300	0 3,300	0 3,300	0 3,300	0 3,300	
0	9	BAILEY	0	0	0	0	0	0	0	
0	23	BRISCOE	0	ŏ	0	ŏ	ő	ő	ő	
ŏ	35	CASTRO	ŏ	Ő	ŏ	ŏ	ŏ	ō	ō	
ŏ	40	COCHRAN	õ	Ő	ō	õ	ő	õ	Ō	
ŏ	54	CROSBY	ŏ	Ō	ō	Ō	ō	ō	0	
õ	58	DAWSON	ō	ō	Ō	Ō	0	0	0	
ŏ	59	DEAF SMITH	ő	ō	õ	Ō	Ō	0	Ō	
ŏ	63	DICKENS	ō	Ō	ō	Ō	Ō	0	0	
õ	77	FLOYD	ō	Ō	Ō	Ō	0	0	0	
ŏ	83	GAINES	õ	Ō	Ō	Ō	Ō	0	0	
ŏ	85	GARZA	ō	Ő	Ō	0	0	0	0	
õ	95	HALE	ō	Ō	0	0	0	0	0	
õ	110	HOCKLEY	ō	Ō	0	Ó	0	0	0	
ŏ	140	LAMB	12,587	18,000	18,000	25,000	25,000	25,000	30,000	
ŏ	152	LUBBOCK	1,715	2,000	2,000	5,000	5,000	5,000	5,000	
ō	153	LYNN	Ó 0	0	0	0	0	0	0	
õ	173	MOTLEY	Ō	Ō	0	0	0	0	0	
õ	185	PARMER	Ō	0	0	0	0	0	0	
õ	219	SWISHER	0	0	0	0	0	0	0	
ō	223	TERRY	0	0	0	0	0	0	-	
ō	251	YOAKUM	0	2,200	2,200	2,200	2,200			
-			14,302	22,200	22,200	32,200	32,200	32,200	37,200	

REGION	CNTY	NAME	d1990	d2000	d2010	d2020	d2030	d2040	d2050	
State Total		TEXAS	425,945	607,527	831,301	917,994	1,007,424	1,057,929	1,134,644	
P	120	JACKSON	0	0	0	0	0	0	0	
Р	143	LAVACA	0	0	0	0	0	Ō	Ó	
Р	241	WHARTON (P)	0	0	0	0	0	Ō	Ō	
			0	0	0	0	0	Ō	Ō	

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State Total TEXAS 1,100.011 1,122.112 1,131.670 1,102.66 1,094.977 1,088.695 A 6 ARMSTRONG 0 <	REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
A 33 CARSON 0 </td <td>State Total</td> <td></td> <td>TEXAS</td> <td>1,100,011</td> <td>1,122,112</td> <td>1,131,670</td> <td>1,110,766</td> <td>1,094,977</td> <td>1,088,695</td>	State Total		TEXAS	1,100,011	1,122,112	1,131,670	1,110,766	1,094,977	1,088,695
A 38 CHILDRESS 0				0	0	0	0	0	0
A 44 COLLINGSWORTH 0				0	0	0	0	0	0
A 56 DALLAM 0 </td <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td></td> <td>0</td> <td>0</td> <td>0</td>				0	0		0	0	0
A 65 DONLEY 0 </td <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td>_</td> <td></td> <td>0</td>				_			_		0
A 90 GRAY 0 <td></td> <td></td> <td></td> <td>_</td> <td>_</td> <td></td> <td></td> <td></td> <td></td>				_	_				
A 96 HALL 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
A 98 HANSFORD 0				-					
A 103 HARTLEY 0				_					
A 106 HEMPHILL 0							-		
A 117 HUTCHINSON 0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>									
A 148 LIPSCOMB 0									
A 171 MOORE 200 200 200 0 0 0 A 179 OCHILTREE 0					-				
A 179 OCHILTREE 0 <th< td=""><td></td><td></td><td></td><td>_</td><td>-</td><td></td><td></td><td></td><td></td></th<>				_	-				
A 180 OLDHAM 0<							_		
A 188 POTTER 18,300 22,432 25,387 26,804 16,114 14,151 Rei A 197 ROBERTS 0		-							
A 191 RANDALL 0 0 0 0 0 0 0 0 0 A 197 ROBERTS 0 0 0 0 0 0 0 0 0 A 211 SHERMAN 0 0 0 0 0 0 0 0 A 242 WHEELER 0 0 14,000 14,000 14,000 14,000 14,000 14,000 B 12 BAYLOR 0 0 0 0 0 0 0 0 0 B 12 BAYLOR 0 0 0 0 0 0 0 0 0 0 B 12 BAYLOR 0 <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>-</td> <td>-</td> <td>-</td>					-		-	-	-
A 197 ROBERTS 0									
A 211 SHERMAN 0				_	-				
A 242 WHEELER 0 0 0 0 0 0 0 0 B 5 ARCHER 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 0 </td <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td>					-				
18,500 22,632 25,587 26,804 16,114 14,151 B 5 ARCHER 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 14,000 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td>_</td>								_	_
B 12 BAYLOR 0 </td <td>A</td> <td>242</td> <td>WHEELER</td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td>	A	242	WHEELER		-	-	-	-	-
B 12 BAYLOR 0 </td <td>B</td> <td>5</td> <td>ARCHER</td> <td>14 000</td> <td>14 000</td> <td>14 000</td> <td>14 000</td> <td>14 000</td> <td>14 000</td>	B	5	ARCHER	14 000	14 000	14 000	14 000	14 000	14 000
B 39 CLAY 0 <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td> <td></td> <td></td>				-					
B 51 COTTLE 0 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
B 78 FOARD 0 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>									
B 99 HARDEMAN 1,655 1,601 1,548 1,494 1,440 1,387 B 135 KING 0									
B 135 KING 0 <td></td> <td></td> <td></td> <td>1.655</td> <td>1.601</td> <td></td> <td>-</td> <td>_</td> <td></td>				1.655	1.601		-	_	
B 169 MONTAGUE 0									
B 243 WICHITA 360 20,000		169		0	0	0	0		
B 244 WILBARGER 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 0	В	243	WICHITA	360	360	360	360	360	360
B 252 YOUNG (P) 0 <th< td=""><td>В</td><td>244</td><td>WILBARGER</td><td>20,000</td><td>20,000</td><td>20,000</td><td>20,000</td><td>20,000</td><td></td></th<>	В	244	WILBARGER	20,000	20,000	20,000	20,000	20,000	
36,015 35,961 35,908 35,854 35,800 35,747 C 43 COLLIN 5,023 4,436 3,781 3,390 3,090 2,898 C 49 COOKE 0 0 0 0 0 0 C 57 DALLAS 18,109 17,177 15,489 16,533 16,546 7,022 C 61 DENTON 500 500 500 500 500 500 C 70 ELLIS 0 0 0 0 0 0 0 C 74 FANNIN 10,596 10,596 10,596 10,596 10,596 10,596 10,596 C 81 FREESTONE 18,204 18,204 18,204 18,204 18,204 18,204 C 91 GRAYSON 0 0 0 0 0 0 C 107 HENDERSON (P) 13,501 13,501 13,		252	YOUNG (P)						
C 49 COOKE 0 <td></td> <td></td> <td></td> <td>36,015</td> <td>35,961</td> <td>35,908</td> <td>35,854</td> <td>35,800</td> <td>35,747</td>				36,015	35,961	35,908	35,854	35,800	35,747
C 57 DALLAS 18,109 17,177 15,489 16,533 16,546 7,022 C 61 DENTON 500									
C81FREESTONE18,20418,20418,20418,20418,20418,204C91GRAYSON000000C107HENDERSON (P)13,50113,50113,50113,50113,50113,501C119JACK000000C129KAUFMAN000000C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	С			-	-		-		
C 81 FREESTONE 18,204 0	С							•	
C 81 FREESTONE 18,204 0	С								
C 81 FREESTONE 18,204 0	С								
C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	C							•	
C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	С								
C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	C								
C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	C								
C175NAVARRO000000C184PARKER220204191177163150C199ROCKWALL000000	С								
C 175 NAVARRO 0	С								
C 184 PARKER 220 204 191 177 163 150 C 199 ROCKWALL 0	C								
C 199 ROCKWALL 0 0 0 0 0 0 C 220 TARRANT 7,389 7,499 9,589 9,040 9,993 9,453	C								
C 220 TARRANT 7,389 7,499 9,589 9,040 9,993 9,453	C								
	С	220	TARRANT	7,389	7,499	9,589	9,040	9,993	9,453

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050	
State Total		TEXAS	1,100,011		1,131,670		1,094,977	1,088,695	
С	249	WISE	0	0	0	0	0	0	
			73,542	72,117	71,851	71,941	72,593	62,324	
D	19	BOWIE	0	0	0	0	0	0	
D	32	CAMP	0	0	0	0	0	0	
D	34	CASS	0	0	0	0	0	0	
D	60	DELTA	0	0	0	0	0	0	
D	80	FRANKLIN	0	0	0	0	0	0	
D	92	GREGG	4,686		5,186	5,186	5,186	6,186	
D	102	HARRISON	29,000		29,000	29,000	29,000	29,000	
D	112	HOPKINS	0	0	0	0	0	0	
D D	116	HUNT	800	0	0	0	0	0	
D	139 158	LAMAR MARION	12,209 6,700		12,209 6,700	12,209	12,209	12,209	
D	172	MORRIS	12,000	-	12,000	6,700 12,000	6,700 12,000	6,700	
D	190	RAINS	12,000	12,000	12,000	12,000	12,000	12,000	
D	190	RED RIVER	11,500	11,500	11,500	11,500	11,500	11 500	
D	212	SMITH (P)	0		0	0	11,500	11,500 0	
D	225	TITUS	45,000	45,000	45,000	37,300	37,300	37,300	
D	230	UPSHUR	40,000	0,000		0,000	07,000	0	
D	234	VAN ZANDT	ő	Ő	ő	Ő	0	0	
D	250	WOOD	Ő	7,500	7,500	7,500	7,500	7,500	
-			121,895	129,095	129,095	121,395	121,395	122,395	
							,		
E	22	BREWSTER	0	0	0	0	0	0	
E	55	CULBERSON	0	0	0	0	0	0	
E	71	EL PASO	6,000	6,000	6,000	0	0	0 Reu	se
E	115	HUDSPETH	0	0	0	0	0	0	
E	122	JEFF DAVIS	0	0	0	0	0	0	
E	189	PRESIDIO	0	0	0	0	0	0	
E	222	TERRELL	0	0	0	0	0	0	
			6,000	6,000	6,000	0	0	0	
F	2	ANDREWS	0	0	0	0	0	0	
F	17	BORDEN	0	0	0	0	0	0	
F	25	BROWN	0	0	0	0	0	0	
F	41	COKE	1,000	1,000	1,000	1,000	1,000	1,000	
F	42	COLEMAN	0	0	0	0	0	0	
F	48	CONCHO	0	0	0	0	0	0	
F	52	CRANE	0	0	0	0	0	0	
F	53	CROCKETT	2,391	2,391	2,391	2,391	2,391	2,391	
F	68	ECTOR	6,700		6,700		6,700	6,700	
F	87	GLASSCOCK	0	-	0	-	0	0	
F	114	HOWARD	2,024		2,024	2,024	2,024	2,024	
F	118 134	IRION KIMBLE	0		0	0	0	0 0	
F	134		0	0	0	0	0	0	
F	151	MCCULLOCH	0		0	-	0	0	
F	154	MARTIN	0	-	0		0	ŏ	
F	160	MASON	0		0		0 0	ő	
F	164	MENARD	0		õ		ŏ	õ	
F	165	MIDLAND	0		Ő		õ	õ	
		··	•	•	•	-	-	-	

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State Total TEXAS 1.100.011 1.122.112 1.131.670 1.10.766 1.064.977 1.088.695 F 168 MITCHELL 3.970 3.943 3.916 3.897 3.882 3.861 F 168 PECOS 6 <th>REGION</th> <th>CNTY</th> <th>NAME</th> <th>d2000</th> <th>d2010</th> <th>d2020</th> <th>d2030</th> <th>d2040</th> <th>d2050</th>	REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
F 186 PECOS 1.00 0.	State Total		TEXAS	1,100,011	1,122,112	1,131,670	1,110,766		
F 192 REAGAN 0<				3,970	3,943	3,916	3,897	3,882	3,861
F 195 REEVES 0<				6	6	6	6	6	6
F 200 RUNNELS 0				0	0	0	0	0	0
F 207 SCHLEICHER 0 <t< td=""><td></td><td></td><td></td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></t<>				0	0	0	0	0	0
F 208 SCURRY 0<			RUNNELS	0	0	0	0	0	0
F 216 STERLING 0				0	0	0	0	0	0
F 216 STERLING 0		208	SCURRY	0	0	0	0	0	0
F 218 SUTTON 0<		216	STERLING	0	0	0	0	0	
F 231 UPTON 0 </td <td></td> <td></td> <td>SUTTON</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td></td>			SUTTON	0	0	0	0	0	
F 231 UPTON 0 </td <td></td> <td>226</td> <td>TOM GREEN</td> <td>1,602</td> <td>1,524</td> <td>1,449</td> <td>1,386</td> <td>1,298</td> <td>1.210</td>		226	TOM GREEN	1,602	1,524	1,449	1,386	1,298	1.210
F 238 WARD 5.728 5.788 5.680 5.689 5.724 5.763 G 14 BELL 0		231	UPTON	0	0				
F 248 WINKLER 0	F	238	WARD	5,728	5,683	5,680	5,689	5.724	
23,421 23,271 23,166 23,093 23,025 22,955 G 14 BELL 0	F	248	WINKLER	0	0				
G 18 BOSQUE 0 </td <td></td> <td></td> <td></td> <td>23,421</td> <td>23,271</td> <td>23,166</td> <td>23,093</td> <td></td> <td>-</td>				23,421	23,271	23,166	23,093		-
G 21 BRAZOS 5.756				0		0	0	. 0	0
G 26 BURLESON 0				-		0	+	0	0
G 30 CALLAHAN 0				5,756	5,756	5,756	5,756	5,756	5,756
G 47 COMANCHE 0		=		0	0	0	0	0	0
G 50 CORYELL 0<				0	0	0	0	0	0
G 67 EASTLAND 0					0	0	0	0	0
G 72 ERATH 0 <td></td> <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>					0	0	0	0	0
G 73 FALLS 0 <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>				0	0	0	0	0	0
G 76 FISHER 0 </td <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>				0	0	0	0	0	0
G 93 GRIMES 10,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 20,000 G 0 </td <td></td> <td></td> <td></td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>				0	0	0	0	0	0
G 97 HAMILTON 0				0	0	-	0	0	0
G 104 HASKELL 1,465 1,407 1,349 1,291 1,233 1,175 G 109 HILL 0				10,000	20,000	20,000	20,000	20,000	20,000
G 109 HILL 0 <td></td> <td></td> <td></td> <td>0</td> <td>-</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td>				0	-	0	0	0	0
G 111 HOOD 40,000 40,000 40,000 40,000 39,905 G 126 JOHNSON 0 0 0 0 0 0 0 G 127 JONES 6,500 0<				1,465	1,407	1,349	1,291	1,233	1,175
G 126 JOHNSON 0				-	-	-	0	0	0
G 127 JONES 6,500 0				40,000	40,000	40,000	40,000	40,000	39,905
G 132 KENT 0 <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td>0</td> <td>-</td> <td>0</td>					-		0	-	0
G 138 KNOX 0 <td></td> <td></td> <td></td> <td>6,500</td> <td>6,500</td> <td>6,500</td> <td>6,500</td> <td>6,500</td> <td>6,500</td>				6,500	6,500	6,500	6,500	6,500	6,500
G 141 LAMPASAS 0				0	0	0	0	0	0
G 144 LEE 0 0 0 0 0 0 G 147 LIMESTONE 27,458				0	0	0	0	0	0
G 147 LIMESTONE 27,458				0	0	0	0	0	0
G 155 MCLENNAN 16,858 16,858 20,000 25,000 30,000 35,000 G 166 MILAM 9,002 9,002 9,002 9,002 9,002 9,002 9,002 G 177 NOLAN 0 0 0 0 0 0 0 G 182 PALO PINTO 87,296 79,176 74,034 69,034 59,034 49,034 G 198 ROBERTSON 35,807 38,727 40,727 45,727 50,727 G 209 SHACKELFORD 0 0 0 0 0 0 G 213 SOMERVELL 18,000 23,200 23,200 23,200 23,200 23,200 23,200 23,200 23,200 0				-			0	0	0
G 166 MILAM 9,002 9,003 0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>27,458</td></th<>									27,458
G 177 NOLAN 0 </td <td>G</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	G								
G 182 PALO PINTO 87,296 79,176 74,034 69,034 59,034 49,034 G 198 ROBERTSON 35,807 38,727 40,727 40,727 45,727 50,727 G 209 SHACKELFORD 0 0 0 0 0 0 G 213 SOMERVELL 18,000 23,200 23,200 23,200 23,200 23,200 23,200 23,200 0 <td< td=""><td>G</td><td></td><td></td><td>9,002</td><td>9,002</td><td>9,002</td><td>9,002</td><td>9,002</td><td>9,002</td></td<>	G			9,002	9,002	9,002	9,002	9,002	9,002
G 198 ROBERTSON 35,807 38,727 40,727 40,727 45,727 50,727 G 209 SHACKELFORD 0	G			-		-	-	0	0
G 209 SHACKELFORD 0 <	G			87,296				59,034	49,034
G 213 SOMERVELL 18,000 23,200 0 <td>G</td> <td></td> <td>ROBERTSON</td> <td>35,807</td> <td>38,727</td> <td>40,727</td> <td>40,727</td> <td>45,727</td> <td>50,727</td>	G		ROBERTSON	35,807	38,727	40,727	40,727	45,727	50,727
G 215 STEPHENS 0	G			-					
G221TAYLOR2,6192,6192,6192,6192,6192,619G224THROCKMORTON000000G239WASHINGTON000000G246WILLIAMSON (P)000000	G			18,000	23,200	23,200	23,200	23,200	23,200
G221TAYLOR2,6192,6192,6192,6192,6192,619G224THROCKMORTON000000G239WASHINGTON000000G246WILLIAMSON (P)000000	G			-			-	0	0
G 224 THROCKMORTON 0	G				-			-	-
G 239 WASHINGTON 0 </td <td></td> <td></td> <td></td> <td></td> <td>2,619</td> <td></td> <td>2,619</td> <td>2,619</td> <td>2,619</td>					2,619		2,619	2,619	2,619
G 246 WILLIAMSON (P) 0 0 0 0 0 0									0
	G							0	
G 252 YOUNG (P) 0 0 0 0 0 0	G							=	
	G	252	YOUNG (P)	0	0	0	0	0	0

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050	
State Total		TEXAS	1,100,011	1,122,112	1,131,670	1,110,766	1,094,977	1,088,695	
			260,761	270,703	270,645	270,587	270,529	270,376	
н	8	AUSTIN	0	0	0	0	0	0	
н	20	BRAZORIA	0	0	0	Ō	Ō		Salt
н	36	CHAMBERS	1,120	1,142	1,142	1,142	1,135	1,170	30,0
н	79	FORT BEND	104,400	104,400	104,400	104,400	104,400	104,400	00,0
н	84	GALVESTON	1,820	1,820	1,820	1,820	1,820	1,820	
н	101	HARRIS	48,260	46,610	46,610	46,610	46,610	46,610	
н	145	LEON	0	0	0	0	-10,010	-0,010	
н	146	LIBERTY	0	Ō	ō	Ő	Ő	0	
н	157	MADISON	Ō	Ō	0	Ő	ő	0	
н	170	MONTGOMERY	12,096	12,096	12,096	12,096	12,096	12,096	
н	187	POLK (P)	0	0	0	12,000	12,030	12,090	
н	204	SAN JACINTO	õ	õ	Ő	ő	Ő	0	
н	228	TRINITY (P)	õ	õ	ő	ő	0		
н	236	WALKER	0	0	0	0	0	0	
Н	237	WALLER	0	0	0	0	0	0	
			167,696	166,068	166,068	166,068	166,061	166,096	
1	1	ANDERSON	0	0	0	0	0	0	
I	3	ANGELINA	0	0	0	Ő	Ō	Ō	
1	37	CHEROKEE	5,343	5,343	5,343	5,343	5,343	5,343	
1	100	HARDIN	0	0	0	0	0	0,0,0	
l l	107	HENDERSON (P)	Ó	Ő	Ō	Ō	Ő	õ	
I	113	HOUSTON	Ō	Õ	Ō	Õ	õ	õ	
I	121	JASPER	0 0	Ō	ŏ	Ő	Ö	ő	
1	123	JEFFERSON	Ō	Ō	ŏ	õ	Ő	Ő	
1	174	NACOGDOCHES	Ō	ŏ	ŏ	ő	Ő	0	
Í	176	NEWTON	õ	ŏ	ŏ	Ő	0	0	
i	181	ORANGE	22,977	22,977	22,977	22,977	22,977	22,977	
i	183	PANOLA	22,0.1	0	22,377	22,377	22,917		
i	187	POLK (P)	ŏ	ő	0	0	0	0	
	201	RUSK	25,179	25,179	25,179	25,179		0	
i	202	SABINE	20,170	20,179	20,179		25,179	25,179	
	203	SAN AUGUSTINE	0	0		0	0	0	
	210	SHELBY	0	0	0	0	0	0	
+ 1	212	SMITH (P)	0	0	0	0	0	0	
1	232	TRINITY (P)	0			_	0	0	
1	229	TYLER	0	0	0	0	0	0	
•	223	TILEN	53,499	53,499	0 53 400	0 53,499	0	0	
			03,435	55,499	53,499	55,499	53,499	53,499	
J	10	BANDERA	0	0	0	0	0	0	
J	69	EDWARDS	0	0	0	0	0	0	
J	133	KERR	0	0	0	0	0	0	
J	136	KINNEY	0	0	0	0	0	0	
J	193	REAL	0	0	0	0	0	0	
J	233	VAL VERDE	0	0	0	0	0	0	
			0	0	0	0	0	0	
к	11	BASTROP	11,750	11,750	11,750	11,750	11,750	11,750	
к	16 27	BLANCO	0	0	0 0	0	0	0	
к		BURNET	0			0	0	0	

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	1,100,011	1,122,112		1,110,766	1,094,977	1,088,695
1Z	45							, ,
K	45	COLORADO	0	0	0	0	0	0
K	75	FAYETTE	45,613	45,613	45,613	45,613	45,613	45,613
ĸ	86	GILLESPIE						
ĸ	105	HAYS (P)						
ĸ	150	LLANO	15,000	15,000	15,000	15,000	15,000	15,000
ĸ	161	MATAGORDA	47,443	47,443	47,443	47,443	41,763	41,763
к	167	MILLS	0	0	0	0	0	0
к	206	SAN SABA	0	0	0	0	0	0
к	227	TRAVIS	40,859	40,859	40,859	40,859	40,859	40,859
к	241	WHARTON (P)	0	0	0	0	0	0
К	246	WILLIAMSON (P)	0	0	0	0	0	0
			160,665	160,665	160,665	160,665	154,985	154,985
							,	
L	7	ATASCOSA	22,000	22,000	22,000	13,496	13,496	13,496
L	15	BEXAR	59,428	59,428	59,428	59,428	59,428	59,428
L	28	CALDWELL	0	0	0	0	0	0
L	29	CALHOUN	100	100	100	100	100	100
L	46	COMAL	0	0	0	0	0	0
L	62	DEWITT	0	0	Ō	Ō	Õ	õ
L	64	DIMMIT	0	0	Ō	Ō	Ő	õ
L	82	FRIO	400	400	400	400	400	400
L	88	GOLIAD	23,567	23,570	23,574	23,577	23,579	23,579
L	89	GONZALES		,•.•		20,077	20,070	20,010
L	94	GUADALUPE	9,840	9,840	9,840	9,840	9,840	9,840
L	105	HAYS (P)	2,500	6,436	6,436	6,436	6,436	6,436
Ĺ	128	KARNES	2,000	0,400	0,-00	0,400	0,430	
Ĺ	130	KENDALL	0 0	0 0	0	0	0	0
Ĺ	142	LA SALLE	Ő	0	Ő	0	0	0
Ľ	163	MEDINA	Ő	Ő	0	0	0	0
L	196	REFUGIO	ő	Ő	0	0	0	0
-	232	UVALDE	ő	0	0	0	0	0
L L	235	VICTORIA	10,000	10,000	10,000	-		0
1	247	WILSON	0,000	0,000	10,000	10,000	10,000	10,000
ĩ	254	ZAVALA	0	0		0	0	0
-	204		127,835	131,774	121 770	0	0	0
			127,035	131,774	131,778	123,277	123,279	123,279
м	31	CAMERON	2,400	2,400	2,400	2,400	2,400	2 400
M	108	HIDALGO	17,289					2,400
M	124	JIM HOGG	0	17,289 0	17,289 0	17,289 0	17,289	17,289
M	162	MAVERICK	0	0	0	0	0	0
M	214	STARR	0	0	0	0	0 0	0
M	240	WEBB	2,195	2,195	2,195	2,195	2,195	0
M	245	WILLACY	2,195	2,195				2,195
M	253	ZAPATA	ő	0	0	0	0	0
141	200					0	0	0
			21,884	21,884	21,884	21,884	21,884	21,884
N	4	ARANSAS	0	0	0	•	0	0
N	13	BEE	0	0 0	0	0	0 0	0
N	24	BROOKS	0	0	0	0	U 0	0 0
N	66	DUVAL	0	0	0	0	0	
N	125	JIM WELLS	0	0	0	0		0
N	131	KENEDY	0	0	0	0	0 0	0 0
••	101		0	J	U	U	0	U

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	1,100,011	1,122,112	1,131,670	1,110,766	1,094,977	1,088,695
N	137	KLEBERG			_			
N	149	LIVE OAK	0	0	0	0	0	0
N	156	MCMULLEN	0	0	0	0	0	0
N	178	NUECES	0	0	0	0	0	0
N	205	SAN PATRICIO	3,300	3,300	3,300	3,300	3,300	3,300
14	200	SAN FATRICIU	0	0	0	0	0	0
			3,300	3,300	3,300	3,300	3,300	3,300
0	9	BAILEY	0	0	0	0	0	0
0	23	BRISCOE	Ō	Ő	ŏ	ŏ	0	0
0	35	CASTRO	Ō	Ő	ŏ	0	0	0
0	40	COCHRAN	ō	Ő	ŏ	0	Ö	0
0	54	CROSBY	ō	õ	Ő	Ő	0	0
0	58	DAWSON	0	õ	ŏ	ő	0	0
0	59	DEAF SMITH	Ō	Ő	Ő	ŏ	0	0
0	63	DICKENS	Ő	Ō	õ	ŏ	0	0
Ō	77	FLOYD	Ō	Ō	Õ	ŏ	Ő	0
0	83	GAINES	Ō	Ō	Ő	Ő	0	0
0	85	GARZA	Ō	Ō	0	ŏ	ő	0
0	95	HALE	Ō	ŏ	Ō	Ő	õ	0
0	110	HOCKLEY	0	Ō	õ	Ő	Ő	õ
0	140	LAMB	18,000	18,000	25,000	25,000	25,000	30,000
0	152	LUBBOCK	4,799	4,944	5,025	5,200	5,314	5,505 Reuse
0	153	LYNN	0	0	0	0	0	0
0	173	MOTLEY	0	0	Ō	ō	ŏ	ő
0	185	PARMER	0	0	Õ	Ő	Ő	õ
0	219	SWISHER	0	0	Ō	Ō	Ő	õ
0	223	TERRY	0	0	0	Ō	Ō	õ
0	251	YOAKUM	2,200	2,200	2,200	2,200	2,200	2,200
			24,999	25,144	32,225	32,400	32,514	37,705
Р	120	JACKSON	0	0	0	~	~	•
P	143	LAVACA	0	0	0	0	0	0
P	241	WHARTON (P)	0	0	0	0	0	0
			0	0	0	0	0	0
			U	0	U	0	0	0

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REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
			•	•	•	0	•	•
A	6	ARMSTRONG	0	0	0	0	0 0	0
A	33		0	0 0	0 0	0	0	0
A	38	CHILDRESS COLLINGSWORTH	0	0	0	0	0	0
A	44 56	DALLAM	0	0	0	0	0	0
A	56 65	DONLEY	0	0	0	0	0	0
A	90	GRAY	0	0	0	0	Ő	Ő
A	90 96	HALL	0	0	0 0	Ö	0 0	ŏ
A A	90 98	HANSFORD	0	0	0 0	ŏ	ő	õ
A	98 103	HARTLEY	0	0	ŏ	ŏ	Ő	Õ
A	105	HEMPHILL	0	Ö	õ	ŏ	Ő	Ő
A	108	HUTCHINSON	0	Ő	0 0	ŏ	Ő	Ő
A	148	LIPSCOMB	0	0	Ő	Ő	õ	Ő
A	140	MOORE	Ő	Ő	ŏ	-200	-200	-200
A	179	OCHILTREE	0	0	Ő	0	0	0
A	180	OLDHAM	Ő	Ő	Ő	õ	0 0	Õ
Â	188	POTTER	0	Ö	Ő	õ	-12,294	-15,860
Â	191	RANDALL	Õ	Õ	Ő	0	0	0
Â	197	ROBERTS	Õ	Õ	Ō	Ō	Ō	Ō
Â	211	SHERMAN	Ő	0	Õ	Õ	Ō	Ō
Â	242	WHEELER	Ő	Ō	0	Ō	Ō	0
~	LTL		õ	Ō	Ō	-200	-12,494	-16,060
			-	-	-		,	
В	5	ARCHER	14,000	0	0	0	0	0
В	12	BAYLOR	0	0	0	0	0	0
B	39	CLAY	0	0	0	0	0	0
В	51	COTTLE	0	0	0	0	0	0
В	78	FOARD	0	0	0	0	0	0
В	99	HARDEMAN	655	601	548	494	440	387
В	135	KING	0	0	0	0	0	0
В	169	MONTAGUE	0	0	0	0	0	0
В	243	WICHITA	0	0	0	0	0	0
В	244	WILBARGER	11,900	8,000	4,000	0	0	0
В	252	YOUNG (P)	0	0	0	0	0	0
			26,555	8,601	4,548	494	440	387
~	40		3,023	-2,564	-3,219	-3,610	-6,910	-7,102
C	43	COLLIN COOKE	3,023	-2,504	-3,219	-5,010	-0,510	0
C	49 57	DALLAS	109	-2,823	-9,511	-8,467	-8,454	-17,978
C		DALLAS DENTON	500	-4,000	-4,000	-4,000	-5,500	-5,500
C	61 70	ELLIS	0	-15,000	-15,000	-15,000	-18,000	-18,000
C C	70 74	FANNIN	5,596	4,596	3,596	2,596	1,596	596
	74 81	FREESTONE	2,204	-8,796	-10,796	-10,796	-14,988	-14,988
C C	91	GRAYSON	2,204	0,730	0	0	0	0
	31	GRAIDUN	0	0	5	5	•	5

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
С	107	HENDERSON (P)	9,501	9,501	9,501	9,501	9,501	9,501
С	119	JACK	0	0	0	0	0	0
С	129	KAUFMAN	-7,800	-8,000	-8,000	-10,000	-10,000	-15,000
С	175	NAVARRO	0	0	0	0	0	0
С	184	PARKER	220	-5,796	-5,809	-9,823	-11,837	-11,850
С	199	ROCKWALL	0	-5,600	-6,000	-6,000	-6,000	-6,000
C C	220	TARRANT	389	-501	-411	-960	-1,807	-2,347
С	249	WISE	0	-11,200	-11,200	-11,200	-11,200	-11,200
			13,742	-50,183	-60,849	-67,759	-83,599	-99,868
D	19	BOWIE	0	0	0	0	0	0
D	32	CAMP	0	0	0	0	0	0
D	34	CASS	0	0	0	0	0	0
D	60	DELTA	0	0	0	0	0	0
D	80	FRANKLIN	0	0	0	0	0	0
D	92	GREGG	3,435	3,935	3,935	3,935	3,935	4,935
D	102	HARRISON	23,240	23,240	23,240	23,240	23,240	23,240
D	112	HOPKINS	0	0	0	0	0	0
D	116	HUNT	284	-516	-516	-516	-516	-516
D	139	LAMAR	0	0	0	0	0	0
D	158	MARION	3,832	3,832	3,832	3,832	3,832	3,832
D	172	MORRIS	11,952	11,952	11,952	11,952	11,952	11,952
D	190	RAINS						
D	194	RED RIVER	10,000	6,500	4,500	1,500	1,500	1,500
D	212	SMITH (P)	0	0	0	0	0	0
D	225	TITUS	16,720	13,720	13,720	1,020	1,020	1,020
D	230	UPSHUR	0	-5,601	-5,601	-5,601	-5,601	-5,601
D	234	VAN ZANDT	0	0	0	0	0	0
D	250	WOOD	0	0	0	0	0	-7,500
			69,463	57,062	55,062	39,362	39,362	32,862
E	22	BREWSTER	0	0	0	0	0	0
Е	55	CULBERSON	0	0	0	0	0	0
E	71	EL PASO	0	0	0	-6,000	-6,000	-6,000
E	115	HUDSPETH	0	0	0	0	0	0
E	122	JEFF DAVIS	0	0	0	0	0	0
E	189	PRESIDIO	0	0	0	0	0	0
Е	222	TERRELL	0	0	0	0	0	0
			0	0	0	-6,000	-6,000	-6,000
F	2	ANDREWS	0	0	0	0	0	0
F	17	BORDEN	0	0	0	0	0	0
F	25	BROWN	0	0	0	0	0	0
F	41	COKE	165	165	165	165	165	165
F	42	COLEMAN	0	0	0	0	0	0

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
F	40	CONCHO	0	0	0	0	0	0
F	48 52	CRANE	0	0	0	0	0	0
F	52 53	CROCKETT	477	-1,889	-1,889	-1,889	-1,889	-1,889
F	53 68	ECTOR		-1,009	0	-1,009 0	0	0
F	87	GLASSCOCK	0	0	0	0	Ő	Ő
F	114	HOWARD	644	644	644	644	644	644
F	118	IRION	0	0	0	0	0	0
F	134	KIMBLE	0	0	Ő	Ö	õ	õ
F	154	LOVING	0 0	Ő	ŏ	Ő	Ő	õ
F	154	MCCULLOCH	õ	Ő	õ	Ő	Õ	Ō
F	159	MARTIN	õ	õ	Ő	Ő	0	õ
F	160	MASON	õ	Ő	õ	0	0	Ō
F	164	MENARD	Õ	0 0	Ō	ŏ	0	Ō
F	165	MIDLAND	õ	Ő	Ő	Ō	Õ	Ō
F	168	MITCHELL	-30	-457	-1,364	-2,439	-3,721	-5,263
F	186	PECOS	0	0	0	0	0	0
F	192	REAGAN	Ō	Ō	Ō	0	0	0
F	195	REEVES	Ō	0	0	0	0	0
F	200	RUNNELS	0	0	0	0	0	0
F	207	SCHLEICHER	0	0	0	0	0	0
F	208	SCURRY	0	0	0	0	0	0
F	216	STERLING	0	0	0	0	0	0
F	218	SUTTON	0	0	0	0	0	0
F	226	TOM GREEN	582	-2,156	-2,231	-2,294	-2,382	-2,470
F	231	UPTON	0	0	0	0	0	0
F	238	WARD	228	-367	-1,580	-3,023	-4,730	-6,782
F	248	WINKLER	0	0	0	0	0	0
			2,066	-4,060	-6,255	-8,836	-11,913	-15,595
G	14	BELL	0	-11,200	-11,200	-11,200	-11,200	-11,200
G	18	BOSQUE	Ő	-5,600	-5,600	-5,600	-5,600	-5,600
G	21	BRAZOS	756	756	756	756	756	756
G	26	BURLESON	0	0	0	0	0	0
Ğ	30	CALLAHAN	Ō	Ő	0	0	0	0
	47	COMANCHE	0	0	0	0	0	0
G G	50	CORYELL	0	0	0	0	0	0
Ğ	67	EASTLAND	0	· 0	0	0	0	0
Ğ	72	ERATH	0	0	0	0	0	0
Ğ	73	FALLS	0	0	0	0	0	0
0 0 0 0 0 0 0 0	76	FISHER	Ō	0	0	0	0	0
Ğ	93	GRIMES	0	0	0	0	0	0
Ğ	97	HAMILTON	0	0	0	0	0	0
Ğ	104	HASKELL	765	-933	-1,651	-1,709	-1,767	-1,825
Ğ	109	HILL	0	0	0	0	0	0
G	111	HOOD	35,500	33,300	33,300	33,300	33,300	33,205

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,81 1	213,676	103,342	37,048	-45,949
							_	
G	126	JOHNSON	0	0	0	0	0	0
G	127	JONES	4,160	2,944	-3,824	-3,824	-3,824	-3,824
G	132	KENT	0	0	0	0	0	0
G	138	KNOX	0	0	0	0	0	0
G	141	LAMPASAS	0	0	0	0	0	0
G	144	LEE	0	0	0	0	0	0
G	147	LIMESTONE	9,458	7,458	7,458	7,458	7,458	7,458
G	155	MCLENNAN	1,858	1,858	0	0	0	0
G	166	MILAM	322	322	-3,498	-3,498	-3,498	-6,998
G	177	NOLAN	0	0	0	0	0	0
G	182	PALO PINTO	84,796	76,176	71,034	66,034	56,034	46,034
G	198	ROBERTSON	20,807	10,727	10,727	10,727	10,727	10,727
G	209	SHACKELFORD	0	0	0	0	0	0
G	213	SOMERVELL	0	0	0	0	0	0
G	215	STEPHENS	0	0	0	0	0	0
G	217	STONEWALL	0	0	0	0	0	0
G	221	TAYLOR	2,319	2,319	2,319	2,319	2,319	2,319
G	224	THROCKMORTON	0	0	0	0	0	0
G	239	WASHINGTON	0	0	0	0	0	0
G	246	WILLIAMSON (P)	0	0	0	0	0	0
G	252	YOUNG (P)	-3,000	-3,500	-3,500	-3,500	-3,500	-3,500
			157,7 41	114,627	96,321	91,263	81,205	67,552
Н	8	AUSTIN	0	0	0	0	0	0
H	20	BRAZORIA	0 0	õ	Ő	õ	Ő	Ō
H	36	CHAMBERS	20	42	42	42	-365	-3,830
Н	79	FORT BEND	34,400	34,400	34,400	34,400	34,400	34,400
H	84	GALVESTON	320	320	320	320	320	320
H	101	HARRIS	31,760	29,110	26,610	24,110	24,110	24,110
H	145	LEON	0	23,110	20,010	24,110	24,110	21,110
H	145	LIBERTY	0	0	Ő	Õ	Ő	Ő
Н	140	MADISON	Ő	Ő	Ő	õ	Ō	0
Н	157	MONTGOMERY	6,096	6,096	6,096	6,096	6,096	6,096
			0,030	0,030	0,000	0,000	0,000	0,000
H	187 204	POLK (P) SAN JACINTO	0	0	0	0	Ő	õ
H	204	TRINITY (P)	0	ŏ	0	Ő	Õ	õ
H	226	WALKER	0	0	Ő	Ő	0	Ō
H H	230	WALLER	0	Ő	Ő	0	Ő	Ō
п	237	WALLER	72,596	69,968	67,468	64,968	64,561	61,096
			72,390	09,900	07,100	04,000	04,001	01,000
I	1	ANDERSON	0	-11,209	-11,209	-11,209	-11,209	-11,209
I	3	ANGELINA	Ō	0	0	0	0	0
, I	37	CHEROKEE	343	343	-4,657	-9,657	-9,657	-14,657
1	100	HARDIN	0	0	0	0	0	0
·	107	HENDERSON (P)	Ō	0	0	0	0	0
•	. • •		-					

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
			_		_	_	-	_
I	113	HOUSTON	0	0	0	0	0	0
I	121	JASPER	0	0	0	0	0	0
1	123	JEFFERSON	-3,000	-6,000	-6,000	-6,000	-6,000	-6,000
1	174	NACOGDOCHES	0	0	0	-7,505	-7,505	-7,505
	176	NEWTON	0	-11,200	-11,200 7,977	-11,200 2,977	-11,200 -2,023	-11,200 -7,023
1	181	ORANGE	16,977	12,977		2,977	-2,023	-7,023
1	183		0	0	0	0	0	0
1	187	POLK (P) RUSK	-4,821	-9,821	-14,821	-19,821	-19,821	-19,821
1	201 202	SABINE	-4,021	-9,021	0	-13,021	-19,021	0
1	202	SAN AUGUSTINE	0	0	0 0	Ő	Ő	Ő
1	203	SHELBY	0	ŏ	Ő	Ő	õ	Ő
1	212	SMITH (P)	õ	õ	Ő	- 0	Ő	0
4	228	TRINITY (P)	Ő	õ	Ő	Ō	Õ	0
,	229	TYLER	0	-5,000	-10,000	-15,000	-20,000	-25,000
I	LLU		9,499	-29,910	-49,910	-77,415	-87,415	-102,415
			•,	,_ · · ·		,		
J	10	BANDERA	0	0	0	0	0	0
Ĵ	69	EDWARDS	0	0	0	0	0	0
Ĵ	133	KERR	0	0	0	0	0	0
J	136	KINNEY	0	0	0	0	0	0
J	193	REAL	0	0	0	0	0	0
J	233	VAL VERDE	0	0	0	0	0	0
			0	0	0	0	0	0
			7 0 5 0	0.750	0.750	2 750	2 750	2 750
K	11	BASTROP	7,250	3,750	3,750	3,750	3,750	3,750
K	16	BLANCO	0	0	0	0	0	0
ĸ	27	BURNET	0	0	0	0	0	0
K	45	COLORADO	0	0	20,613	5,613	5,613	613
K	75	FAYETTE	30,613	25,613	20,013	5,015	5,015	015
K	86	GILLESPIE HAYS (P)						
K K	105 150	LLANO	14,000	13,000	13,000	13,000	13,000	13,000
		MATAGORDA	443	443	443	443	-5,237	-5,237
K K	161 167	MILLS	0 0	0 0	0	0	0	0
K	206	SAN SABA	õ	Ő	Ő	0	Ō	Ō
K	200	TRAVIS	27,359	27,359	27,359	27,359	27,359	24,359
K	241	WHARTON (P)	0	0	0	0	. 0	0
ĸ	241	WILLIAMSON (P)	õ	0	Ō	Ō	0	0
IX IX	240		79,665	70,165	65,165	50,165	44,485	36,485
i	7	ATASCOSA	10,000	10,000	10,000	1,496	-1,504	-8,504
L	, 15	BEXAR	23,428	23,428	19,428	14,428	9,428	3,428
L I	28	CALDWELL	20, 120	0	0	0	0	0
	29	CALHOUN	-	•				
L.								

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
L	46	COMAL	0	0	0	0	0	0
	62	DEWITT	Ö	Ő	Ő	ŏ	Ő	Ő
L. 1	62 64	DIMMIT	0	0	0	0	0	0
L		FRIO	0	0	0	0	0	0
L	82		8,567	8,570	3,574	3,577	3,579	3,579
L	88	GOLIAD	0,007	0,570	5,574	3,577	3,575	5,575
L	89	GONZALES	000	000	000	000	000	020
L	94	GUADALUPE	-920	-920	-920	-920	-920	-920
L	105	HAYS (P)	2,500	36	36	36	36	36
L	128	KARNES	0	0	0	0	0	0
L	130	KENDALL	0	0	0	0	0	0
L	142	LA SALLE	0	0	0	0	0	0
L	163	MEDINA	0	0	0	0	0	0
L	196	REFUGIO	0	0	0	. 0	0	0
L	232	UVALDE	0	0	0	0	0	0
L	235	VICTORIA	2,000	0	0	0	0	0
L	247	WILSON	0	0	0	0	0	0
L	254	ZAVALA	0	0	0	0	0	0
			45,575	41,114	32,118	18,617	10,619	-2,381
м	31	CAMERON	0	400	400	-9,200	-9,200	-9,200
М	108	HIDALGO	12,589	11,789	11,289	11,289	10,289	10,289
М	124	JIM HOGG	0	0	0	0	0	0
М	162	MAVERICK	0	0	0	0	0	0
М	214	STARR	0	0	0	0	0	0
М	240	WEBB	195	-1,706	-1,706	-3,606	-3,606	-3,606
М	245	WILLACY	0	0	0	0	0	0
М	253	ZAPATA	0	0	0	0	0	0
			12,784	10,484	9,984	-1,517	-2,517	-2,517
N	4	ARANSAS	0	0	0	0	0	0
Ν	13	BEE	0	0	0	0	0	0
Ν	24	BROOKS	0	0	0	0	0	0
N	66	DUVAL	0	0	0	0	0	0
N	125	JIM WELLS	0	0	0	0	0	0
Ν	131	KENEDY	0	0	0	0	0	0
N	137	KLEBERG	0	0	0	0	0	0
N	149	LIVE OAK	0	0	0	0	0	0
N	156	MCMULLEN	0	0	0	0	0	0
N	178	NUECES	Ō	0	0	0	0	0
N	205	SAN PATRICIO	Ō	0	0	0	0	0
11	200		Ő	0	0	0	0	0
0	9	BAILEY	0	0	0	0	0	0
õ	23	BRISCOE	0	0	0	0	0	0
õ	35	CASTRO	0	0	0	0	0	0
Ŭ			-	-				

REGION	CNTY	NAME	d2000	d2010	d2020	d2030	d2040	d2050
State Total		TEXAS	492,484	290,811	213,676	103,342	37,048	-45,949
			•		-	•	_	
0	40	COCHRAN	0	0	0	0	0	0
0	54	CROSBY	0	0	0	0	0	0
0	58	DAWSON	0	0	0	0	0	0
0	59	DEAF SMITH	0	0	0	0	0	0
0	63	DICKENS	0	0	0	0	0	0
0	7 7	FLOYD	0	0	0	0	0	0
0	83	GAINES	0	0	0	0	0	0
0	85	GARZA	0	0	0	0	0	0
0	95	HALE	0	0	0	0	0	0
0	110	HOCKLEY	0	0	0	0	0	0
0	140	LAMB	0	0	0	0	0	0
0	152	LUBBOCK	2,799	2,944	25	200	314	505
0	153	LYNN	0	0	0	0	0	0
0	173	MOTLEY	0	0	0	0	0	0
0	185	PARMER	0	0	0	0	0	0
0	219	SWISHER	0	0	0	0	0	0
0	223	TERRY	0	0	0	0	0	0
0	251	YOAKUM	0	0	0	0	0	0
			2,799	2,944	25	200	314	505
Р	120	JACKSON	0	0	0	0	0	0
P	143	LAVACA	0	Ő	õ	Ő	0	Ő
P	241	WHARTON (P)	0	õ	0	õ	Õ	0
F	44 1		õ	0	Ő	õ	Ő	Ő
			v	U	Ų	0	Ŭ	•

2002 STATE WATER PLAN STEAM ELECTRIC WATER SUPPLY VERSUS DEMAND PROJECTIONS (acre feet)

Appendix D Comparison of Steam Electric Water Supply and Demand

Annual Statewide Steam Electric Water Supply vs. Demand

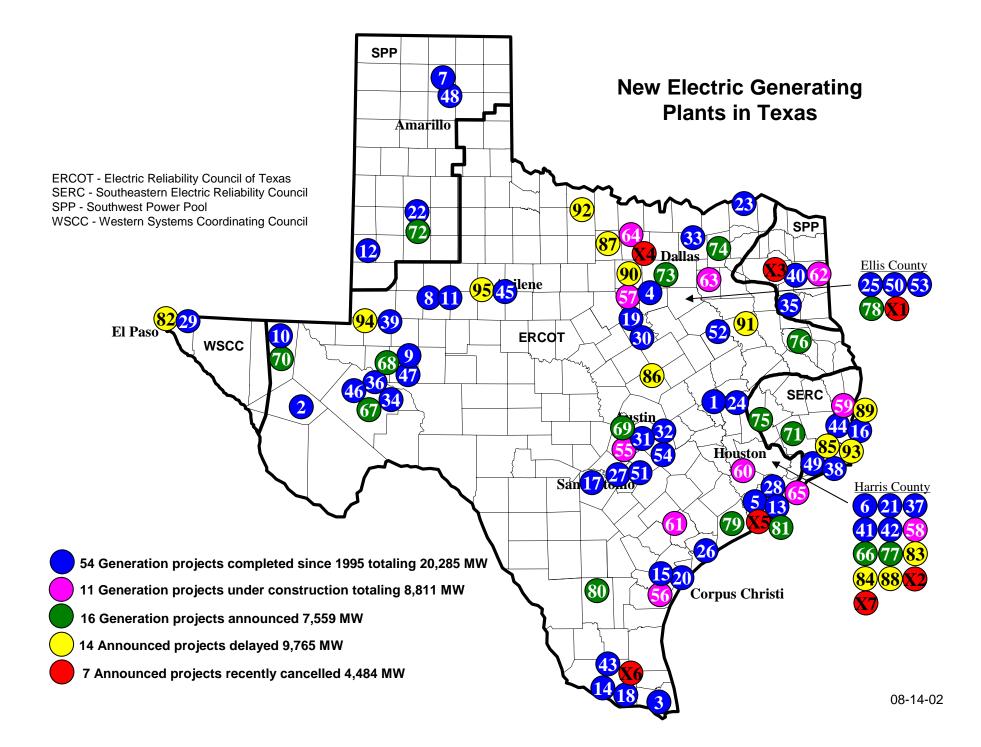
Year	Year	TWDB Demand per 2002 SWP	TWDB Supply per 2002 SWP	Study Demand	Study Demand Minus TWDB Supply	TWDB Supply Minus TWDB Demand
2000	4	611,338	1,099,675	621,872	477,803	488,337
2000	1 1	637,065	1,102,764	631,574	471,189	465,699
2001	1.1 1.2	661,555	1,105,735	641,370	464,365	403,899
2002	1.2	684,847	1,108,574	651,267	457,307	423,727
2003	1.3	706,980	1,111,268	661,271	449,996	404,288
2004	1.4	708,980	1,113,804	671,392	442,412	385,813
2005		747,991	1,116,173	681,636	434,537	368,253
2008	1.6 1.7	766,806	1,118,364	692,010	426,354	351,559
2007				702,524	417,846	335,685
	1.8	784,685	1,120,370 1,122,181	702,524	408,998	320,585
2009	1.9	801,597		713,183	399,797	306,213
2010	2	817,580	1,123,793			
2011	2.1	832,672	1,125,199	734,969	390,230	292,527 279,484
2012	2.2	846,912	1,126,396	746,111	380,285	
2013	2.3	860,339	1,127,381	757,429	369,951	267,042
2014	2.4	872,990	1,128,151	768,931	359,220	255,161
2015	2.5	884,904	1,128,707	780,624	348,083	243,802 232,927
2016	2.6	896,120	1,129,048	792,516	336,532	
2017	2.7	906,676	1,129,175	804,614	324,562	222,499
2018	2.8	916,611	1,129,092	816,925	312,167	212,482
2019	2.9	925,962	1,128,803	829,458	299,344	202,841
2020	3	934,768	1,128,311	842,220	286,091	193,542
2021	3.1	943,068	1,127,622	855,218	272,404	184,554
2022	3.2	950,900	1,126,745	868,460	258,285	175,845
2023	3.3	958,303	1,125,687	881,953	243,733	167,384
2024	3.4	965,314	1,124,456	895,705	228,751	159,143
2025	3.5	971,973	1,123,065	909,724	213,341	151,092
2026	3.6	978,317	1,121,524	924,017	197,507	143,207
2027	3.7	984,385	1,119,845	938,591	181,254	135,460
2028	3.8	990,216	1,118,043	953,454	164,588	127,826
2029	3.9	995,848	1,116,132	968,614	147,518	120,284
2030	4	1,001,319	1,114,128	984,078	130,050	112,809
2031	4.1	1,006,668	1,112,049	999,854	112,195	105,380
2032	4.2	1,011,934	1,109,912	1,015,949	93,963	97,978
3033	4.3	1,017,153	1,107,737	1,032,370	75,367	90,584
2034	4.4	1,022,366	1,105,544	1,049,126	56,418	83,178
2035	4.5	1,027,610	1,103,356	1,066,224	37,132	75,745
2036	4.6	1,032,925	1,101,193	1,083,671	17,522	68,269
2037	4.7	1,038,347	1,099,081	1,101,475	-2,394	60,734
2038	4.8	1,043,916	1,097,044	1,119,643	-22,599	53,128
2039	4.9	1,049,670	1,095,108	1,138,183	-43,075	45,438
2040	5	1,055,648	1,093,300	1,157,102	-63,803	37,652
2041	5.1	1,061,887	1,091,648	1,176,409	-84,761	29,761
2042	5.2	1,068,427	1,090,183	1,196,110	-105,927	21,755
2043	5.3	1,075,306	1,088,933	1,216,213	-127,280	13,627
2044	5.4	1,082,562	1,087,932	1,236,726	-148,794	5,370
2045	5.5	1,090,233	1,087,211 1,086,804	1,257,656	-170,445	-3,022
2046	5.6			1,279,010	-192,206	-11,555
2047	5.7	1,106,977	1,086,747	1,300,797	-214,050	-20,230

Annual Statewide Steam Electric Water Supply vs. Demand

Year	Year	TWDB Demand per 2002 SWP	TWDB Supply per 2002 SWP	Study Demand	Study Demand Minus TWDB Supply	TWDB Supply Minus TWDB Demand
	· ·					
2048	5.8	1,116,125	1,087,074	1,323,023	-235,949	-29,051
2049	5.9	1,125,843	1,087,825	1,345,697	-257,872	-38,019
2050	6	1,136,169	1,089,036	1,368,825	-279,790	-47,133
2051	6.1	1,147,140	1,090,747	1,392,416	-301,669	-56,394
2052	6.2	1,158,796	1,092,998	1,416,476	-323,478	-65,798
2053	6.3	1,171,176	1,095,832	1,441,014	-345,182	-75,344
2054	6.4	1,184,316	1,099,291	1,466,037	-366,746	-85,025
2055	6.5	1,198,256	1,103,418	1,491,552	-388,134	-94,838
2056	6.6	1,213,034	1,108,259	1,517,567	-409,308	-104,775
2057	6.7	1,228,689	1,113,861	1,544,090	-430,229	-114,829
2058	6.8	1,245,259	1,120,269	1,571,128	-450,859	-124,990
2059	6.9	1,262,782	1,127,532	1,598,688	-471,156	-135,250
2060	7	1,281,297	1,135,700	1,626,778	-491,078	-145,597
	•	· · · · · · · · · · · · · · · · · · ·				Curve Quality
TWDB Der	mand Cur	/ey=6402.5x^3-829	41.3x^2+410247.7	7x+277629.3		г^2=1.0
		y=464.8x^4-4498			3.3	r^2=1.0
Study Medium Use						
Demand Curve		y=1255.4x^3+518	3.2x^2+91781.0x+	528317.4		r^2=1.0

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Appendix E Projected Electrical Demand Per State and Federal Agencies



Map	Company	Facility	City (County)	Capacity ² (MW)	Cogen Host (MW)	Date in Service	Intercon- nection	Region
- I	Texas A&M Uni		College Station (Brazos)	40	40	Jan-96	Brazos	ERCOT
~	CSW Services (wind)		Ft. Davis (Jeff Davis)	6.6		Jan-96	мп	ERCOT
e.	City of Brownsville	Silas Ray	Brownsville (Cameron)	43		Jun-96	BPUB	ERCOT
	Tenaska IV Texas Partners	Tenaska IV Texas Partners	Cleburne (Johnson)	258		Nov-96	TU/BEPC	ERCOT
- vo	CSW Enerov	Sweeny Cogeneration	Sweeny (Brazoria)	330	96	Feb-98	TNMP	ERCOT
e e	Calnine/Phillins	Pasadena Power Plant I	Pasadena (Hamis)	240	6	Jut-98	Reliant	ERCOT
> -		Black Hawk Station	Borger (Hutchinson)	254 ³	38	Aug-98	SPS	SPP
- ∝		Big Spring Wind Power	Big Spring (Howard)	34		Feb-99	5	ERCOT
,	EPI Fremv (wind)	Southwest Mesa Wind Proj.	McCamey (Upton)	75		Jun-99	WTU	ERCOT
ې ۲	-	Delaware Mtn Wind Farm	Delaware Mtn (Culberson)	90		Jun-99	TXU	ERCOT
2 -		Big Spring Wind Power	Big Spring (Howard)	6.6		Jun-99	UXT	ERCOT
12	Golden Spread/LS Power	Mustang Station	Denver City (Yoakum)	280		96-unf	SPS	SPP
				198		May-00		
£	BASF	Freeport	Freeport (Brazonia)	93		96-INC	Reliant	ERCOT
4		Frontera Power Station	Mission (Hidalgo)	344		96-Inf	đ	ERCOT
:				170		May-00		
4	15 Comm Global-OxyChem	Incleside Cogeneration	Ingleside (San Patricio)	440	235	Oct-99	Ъ	ERCOT
9	Reliant Friend/Air Liouide/Baver	Sabine Project	Sabine (Orange)	1004	36	Dec-99	Entergy	SERC
2 2	17 (DS	A. von Rosenberg	San Antonio (Bexar)	200		May-00	cPS S	ERCOT
ę	Caloine	Hidalgo Energy Center	Edinburg (Hidalgo)	500		Jun-00	CSW	ERCOT
e e	Southern Energy	Bosque County Power Plant	Lake Whitney (Bosque)	308		00-unf	Brazos	ERCOT
2	I G&E/Columbia-Revnolds	Gregory Power Plant	Gregory (San Patricio)	450	50	Jul-00	CSW	ERCOT
5		Pasadena Power Plant II	Pasadena (Harris)	540		Jul-00	Reliant	ERCOT
3	Ihook Prese & Light	J. Robert Massengale	Lubbock (Lubbock)	43		Sep-00	ĿР	SPP
18	EPI Freedov/Panda Enerov	Lamar Power Plant	Paris (Lamar)	1000		Sep-00	TXU	ERCOT
2	_	Tenaska Frontier Gen. Sta.	Shirow (Grimes)	830		Sep-00	Reliant/EGS	ERCOT/SERC
32	+	Midlothian I	Midlothian (Ellis)	820		Oct-00	UXT	ERCOT
¦ 				280		Feb-01		

Texas Since 1995 ¹
in
Completed
Projects
Generation

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The Texas Legislature opened the electric wholesale market in Texas to competition on September 1, 1995.
 Wind generation facilities are shown at nameplate capacity rating; however, the actual capacity they provide at the time of peak demand may be substantially less.
 Approximately 216 MW is under 25-year contract to SPS.
 Sixty megawatts under contract to Alabama Electric Cooperative for three years beginning January 1, 2000.

	Company	Facility	City (County)	Capacity (MW)	Cogen Host (MW)	Date in Service	Intercon- nection	Region
	I Inion Carbida		Seadrift (Calhoun)	40	40	Nov-00	Ъ	ERCOT
2	Tavas Indenendent Friemv	Guadalupe Power Plant	Marion (Guadalupe)	1000		Jan-01	LORA	ERCOT
2 6	AFP. Philins	Sweenv (expansion)	Sweeny (Brazoria)	110	35	Jan-01	TNMP	ERCOT
8	Cieto/El Paso Electric (wind)	Hueco Mountain Wind Ranch	Hueco Mtn. (El Paso)	1.3		Apr-01	EPE	wscc
3 8	Mirant	Bosoue County Power Plant	Lake Whitney (Bosque)	248		Jun-01	Brazos	ERCOT
36	Enon/Austin	Sand Hill Energy Center	Austin (Travis)	180		Jun-01	AE	ERCOT
5	Calnine/Gen Tex Power	Lost Pines I	Lost Pines (Bastrop)	520 ⁵		Jun-01	LCRAVAE	ERCOT
3	Garland Power & Licht	Ray Olinger Power Plant	Gartand (Collin)	75		Jun-01	GP&L	ERCOT
3 2	t Wind Pwr (wind)	Indian Mesa I	(Pecos)	82.5		Jun-01	ΜŪ	ERCOT
5	Tensets/Crval Friendy	Tenaska Gateway Gen. Sta.	Henderson (Rusk)	845		Jul-01	TXU/AEP	ERCOT/SERC
3 %	EDI (Cialo/TX11 (wind)	Woodward Mountain Ranch	McCamey (Pecos)	160		Jul-01	ли	ERCOT
3 6	Catoine-Lyondell-Citoo	Channel Energy Center	Houston	160	160	Jul-01	Refant	ERCOT
5		ł		6		Apr-02		
ġ	Fina RASF		Port Arthur (Jefferson)	80	80	Аид-01	EGS	SERC
3 8	Texes Indemodent Friendy	Odessa-Ector Power Plant	Odessa (Ector)	1000		Aug-01	UXT	ERCOT
89	AFP/Fastman Chemical		Longview (Hamison)	440	130	Aug-01	SWEPCO	SPP
2 E	Evolution & Chemicals	ExTex Power Station	La Porte (Harris)	165		Aug-01	Reliant	ERCOT
- CF	Reliant Frierdy / Eduistar	Reliant Energy Channelview	Channelview (Hamis)	172	293	Aug-01	Reliant	ERCOT
ł		3		608		Jun-02		
43	Caloine	Magic Valley Gen. Station	Edinburg (Hidalgo)	3506		Sep-01	ಕ	ERCOT
2				380		Dec-01		
V	Concor Global/Duncht	SRW Cogeneration	Orange (Orange)	420	70	Nov-01	EGS	SERC
45		Trent Mesa	Trent Mesa (Nolan)	150		Nov-01	ŊXL	ERCOT
4		Desert Sky (Indian Mesa II)	Iraan (Pecos)	160	1	Dec-01	MU MU	ERCOT
	EDI (Cialo (wind)	King Mtn Wind Ranch	McCamey (Upton)	278		Dec-01	wп	ERCOT
e e	Shalt Wind Frame (wind)	Lano Estacado Wind Ranch	White Deer (Carson)	62		Jan-02	SPS	SPP
4	Calning-Baver	Baytown Power Plant	Baytown (Chambers)	700	300	Apr-02	Reliant	ERCOT
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GenTex is an affiliate of LCRA. Half of plant capacity will serve LCRA; Calpine will sell the remainder. Magic Valley Electric Cooperative has contracted to buy 246 MW for 2001, increasing by 25 MW in 2002. PG&E Energy Trading will take up to 250 MW over a 10-year period. Approximately 100 MW will be sold into the SERC region. ۲

50 Tractebel 51 Constellation Power 52 Calpine	Company	Facility	City (County)	Capacity (MW)	Capacity Cogen Host Date in (MW) (MW) Service	Date in Service	Intercon- nection	Region
51 Constellation Power 52 Calpine		Ernis Tractebel Power Project Ennis (Etlis)	Ennis (Ellis)	343		Jun-02 TXU	TXU	ERCOT
52 Calpine		Rio Nogales Power Plant	Seguin (Guadalupe)	800		Jun-02 LORA	LORA	ERCOT
		Freestone Energy Center	Fairfield (Freestone)	1040		Jul-02 TXU	UXT	ERCOT
53 ANP	_	Midlothian II	Midiothian (Ellis)	550		Aug-02 TXU	UXT U	ERCOT
54 FPL Energy/Coastal Power	ver	Bastrop Energy Center	(Bastrop)	535		Aug-02	Aug-02 AEACRA	ERCOT
54 Projects Completed	mpleted		Total Capacity	20,285	1,687			

Generation Projects Completed in Texas Since 1995 (continued)

Map		Taoiltr.		≥	Cogen Host	Date in	Intercon-	
	Company	raciiity	city (county)	(MAW)	(MVV)	Service	nection	Region
55	ANP	Hays Station	San Marcos (Hays)	550		Aug-02	LORA	ERCOT
				550		Complete		
ŝ	Calpine-Citgo	Corpus Christi Energy Center	Corpus Christi (Nueces)	520	110	Aug-02 CPL	ಕ	ERCOT
57	AES ⁸	Wolf Hollow Power Plant	Granbury (Hood)	730		Oct-02 TXU	TXU	ERCOT
8 8	58 Calpine-Shell	Deer Park Energy Center	Deer Park (Harris)	166	190	Feb-03	Reliant	ERCOT
			_	169		Aug-03		
				438		Jun-04		
20	InterGen	Cottonwood Energy Project	Deweyville (Newton)	1200		Apr-03 EGS	EGS	SERC
99	NRG Energy	Brazos Valley Energy	Thompsons (Fort Bend)	633		May-03	Reliant	ERCOT
6	South Texas Electric Co-op		Nursery (Victoria)	185		Jun-03	STEC	ERCOT
8	Entergy/NTEC ⁹	Harrison County Gen Station	(Harrison)	550		Jun-03	SWEPCO	SPP
ន	FPL/Cobisa	Forney	Fomey (Kaufman)	1750		3Q-03	TXU UXT	ERCOT
2	Tractebel	Wise County Power Project	Bridgeport (Wise)	800		Jan-04	UXT	ERCOT
65	BP/Cinergy	Texas City	Texas City (Galveston)	570	¥	Spring-04	TNMP	ERCOT
	11 Under Construction		Total Capacity	8,811	300			

Generation Projects Under Construction in Texas

⁸ Twenty-year agreement to sell 350 MW to Excelon Energy Company, and the balance will be marketed by affiliate AES NewEnergy. ⁹ Project is 70% owned by Entergy and 30% owned by Northeast Texas Electric Cooperative.

					Expected	Expected		
Map No.	Company	Facility	City (County)	Capacity (MW)	Construction Date	Date In Service	Region	
8	Reliant/Jenbacher		Humble (Harris) ¹⁰	24	Sum-02	Dec-02	ERCOT	
				8		Mar-03		
67	Cielo/Renewable Energy (wind)	Capital Hill Wind Ranch	(Pecos)	100	Nov-02	Feb-03	ERCOT	_
68	TXU Energy/Cielo Wind (wind)	Noelke Hill Wind Ranch	McCamey (Upton)	240	Dec-02	Sep -03	ERCOT	_
69	Austin Energy	Sand Hill	Del Valle (Travis)	300	2002	Oct-03	ERCOT	
				250		Sum-07		
	70 Orion Energy (wind)		(Culberson)	175 ¹¹	2002	2003	ERCOT	-
71	Sempra Energy Resources	Cedar Power Project	Dayton (Liberty)	600	Spring-03	Spring-05	ERCOT/SERC	_
72	Cielo Wind Power/LPL (wind)	Llano Estacado at Lubbock	Lubbock (Lubbock)	2	20-unf	Jun-03	SPP	
	73 DFW Airport		(Tarrant/Dallas)	55	2003	2005	ERCOT	_
_				55	2005	2007		
74	Cobisa	Greenville	Greenville (Hunt)	1750	Spring-04	Spring-06	ERCOT	_
75	Sempra Energy Resources	MC Energy Partners	Dobbin (Montgomery)	600	Apr-04	Apr-06	ERCOT/SERC	
76	Steag Power	Sterne	(Nacogdoches)	950	50-04	20-06	ERCOT/SPP	_
77	Texas Petrochemicals		Houston (Harris)	006	2004	2006	ERCOT	
8	Tractebel	Ennis-Tractebel II	Ennis (Ellis)	800	¥	Jun-04	ERCOT	_
79	Ridge Energy Storage ¹²	Markham Energy Storage Center (Matagorda)	(Matagorda)	270	A	30-04	ERCOT	_
8	CCNG Inc ¹³		San Diego (Duval)	310	¥	20-05	ERCOT	
81	Dow Chemical		Freeport (Brazoria)	170	¥	Dec-05	ERCOT	_
	16 Projects Announced		Total Capacity	7,559				-

Announced Generation Projects in Texas

¹⁰ This project consists of 12 landfill gas facilities at different locations between Houston and Dallas. The total capacity is expected to reach 40 MW by 2004. ¹¹ Capacity will be in the range of 175 to 225 MW. Construction will start late 2002 or early 2003. ¹² Compressed air energy storage project. ¹³ Compressed air energy storage project which will require 60 to 70 miles of new transmission.

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Region	WSCC	ERCOT	ERCOT	SERC	ERCOT	ERCOT	ERCOT	SERC	ERCOT	ERCOT	ERCOT	SERC	ERCOT	ERCOT	
Expected Date In Service	¥	₹	¥	≸	¥	¥	¥	¥	¥	¥	¥	¥	¥	¥	
Expected Construction Date	M	¥N	¥	¥	¥2	¥	Ā	¥	AN N	¥	AN N	¥	¥	¥	
Capacity (MW)	450	2150	180	800	500	500	155	800	650	1600	500 ¹⁶	1000	80	400	9,765
City (County)	El Paso (El Paso)	Houston (Harris)	Houston (Harris)	Beaumont (Jefferson)	(Bell)	(Jack)	Lyondell expansion (Harris)	Deweyvitle (Newton)	Weatherford (Parker)	Palestine (Anderson)	Holliday (Archer)	Port Arthur (Jefferson) ¹⁷	(Ector, Winkler)	Sweetwater (Nolan)	Total Capacity
Facility			Channel Energy Center exp.	Amelia Energy Center						Palestine Power Project	Archer Power Partners		Notrees Wind Farm		
Company	ANP	ANP	84 Calpine	Calpine	Duke Energy	Duke Energy	Dynegy	Hartburg Power	Mirant	Newport Generation ¹⁵	Texas Independent Energy	Sabine Power I/Port of Port Arthur	York Research Group (wind)	Enron Wind ¹⁸	14 Projects Delayed
Ma o N	82 /	83	28	85 (86	87	88	89	8	9	92	63	\$	95	

Delayed Generation Projects⁴

¹⁴ An announced project which does not have a projected in-service date is listed as delayed. ¹⁵ Newport is considering interconnection of the project to SPP through the SWEPCO. ¹⁶ Project has been on hold due to lack of transmission into DFW area. ¹⁷ Fuel for this plant would be provided by a petroleum coke gasification facility to be constructed in Port Arthur. ¹⁸ Currently unable to determine the status of this project. Enron Wind is no longer developing it since a portion of its business was sold to GE Power Systems.

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Map				Capacity	Year	
ģ	Company	Facility	City (County)	(MM)	Cancelled	Region
X	Steag Power		Ennis (Ellis)	1200	2001	ERCOT
R	KM Power		(Harris)	1070	2001	ERCOT
X3	Constellation Power	Gateway Power Project	Gilmer (Upshur)	800	2001	SPP
X4	KM Power		Boonville (Wise)	510	2001	ERCOT
X5	X5 BP/Cinergy		Alvin (Brazoria)	70	2001	ERCOT
X6	ANP		Edinburg (Hidalgo)	550	2002	ERCOT
X	Celanese		Pasadena (Hamis)	284	2002	ERCOT
	7 Projects Cancelled		Total Capacity	4,484		

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Coal Lignite Nuclear Hydro Other Generation 60.053 0.34 57,206 33.158 1.325 2015 212 247.605 60.053 0.34 57,706 0.14 1.325 2014 57.14 257.485 60.053 0.34 57.17 0.14 1.325 2014 212 257.485 64.011 3.7% 51.719 2.4% 43.154 3.8% 1.701 57.1% 236 1.8% 266.05 66.176 2.9% 60.68 3.044 4.805 3.7% 1.317 -232% 2.37 4.6% 266.05 66.177 2.9% 43.154 3.7% 1.317 -232% 2.37 4.6% 267.13 2.96 0.6% 43.604 3.764 1.317 -232% 2.84 1.36 2.94 1.701 57.14 1.2% 1.2% 1.2% 2.37 4.6% 266.05 66.170 0.6% 43.606	Total Texas Generation by Resource Type (GWh	Seneration	by F	Resource	∋ Type	(GWh)	PUC	PUCT Table 9											
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		latural								<u>.</u>				Net Utility	:	Net Energy			-
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$		as/Oil		Coal		Lignite		Nuclear		Hydro	 	Other		Generation		Purchases	+-	Total	
9 0.4% 60.262 0.3% 57.277 0.1% 42.043 21.1% 1.656 20.1% 226 6.2% 257.455 0 0.9% 64.311 3.7% 1.12% 7.29 1.27.4% 230 1.7% 266.00 0 14.9% 66.178 2.1% 63.00 3.7% 1.317 235.7% 236 1.9% 266.00 0 14.9% 66.178 2.1% 43.004 4.2% 1.001 236 1.9% 266.00 1 4.9% 5.074 4.806 3.7% 1.317 2.20.7% 236 1.1% 236 2 4.1% 5.072 1.7% 4.5% 1.301 237 236 1.1% 236 1.1% 236 1.1% 236 236.37 236.37 236.316 276.32 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 276.3 <	1994			60,053		57,206		33,158		1,325		212		247,605		36.074		283.6	<u></u>
0 0.9% 62,402 3.4% 62,609 8.6% 41,528 1.2% 720 1.27,4% 230 1.7% 266,419 0.0% 66,110 3.7% 61,219 2.4% 43,154 3.9% 1,701 257,1% 226 1.9% 266,010 0.14% 66,170 2.1% 51,1% 2.57 1.9% 286,010 0.14% 66,170 2.1% 43,004 4.2% 700 231 237 231 237 231 237 231 237 231 237 231 237 231 237 231 237 231 231 231 231 231 231 231 231 231 231 233 233 233 233 233 233 233 266 167 267 217 267 217 267 217 267 217 267 217 266 266 266 17% 266 167 266 167	1995		*	60,262	0.3%	57,277	0.1%	42,043	21.1%	1,658	20.1%	226	6.2%		3.8%	35 822	70°F	6 600	2
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	1996		%	62,402	3.4%	62,669	8.6%	41,528	-1.2%	729	-127.4%	230	1.7%		2.6%	45 218	20.8%	200,000	22
0 14.9% 66,176 2.1% 59,71 2.5% 44,805 37% 1,317 232,5% 2337 4,6% 286,036 2 41% 69,670 5.0% 60,063 0.6% 43.004 4.2% 1,006 -30.7% 234 -13% 286,036 2 44,6% 26% 60,053 0.6% 43.004 4.2% 1,006 -30.7% 234 -13% 283,318 5 26% 55/72 7.7% 42.535 1.1% 1.222 0.4% 0.4% 0.4% 0.4% 0.4% 0.4% 263,318 263,318 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 0.4% 271,306 263,415 1.222 0.0% 266,315 0.4% 271,306 264,517 1.222 0.0% 266,315 264,523 264,517 264,523 1.1% 1.221 0.1%	1997		%	64,811	3.7%	61,219	-2.4%	43,154	3.8%	1,701	57.1%	226	-1.8%		1 3%	51.628	12 4%	310 8	
0 41% 69,670 5,0% 61,063 0,6% 43,004 4,2% 1,008 -30,7% 234 1,3% 280,318 24% 24% 216% 0,9% 60,063 0,9% 45% 230,7% 234 1,3% 280,318 33.6% 24% 21,7% 25,535 11% 1,227 0,3% 0,1% 20,3% 216,375 55.72 17,7% 25,535 11% 1,222 0,0% 333 8,0% 21,305 66% 83,06 11,4% 55,772 7.7% 42,535 11% 1,222 0,0% 30,65 216,375 66% 83,306 0,8% 42,100 0,3% 1,222 0,0% 370 267,515 267,515 30% 82,644 2.2% 42,100 0,3% 1,222 0,0% 366 267,515 30% 83,306 0,8% 43,937 2.3% 41,491 1,222 0,0% 366 67,516	1998		1%	66,178	2.1%	59,717	-2.5%	44,805	37%	1.317	-29.2%	237	4 6%		6.3%	51 268	742.0	1000	3.5
2 4% 2 9% 0 9% 4 6% 22 0% 1 9% 2 4% 2 1.2% 2 1.2% 1 5.2% 0 4% 2 1.2% 1 9% 2 4.6% 2 1.2% 2 1.2% 1 5.2% 0 4% 0 4% 0 1% 2 5.6% 78.617 1 14% 55.772 7 7.8% 1 2.29% 2 9% 2 78.375 4 5 5.6 7.8 7.4% 53.74 3 8% 42.535 1 1.7% 1 2.22 0 0% 353 2 9% 2 78.355 6 5 8% 79,755 1 4% 53.74 3 8% 42.793 0 7% 1 2.22 0 0% 360 4 5% 265.515 6 30% 82.644 2 2.3% 42.135 0 7% 1 222 0 0% 366 27% 265.515 8 - 30% 80.832 1 9% 42.100 0 3% 1 222 0 0% 366 267.517 8 - 366 1 227 0 1% 1 222 0 1% 370 1 6% 263.366 1 30% 8 333 <td>1999</td> <td></td> <td>*</td> <td>69,670</td> <td>5.0%</td> <td>60,063</td> <td>0.6%</td> <td>43,004</td> <td>4.2%</td> <td>1.008</td> <td>-30.7%</td> <td></td> <td>-13%</td> <td></td> <td>1 0%</td> <td>51 B41</td> <td>1 104</td> <td>235.1</td> <td>20</td>	1999		*	69,670	5.0%	60,063	0.6%	43,004	4.2%	1.008	-30.7%		-13%		1 0%	51 B41	1 104	235.1	20
246% 246% 21,2% 15,2% 0,4% 0,4% 0,1% 32,6% 78,6% 77% 2,533 11,8% 22,9% 27% 23,6% 21,2% 0,1% 23,6% 21,5% 0,1% 21,3% 21,3% 21,3% 21,3% 21,3% 21,3% 21,3% 0,1% 21,3% 0,1% 21,3% 0,1% 21,3% 0,1% 213,3% 21,3%	average=	2.4%	*		2.9%		0.9%		46%		-22.0%	1	1 9%		26%		6.64	-	5
32.6% 70.6% 17.9% 12.8% 12.8% 0.3% 0.1% 278.376 1.7% 2.8% 2.78.376 2.77.306 2	Utility Percent by Fue		×		24.6%		21.2%	 	15.2%		0.4%		0.1%	-	2		2		
99.895 95% 76.11 11.4% 55.772 7.7% 42.536 -11% 1222 17.5% 33.4 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.83.37 27.86.37 27.86.26 27.86.37 27.86.37 27.86.57 27.86.57 265.717 267.762 267.762 267.762 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 267.363 2	Total Percent by Fuel		*		20.8%		17.9%		12.8%		0.3%						15.54		
94.424 5 8% 79,755 1.4% 53,744 3.8% 42,296 0.6% 1.222 0.0% 363 8.0% 271,866 90,304 4.6% 80.832 1.3% 52,369 2.6% 42,410 0.3% 1.222 0.0% 363 8.0% 271,866 265,215 87.655 3.0% 82,369 2.6% 42,410 0.3% 1.222 0.0% 363 8.0% 273 265,215 87.655 1.3% 82,061 1.3% 1.222 0.0% 363 8.0% 271,866 265,215 87.01 0.3% 1.222 0.1% 1.222 0.1% 370 2.7% 265,351 86,038 1.3% 89,435 2.4% 42,460 1.3% 1.222 0.1% 370 1.4% 261,363 86,014 -1.2% 86,026 1.1% 42,460 1.1% 1.220 0.1% 370 1.4% 261,363 86,014 -1.2% 86,061	2000		*	78,617	11.4%	55,772	-7.7%	42,535	-1.1%	1 222	17.5%	ĺ	29.9%	1	1 9%	50 206	704 01	337 64	ľ
90.304 46 % 80 632 1.3% 52.369 2.6% 42,410 0.3% 1.222 0.0% 380 4.5% 267,517 87.656 -3 0% 82.644 2.2% 51.188 2.3% 42.135 0.7% 1.221 0.1% 370 2.7% 265,515 80.7123 0.6% 83.3308 0.894 2.5% 42.100 0.3% 1.222 0.1% 370 2.7% 265,515 86.014 -1.2% 64.913 2.5% 42.001 0.3% 1.222 0.1% 370 2.7% 265,355 86.014 -1.2% 64.911 1.1% 1.202 0.2% 370 -1.6% 263,355 85.61 0.7% 85.61 1.1% 46.942 2.3% 41,491 -1.1% 1.221 0.1% 370 -1.6% 263,355 85.61 0.7% 85.61 1.1% 1.221 0.1% 370 -0.% 263,635 85.651 1.7% 1.6%	2001		×	79,755	1 4%	53,744	-3.8%	42.298	-0.6%	1 222	900		80.8		2 4%	58 337	201 01	0.100	N70 100 N7 70
87.556 -3 0% 82.644 2 2% 51,188 -2 3% 42,135 -0 7% 1 221 0 1% 370 2 7% 265,215 80.7123 0 6% 83,308 0 8% 49,433 2.5% 42,001 -0 3% 1 222 0 1% 364 1-6% 265,315 80.7123 0 6% 83,308 0 8% 49,4375 2.4% 42,460 1 1% 1221 0 1% 364 1-6% 265,353 85,0148 -1.2% 85,325 1 0% 41,927 2 4% 43,460 1 1% 1 221 0 1% 370 2 9% 265,353 85,651 0 7% 85,661 1 7% 1 221 0 1% 370 0 0% 261,841 81,866 0 7% 85,661 1 7% 1 7% 1 221 0 2% 261,841 81,866 0 7% 86,661 1 7% 1 7% 1 221 0 2% 261,841 81,866 0 7% 86,661 1 7% 1 7% 261,841	2002		8	80,832	1.3%	52,369	-2.6%	42.410	0.3%	1 222	800		454	i.	154	87.642	84.0	1040	¥ 9
B7.123 0.6% 63.306 0.8% 49.943 2.5% 42.001 0.3% 1.222 0.1% 3.64 1.6% 263.961 B6.038 -1.3% B4.485 1.4% 48.775 2.4% 42.460 1.1% 1.220 0.2% 375 2.9% 263.363 B5.014 -1.2% B5.325 1.0% 47.925 1.8% 41.965 1.2% 1.21 0.1% 370 1.4% 263.363 B5.014 -1.2% B5.325 1.0% 47.925 1.8% 41.965 1.1% 1.211 0.1% 370 0.14% 261.841 B5.051 0.7% B5.325 1.1% 41.395 1.7% 1.219 0.2% 370 0.0% 261.841 B1.366 -0.8% 87.463 1.1% 1.219 0.2% 370 0.0% 265.164 B1.366 -1.8% 47.305 1.7% 1.219 0.2% 370 0.9% 265.164 B1.366 -376	2003		*	82,644	2.2%	51,188	-2.3%	42 135	%2 0-	1 221	0.1%	-	274	1	2000	00,926			R 1
B6.038 -13% B4.485 1.4% 48,775 2.4% 42,460 1.1% 1.220 -0.2% 375 2.9% 263,333 333	2004	-	8	83,308	0.8%	49,943	-2.5%	42,001	0.3%	1 222	0.1%		1.64			107 550	8004	1/4/00	
86,014 -1.2% 85,325 1.0% 47,925 1.8% 41,965 -1.2% 1.221 0.1% 370 1.4% 261,820 85,651 0.7% 86,567 1.1% 46,942 2.3% 41,491 -1.1% 1.219 0.2% 370 0.0% 261,841 85,651 0.9% 87,454 1.4% 46,942 2.3% 41,491 -1.1% 1.219 0.2% 370 0.0% 261,841 84,689 0.9% 87,454 1.4% 42,055 1.7% 1.219 0.2% 372 0.5% 262,179 81,386 43,86 42,192 0.0% 1.219 0.2% 372 0.5% 262,179 81,386 43,86 42,192 0.0% 1.219 0.2% 372 0.5% 262,179 81,386 43,86 2.5% 45,088 2.1% 42,192 0.0% 1.219 0.2% 372 0.5% 262,179 30% 30% 2.5%	2005		*	84,485	1.4%	48,775	-2.4%	42,460	1.1%	1.220	-0.2%		2.9%		10.04	110.625	7.2%	2000	- 9
85.651 0.7% 86.267 1.1% 46.842 2.3% 41.491 1.1% 1.219 0.2% 370 0.0% 261.641 84.899 0.9% 87.454 1.4% 46.028 1.8% 42.205 1.7% 1.221 0.2% 372 0.5% 262.179 81.386 4.3% 22.5% 45.088 2.1% 42.192 0.0% 1.219 0.2% 371 0.5% 262.179 -3.0% 3.0% 3.0% 3.0% 4.2.9% 4.2.	2006		*	85,325	1.0%	47,925	-1.8%	41,965	-1.2%	1.221	0 1%	!	-14%	İ.	10.6%	121 661	018	283.45	
84.899 -0.9% 87,454 1.4% 46.028 -1.8% 42.205 1.7% 1.221 0.2% 372 0.5% 263,179 81,386 -4.3% 92,507 5.5% 45,088 -2.1% 42,192 0.0% 1,219 0.2% 311 0.3% 265,764 -3.0% 2.7% -2.9% -0.2% 1,7% 1,7% 4.7%	2007		*	86,267	1.1%	46,842	-2.3%	41,491	-1.1%	1,219	-0.2%		%0'0		800	129 770	30.0	1000 102	
81,386 -4.3% 92,507 5.5% 45,088 -2.1% 42,192 0.0% 1,219 -0.2% 371 -0.3% 262,764 -3.0% -3.0% 2.7% -2.9% -0.2% 1.7% -0.3% 262,764	2008		×	87,454	1.4%	46,028	-1.8%	42,205	1.7%	1,221	0.2%	1	0.5%	į.	0.1%	139.049	67%	401 228	1 9
-3.0% 2.7% -2.9% -0.2% 17% 4.0%	5009		×		5.5%	45,088	-2.1%	42,192	0.0%	1,219	-0.2%		-0.3%		0.2%	147 651	5.8%	410 415	
	average=	-3.0%	8		2.7%		-2.9%		-0.2%		1 7%		4.0%	!	-0.8%		%66	22 45	22 45% average
Type 31.0% 35.2% 17.2% 16.1% 0.5% 0.1%	Utility Percent by Fuel	-	ž		35.2%		17.2%		16.1%		0.5%		0.1%			-	4	Vnnual Gener	unual Generation Increase
11.0% 10.3% 0.3%	Total Percent by Fuel 1		*		22.5%		11.0%		10.3%	-	0.3%	 	0.1%				26 04	780	Dentation

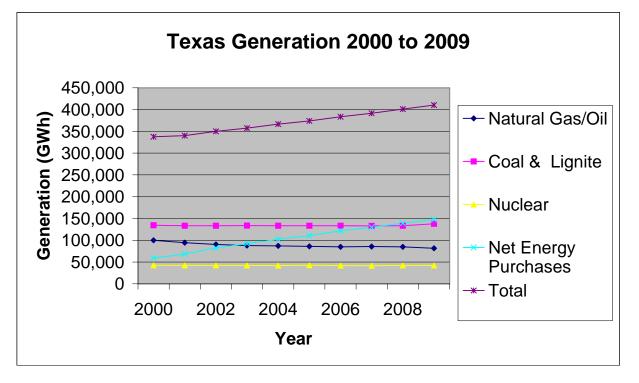
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from 2000 Annual Update of Generating Electric Utility Data, published by the Public Utilities Commission of Texas

PUCT Generation Projections

	Natural Gas/Oil	Coal & Lignite	Nuclear	Net Energy Purchases	Total
2000	99,895	134,389	42,535	59,206	337,582
2001	94,424	133,499	42,298	68,337	340,142
2002	90,304	133,201	42,410	82,613	350,129
2003	87,656	133,832	42,135	92,256	357,471
2004	87,123	133,251	42,001	102,550	366,511
2005	86,038	133,260	42,460	110,625	373,979
2006	85,014	133,250	41,965	121,663	383,482
2007	85,651	133,109	41,491	129,770	391,612
2008	84,899	133,482	42,205	139,049	401,228
2009	81,386	137,595	42,192	147,651	410,415

Linear Curve Fit		
Coal and Lignite	160.84x + 133002	R2 = 0.1286
Nuclear	-50.812x + 42449	R2 = 0.2579
Natural Gas	-1609.3x + 97090	R2 = 0.8217
Purchases	9836.8x + 51270	R2 = 0.9965
Total	8339.5x + 325388	R2 = 0.9954



from 2000 Annual Update of Generating Electric Utility Data, published by the Public Utilities Commission of Texas

Projected Power Demand in ERCOT by Fuel Type

Lectricity Generating Capacity 1/ parameters						-		-		+-	!						•••		-			
Electricity Generating Capacity 1/ (ggnarating Capacity 1/ Coal Steam	3	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
lectricity Generating Capacity 1/ gigawatts) Coal Steam								;										+ +				* .
Coal Steam								-	•												-	
	15.	Ц	!	.	15.25 11	15.25 1		52	+		15.25	15.25 1	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25 22.53	15.25 22.53	15.25 22.31
Other Fossil Steam 2/	29.95		29.91 29	3 98 23		-	- =	57	8 24	2 2	8 8	8 3	22	2 6	32	19.76	20.47	21.01	2150		22 50	2
Combustion Turbine/Diese		3.12 3	Ĺ	-			. 1	1	12	5	8	8	R	\$	2	11 92	12.02	12 09	12 15		12 31	12.39
Nuclear Power	4						2	82	2	8	82	82	82	201	88	4.82	4 82	4 82	1			
Pumped Storage/Other 3/			_	88	8.8		8 8	8:8	22	88	8.8	88	8.8	8.8	3:8	88	88	88	000		88	88
Fuel Cells		0 12 0	i.				2 12	3 3	2 24	32	3 60	1.28	16	នេ	SG	2.97	2 99	3.01	30		3.08	3.10
Distributed Generation 5/	8		000	80	Ļ	į į	5	0.23	2	88	62	83	83	9 9	ខ្ល	1.31	1.42	1.55	1.76		2.15	2.33 R3 25
Fotal Capability	22			1	60.72		2	8	2	8	e	3	5	2	2	7.01	R. P.	27.8	5		5	2
Cumulative Planned Additions 6/		-	-								•			+ -+				•				22
Coal Steam	0		0.00		800	0.0	8	8	000	000	80	88	88	8.8	8 8	88	88	88	85	8.8	88	8.8
Other Fossil Steam 2/			-		1	8.8	8 8	88		800	8 8	8.0	88	880	88	88	88	88		88	88	000
Combined Cycle		:		ĺ.		00.0	000	38		80	800	0.0	0.00	0.00	000	80	8	80		000	00.0	80
			0.00	80	00 0	8	80	0.00		0.00	80	0.0	000	8	8	800	80	8		88	80	88
Pumped Storage/Other 3/		80		Î	-	80	8.8	88		800	8 8	88	800	8 8	8.0	800	88	88		88	88	88
Fuel Cells Descentia Sources 4/	 		1	;		89	80	26		2 02	2.10	2 12	2.14	2.16	2.18	2.20	2.22	2.24		2.29	2.31	2.33
heriowethe Sources		000	Ĺ	ĺ		80	000	8		80	000	0.00	0.0	0.00	000	8	8	80		8	80	8
Total Planned Additions	•	Ľ				1.66	1.80	61		2.02	2.10	2.12	2.14	2.16	2.18	2.20	2.22	2 24		5.29	2.31	2.53
Cumulative Unplanned Additions 6/		1						.				-		_								
Coal Steam		000	000		8.0	80	8.8	İ	88	88	88	88	2 9		800	88	8.0	318	000	 8.8	38	88
Other Fossil Steam 2/					88	88	3 3		3 5	38	3 5	3 6	2 07		4.75	15.78	16.50	17.03	17.53	17.99	18.53	19 09
Combustion Turbine/Diesel		000	0.00			2.43	98		8	8	23	8	-		9.11	9.30	9.39	946	9.52	9.57	69.6	9.76
Nuclear Power						88	88	_	8:8	8 8	80	8.8	2 2	800	8 8	88	8 8	3.0	80	38	88	88
Pumped Storage/Other 3/				i		0.0	3.8		88	88	8	8	2		000	8	0.0	800	8	80	800	8
Renewable Sources 4/						0.00	8		8	8	8	8	8.1		8.5	88	88	8	80	8	800	0.0
Total Unplanned Additions			ĺ			3.59	3.4	-	92 52	89	E a	<u>ء</u> ۾	0 9		1 23	131	5.12	59	1 76	1.96	2.15	2.33
Distributed Generation 5/ Currentiative Total Additions		800	121	2.67	3.67	5.26	6.74	10.97	÷	3 8	2	:			27.28	28.60	29.53	30.29	31.07	31 80	32.67	33.51
						. 					_		+						-			1
Cumulative Retirements 7/		80		•			000	00.0	8	0.0	0.00	00.0	0.0	00.0	0.00	0.00	0.00	00.0		8	80	0.00
Other Fossil Stearn 3/		1		Ļ.	0.35		1.13	2.84	8	96.9	7.02	7.02	7 12	7.12	7.22	7.22	7.38	7.38		7 38	7.38	8
Combined Cycle	•			_	Ì		800	50	83	800		8.9	50	100	50	50	500			50	64	570
Combustion Turbine/Diesel		88		8 8		28	18	80	0.0	800	00.0	000	80	200	0.0	800	80	900	800	8	8	0.00
Pumped Storage							800	80	8	80	800	80	80	80	80	0.00	0.0	8		88	88	8
Fuel Cells		80		_	0.0		8.0	88	88	88	800	8.8	8 8	8.0	8.0	88	88	88		38	88	000
Renewable Sources 4/			i				161	3.32	33	46	7.55	7 55	302	7.64	7.74	1.74	06.7	7.90		86 2	7.90	8.12
			<u> </u>													:				+		
Cogenerators b/ Capability									1		•								ç	-	2	000
Coal						0.28	0.28	8			0.28	-	8 7		0.28	870	0.28		870	20	0.76	100
Petroleum		1		j		800	10.32	្រុន			1.16		62		12.08	12 32	12.58	12.86	13 12	13.42	13.71	14.04
Other Gaseous Fuels	, o				 	0.16	0.16	9			0.17	: 	9		0.19	0.20	0.20	0.20	0.21	0.22	0.22	0.23
Renewable Sources 4/			_,			80	800	8		ļ	80	-	88	-	8.8	8 8	88	88	88	8	3 8	8.8
Other Total		0000	0.00	10.39	10.62	0.00	9.9 2	11.34	54	11.74	11.95	12 18	5.4	12.86	12.8	13.14	13 41	13.68	13.95	14.25	14 56	14.89
						-	 								:							
Electricity Demand (billion kilowatthours)						in in in				•						 {	-		100.04	71 9C1		
Residential	ž.	100.55	103.06 105	105.51 10	109 15 11 88 14 0	11.36 00.88	113.36 1	05.56 11 05.56 11	98.09 17 11 98.09 16	117.64 119.	4 8	21 43	123.49	111.03	13 09 1	115.00	16 63	118 00	119.25	120.27	121.37	122.42

from US DOE Energy Information Administration's 2000 Annual Energy Outlook

Appendix E4

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Projected Power Demand in ERCOT by Fuel Type

Table 60 Electric Power Projections for Electricity Market Module Region Electric Reliability Council of Taxas	arket Module	Region																			
		•		+ +	: ;		•		•	1		••••				•		••			
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Industrial Tansportation Total Sales	83.96 0.98 269.07	80.17 1.01 267.68	60.86 1.04 272.52	84 23 1.17 282 69	86.43 1.30 289.97	88.61 1.42 296.56	90.97 1.53 302.96	94 14 1.63 310.03	95 19 1.73 315 20	96.90 1.83 321.48	99.65 1 93 329.09	102.34 2.03 336.61	103.98 2.13 342.59	105.42 2.23 348.20	107.01 2.33 353.97	108.51 2.38 359.47	109.78 2.37 364 19	111.08 2.36 368.92	112.51 2.34 373.60	113.90 2.31 378.43	115.17 2.28 383.01
Net Energy for Load (pillion kilowetthours) 7/ Gross International Imports Gross International Exports	8 0 8 0	000	000	0.00	0.0	0.0	0.49	0.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00 0.67	0.00	0.67
Gross Interregional Electricity Imports Gross Interregional Electricity Exports Purchases from Cogenerations M Usity Generation for Customers Total Net Electry for Load	3.63 2.87 30.60 255.23 255.23	348 313 3127 25335 284.65	2.64 3.11 3.11 259.08 289.56	2 83 31 93 368 22 300 17	302 2.27 32.29 307.58	3.16 2.05 32.65 281.02 314.34	3.49 2.26 32.55 287.64 320.93	3.66 2.245 2.245 3.2311 3.231	3 05 3 05 3 05 58 3 33 45	3.07 2.63 32.99 32.99 339.81	2.93 2.55 33.51 33.51 33.51 34.60 347.81	2.66 2.61 34.04 322.05 355.48	263 244 3465 32756 361.74	2.55 2.74 35.22 333.10 367.46	2.38 2.64 35.87 338.35 373.29	2.06 2.68 36.60 343.57 378.87	1.87 2.50 37.35 347.80 383.85	1 98 2.19 38.05 351.67 388.84	1.83 1.46 38.88 355.19 393.76	1 70 1 21 39.73 398.84	1 76 1 00 40 64 362 94 403 67
Generation by Fuel Type (pillion Wh) Coal Harden Nuclear Nuclear Revenable Sources 4 Cases to Customers Generation for Own Use Generation for Own Use	2000 2 110.89 2 39.10 39.10 256.31 255.23 255.23	2001 2 109.82 2 2 91 2 2 91 2 2 91 7 39.48 9 39.48 2 253.35 253.35 253.35 1.51	2002 107.95 0.22 0.22 105.06 105.06 105.06 5.52 280.59 280.59 280.59 280.59 280.59 280.59 280.59	2003 109.61 0.13 114.85 39.17 39.17 39.17 5.85 269.73 269.73 269.73 269.73 269.73 269.73	004 21 11104 23 39,17 39,17 39,17 39,17 39,17 1151 151	2005 20 111.79 20 0.12 0.12 134.58 111.79 20 0.12 0.12 20 201.02 201.00	2006 20 112.52 20 112.52 20 11111111111111111111111111111111111	2007 2007 113.23 2000 2000 2000 2000 2000 2000 2000	2008 22 113 23 113 23 113 23 113 23 113 23 113 23 113 23 113 23 115 1 151	2009 112 92 147 95 147 95 147 95 147 95 147 95 147 95 147 95 147 95 15 15 15 15	2010 22 112 73 112 73 155 03 3917 316 11 316 11 151	2011 112.74 112.74 2005 0.05 0.00 0.00 0.00 0.00 0.00 1.51	2012 2012 112.74 0.05 15.76 39.17 8.85 329.07 329.07 1.51	2013 20 112.93 20 12.93 10 172.62 172.62 172.62 172.62 172.62 172.62 133.10 334.61 333.10 333.10 151	2014 2 11323 2 178 11 39,17 39,67 339,67 338,55 151	2015 2 112 83 1 0 0 04 183 06 0 00 0 00 0 00 0 345 03 1 151	2016 21 2016 22 113 22 39 17 39 17 34 31 34 31 1 51	2017 2 113.23 10.05 1908 3917 913 3918 913 913 151	2018 2 11323 2 11323 2 19411 3917 35570 926 35570 35570 35570	2019 113 25 113 25 113 25 13 17 33 17 33 17 33 17 33 17 33 17 33 17 33 17 151	2020 113 23 201 43 364 45 364 45 362 94 151
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Emissions (million bons) 10/ Total Carbon Carbon Doxide Nitrogen Oxide Nitrogen Oxide	50.40 184.80 0.35 0.35	49 14 180 17 0 40 0 27	49.16 180.25 0.38 0.27	50.98 186.93 0.35 0.28	51 75 189 79 0 35 0 28	52.45 192.31 0.38 0.27	63 25 195 24 0.42 0.27	53 10 0 40 0 26	53.03 0.39 0.24	53.15 194.88 0.38 0.24	53.86 197.45 0.38 0.24	54 55 200 02 0 30 0 24	202 40 0.30 0.24	55.78 204.52 0.30 0.24	56 29 206 41 0.31 0.24	56.67 207.80 0.31 0.24	57.24 209.90 0.30 0.24	57 64 211 35 0 33 0 24	58.01 212.69 0.33 0.24	58.42 214.21 0.36 0.24	58.75 215.43 0.38 0.24

from US DOE Energy Information Administration's 2000 Annual Energy Outlook

Appendix E4

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Projected Power Demand in ERCOT by Fuel Type

Electric Reliability Council of Teads 2000 2001 2002 2003 2004 2006 2009 2011 2012 2013 2014 2015 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2011 2012 2013 2014 2015 2016 2016 2016 2011 2011 2011 2011 2014 2015 2016 2016 2016 2011 2011 2011 2011 2013 2014 2016 2016 2016 2010 2011 2011 2011 2011 2011 2013 2014 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2016 2011 2012 2013 2014 2015 2016 2016 2016 2016 2011 2012 2015 2016 2016 2011 2012 2015 2016	Table 60. Electric Power Projections for Electricity Market Module Region	lodule Re	Uoio		 					-						+					1
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Annual Electric Caneraterin Report - Nonutrity * Namepate capacity is designated by the manufacturer. The namepate capacity has been converted to net summer capacity based on historic reliationships. In historic reliationships. Of historic reliationships. 2 Other includes conventional involution additional manufacturer and involution batteries. Chemicals, fish oil, and spent suffice figures conventional involution additional manufacturer and mark municipal sold wats, other homats, notat spent suffice figures conventional involutional involutional involutional involutional involutional involutional involutional involutional involutional and to the homats, notat thermal, photovoltatics, and which power. 2 Primately past, locat capacity nutural rats. 2 Primately past, locat capacity nutural rats. 3 Primately past, locat capacity nutural rats. 3 Primately rats rats nonuclines (soluting operation). 3 Primately rats rats nonuclines (soluting operation). 3 Primately rats rats nonuclines (soluting operation). 3 Primately	1/ Not summer capability is the stearcy nouny burgut they get income cash damand directivities electric utilities small prover	, Runatern	rs. and exem	TO MORES	Ne denerativ	amen ar	plate capaci	N is reported	1 for nonutility	es on Form	EIA-860B,										
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Appendix F Comparison of previous projections for future water use by electric generation

A reviewed the 1997 and 2002 water use projections, focusing on areas where changed conditions or new information might justify revisions to the projections. Below is information regarding the previous methodology for making the projections taken from the 1997 and 2002 referenced reports.

1997 State Water Plan

"Water used for steam electric power generation totaled about 426,000 acre-feet in 1990. This represents an increase in water use of nearly 122,000 ac-feet of water above the 1980 level of water use. Currently, water used for steam-electric power generation accounts for about 3 % of the state's total water use. Based on the recommended case projection scenario, state wide water use for steam electric power generation is projected to increase from 426,000 acre feet in 1990 to about 938,000 acre feet by the year 2050..." (Reference: "Water for Texas August 1997, page 3-8)

"Water use projections for steam electric power generation have two major components: power generation capacity and water use for that projected capacity. Power generation projections were based on current per capita electric demand for reported residential, commercial, and other sectors on a utility specific basis. Industrial [electrical] power water uses were based on each utility's reported sales by Standard Industrial Classification (SIC). A composite growth factor was estimated for the remaining unaccounted-for sales. For existing plants, future water use was assumed to remain constant at the average 1988 – 1991 historical water use patterns unless information indicated that plants were scheduled for closure. For planned plants and facilities, water use permits and/or plant design data were used to determine future water needs. If permit or facility design information was not available, it was assumed that additional generation would use water at the same gallons per kilowatt-hour rate as the current average use for that utility." (Reference: "Water for Texas August 1997", page 2-19)

In developing the steam electric water use projections, a number of assumptions were used including: (1) power generation demands will grow in direct proportion to population growth for residential, commercial, and other sectors. The power demands are based on the recommended-case population projections: (2) industrial power generation demands are assumed to grow in direct proportion to industrial and manufacturing growth projections for each major electric power use by SIC (3) no change is assumed in electric power generation capacity for the upper case scenario; and (4) a combination of technological, conservation measures and other factors are assumed to reduce total water use by five percent by the year 2000, ten percent by 2010, and 15 percent from 2020 to 2050. (Reference: "Water for Texas August 1997", page 2-19)

Two scenarios were developed to reflect potential technology changes in the electric power industry...the advanced combined-cycle combustion technology, if broadly implemented by the power industry, could significantly lower water use in this sector. (Reference: "Water for Texas August 1997", page 2-20)

A number of data sources were used in the development of steam electric power water use projections. These sources included TWDB's survey of annual water use (1980-1991): the consensus population and water use projections developed by staffs of the three agencies with advisory committee assistance; PUCT's projections of additions and removal of power generation to the year 2005; fuel use, thermodynamics of existing power plants, co-generation statistics, long range power needs, and the impact of technology on power generation; water rights permit information from TNRCC; and research on new technologies and related information from the Electric Power Research Institute. (Reference: "Water for Texas August 1997", page 2-20)

Because it is unknown where future power plants will be located, the methodology assumes that power generation will occur in locations that have historically had power generation or where power companies have announced new locations. However, unforeseen technological advances, changes in market forces, and conservation efforts could affect both power plant locations and water use. Additionally, changes in Federal regulations could have an important affect on steam electric power generation and water use. (Reference: "Water for Texas August 1997", page 2-20)

2002 Water Use Plan

"In determining current and future water use of steam electric power generation, the TWDB relied on several types of information. Current water use for the base year 1990 was obtained for each plant from the TWDB's water use survey. Demands for many new plants, both completed and under construction, were identified by Planning Groups as part of the regional planning process. Future water demand was estimated using a combination of available information, including published materials on planned additions to existing plants, existing water rights permits, specific company information, ligniteresource ownership, and other related sources. Individual plant design, thermodynamic characteristics, energyconservation operating strategies. and technological improvements were also evaluated to determine how water use would change over time." (Reference: "Water for Texas 2002, page 36)

Appendix G Glossary of Electricity Terms

Anthracite: The highest rank of coal; used primarily for residential and commercial space heating. It is hard, brittle, and black lustrous coal, often referred to as hard coal, containing a high percentage of fixed carbon and a low percentage of volatile matter. The moisture content of fresh-mined anthracite generally is less than 15 percent. The heat content of anthracite ranges from 22 to 28 million Btu per ton on a moist, mineral-matter-free basis. The heat content of anthracite coal consumed in the United States averages 25 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter). Note: Since the 1980's, anthracite refuse or mine waste has been used for steam electric power generation. This fuel typically has a heat content of 15 million Btu per ton or less.

Ash: Impurities consisting of silica, iron, alumina, and other noncombustible matter that are contained in coal. Ash increases the weight of coal, adds to the cost of handling, and can affect its burning characteristics. Ash content is measured as a percent by weight of coal on a "received" or a "dry" (moisture-free, usually part of a laboratory analysis) basis.

Baseload Plant: A plant, usually housing high-efficiency steam-electric units, which is normally operated to take all or part of the minimum load of a system, and which consequently produces electricity at an essentially constant rate and runs continuously. These units are operated to maximize system mechanical and thermal efficiency and minimize system operating costs.

Bcf: The abbreviation for 1 billion cubic feet.

Bituminous Coal: A dense coal, usually black, sometimes dark brown, often with welldefined bands of bright and dull material, used primarily as fuel in steam-electric power generation, with substantial quantities also used for heat and power applications in manufacturing and to make coke. Bituminous coal is the most abundant coal in active U.S. mining regions. Its moisture content usually is less then 20 percent. The heat content of bituminous coal ranges from 21 to 30 million Btu per ton on a moist, mineral-matterfree basis. The heat content of bituminous coal consumed in the United States averages 24 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

Boiler: A device for generating steam for power, processing, or heating purposes or for producing hot water for heating purposes or hot water supply. Heat from an external combustion source is transmitted to a fluid contained within the tubes in the boiler shell. This fluid is delivered to an end-use at a desired pressure, temperature, and quality.

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 amount of electric power delivered or required for which a generator, turbine, transformer, transmission circuit, station, or system is rated by the manufacturer.

Coal: A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time.

Cogenerator: A generating facility that produces electricity and another form of useful thermal energy (such as heat or steam), used for industrial, commercial, heating, or cooling purposes. To receive status as a qualifying facility (QF) under the Public Utility Regulatory Policies Act (PURPA), the facility must produce electric energy and "another form of useful thermal energy through the sequential use of energy," and meet certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (FERC). (See the Code of Federal Regulations, Title 18, Part 292.)

Coke (Petroleum): A residue high in carbon content and low in hydrogen that is the final product of thermal decomposition in the condensation process in cracking. This product is reported as marketable coke or catalyst coke. The conversion is 5 barrels (of 42 U.S. gallons each) per short ton. Coke from petroleum has a heating value of 6.024 million Btu per barrel.

Combined Cycle: An electric generating technology in which electricity is produced from otherwise lost waste heat exiting from one or more gas (combustion) turbines. The exiting heat is routed to a conventional boiler or to a heat recovery steam generator for utilization by a steam turbine in the production of electricity. This process increases the efficiency of the electric generating unit.

Combined Cycle Unit: An electric generating unit that consists of one or more combustion turbines and one or more boilers with a portion of the required energy input to the boiler(s) provided by the exhaust gas of the combustion turbine(s).

Combined Pumped-Storage Plant: A pumped-storage hydroelectric power plant that uses both pumped water and natural streamflow to produce electricity.

Commercial: The commercial sector is generally defined as non-manufacturing business establishments, including hotels, motels, restaurants, wholesale businesses, retail stores, and health, social, and educational institutions. The utility may classify commercial service as all consumers whose demand or annual use exceeds some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Consumption (Fuel): The amount of fuel used for gross generation, providing standby service, start-up and/or flame stabilization.

Cooperative Electric Utility: An electric utility legally established to be owned by and operated for the benefit of those using its service. The utility company will generate, transmit, and/or distribute supplies of electric energy to a specified area not being serviced by another utility. Such ventures are generally exempt from Federal income tax laws. Most electric cooperatives were initially financed by the Rural Electrification Administration, U.S. Department of Agriculture.

Current (Electric): A flow of electrons in an electrical conductor. The strength or rate of movement of the electricity is measured in amperes.

Deregulation: The elimination of regulation from a previously regulated industry or sector of an industry.

Distillate Fuel Oil: A general classification for one of the petroleum fractions produced in conventional distillation operations. It is used primarily for space heating, on-and-offhighway diesel engine fuel (including railroad engine fuel and fuel for agriculture machinery), and electric power generation. Included are Fuel Oils No. 1, No. 2, and No. 4; and Diesel Fuels No. 1, No. 2, and No. 4.

Distribution: The delivery of electricity to retail customers (including homes, businesses, etc.).

Electric Plant (Physical): A facility containing prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or fission energy into electric energy.

Electric Utility: A corporation, person, agency, authority, or other legal entity or instrumentality that owns and/or operates facilities within the United States, its territories, or Puerto Rico for the generation, transmission, distribution, or sale of electric energy primarily for use by the public and files forms listed in the Code of Federal Regulations, Title 18, Part 141. Facilities that qualify as cogenerators or small power producers under the Public Utility Regulatory Policies Act (PURPA) are not considered electric utilities.

Energy: The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatthours (kWh), while heat energy is usually measured in British thermal units.

Energy Source: The primary source that provides the power that is converted to electricity through chemical, mechanical, or other means. Energy sources include coal, petroleum and petroleum products, gas, water, uranium, wind, sunlight, geothermal, and other sources.

Facility: An existing or planned location or site at which prime movers, electric generators, and/or equipment for converting mechanical, chemical, and/or nuclear energy into electric energy are situated, or will be situated. A facility may contain more than one generator of either the same or different prime mover type. For a cogenerator, the facility includes the industrial or commercial process.

Federal Energy Regulatory Commission (FERC): A quasi-independent regulatory agency within the Department of Energy having jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, oil pipeline rates, and gas pipeline certification.

Federal Power Act: Enacted in 1920, and amended in 1935, the Act consists of three parts. The first part incorporated the Federal Water Power Act administered by the former Federal Power Commission, whose activities were confined almost entirely to licensing non-Federal hydroelectric projects. Parts II and III were added with the passage of the Public Utility Act. These parts extended the Act's jurisdiction to include regulating the interstate transmission of electrical energy and rates for its sale as wholesale in interstate commerce. The Federal Energy Regulatory Commission is now charged with the administration of this law.

Federal Power Commission: The predecessor agency of the Federal Energy Regulatory Commission. The Federal Power Commission (FPC) was created by an Act of Congress under the Federal Water Power Act on June 10, 1920. It was charged originally with regulating the electric power and natural gas industries. The FPC was abolished on September 20, 1977, when the Department of Energy was created. The functions of the FPC were divided between the Department of Energy and the Federal Energy Regulatory Commission.

Flue Gas Desulfurization Unit (Scrubber): Equipment used to remove sulfur oxides from the combustion gases of a boiler plant before discharge to the atmosphere. Chemicals, such as lime, are used as the scrubbing media.

Flue Gas Particulate Collectors: Equipment used to remove fly ash from the combustion gases of a boiler plant before discharge to the atmosphere. Particulate collectors include electrostatic precipitators, mechanical collectors (cyclones), fabric filters (baghouses), and wet scrubbers.

Fly Ash: Particulate matter from coal ash in which the particle diameter is less than 1 x 10-4 meter. This is removed from the flue gas using flue gas particulate collectors such as fabric filters and electrostatic precipitators.

Fossil Fuel: Any naturally occurring organic fuel, such as petroleum, coal, and natural gas.

Fossil-Fuel Plant: A plant using coal, petroleum, or gas as its source of energy.

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

Gas: A fuel burned under boilers and by internal combustion engines for electric generation. These include natural, manufactured and waste gas.

Gas Turbine Plant: A plant in which the prime mover is a gas turbine. A gas turbine consists typically of an axial-flow air compressor, one or more combustion chambers, where liquid or gaseous fuel is burned and the hot gases are passed to the turbine and where the hot gases expand to drive the generator and are then used to run the compressor.

Generating Unit: Any combination of physically connected generator(s), reactor(s), boiler(s), combustion turbine(s), or other prime mover(s) operated together to produce electric power.

Generation (Electricity): The process of producing electric energy by transforming other forms of energy; also, the amount of electric energy produced, expressed in watthours (Wh).

Generation Company: A regulated or non-regulated entity (depending upon the industry structure) that operates and maintains existing generating plants. The generation company may own the generation plants or interact with the short-term market on behalf of plant owners. In the context of restructuring the market for electricity, the generation company is sometimes used to describe a specialized "marketer" for the generating plants formerly owned by a vertically integrated utility.

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

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

Generator: A machine that converts mechanical (kinetic) energy into electrical energy.

Generator Nameplate Capacity: The full-load continuous rating of a generator, prime mover, or other electric power production equipment under specific conditions as designated by the manufacturer. Installed generator nameplate rating is usually indicated on a nameplate physically attached to the generator. **Geothermal Plant:** A plant in which the prime mover is a steam turbine. The turbine is driven either by steam produced from hot water or by natural steam that derives its energy from heat found in rocks or fluids at various depths beneath the surface of the earth. The energy is extracted by drilling and/or pumping.

Gigawatt (GW): One billion watts.

Gigawatthour (GWh): One billion watthours.

Gross Generation: The total amount of electric energy produced by a generating facility, as measured at the generator terminals.

Heavy Oil: The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all petroleum used in steam plants is heavy oil.

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

Independent Power Producers: Entities that are also considered nonutility power producers in the United States. These facilities are wholesale electricity producers that operate within the franchised service territories of host utilities and are usually authorized to sell at market-based rates. Unlike traditional electric utilities, Independent Power Producers do not possess transmission facilities or sell electricity in the retail market.

Industrial: The industrial sector is generally defined as manufacturing, construction, mining agriculture, fishing and forestry establishments Standard Industrial Classification (SIC) codes 01-39. The utility may classify industrial service using the SIC codes, or based on demand or annual usage exceeding some specified limit. The limit may be set by the utility based on the rate schedule of the utility.

Intermediate Load (Electric System): The range from base load to a point between base load and peak. This point may be the midpoint, a percent of the peakload, or the load over a specified time period.

Internal Combustion Plant: A plant in which the prime mover is an internal combustion engine. An internal combustion engine has one or more cylinders in which the process of combustion takes place, converting energy released from the rapid burning of a fuel-air mixture into mechanical energy. Diesel or gas-fired engines are the principal types used in electric plants. The plant is usually operated during periods of high demand for electricity.

Investor-Owned Utility: A class of utility whose stock is publicly traded and which is organized as a tax-paying business, usually financed by the sale of securities in the capital market. It is regulated and authorized to achieve an allowed rate of return.

Kilowatt (kW): One thousand watts.

Kilowatthour (kWh): One thousand watthours.

Light Oil: Lighter fuel oils distilled off during the refining process. Virtually all petroleum used in internal combustion and gas-turbine engines is light oil.

Lignite: The lowest rank of coal, often referred to as brown coal, used almost exclusively as fuel for steam-electric power generation. It is brownish-black and has a high inherent moisture content, sometimes as high as 45 percent. The heat content of lignite ranges from 9 to 17 million Btu per ton on a moist, mineral-matter-free basis. The heat content of lignite consumed in the United States averages 13 million Btu per ton, on the asreceived basis (i.e., containing both inherent moisture and mineral matter).

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 consumers.

Mcf: One thousand cubic feet.

Megawatt (MW): One million watts.

Megawatthour (MWh): One million watthours.

MMcf: One million cubic feet.

Natural Gas: A naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in porous geological formations beneath the earth's surface, often in association with petroleum. The principal constituent is methane.

Net Generation: Gross generation minus plant use from all electric utility owned plants. The energy required for pumping at a pumped-storage plant is regarded as plant use and must be deducted from the gross generation.

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

Net Winter Capability: The steady hourly output which generating equipment is expected to supply to system load exclusive of auxiliary power, as demonstrated by tests at the time of winter peak demand.

Nonutility Power Producer: A corporation, person, agency, authority, or other legal entity or instrumentality that owns electric generating capacity and is not an electric utility. Nonutility power producers include qualifying cogenerators, qualifying small power producers, and other nonutility generators (including independent power producers) without a designated franchised service area, and which do not file forms listed in the Code of Federal Regulations, Title 18, Part 141.

Nuclear Fuel: Fissionable materials that have been enriched to such a composition that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction, producing heat in a controlled manner for process use.

Nuclear Power Plant: A facility in which heat produced in a reactor by the fissioning of nuclear fuel is used to drive a steam turbine.

Peak Demand: The maximum load during a specified period of time.

Peak Load Plant: A plant usually housing old, low-efficiency steam units; gas turbines; diesels; or pumped-storage hydroelectric equipment normally used during the peak-load periods.

Peaking Capacity: Capacity of generating equipment normally reserved for operation during the hours of highest daily, weekly, or seasonal loads. Some generating equipment may be operated at certain times as peaking capacity and at other times to serve loads on an around-the-clock basis.

Petroleum: A mixture of hydrocarbons existing in the liquid state found in natural underground reservoirs, often associated with gas. Petroleum includes fuel oil No. 2, No. 4, No. 5, No. 6; topped crude; Kerosene; and jet fuel.

Petroleum (Crude Oil): A naturally occurring, oily, flammable liquid composed principally of hydrocarbons. Crude oil is occasionally found in springs or pools but usually is drilled from wells beneath the earth's surface.

Plant: A facility at which are located prime movers, electric generators, and auxiliary equipment for converting mechanical, chemical, and/or nuclear energy into electric energy. A plant may contain more than one type of prime mover. Electric utility plants exclude facilities that satisfy the definition of a qualifying facility under the Public Utility Regulatory Policies Act of 1978.

Plant-Use Electricity: The electric energy used in the operation of a plant. This energy total is subtracted from the gross energy production of the plant; for reporting purposes the plant energy production is then reported as a net figure. The energy required for pumping at pumped-storage plants is, by definition, subtracted, and the energy production for these plants is then reported as a net figure.

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

Power Pool: An association of two or more interconnected electric systems having an agreement to coordinate operations and planning for improved reliability and efficiencies.

(In Texas, generating plants are primarily in the Electric Reliability Council of Texas. In addition a few plants are members of other power pools such as the Southwest Power Pool, Southeastern Electric Reliability Council, Western States Coordinating Council)

Prime Mover: The engine, turbine, water wheel, or similar machine that drives an electric generator; or, for reporting purposes, a device that converts energy to electricity directly (e.g., photovoltaic solar and fuel cell(s)).

Pumped-Storage Hydroelectric Plant: A plant that usually generates electric energy during peak-load periods by using water previously pumped into an elevated storage reservoir during off-peak periods when excess generating capacity is available to do so. When additional generating capacity is needed, the water can be released from the reservoir through a conduit to turbine generators located in a power plant at a lower level.

PURPA: The Public Utility Regulatory Policies Act of 1978, passed by the U.S. Congress. This statute requires States to implement utility conservation programs and create special markets for co-generators and small producers who meet certain standards, including the requirement that States set the prices and quantities of power the utilities must buy from such facilities.

Qualifying Facility (QF): A cogeneration or small power production facility that meets certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (FERC) pursuant to the Public Utility Regulatory Policies Act (PURPA).

Regulation: The governmental function of controlling or directing economic entities through the process of rulemaking and adjudication.

Renewable Resources: Naturally, but flow-limited resources that can be replenished. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Some (such as geothermal and biomass) may be stock-limited in that stocks are depleted by use, but on a time scale of decades, or perhaps centuries, they can probably be replenished. Renewable energy resources include: biomass, hydro, geothermal, solar and wind. In the future, they could also include the use of ocean thermal, wave, and tidal action technologies. Utility renewable resource applications include bulk electricity generation, on-site electricity generation, distributed electricity generation, non-grid-connected generation, and demand-reduction (energy efficiency) technologies.

Reserve Margin (Operating): The amount of unused available capability of an electric power system at peakload for a utility system as a percentage of total capability.

Residential: The residential sector is defined as private household establishments which consume energy primarily for space heating, water heating, air conditioning, lighting, refrigeration, cooking and clothes drying. The classification of an individual consumer's account, where the use is both residential and commercial, is based on principal use. For

the residential class, do not duplicate consumer accounts due to multiple metering for special services (water, heating, etc.). Apartment houses are also included.

Residual Fuel Oil: The topped crude of refinery operation, includes No. 5 and No. 6 fuel oils as defined in ASTM Specification D396 and Federal Specification VV-F-815C; Navy Special fuel oil as defined in Military Specification MIL-F-859E including Amendment 2 (NATO Symbol F-77); and Bunker C fuel oil. Residual fuel oil is used for the production of electric power, space heating, vessel bunkering, and various industrial purposes. Imports of residual fuel oil include imported crude oil burned as fuel.

Running and Quick-Start Capability: The net capability of generating units that carry load or have quick-start capability. In general, quick-start capability refers to generating units that can be available for load within a 30-minute period.

Small Power Producer (SPP): Under the Public Utility Regulatory Policies Act (PURPA), a small power production facility (or small power producer) generates electricity using waste, renewable (water, wind and solar), or geothermal energy as a primary energy source. Fossil fuels can be used, but renewable resource must provide at least 75 percent of the total energy input. (See Code of Federal Regulations, Title 18, Part 292.)

Sparge: Spray or disperse

Spinning Reserve: That reserve generating capacity running at a zero load and synchronized to the electric system.

Standard Industrial Classification (SIC): A set of codes developed by the Office of Management and Budget, which categorizes business into groups with similar economic activities.

Standby Facility: A facility that supports a utility system and is generally running under no-load. It is available to replace or supplement a facility normally in service.

Steam-Electric Plant (Conventional): A plant in which the prime mover is a steam turbine. The steam used to drive the turbine is produced in a boiler where fossil fuels are burned.

Stocks: A supply of fuel accumulated for future use. This includes coal and fuel oil stocks at the plant site, in coal cars, tanks, or barges at the plant site, or at separate storage sites.

Subbituminous Coal: A coal whose properties range from those of lignite to those of bituminous coal and are used primarily as fuel for steam-electric power generation. It may be dull, dark brown to black, soft and crumbly at the lower end of the range, to bright, jet black, hard, and relatively strong at the upper end. Subbituminous coal contains 20 to 30 percent inherent moisture by weight. The heat content of subbituminous

coal ranges from 17 to 24 million Btu per ton on a moist, mineral-matter-free basis. The heat content of subbituminous coal consumed in the United States averages 17 to 18 million Btu per ton, on the as-received basis (i.e., containing both inherent moisture and mineral matter).

Sulfur: One of the elements present in varying quantities in coal which contributes to environmental degradation when coal is burned. In terms of sulfur content by weight, coal is generally classified as low (less than or equal to 1 percent), medium (greater than 1 percent and less than or equal to 3 percent), and high (greater than 3 percent). Sulfur content is measured as a percent by weight of coal on an "as received" or a "dry" (moisture-free, usually part of a laboratory analysis) basis.

Transformer: An electrical device for changing the voltage of alternating current.

Transmission System (Electric): An interconnected group of electric transmission lines and associated equipment for moving or transferring electric energy in bulk between points of supply and points at which it is transformed for delivery over the distribution system lines to consumers, or is delivered to other electric systems.

Turbine: A machine for generating rotary mechanical power from the energy of a stream of fluid (such as water, steam, or hot gas). Turbines convert the kinetic energy of fluids to mechanical energy through the principles of impulse and reaction, or a mixture of the two.

Useful Thermal Output: The thermal energy made available for use in any industrial or commercial process, or used in any heating or cooling application, i.e., total thermal energy made available for processes and applications other than electrical generation.

Watt: The electrical unit of power. The rate of energy transfer equivalent to 1 ampere flowing under a pressure of 1 volt at unity power factor.

Watthour (Wh): An electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electric circuit steadily for 1 hour.

Wholesale Competition: A system whereby a distributor of power would have the option to buy its power from a variety of power producers, and the power producers would be able to compete to sell their power to a variety of distribution companies.

Wholesale Sales: Energy supplied to other electric utilities, cooperatives, municipals, and Federal and State electric agencies for resale to ultimate consumers.

Wholesale Power Market: The purchase and sale of electricity from generators to resellers (who sell to retail customers), along with the ancillary services needed to maintain reliability and power quality at the transmission level.

Appendix H Executive Administrator's Comments on Draft Report

ATTACHMENT 1 TEXAS WATER DEVELOPMENT BOARD Review of the Draft Final Report: Contract No. 2001-483-396 "Power Generation Water Use in Texas for the Years 2000 through 2060"

- 1. The methodology appears sound, however for staff to utilize the data located in the appendices, further meetings or phone calls with Greg Carter will be necessary. I'm looking forward to receiving the tables in electronic format (Excel).
- 2. Please provide an overview of summary of the steam electric power plants included in this study; such as the total number of the plants, if possible dropped or added compared to the last plan. Does the recent announcement of AEP's intention to close plants have any impact on the study?
- 3. Please explain why some of the power plants have blank fields with no data.
- 4. In Section 6, please provide an example of how a county's water demand is derived, with an explanation of how a county's demand can decline through 2020 and increase thereafter. (All reviewers made a variation of this comment, requesting more clarity regarding the derivation of county demands.)
- 5. The tables attached in the appendix were difficult to figure out. It would be helpful if those have footnotes for abbreviations used in the tables, data source for each table, explanations for the formulas or variables.
- 6. Appendix D (pp76) Annual Statewide Steam Electric Water Supply vs. Demand: the 6th column from the left, 'Study Minus TWDB Supply' should be changed to 'TWDB Supply Minus Study Demand'
- 7. Appendix B2: Please clarify whether the data was from the State Data Center or TWDB Projection numbers.