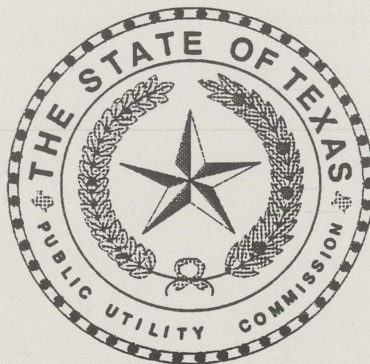


**LONG TERM ELECTRIC PEAK DEMAND  
AND CAPACITY RESOURCE FORECAST  
FOR TEXAS**

**1990**



**VOLUME II**

**A REVIEW OF CURRENT UTILITY-DEVELOPED LOAD FORECASTS  
AND CAPACITY RESOURCE PLANS**

**MARCH 1991**

**THE PUBLIC UTILITY COMMISSION OF TEXAS**



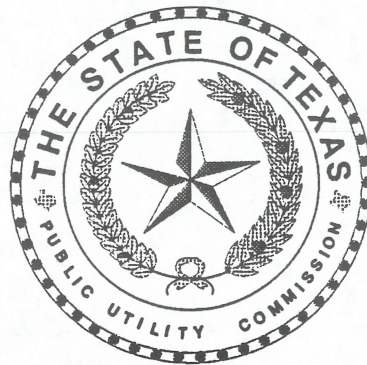
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**MARCH 1991**

**THE PUBLIC UTILITY COMMISSION OF TEXAS**



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The current staff wishes to recognize the contribution made by Dr. Jay Zarnikau, former Director of Electric Utility Regulation, to this and all prior forecast reports.

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## ABSTRACT

There is more than adequate electrical generating capacity in the near term in Texas. This offers luxuries to Texans (high reliability), but also imposes costs (large power plant investments reflected in rate increases in certain electric service areas). Despite these near-term capacity surpluses, a number of resource planning issues deserve prompt attention if Texas is to remain a low-cost provider of reliable electricity. The resource planning issues identified in this report include:

1. Defining the appropriate degree of operating and planning coordination among the utilities in Texas
2. Determining the role of cogenerated power
3. Determining how to better use the transmission system
4. Alleviating potential transmission bottlenecks in some areas
5. Determining the role of conservation programs which increase the efficiency of electrical energy use
6. Estimating the importance of rate design as a resource planning tool

**The Long-Term Electric Peak Demand and Capacity Resource Forecast for Texas 1990** is designed to provide information and recommendations to policy makers and others interested in the present and future status of the Texas electric power industry. Volume I of this three-volume report provides staff-recommended electricity demand projections for thirteen of the state's largest utilities and a capacity resource plan for Texas. Fuel markets, cogeneration activity, demand-side management program impacts, environmental issues, and strategic rate design are highlighted.

Volume II summarizes the electricity demand forecasts, energy efficiency plans, and capacity resource plans developed by generating electric utilities and filed at the Commission in December 1989 (or later amended). The third volume provides a technical description of the Commission staff's econometric electricity demand forecasting system used to develop the load forecast contained in Volume I.

The Commission is required to submit a statewide electrical energy plan to the governor every two years. The 1984 and 1986 plans focused on the development of load forecasting methodologies, data, and models, and a review of the capacity expansion plans dominated by utility-owned generating units. The central theme of the 1988 plan



(in light of the statewide recession) was the identification of the means to achieve greater efficiency in the use of the state's electrical resources.

The current report recognizes the end of the late 1980s economic recession in Texas, yet continues to emphasize efficiency improvements as the key to reliable and low-cost electrical services, environmental integrity, and increased economic growth. Within this framework, substantial emphasis is placed on alternative power sources (particularly purchases from qualifying facilities) and energy efficiency to reduce the rate of growth of peak demand. The information contained here emphasizes the importance of planning generally and the techniques applied specifically by the Commission staff to forecasting and planning.



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VOLUME II  
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## CHAPTER ONE

### STATEWIDE SUMMARY

Total sales of electrical energy and peak demand in Texas are forecast by the generating utilities of Texas to have annual compound rates of growth through 1999 of 2.4 percent. The diversified sum of the generating utilities peak demand is projected to reach 59,045 MW in 1999. The utilities report that system-wide installed generation capacity should amount to 75,559 MW in 1999 from 65,586 MW in 1989, an increase of 9,973 MW or 15.2 percent over the 1989 capacity. Forecast adjustments totaling 4,886 MW in 1999 have been made to account for the impact of interruptible loads, loss of load due to self-generation, and efficiency gains due to the National Appliance Energy Conservation Act of 1987 (NAECA) and utility-sponsored demand-side management programs.

#### **Methodology**

The second volume of this three-volume report, the *Long-Term Electric Peak Demand and Capacity Resource Forecast for Texas 1990*, summarizes the electricity demand forecasts, energy efficiency plans, and capacity resource plans developed by the generating electric utilities in Texas and filed with the Public Utility Commission of Texas in December 1989. The information was provided by each generating electric utility in the state pursuant to Section 16(c) and (d) of the Public Utility Regulatory Act (PURA). PURA mandates that every generating electric utility shall provide the following information to the Public Utility Commission of Texas (PUCT):

1. A description of methods and economic/demographic assumptions incorporated in the forecast and of projected population growth, urban development, industrial expansion, and other growth factors influencing the demand for electric energy in the service area



*STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT*

2. A list of existing electric generating plants in service with a description of planned and potential generating capacity at existing sites
3. Projected annual system capacity, peak load, interruptible load, and reserve margins
4. Forecasted annual load duration curves and peak loads for major demand sectors in the service area
5. Projected annual firm purchases and sales of capacity
6. A description of how electrical energy requirements identified in the forecast will be met
7. Descriptions of current load management and conservation programs and efforts to encourage cogeneration and small power production
8. Such additional information (including historical data) deemed necessary to the evaluation of utility forecasts and resource plans and the development of the statewide electrical energy forecast

PURA requires the PUCT to compile and report the information pursuant to Article III, Section 16(d)-(f) of the Public Utility Regulatory Act (PURA). December 1989 was the fourth time that utilities filed this information.

Thirty-four generating electric utilities have completed and filed their 1989 *Load and Capacity Resource Forecast Filing* forms. These include all generating utilities except eight municipal utilities: The cities of Brady, Bryan, Coleman, Garland, Robstown, Sanger, Weatherford, and Whitesboro. These eight small utilities that did not file account for a minimal share of sales, peak demand, and capacity; thus their absence does not materially alter this summary. Some changes to the numbers filed by the utilities have been made by the PUC staff to increase comparability between the utilities, to interpolate missing numbers, or simply to correct misplaced numbers. The databases which contain the raw utility information for customers, megawatts and megawatthours are available upon request.

The state's boundaries do not include all of the service areas of four major utilities. These multi-jurisdictional utilities (El Paso Electric Company [EPE], Gulf States Utilities Company [GSU], Southwestern Electric Power Company [SWEPCO], and Southwestern Public Service Company [SPS]) have provided information on their "total system" as well as the "Texas only" portion of their service areas. The "Texas" portion does not refer to jurisdiction of the PUCT, but to geographical sales and demand, and where applicable, allocated Texas capacity and generation by use of the



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**

ratio of the demand in Texas to the system demand or the ratio of sales in Texas to total system sales.

The Electric Reliability Council of Texas (ERCOT) plays a prominent role in the Texas utility industry, with ERCOT utilities servicing about 84 percent of the summer peak demand in the state in 1989. ERCOT includes 20 municipalities, 51 cooperatives, six investor-owned utilities, and three state river authorities. ERCOT is a self-contained grid system entirely within the state but does have a 220-MW asynchronous DC tie at Oklaunion to the Southwest Power Pool (SPP). The Western Systems Coordinating Council (WSCC) also borders ERCOT. ERCOT members BEPC, COA, CPL, CPS, HL&P, LCRA, TNP, TU Electric, and WTU are covered in detail in this volume. In addition, EPE of WSCC and GSU, SPS, and SWEPCO of SPP are other major Texas utilities covered in detail in this report. A list of electric utilities which responded to the December 1989 *Load and Capacity Resource Forecast Filing* is provided below.



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**

**Electric Utilities in Texas  
Which Provided December 1989  
Load and Capacity Resource Forecast Filings**

<u>Utility Name</u>	<u>Abbreviation Used</u>	<u>Regional Reliability Affiliation</u>
City of Austin Electric Utility Dept.	(COA)	ERCOT
Brazos Electric Power Cooperative, Inc.	(BEPC)	ERCOT
Brazos River Authority	(BRA)	ERCOT
Brownfield Municipal Power & Light	(BPL)	SPP
Brownsville Public Utilities Board	(PUB)	ERCOT
Central Power and Light Company	(CPL)	ERCOT
Denton Municipal Utilities	(DMU)	ERCOT
El Paso Electric Company	(EPE)	WSCC
City of Electra	(ELECTRA)	SPP
City of Floydada	(FLOYADA)	SPP
City of Greenville	(GREENVILLE)	ERCOT
Guadalupe-Blanco River Authority	(GBRA)	ERCOT
Gulf States Utilities Company	(GSU)	SPP
City of Hearne	(HEARNE)	ERCOT
Houston Lighting and Power Company	(HL&P)	ERCOT
Lower Colorado River Authority	(LCRA)	ERCOT
Lubbock Power & Light	(LPL)	SPP
Medina Electric Cooperative, Inc.	(MEC)	ERCOT
Northeast Texas Electric Cooperative, Inc.	(NTEC)	SPP
Sam Rayburn G & T, Inc.	(SRGT)	SPP
Sam Rayburn Municipal Power Agency	(SRMPA)	SPP
City Public Service of San Antonio	(CPS)	ERCOT
Sabine River Authority	(SRA)	SPP
San Miguel Electric Cooperative, Inc.	(SMEC)	ERCOT
South Texas Electric Cooperative, Inc.	(STEC)	ERCOT
Southwestern Electric Power Company	(SWEPCO)	SPP
Southwestern Power Administration	(SPA)	ERCOT
Southwestern Public Service Company	(SPS)	SPP
Tex-La Electric Cooperative of Texas, Inc.	(TEXLA)	SPP
Texas Municipal Power Agency	(TMPA)	ERCOT
Texas-New Mexico Power Company	(TNP)	ERCOT
Texas Utilities Electric Company	(TU Electric)	ERCOT
City of Tulia	(TULIA)	SPP
West Texas Utilities Company	(WTU)	ERCOT



## STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

This volume is only a summary of the utility filings. The Commission staff also prepares an independent forecast and capacity resource plan. When adopted by the Commission, this plan becomes the statewide energy plan specified in the PURA Article III, Section 16(b). The statewide energy plan bears the title *Long-Term Electric Peak Demand and Capacity Resource Forecast for Texas 1990 Volume 1*.

The December 1989 filing marks the first time that the Commission staff requested a fifteen-year load forecast and capacity resource plan. In general, utilities were reluctant to officially provide five additional years of forecast and resource plan data (2000-2004). Many utilities insisted that projections for these years do not constitute an official forecast. Therefore, caution should be exercised interpreting projections beyond 1999.

### Demand Forecast

**Number of Customers**                      The number of residential customers served by the generating utilities selling retail in the state increased to 5,298,693 in 1989 from 3,781,106 in 1979, an annual growth rate of 3.4 percent. The number of commercial customers also increased but at a slower rate of three percent per year. Figure 1.1 shows that the number of residential and commercial customers increased annually over the last 13 years while there was a considerable slowdown in growth after 1984. The number of industrial customers declined after 1985 but is projected to increase over the next decade. The number of residential customers is projected to grow at a compound rate of 1.8 percent per year, according to the utilities' projections, and to reach 6,343,371 in 1999. Annual growth from 1999 to 2004 is projected at 1.7 percent.

COA experienced the highest growth rate in the number of residential electric customers over the 10-year period from 1979 to 1989 with a compound average of 5 percent per year. San Antonio's CPS and TU Electric, whose service area includes Dallas and Fort Worth, followed at 4 percent. The slowest growing service areas in terms of the number of residential customers were SPS and SWEPCO with 10-year average annual growth rates of one percent.



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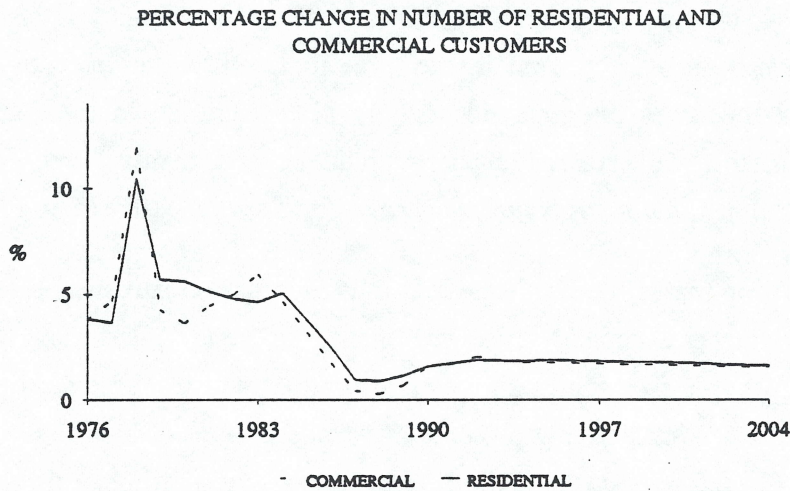


Figure 1.1

COA projects a rate of growth for the number of residential customers at less than one percent per year through 1999 and the PUCT staff also projects for SPS a rate of growth for the number of residential

customers at less than one percent per year through 1999. TU Electric, HL&P, GSU Texas, SWEPCO and WTU project rates at between one and two percent. CPL, CPS, and TNP project rates of between 2 and 3 percent. Only EPE projects an annual rate over 3 percent, 3.28 in Texas, over the next decade. The ERCOT utilities expect a higher rate of growth than the non-ERCOT utilities. None of the utilities project growth rates over the next 10 years to be as large as those in the last 10 years.

Table 1.1, at the end of this chapter, shows the statewide annual aggregate number of customers by customer class for the period of 1975 to 2004.

**Sales** Electric generating utilities recorded system sales of 240,125,735 MWH of electricity in Texas during 1989. Sales in Texas are projected to reach 304,388,800 MWH in 1999, an increase of 27 percent. This is equivalent to a 2.4 percent annual growth rate over the next ten years in contrast with the 3.2 percent annual rate experienced over the last ten years. Following a similar rate of 2.4 percent projected to 2004, the sales are expected to reach 342,875,357 MWH in that year.

Compound annual growth rates of system sales in Texas for the 13 largest utilities over the 1989 to 1999 time period are presented below. The 21 smaller utilities project an annual aggregate 1.5 percent rate of growth in sales.



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<u>Over 3 %</u>		<u>2% - 3%</u>		<u>Under 2%</u>	
BEPC	4.20	EPE	2.63	HL&P	1.98
CPS	4.12	TU	2.48	WTU	1.84
COA	3.78			TNP	1.76
CPL	3.30			GSU	1.15
SWEPCO	3.23			SPS	0.90
LCRA	3.07				

Sales to the industrial sector purchased 79,377,313 MWH from the generating utilities in 1989. This accounts for one-third of all system sales and places this customer class as the largest purchaser in the state. The industrial sector will continue as the largest class of customers for energy sales throughout the forecast horizon. The HL&P and SPS-Texas systems rely on industrial customers for about half of their sales. GSU, SWEPCO, CPS, and TNP are all dependent on industrial customers for over one-third of their sales. Sales to industrial customers are projected to grow at an annual rate of 2.5 percent over the next 10 years and at 2.2 percent from 1999 to 2004. These rates are over twice the one-percent rate of growth experienced during the previous 10-year period. Of the 11 largest utilities, i.e., not counting BEPC and LCRA who sell primarily wholesale, only SPS, SWEPCO, COA, and WTU project rates of growth in industrial sales over the next 10 years lower than experienced over the previous period.

As seen in Figure 1.2, the residential sector consumes the second largest portion of energy at 28 percent of all sales by the generating utilities. Annual growth in residential sales is projected at less than half the rate of the preceding 10 years, dropping to 2.1 percent over the next 10 years from 4.3 percent for the last decade. An annual rate of 2.4 is forecast for the 1999 to 2004 time period. All utilities engaged in retail sales project lower rates of growth in residential sales for the future than experienced over the past decade.



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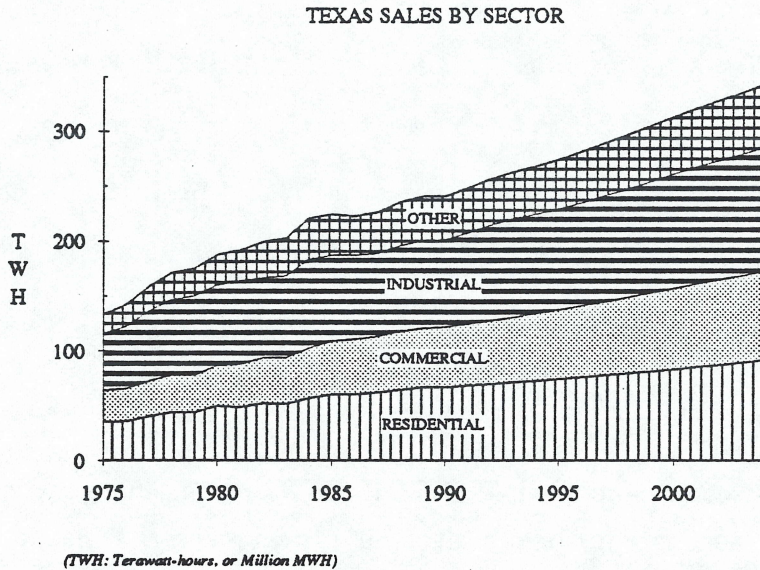


Figure 1.2

Commercial sales amounted to 22 percent of all sales by generating utilities in 1989. It should be noted that the distinction between industrial and commercial customers varies among utilities. Annual growth in sales to com-

mercial customers through 1999 is projected at the rate of 2.8 percent, and for the 1999 to 2004 period at 2.6 percent. Of the 13 largest utilities, only HL&P and SPS expect higher rates of growth over the next 10 years in commercial sales than experienced over the past 10 years.

Wholesale customers take a significant percentage of total system sales from only a few utilities. BEPC is a wholesale supplier and LCRA makes 98 percent of its sales to wholesale customers. WTU, SWEPCO, and SPS sell significant percentages of system sales to wholesale customers in Texas, at 27 percent, 22 percent, and 20 percent, respectively. Wholesale sales are made to non-generating electric cooperatives and municipalities who sell to residential, commercial, and industrial or other retail customers. Sales between the generating utilities are reported to the PUCT as off-system sales.

TU Electric is the largest utility in the state and made 34 percent of all system sales by utilities in the state in 1989. HL&P shows the next highest level of sales with 24 percent of the state total, followed in order by CPL, GSU, SPS, CPS, SWEPCO, LCRA, COA, WTU, TNP, BEPC, and EPE. The four largest utilities make over two-thirds of annual sales by generating utilities in the state and the 13 largest



## STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

utilities sell 95 percent of the total. The 21 utilities making up the "Other" category account for about 5 percent of the total sales in the state.

Table 1.2, at the end of this chapter, shows the state-wide aggregate sales by customer class in MWH for the period of 1975 to 2004.

**Peak Demand**                During the summer of 1989, electric utilities experienced a peak demand of 46,387 MW in Texas. System peak demand in Texas is projected to reach 59,045 MW by 1999, an increase of 27 percent. This is equivalent to a 2.4 percent annual growth rate, which may be contrasted with the 3.3 percent experienced over the previous ten years. Without the projected adjustments to demand, discussed in the *Introduction* above and in the section following, peak demand could reach 63,931 MW by 1999. The peak demand before adjustments quantifies what might occur if the exogenous factors such as conservation and demand-side management activities represented by the adjustments did not take place. Utilities must plan to affect the peak demand through their demand-side management activities, anticipate the effects of exogenous factors on demand, and meet the adjusted peak demand. The adjusted peak is projected to rise at the annual rate of 2.4 percent through the 2004 timeframe.

Over 36 percent of the coincident-peak demand was placed on the utilities by residential customers. This demand is projected to increase by 31 percent over the decade, which represents an annual growth rate of 2.7 percent, but the 36 percent share will remain fairly constant. Industrial customers took approximately 22 percent of the total power demanded at the time of the system peak in 1989. With a growth rate of 3.2 percent annually for the next ten years, the market share for industrial customers should increase only slightly, to 23 percent of the total. Commercial customers also took about 22 percent of the total and with a growth rate projected at 3.1 percent should also increase their market share to about 23 percent of the total in 1999.

In 1999, TU Electric and HL&P will account for about 36 percent and 21 percent, respectively, of system peak demand in Texas if the utilities' projections are realized. However, their respective growth rates in demand rank eighth and tenth among the major generating utilities in Texas. The utilities can be grouped into three ranges of growth rates as follows. These rates are compound annual percentages over the 1989



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**

to 1999 time period. For the multi-jurisdictional utilities, only the Texas portion of total system demand is shown here. Their growth rates for the non-Texas service areas are all projected to be slightly less than the rates for their Texas service areas except for SPS, which forecasts a higher growth rate in its New Mexico service area.

<u>Over 3 %</u>		<u>2% - 3%</u>		<u>Under 2%</u>	
BEPC	4.34	LCRA	2.84	WTU	1.98
CPS	3.95	CPL	2.80	HL&P	1.98
COA	3.82	EPE	2.51	TNP	1.97
SWEPCO	3.18	TU	2.38	GSU	1.15
				SPS	1.11

The aggregate demand of the 21 other utilities is projected to grow at 1.8 percent annually through 1999. ERCOT utilities project an aggregate 2.6 percent annual rate of growth while the non-ERCOT utilities project a 1.8 percent rate.

Table 1.3, at the end of this chapter, summarizes the peak demand by sector and adjustments to demand over the 1975 to 2004 period.

**Adjustments to Demand**            It is commonplace for utilities to adjust the results of their forecasting models to account for activities and events which require a unique modeling framework. The post-modeling adjustments are made in the categories of active and passive demand-side management (DSM) and exogenous factors. Exogenous factors include losses in sales due to customer self-generation, capacity for standby service, and end-use efficiency improvements due to the NAECA of 1987. Passive DSM includes conservation or energy efficiency programs, thermal storage programs, special rate structures, and economic development activities. Active DSM refers to direct control of customer loads and includes interruptible loads. The adjustments forecast for 1999 total 4,886 MW. The adjustments are projected to reach 5,903 MW in 2004.

Loss of load due to industrial self-generation and the NAECA of 1987 are the primary exogenous factors that are expected to slow peak demand growth over the next ten years. The exogenous factors will account for 2,469 MW of peak demand



*STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT*

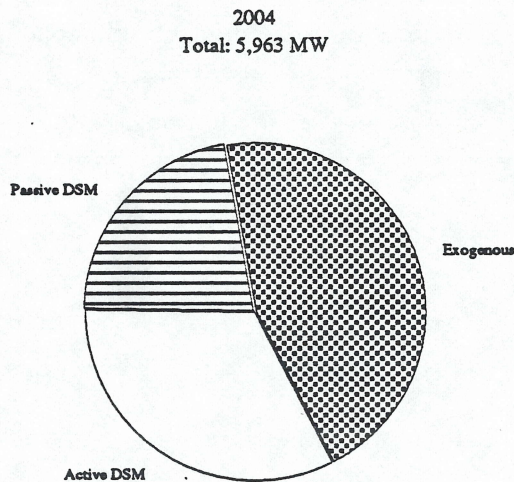
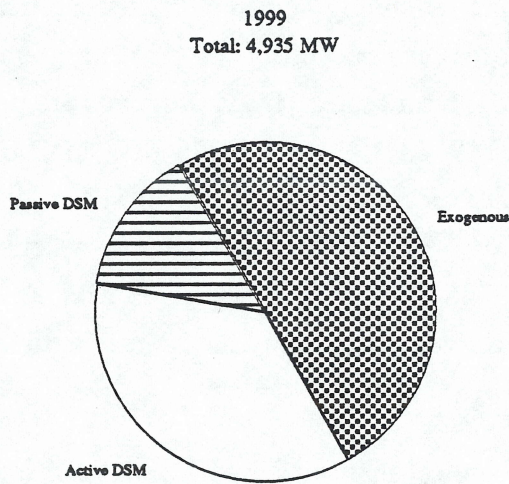
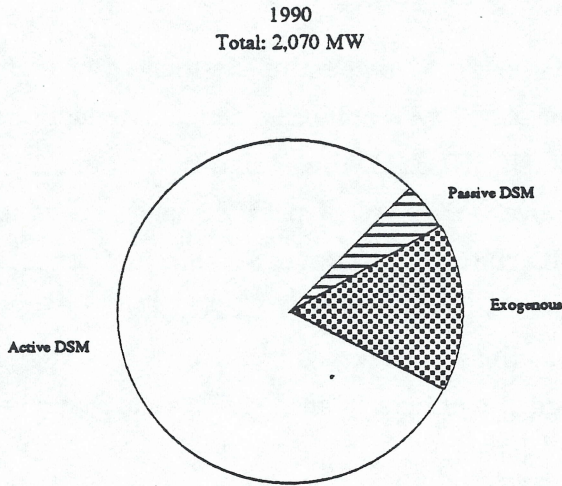
reduction by 1999. This represents nearly 51 percent of the total adjustments. The exogenous factors will account for 2,667 MW of peak demand reductions, or 45 percent of total adjustments by 2004. HL&P, with a significant concentration of industrial customers, accounts for over 900 MW of peak demand reduction due to self-generation. TU Electric and HL&P account for over 93 percent of expected peak demand reduction due to the exogenous factors. SPS, LCRA, COA, EPE, and TNP are other utilities that projected reductions in peak demand due to the 1987 NAECA. While only these utilities quantified the effects of the NAECA, it is likely that all expect some reduction as a result of the act.

DSM programs are responsible for the remaining adjustments to peak demand. In general, no adjustments are made for the historic impacts of DSM programs as these are embedded in the data used to model future sales. DSM programs are projected to reduce total peak demand by 2,407 MW in 1999 and 3,226 MW in 2004. Those programs considered passive DSM are expected to grow from 20 MW in 1989 to 669 MW in 1999 and 1,293 MW in 2004. Programs under the active control of the utilities are expected to increase to 1,748 MW in 1999 and 1,933 MW in 2004 from 1,486 MW in 1989. Much of the active control consists of interruptible loads of industrial customers.

CPL, GSU, HL&P, and TU Electric project that interruptible industrial loads during the next ten to fifteen years will reduce expected peak demand by 1,649 MW in 1999 and 1,843 MW in 2004. Over 75 percent of total interruptible load in Texas is projected to be within the HL&P and TU Electric service areas. In addition, SPS, TNP, LCRA, and COA interrupt or cycle appliances in other classes of customers.



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**



*Figure 1.3*

**Adjustments to Demand**

As in the 1987 filing, TU Electric, COA, and LCRA are ranked first, second, and third highest in forecast reductions of peak demand due to DSM programs, not including interruptible loads.

TU Electric plans to reduce its expected peak demand by 793 MW in 1999 and 1,318 MW in 2004 by the effects of passive DSM efforts.

In contrast, HL&P's economic development and sales promotion activities will more than offset its conservation program impacts. As a percentage of peak demand, the projected DSM program impacts of COA, LCRA, and WTU are greater than those of TU Electric.

The 1975 to 2004 amounts of the aggregate adjustments to peak demand are included in Table 1.3 at the end of this chapter.



## Supply-Side Plans

**Installed Capacity** Texans relied on utility allocated generating capacity of 58,471 MW on an allocated basis in 1989. Projections show this increasing to 68,358 MW in 1999 and 74,414 MW in 2004. The 9,887 MW increase represents a 17 percent increase in ten years. Over the next fifteen years, 15,943 MW of capacity may be added, a 27 percent increase above the 1989 level. Given the current reserve margin of more than 32 percent in Texas, discussed below, new power plants will be added at a slower rate than the projected growth in peak demand—at a 1.6 percent annual rate versus a 2.4 percent annual growth in demand through 1999. TU Electric owns the largest portion of installed capacity, with 31 percent of the allocated total. The top five utilities, TU Electric, HL&P, GSU, CPL, and CPS, control nearly three-fourths of the total.

Considering the total system installed capacity, i.e., including the total capacity of the multi-jurisdictional utilities rather than only the portion allocated to meet Texas demand, the 1989 figure is 65,586 MW of capacity and the projected 2004 figure is 81,792 MW. Gas-fired capacity makes up 64 percent of the 1989 total capacity, coal 16 percent, lignite 14 percent, and nuclear-powered 6 percent.

The renewable energy sources are represented by 489 MW in 1989 of hydroelectric generation capacity and less than one MW of solar-powered capacity. Renewable and alternative sources of energy are not scheduled for any significant expansion, although in 1995 Lubbock plans a 10-MW unit powered by a municipal waste incinerator.

Table 1.5 at the end of this chapter contains the figures for installed capacity by fuel type.

**Net Generation** The 1989 generation mix relied on natural gas for 43 percent, coal for 26 percent, lignite for 24 percent, and nuclear for 6 percent of the 250,336,506 MWH produced. The portion of this total generation allocated to Texas is 225,604,202 MWH. Net generation for Texas in 1999 is projected at 292,521,570 MWH. This indicates a 30 percent increase or a 2.6 percent rate of annual growth. TU Electric generates 34 percent of the total utility generation allocated to Texas and HL&P provides 24 percent. The six largest utilities generate



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

80 percent of the total, and the top 13 utilities generate 96 percent of the total. The ERCOT utilities provide 82 percent of the allocated total net generation.

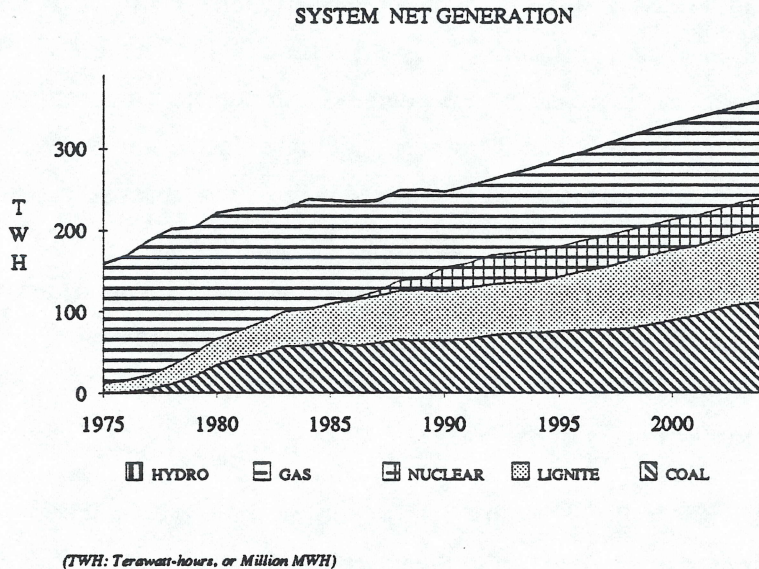


Figure 1.4

The utility generation fuel mix should change somewhat over the forecast period as seen in Figure 1.4. In 1979, just over 75 percent of the total generation was gas-fired. This reliance shifted considerably to 43 percent in

1989 and is projected to continue to decline to 36 percent in 1999. No utilities are now totally dependent upon gas, although GSU, WTU, BEPC, and CPL were in 1979. By 1989, GSU, WTU, CPL, and EPE were still over 50 percent reliant on gas-fired generation, while SWEPCO, SPS, COA, and LCRA were less than 25 percent reliant.

Not included in these calculations are the energy purchases from cogenerators, which amounted to about 24 million MWH in 1989. Cogeneration in Texas is predominantly gas-fired capacity. Counting the non-utility energy purchased by utilities, gas accounts for about 51 percent of total generation. TU Electric and HL&P account for about 90 percent of the energy purchases from Texas cogenerators.

The output of coal-fired generation more than tripled over the decade, reaching 26 percent of the total in 1989. Lignite use also increased, to 24 percent of 1989 generation. The utilities project their coal- and lignite-fired generation each to provide 26 percent of the total in 1999. SPS, LCRA, and COA rely on coal-fired



## *STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT*

generation for over half of their total, while GSU and EPE do so for less than 15 percent. TU Electric, BEPC, and the aggregate of the 21 smaller "other" utilities rely on lignite-fired generation for over half of their MWH output, with SWEPCO and HL&P at 29 percent and 19 percent, respectively.

Nuclear-powered generation is projected to double its share to 12 percent in 1999 from the six percent in 1989, although the 1989 output was low due to the significant outages at the Palo Verde nuclear station that year. In the mid-1990s, EPE is projected as the most reliant on nuclear power as a percent of total generation, followed by CPS, COA, CPL, GSU, TU Electric, and HL&P. After commercial operation of Comanche Peak Unit 2, anticipated in 1993, nuclear-powered generation by all involved utilities is projected to stabilize with annual outputs in the 36- to 39-million MWH range.

Hydroelectric and alternative energy sources provide less than 0.5 percent of net generation.

Table 1.4 contains the statewide data for net generation and can be found at the end of this chapter.

**Net System Capacity** Net system capacity adds the net of purchases and sales to installed capacity and is projected to reach 77,872 MW in 1999, including the total systems of the multi-jurisdictional utilities. This represents a 12 percent increase, or 8,357 MW over 1989. On an allocated basis, Texas net system capacity should grow to 70,671 MW in 1999 from 62,400 MW in 1989. This 13 percent increase, 1.3 percent per year, is significantly lower than the projected annual growth of 2.4 percent in peak demand. As a result, Texas is expected to grow out of the existing excess capacity situation before the turn of century, as seen in Figure 1.5.

The purchase of capacity from another utility or from other suppliers such as cogenerators is an option available to many utilities in Texas. Cogeneration capacity totals over 7,000 MW with just over half of the total in the HL&P service area. GSU, TU Electric, TNP, and CPL each have over 500 MW of cogeneration capacity in their service areas. Purchases from non-utility generators reached 3,223 MW in 1989, up dramatically from the 114 MW in 1979.



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

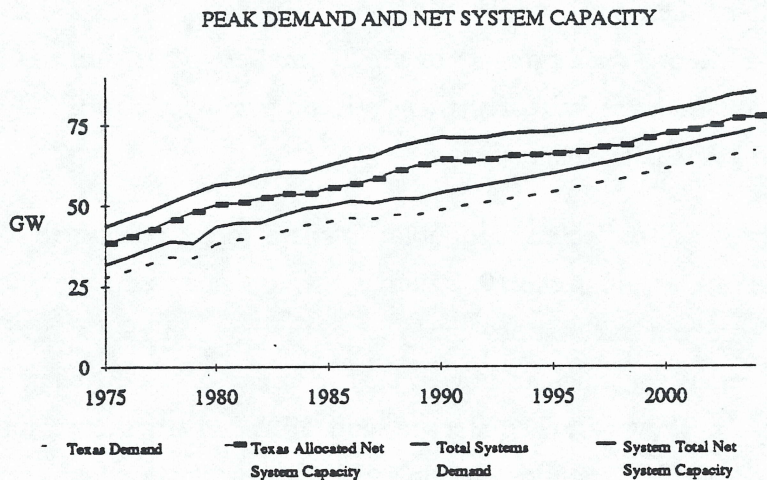


Figure 1.5

TU Electric takes 62 percent of the total with 2,009 MW, followed by HL&P with 820 MW, TNP with 335 MW, and GSU with 11 MW, of which 5 MW have been allocated to the GSU-Texas capacity figure.

Although purchases from non-utilities are scheduled to decline through the 1990s to 1,801 MW in 1999, this reflects the ending of existing contracts with cogenerators during this time. As the need for additional utility capacity becomes imminent, the likelihood remains that new contracts will be negotiated with cogenerators in the years ahead and that the purchased capacity will not fall to the presently projected levels, assuming that relative prices of natural gas do not dramatically increase. As reported in the PUCT publication *Cogeneration and Small Power Production in Texas* (March 1990), about 900 MW of additional cogeneration capacity in the state are under construction or planned.

TU Electric, CPS, and HL&P account for about 82 percent of additions to net system capacity over the next ten years. In comparison with 1989, BEPC, CPS, and TU Electric will experience the largest increase in their net system capacity. In contrast, SPS, GSU, and SWEPCO are projecting reductions in their net system capacity over the next ten years. SPS' contract for firm purchases expired in December 1989. GSU and SWEPCO also project lower firm purchases, which reduce net system capacity.

**Reserve Margins** Reserve margin is calculated as the net system capacity minus peak demand after adjustments, divided by peak demand after adjustments. The reserve margin can be seen in Figure 1.5 as the



## *STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT*

difference between net system capacity and peak demand after adjustments. Utility projections indicate enough capacity to ensure a reliable electric system statewide, with the reserve margin declining from 34.5 percent in 1989 to 19.7 percent in 1999, assuming that the utilities' demand forecasts and resource plans are realized. The reserve of 16,013 MW in 1989 is projected to fall to 11,626 MW in 1999. Reserves continue to fall between 1999 and 2004 to 11,156 MW, 16.9 percent in that year.

The ERCOT reserve margin in 1989 of 33.2 percent is projected to decline to 19.7 percent by 1999, and to 16.7 percent in 2004. The reserve margin of a few utilities within the ERCOT system raises some concern. BEPC reserve margins will fall below the ERCOT recommended 15 percent if the demand projections are realized. In addition, other ERCOT utilities such as CPL, LCRA, and WTU will have reserve margins which are only slightly higher than 15 percent in 1999. However, other utilities and resources within the ERCOT system will provide enough capacity to prevent a decline in system reliability. The multi-jurisdictional utilities will have reserve margins well above their recommended levels through the 1990s.

**System Expansion** If the utility plans are realized, 10,814 MW of capacity will be added through 1999, and 841 MW will be retired, for a net addition of 9,973 MW. Lignite-fueled capacity will provide the largest portion of the plant additions during the forecast period with 4,032 MW to be added by 1999, 40 percent of net capacity additions. Commercial operation of both units of Comanche Peak will mark the addition of 2,300 MW of nuclear capacity in Texas, 23 percent of total capacity additions in Texas through 1999. Natural gas-fired capacity is the third contributor with 2,034 MW or 20 percent of net additions over the same period. Coal-fueled capacity net additions account for 1,563 MW, nearly 16 percent of total net additions between 1989 and 1999. Additions to and retirements of capacity are reflected in Figure 1.6, which shows the resulting installed capacity by fuel type over the forecast period.

According to the 1989 filings, utilities will add 6,233 MW to their installed capacity to meet growing Texas demand between 1999 to 2004. In contrast to the 1989-99 period, coal-fueled units, with 4,922 MW, dominate net additions shown between 1999 and 2004.



## STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

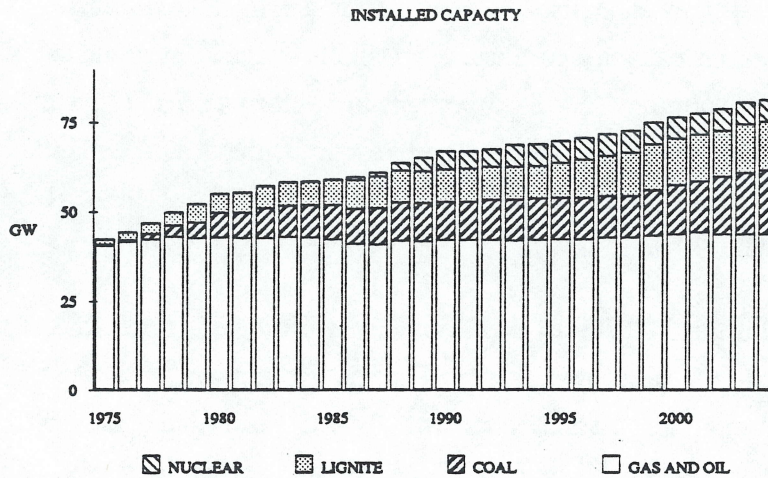


Figure 1.6

net additions to installed capacity over the next ten years. HL&P plans 16 percent of net additions over the same time period. CPS, TNP, and BEPC are the other top contributors. These five utilities account for about 95 percent of total net capacity additions over the next ten years.

The major changes to capacity over the forecast period as projected by the utilities are summarized in Table 1.6 at the end of this chapter.

### Forecast-Comparison With 1987 Filings

A comparison of the utilities' 1987 and 1989 peak demand forecasts is now presented for the year 1997. This comparison was performed for both the "prior to" and "after" adjustment levels to examine the varying effects of exogenous impacts and DSM programs impacts.

Comparing the 1987 and 1989 filings at the state level there has been no significant change in 1997 peak demand forecasts prior to adjustments. After adjustments, however, there is a 2 percent reduction in the projected 1997 peak demand. In other words, the electric utilities in Texas are forecasting a 1,246 MW demand reduction, compared to what was projected two years ago. Utilities plan their system expansions to meet peak demand after adjustments; hence the following utility service-area comparisons focus on the 1997 peak demand after adjustments.

As expected because of its size and growth rate, most of the net capacity additions will occur within the TU Electric service area. TU Electric accounts for about 54 percent of all



## STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

A detailed comparison across major utilities shows significant variations in projected peak demands between the last two filings. COA, WTU, and TNP each provided the greatest percent reductions in their projected 1997 peak demand. These three utilities reduced their 1997 peak demand by 15.1, 10.9, and 10.5 percent, respectively. LCRA and SWEPCO, with 7.4 and 6.9 percent reductions, respectively, were next among the utilities with significant reductions from 1987 to the current filing. TU Electric, which serves one of the fast growing areas, projected slower growth in peak demand than what was filed two years ago. TU Electric's current projected 1997 peak demand is more than four percent lower than its previous filing.

In contrast, four other major utilities projected higher 1997 peak demands than in their 1987 filing. HL&P ranked first with about 4 percent more peak demand projected for 1997. CPL, GSU, and BEPC were also projected at higher growth over the next eight years with annual rates of 3.1 percent, 2.3 percent, and 1.5 percent higher, respectively.

The Commission staff proposed the deferral of several new power plants in the *Long-Term Electric Peak Demand and Capacity Resource Forecast for Texas 1988*. HL&P has not changed the commercial operation dates of its Malakoff units since the previous filing. This is understandable as HL&P now projects a higher peak demand in 1997. These two units are still scheduled to serve summer peaks in 1997 and 1999. The Commission staff also recommended that the CPS coal-based units J.K. Spruce 1 and 2 (then termed Calaveras 5 and 6), each with 498 MW of capacity be deferred from 1992 and 1995, respectively, to 1995 and beyond 1997. CPS' current resource plan indicates that J.K. Spruce 1 is still scheduled for 1992. However, unit 2 is proposed for commercial operation by 2000. Finally, the Commission staff recommended the deferral of TNP One Units 3 and 4 by one year each to 1995 and 1996. TNP's new resource plan shows further deferral of these two units to 1997 and 1998, respectively. More recently, TNP dropped its request for a CCN approval for TNP One Units 3 and 4. As was mentioned earlier, both CPS and TNP adjusted their projected 1997 peak demand downward.

Also in the 1988 report, the Commission staff recommended an earlier commercial operation date for TU Electric's Forest Grove Unit 1, from 1997 to 1996. However, the 1989 TU Electric resource plan indicates that Forest Grove is scheduled for



***STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT***

operation in 1998. This is again due to slower growth in peak demand than was projected in the 1987 filing.

This concludes the statewide summary of demand forecasts and capacity plans filed by the Texas utilities. The thirteen largest utilities are analyzed in detail in the following 13 chapters, while the final chapter summarizes information filed by 21 other utilities.



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.1

TOTAL TEXAS

NUMBER OF CUSTOMERS

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RETAIL			ALL OTHER	
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	WHOLESALE
1975	3,008,046	403,832	33,516	32,615	29,805
1976	3,123,341	419,164	34,715	52,973	31,344
1977	3,237,444	438,763	36,747	54,581	32,604
1978	3,576,972	491,221	39,860	73,360	33,898
1979	3,781,106	512,129	40,779	75,596	35,511
1980	3,992,601	530,772	43,208	76,429	37,354
1981	4,196,362	554,316	43,840	77,512	38,700
1982	4,397,607	581,978	45,656	79,442	40,049
1983	4,601,730	616,468	46,670	82,005	42,641
1984	4,834,264	645,183	48,812	79,072	39,446
1985	5,016,446	665,767	49,482	83,166	40,894
1986	5,141,151	677,362	48,994	73,056	42,152
1987	5,190,806	680,379	48,715	74,036	42,006
1988	5,237,825	682,363	49,334	58,503	43,567
1989	5,298,693	687,148	44,707	61,041	44,718
1990	5,383,084	698,146	51,146	60,317	45,951
1991	5,477,013	710,104	51,935	61,225	47,235
1992	5,581,498	724,689	52,846	62,087	48,556
1993	5,685,592	738,303	53,841	63,088	49,915
1994	5,790,612	751,513	54,982	64,090	51,313
1995	5,899,834	764,804	56,299	65,114	52,751
1996	6,009,621	778,117	57,715	66,137	54,231
1997	6,119,617	791,417	59,140	67,188	55,753
1998	6,230,972	804,807	60,604	68,177	57,320
1999	6,343,371	818,289	62,085	69,177	58,932
2000	6,455,403	831,702	63,597	70,170	60,590
2001	6,567,500	845,194	65,197	71,167	62,297
2002	6,678,964	858,716	66,895	72,170	64,053
2003	6,790,104	872,238	68,640	73,184	65,859

NOTES:

- 1) Data from 1975 through 1989 is actual,; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility, it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 12



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.2

TOTAL TEXAS

ANNUAL SALES BY SECTOR (MWH)

(After Adjustments for Exogenous Factors and DSM Programs)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RETAIL SALES			ALL OTHER		TOTAL	TOTAL
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	WHOLESALE	SYSTEM	OFF-SYSTEM
1975	35,273,442	28,673,379	51,618,522	3,429,413	13,832,894	132,827,650	1,145,797
1976	35,818,204	29,756,324	56,765,647	3,588,119	16,144,206	142,072,500	1,039,905
1977	40,603,456	31,943,119	64,133,761	4,262,454	17,869,213	158,812,003	1,462,396
1978	44,033,576	33,868,686	68,604,817	4,616,785	19,574,475	170,698,339	1,402,799
1979	43,854,378	34,317,323	71,739,135	4,621,009	20,464,865	174,996,710	2,055,704
1980	49,714,830	37,118,285	72,864,339	4,915,466	22,713,795	187,326,715	3,014,939
1981	48,978,225	38,837,039	75,737,191	4,692,945	23,220,842	191,466,243	4,007,155
1982	52,419,305	41,388,208	72,864,717	4,938,349	27,156,649	198,767,229	4,061,218
1983	51,376,327	42,209,149	74,861,838	4,957,861	29,211,430	202,616,606	2,447,109
1984	57,211,478	45,539,584	80,693,940	5,449,867	31,088,190	219,983,059	2,274,933
1985	60,381,153	48,539,383	78,003,404	5,871,200	30,980,655	223,775,795	2,986,998
1986	60,695,735	49,969,521	76,175,486	5,919,788	29,920,333	222,680,863	2,973,030
1987	62,255,090	50,790,606	75,761,324	5,907,663	30,823,210	225,537,892	4,236,273
1988	64,742,844	52,754,137	78,354,826	5,916,070	32,967,956	234,735,833	4,052,505
1989	66,681,670	54,154,830	79,377,313	6,057,377	33,854,545	240,125,735	4,275,034
1990	66,955,354	54,749,595	79,286,997	6,064,559	33,204,877	240,261,382	1,247,914
1991	68,540,012	56,235,083	82,809,972	6,217,213	34,146,731	247,949,012	1,723,875
1992	69,980,267	57,739,426	86,854,254	6,301,396	34,972,239	255,847,582	1,032,220
1993	71,505,216	59,352,405	89,332,130	6,431,759	35,853,786	262,475,296	1,185,386
1994	72,991,512	60,983,654	90,277,967	6,540,893	36,740,491	267,534,518	1,284,536
1995	74,753,011	62,895,964	91,450,403	6,678,064	37,876,927	273,654,370	1,538,675
1996	76,489,659	64,890,458	93,857,999	6,818,970	39,082,611	281,139,697	1,479,871
1997	78,054,331	66,905,881	96,460,032	6,954,929	40,294,233	288,669,406	1,573,363
1998	79,858,999	69,050,335	98,595,491	7,095,881	41,522,781	296,123,486	1,747,671
1999	81,736,820	71,386,474	101,199,520	7,239,908	42,826,078	304,388,800	1,978,507
2000	83,379,143	73,673,816	104,261,901	7,384,521	44,056,980	312,756,361	1,939,966
2001	85,348,016	75,609,529	106,645,786	7,528,826	45,301,973	320,434,131	2,201,952
2002	87,528,239	77,419,462	108,717,102	7,677,546	46,493,043	327,835,392	2,089,684
2003	89,677,474	79,240,454	110,821,292	7,827,550	47,736,929	335,303,700	2,150,501
2004	91,843,728	81,097,813	112,962,209	7,977,920	48,993,687	342,875,357	2,235,561

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.3

TOTAL TEXAS

ANNUAL PEAK DEMAND AND RESERVE MARGINS (MW)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	PEAK	ADJUSTMENTS TO PEAK DEMAND			PEAK	NET	RESERVE MARGIN
	DEMAND	EXOGENOUS	ACTIVE	PASSIVE	DEMAND	SYSTEM	
	Before Adj.	FACTORS	DSM	DSM	After Adj.	CAPACITY	
1975	27,736	149	374		27,212	38,409	39.7%
1976	29,781	145	429	1	29,205	40,267	36.5%
1977	31,895	150	464	2	31,279	42,459	34.4%
1978	34,127	103	639	3	33,382	45,449	34.8%
1979	33,811	65	701	3	33,043	48,131	44.2%
1980	38,174	4	707	3	37,460	50,237	32.8%
1981	39,001	(140)	416	3	38,722	50,891	30.1%
1982	39,322	(10)	228	37	39,066	52,344	32.6%
1983	41,822	33	412	79	41,298	53,435	28.1%
1984	43,725	78	539	137	42,971	53,442	23.1%
1985	44,999	(18)	866	218	43,933	55,334	24.7%
1986	46,316	(15)	969	247	45,115	56,460	23.9%
1987	46,333	62	1,235	241	44,795	58,028	28.2%
1988	47,857	75	1,409	202	46,171	60,701	30.2%
1989	48,007	113	1,486	20	46,387	62,400	34.5%
1990	50,174	330	1,629	91	48,124	63,999	33.0%
1991	51,272	468	1,483	(15)	49,335	63,741	29.2%
1992	52,571	616	1,685	(101)	50,372	65,126	29.3%
1993	53,985	881	1,759	(22)	51,367	65,210	26.9%
1994	55,401	1,355	1,560	64	52,421	65,545	25.0%
1995	56,990	1,703	1,530	184	53,574	65,808	22.8%
1996	58,686	1,887	1,585	299	54,915	66,540	21.2%
1997	60,342	2,078	1,640	417	56,206	67,753	20.5%
1998	62,103	2,341	1,696	542	57,524	68,476	19.0%
1999	63,931	2,469	1,748	669	59,045	70,671	19.7%
2000	65,801	2,650	1,784	773	60,594	72,220	19.2%
2001	67,381	2,661	1,819	899	62,002	73,289	18.2%
2002	68,947	2,670	1,857	1,036	63,384	74,720	17.9%
2003	70,514	2,675	1,895	1,164	64,781	76,696	18.4%
2004	72,078	2,677	1,933	1,293	66,175	77,331	16.9%

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 1



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**

**TABLE 1.4**

**TOTAL TEXAS**

**NET GENERATION BY FUEL TYPE (MWH)**

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL						TOTAL
	GAS & OIL	COAL	LIGNITE	NUCLEAR	HYDRO	ALTERNATIVE	
1975	145,769,825	456,705	11,499,088		1,621,330		159,346,948
1976	151,870,207	1,087,290	15,039,941		825,702		168,823,140
1977	164,361,143	4,873,755	17,427,113		992,048		187,654,059
1978	167,147,957	11,015,766	23,173,268		591,075		201,928,066
1979	153,677,997	20,394,805	28,709,667		975,975		203,758,444
1980	154,971,301	34,531,171	31,724,828		841,583		222,068,883
1981	148,747,389	43,669,170	33,280,409		999,765		226,696,733
1982	137,519,198	48,558,074	39,327,332		933,789		226,338,393
1983	126,036,499	57,459,170	42,896,492		878,090	884	227,271,135
1984	135,215,434	58,766,007	43,608,490		719,683	5,759	238,315,373
1985	126,324,394	62,411,330	47,448,594	12,246	1,105,888	7,573	237,310,025
1986	117,057,400	57,769,113	55,633,430	3,564,280	1,433,969	10,331	235,468,522
1987	110,370,509	61,283,660	58,011,589	5,719,357	1,704,916	11,844	237,101,876
1988	110,101,703	65,471,151	60,389,414	12,383,177	925,933	15,813	249,287,190
1989	108,881,341	64,929,525	61,166,087	14,330,227	1,019,508	9,819	250,336,506
1990	91,914,607	64,697,515	60,422,046	29,650,845	1,077,144	10,535	247,772,692
1991	94,872,891	66,845,284	62,495,394	29,829,761	1,077,144	10,535	255,131,008
1992	97,829,178	70,966,157	62,109,349	29,150,902	1,077,144	10,680	261,143,410
1993	97,076,245	73,602,139	61,967,496	36,728,753	1,077,144	10,680	270,462,457
1994	101,350,684	74,504,621	62,432,629	38,808,645	1,077,144	10,680	278,184,403
1995	106,741,101	75,663,361	67,367,266	37,222,553	1,077,144	85,140	288,156,565
1996	107,792,606	77,354,111	71,845,694	37,543,773	1,077,144	85,140	295,698,469
1997	111,462,925	77,229,515	76,234,652	38,681,722	1,077,144	85,140	304,771,099
1998	113,687,211	79,048,872	81,318,428	38,017,736	1,077,144	85,140	313,234,530
1999	116,400,083	83,339,686	83,372,652	37,512,182	1,077,144	85,140	321,786,887
2000	117,119,423	89,676,631	83,310,350	37,657,446	1,077,144	85,140	328,926,134
2001	119,087,379	94,789,974	83,373,652	37,742,989	1,077,144	85,140	336,156,277
2002	118,310,658	102,494,624	83,512,428	37,856,845	1,077,144	85,140	343,336,839
2003	117,770,091	108,653,292	85,819,752	37,933,228	1,077,144	85,140	351,338,647
2004	118,671,611	111,056,024	87,836,859	38,105,555	1,077,144	85,140	356,832,333

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 16



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.5

TOTAL SYSTEM

NET SYSTEM CAPACITY BY SOURCE (MW)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL		LIGNITE	NUCLEAR	HYDRO/ OTHER	TOTAL INSTALLED CAPACITY	FIRM	FIRM	FIRM
	GAS & OIL	COAL					PURCHASES FROM UTILITIES	PURCHASES FROM NON-UTILITIES	OFF-SYSTEM SALES
1975	40,407	111	1,725		429	42,672	1,268	114	787
1976	41,505	428	2,300		429	44,662	1,501	114	826
1977	42,291	1,374	3,050		429	47,144	1,485	114	843
1978	42,991	3,033	3,800		429	50,253	1,617	114	969
1979	42,578	4,310	5,300		429	52,617	1,810	114	1,003
1980	42,864	6,827	5,300		429	55,420	2,472	114	1,723
1981	42,690	6,876	5,845		429	55,840	3,041	114	2,198
1982	42,666	8,290	6,236		429	57,621	4,042	135	3,044
1983	42,910	8,780	6,626		436	58,752	3,890	139	2,914
1984	42,804	9,032	6,626		463	58,925	3,234	366	2,473
1985	42,189	9,605	7,186		482	59,462	3,879	1,566	2,884
1986	40,940	9,718	8,196	855	482	60,192	4,615	2,348	3,477
1987	40,780	10,161	8,955	1,055	480	61,432	3,352	2,785	2,493
1988	41,977	10,583	8,965	2,120	480	64,125	3,034	2,896	2,256
1989	41,724	10,631	8,986	3,755	489	65,586	2,918	3,223	2,212
1990	42,097	10,675	9,162	4,905	497	67,335	2,213	3,257	1,702
1991	42,061	10,694	9,308	4,905	497	67,464	2,049	2,883	1,577
1992	42,061	11,202	9,308	4,905	497	67,972	2,109	2,629	1,635
1993	41,867	11,446	9,308	6,055	497	69,172	2,098	2,655	1,630
1994	42,075	11,471	9,308	6,088	497	69,438	1,976	2,740	1,513
1995	42,229	11,471	10,058	6,088	507	70,352	1,847	2,096	1,390
1996	42,267	11,491	10,808	6,088	507	71,161	2,140	2,030	1,686
1997	42,734	11,491	11,453	6,088	507	72,273	2,182	2,164	1,698
1998	42,772	11,491	12,403	6,088	507	73,261	2,354	1,900	1,866
1999	43,375	12,541	13,048	6,088	507	75,559	2,364	1,801	1,852
2000	43,726	13,689	13,048	6,088	507	77,058	2,581	1,843	2,013
2001	44,153	14,339	13,048	6,088	507	78,135	2,968	1,855	2,357
2002	43,601	16,053	13,048	6,088	507	79,297	3,370	1,873	2,540
2003	43,752	17,028	13,746	6,088	507	81,301	3,622	1,891	2,735
2004	43,593	17,858	13,746	6,088	507	81,792	4,022	1,958	3,063

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.6

PLANNED ADDITIONS AND RETIREMENTS  
TO INSTALLED CAPACITY  
ON A TOTAL SYSTEM BASIS

(Available for System Peak in Year Listed)

1990-1999 Total Net Addition 9,973 MW  
2000-2004 Total Net Addition 6,233 MW  
1990-2004 Total Net Addition 16,205 MW

	Utility	Additions [Retirements]	Construction Cost	MW	Fuel
1990	<u>Net</u>			<u>1,749</u>	
	TUEC	DeCordova CT (1-4)		260	Gas
	TUEC	Permian Basin CT (4, 5)		130	Gas
	TUEC	Comanche Peak (1)	\$5,263,430,000	1,150	Uranium
	LPL	LP&L Cogen	\$18,050,000	21	Gas
	SPS	Maddox #3 (487)	\$1,603,000	10	Gas
	TNP	TNP One (1)	\$349,931,171	146	Lignite
	Others			32	
1991	<u>Net</u>			<u>129</u>	
	TNP	TNP One (2)	\$278,980,998	146	Lignite
	COA	[Seaholm (5, 6)]		(36)	Gas
	Others			19	
1992	<u>Net</u>			<u>508</u>	
	CPS	J K Spruce (1)	\$832,195,000	498	Coal
	Others			10	
1993	<u>Net</u>			<u>1,200</u>	
	TUEC	Comanche Peak (2)	\$3,636,400,000	1,150	Uranium
	LPL	Repower	\$30,000,000	50	Gas
1994	<u>Net</u>			<u>266</u>	
	BEPC	R W Miller (4, 5)		208	Gas
	GSU			33	Uranium
	GSU			15	Coal
	SRMPA			10	Gas



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.6

(CONTINUED)

	Utility	Additions [Retirements]	Construction Cost	MW	Fuel
1995	Net			914	
	COA	[Seaholm (7, 8)]		(28)	Gas
	BEPC	Base 1		288	Gas
	HL&P	N/A (GT 1, 2)	\$85,582,960	160	Gas
	TUEC	[Handley (1, 2)]		(125)	Gas
	TUEC	[North Main]		(80)	Gas
	TUEC	[Trinidad]		(70)	Gas
	TUEC	[Permian Basin]		(1)	Gas
	TUEC	Twin Oak (1)	\$1,485,387,000	750	Lignite
	LPL	Waste Recovery	\$50,000,000	10	Refuse
	CPL	[La Palma (7)]		(47)	Gas
	Others			57	
1996	Net			808	
	EPE	Turbine 1		70	Gas
	TUEC	[Dallas (3, 9)]		(145)	Gas
	TUEC	Twin Oak (2)	\$793,420,000	750	Lignite
	HL&P	N/A (Conversion)	\$227,104	160	Gas
	CPL			(47)	Gas
	SRMPA			20	Gas
1997	Net			1,112	
	TUEC	Unspecified	\$305,467,000	375	Gas
	HL&P	Malakoff 1	\$1,843,309,000	645	Lignite
	WTU	Repower Rio Pecos (5)	\$41,824,000	92	Gas
1998	Net			988	
	COA	[Seaholm (9)]		(36)	Gas
	CPL	Repower Laredo	\$51,698,000	90	Gas
	EPE	Turbine 2		70	Gas
	TUEC	[Mountain Creek (2, 3)]		(103)	Gas
	TUEC	[Morgan Creek (2, 3)]		(66)	Gas
	TUEC	Forest Grove 1	\$1,417,056,000	750	Lignite
	CPS	GT 98 (1, 2)	\$79,080,000	140	Gas
	BEPC	N/A		200	Lignite
	WTU	[Abilene ]		(18)	Gas
	WTU	[Concho 3]		(15)	Gas
	WTU	[Lake Pauline 1]		(19)	Gas
	WTU			(5)	Gas



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.6

(CONTINUED)

	Utility	Additions [Retirements]	Construction Cost	MW	Fuel
1999	<u>Net</u>			<u>2,298</u>	
	COA	FB400	\$457,239	400	Coal
	HL&P	Malakoff (2)	\$1,147,903,000	645	Lignite
	TUEC	Unspecified		650	Coal
	GSU			50	Gas
	CPL	Repower J L Bates	\$90,155,000	175	Gas
	CPS	GT99 (1, 2, 3)	\$127,527,000	210	Gas
	WTU	Repower Rio Pecos (6)	\$29,789,000	41	Gas
	LCRA	N/A		127	Gas
2000	<u>Net</u>			<u>1,499</u>	
	COA	[Holly (1)]		(97)	Gas
	EPE	Combined 1		80	Gas
	TUEC	[Eagle Mountain]		(115)	
	TUEC	[Parkdale (1)]		(87)	
	TUEC	[River Crest]		(110)	
	TUEC	Unspecified		244	Gas
	TUEC	Unspecified		650	Coal
	CPS	J.K. Spruce (2)		498	Coal
	LCRA	N/A		127	Gas
	SWEPCO	Repower Wilkes (2, 3)	\$81,170,000	174	Gas
	WTU	WTU CT	\$64,584,000	135	Gas
2001	<u>Net</u>			<u>1,076</u>	
	TUEC	[Parkdale (2, 3)]		(240)	Gas
	TUEC	[Mountain Creek (6)]		(115)	Gas
	TUEC	Unspecified		255	Gas
	TUEC	Unspecified		650	Coal
	CPL	Repower L C Hill	\$90,449,000	175	Gas
	CPL	[Laredo]		(35)	Gas
	SWEPCO	SWE CT	\$19,991,000	135	Gas
	LCRA			148	Gas
	BEPC	N/A		103	Gas



STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT

TABLE 1.6

(CONTINUED)

	Utility	Additions [Retirements]	Construction Cost	MW	Fuel
2002	<u>Net</u>			<u>1,168</u>	
	TUEC	[Mountain Creek]		(125)	Gas
	TUEC	[Morgan Creek (D, 4)]		(72)	Gas
	TUEC	[Lake Creek (1)]		(87)	Gas
	TUEC	Unspecified		244	Gas
	TUEC	Unspecified		650	Coal
	COA			400	Coal
	CPL	PSO Coal	\$45,407,000	50	Coal
	SWEPSCO	PSO Coal	\$112,608,533	124	Coal
	WTU	PSO Coal	\$59,029,000	71	Coal
	SWEPSCO	[Lone Star]		(50)	Gas
	SWEPSCO	[Knox Lee (2, 3)]		(74)	Gas
	SWEPSCO	[Lieberman (1, 2)]		(56)	Gas
	LCRA	Conversion (-402 gas + 425 coal)		23	Coal
	CPS	GT02 (1)	\$50,082,000	70	Gas
2003	<u>Net</u>			<u>2,005</u>	
	TUEC	[North Lake]		(175)	Gas
	TUEC	[Stryker Creek]		(175)	Gas
	TUEC	Unspecified		366	Gas
	TUEC	Unspecified		650	Coal
	CPL	[Victoria]		(60)	Gas
	CPL	Coletto Creek	\$193,506,000	222	Coal
	SWEPSCO	Coletto Creek	\$163,049,824	212	Coal
	WTU	Coletto Creek	\$54,606,000	72	Coal
	CPS	Mine Mouth Lignite (1)	\$1,205,995,000	498	Lignite
	LCRA			195	Gas
	BEPC			200	Lignite
2004	<u>Net</u>			<u>491</u>	
	COA	[Holly (2)]		(97)	Gas
	TUEC	[Eagle Mountain (2, 3)]		(550)	Gas
	TUEC	Unspecified		650	Coal
	TUEC	Unspecified		488	Gas

Notes: As reported in Load Forecast 1989 Filings, Requests 27, 28, and 29.  
Construction costs include AFUDC where applicable.



**STATEWIDE SUMMARY OF RESOURCE PLANS FILED WITH THE PUCT**



## CHAPTER TWO

### **TEXAS UTILITIES ELECTRIC COMPANY**

Texas Utilities Electric Company (TU Electric or Company) is the principal subsidiary of Texas Utilities Company (Texas Utilities). Texas Utilities also has three other subsidiaries which perform specialized services for the Texas Utilities Company System. Texas Utilities Fuel Company acquires, stores and delivers fuel gas and provides other fuel services for the generation of electric energy by the Company. Texas Utilities Mining Company owns and operates fuel production facilities for the surface mining and recovery of lignite for use at the Company's generating stations. Texas Utilities Services, Inc. furnishes financial, accounting, computer, and other administrative services. Effective January 1, 1984, the Company became the successor by consolidation of Dallas Power & Light Company, Texas Electric Service Company, and Texas Power & Light Company, which had been subsidiaries of Texas Utilities.

The Company is engaged in the generation, purchase, transmission, distribution, and sale of electric energy in the north central, eastern, and western parts of Texas. These areas have a population estimated at 5,220,000—about one-third of the population of Texas. Electric service is provided in 91 counties and 370 incorporated municipalities, including Dallas, Fort Worth, Midland, Odessa, Wichita Falls, Arlington, Irving, Plano, Richardson, Waco, Tyler, and Killeen. The urban areas comprise banking, insurance, and commercial centers with substantial electronics, aerospace, petrochemical and specialized steel manufacturing, and automotive and aircraft assembly. The territory served also includes major portions of the oil and gas fields in the Permian Basin and East Texas, as well as substantial farming and ranching sections of the state and the Dallas-Fort Worth International Airport. TU Electric is a member of the Electric Reliability Council of Texas (ERCOT).

TU Electric operating revenues in 1989 totaled \$4,318,564,721 with total assets as of December 31, 1989 valued at \$16,195,193,523. The Company's capital structure as of



that date was comprised of 43.7 percent common equity, 10.1 percent preferred stock, and 46.2 percent long-term debt.

## **System Resource Planning**

Texas Utilities Electric Company produces an annual System Resource Plan that includes a detailed forecast of anticipated load growth and a plan of the resources to be utilized in meeting those future loads. The objective of the resource planning process is to coordinate and integrate TU Electric's demand-side planning activities with the supply-side planning activities in order to plan to serve the forecasted load while meeting TU Electric's capital expenditure objectives for new plant construction.

The resource planning process consists of the following discrete activities which, when combined in the proper sequence, result in the System Resource Plan:

- o Planning Assumptions
- o Load Forecast
- o Conservation and Load Management Forecast
- o Firm-Load Forecast
- o Supply-Side Plan
- o Financial Assessment
- o Resource Plan Selection

## **Demand Forecast**

After an initial set of planning assumptions is determined, development of forecasts of peak demand and net consumed energy sales is the second step in the system resource planning process. Forecasts of peak demand and net consumed energy sales are derived via a system of econometric equations which produce a forecast of customers and MWH sales by class and an end-use model which generates system demand by hour. TU Electric's Econometric Forecasting Model provides broad perspectives of future developments and alternatives to Company decision makers. Econometric equations of the relationships between electricity consumption and a variety of influences, including weather, economic and demographic changes, and electric and natural gas prices, are determined statistically from actual historical data. Forecasts of these several influences are used in the TU Electric model to estimate levels of future electricity consumption.



## TEXAS UTILITIES ELECTRIC COMPANY

The most important of these forecast factors is the number of jobs added to the service area economy. Employment statistics are the most accurate and up-to-date measures of economic activity at the substate level. More importantly, over the long term, employment opportunities in the service area are a basic determinant of in- and out-migration, income, and other major economic/demographic measures for the service area.

TU Electric service area has demonstrated cyclical job growth historically, experiencing a significant slowing of growth during the 1974-1975 recession and an employment decrease during the 1982-1983 recession and the 1986-1988 downturn in the Texas economy. However, the overall trend through the 1970s and 1980s was one of vigorous growth. The service area's 3.8 percent average annual growth rate (over 63,000 jobs added annually) from 1972 through 1988 reflects its underlying strength and diversity.

From 1983 through 1985, the TU Electric service area experienced strong employment growth as the national recovery gained momentum, as oil prices remained relatively high, and as Texas and the Southwest continued to grow strongly. During this period, employment growth in the service area was also influenced by the passage of the Economic Recovery Tax Act of 1981, which along with the financial deregulation of the 1980s, spurred investments in real estate and overbuilding in metropolitan areas throughout the U.S. This situation was especially true of the Dallas-Fort Worth Consolidated Metropolitan Statistical Area.

During the 1986-1988 period, several coinciding factors caused the service area economy to slow and even contract in some measures: a drastic drop in oil prices; lackluster economic performance in Texas and the Southwest, which impacts the service area through the position of Dallas-Fort Worth as the regional center of commerce; and a collapse of construction activity.

Measured by monthly nonfarm employment in TU Electric Metropolitan Statistical Areas, the service area economy peaked in December 1985 with 2,259,000 jobs before declining to 2,203,000 jobs in February 1987. Since then, the TU Electric service area economy has been on the rebound and reached 2,278,000 jobs in June 1989.

Stable and increasing oil prices, continued growth in the nation, a moderate recovery in the Southwest and Texas, competitively priced office space and housing, and the

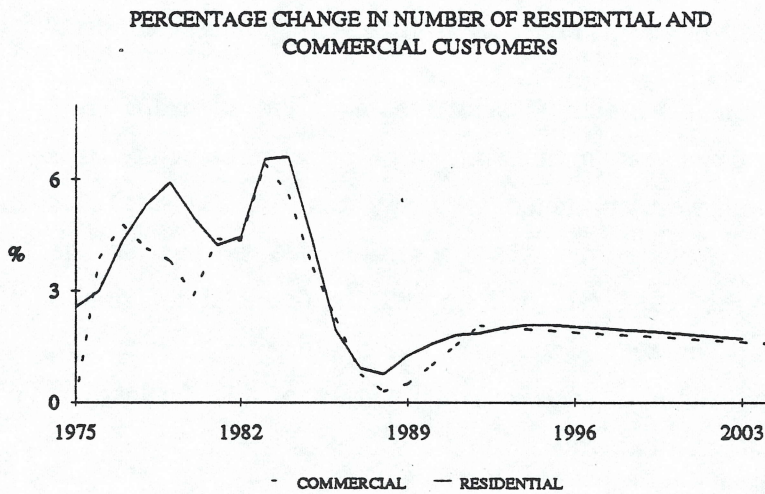


underlying diversity of the Dallas-Fort Worth economy support the 1990-1999 base-case forecast of 2.0 percent average annual employment growth or around 50,000 jobs per year.

**Number of Customers**

Figure 2.1 shows the annual percentage change in the number of residential and commercial customers served by TU Electric.

The Company provided electric service to 1,861,206 residential customers in 1989. The historical data for the period from 1979 through 1989 indicate an average annual compound growth rate of 4.0 percent for the residential class of customer. Growth at a rate of 1.9 percent annually is projected to continue into 1999, with a slightly lower annual growth rate of 1.8 percent during the 1999-2004 period.



Commercial customers totaled 220,333 in 1989. While a 3.1 percent annual increase occurred over the previous 10 years, the projected rate of increase drops by almost half, to slightly less than 1.8 percent per year for the next 10 years. Industrial customers

Figure 2.1

totalled 23,727 in 1989. The annual rate of growth is expected to increase for the number of industrial customers, from 2.6 percent over the historical period to 3.1 percent through 1999.

**Sales**

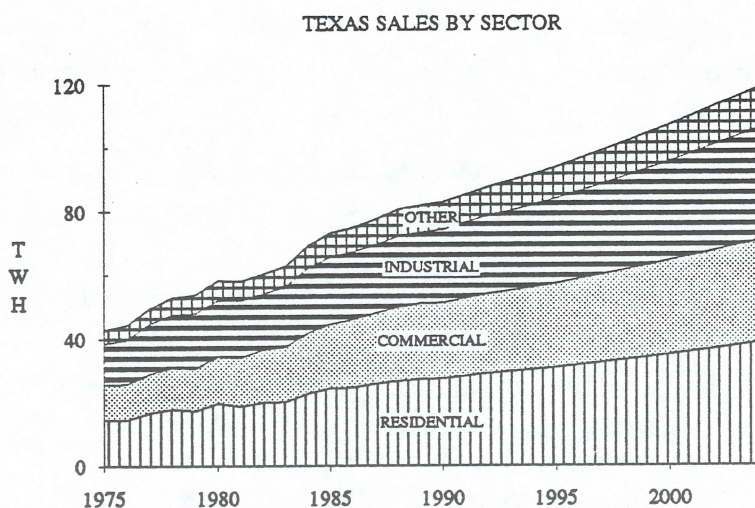
Total system sales were 81,720,696 MWH in 1989 after growing at a compound rate of about 4.3 percent annually for 10 years.

Based on Company projections, growth over the next 10 years will drop to 2.5 percent annually, with an estimated total system sales in 1999 of 104,450,353 MWHs seen in Figure 2.2, sales will continue at a similar rate over the 1999-2004 time period.



## TEXAS UTILITIES ELECTRIC COMPANY

Sales in 1989 to the residential sector totaled 27,204,857 MWH. Sales to residential customers in that year comprised 33.3 percent of total system sales, slightly higher than in 1979, which was 32.4 percent.



(TWH: Terawatt-hours, or Million MWH)

Figure 2.2

The growth rate for the residential sec-

tor is projected to be 2.3 percent annually for the next 10 years and to reach 34,057,692 MWH in 1999. TU Electric projects sales within the commercial sector to increase from 23,836,336 MWH in 1989 at the rate of two percent per annum through 1999, a decrease from the six percent per year average seen during the period from 1979 through 1989. Industrial sales have grown at an average compound annual rate of 2.5 percent since 1979 to a total of 22,163,404 MWH in 1989. Sales to wholesale customers, at 5,825,941 MWH, comprised 7.1 percent of total system sales in 1989 and are expected to retain this share of the total for the next 10 years.

### Peak Demand

Over the period from 1979 through 1989, TU Electric experienced 4.5 percent annual growth in firm peak demand.

Peak demand increased from 10,880 MW in 1979 to 16,944 MW in 1989. TU Electric projects the firm peak demand will increase over the next 10 years (1990-1999) at a growth rate of 2.2 percent per year and continue at about the same rate from 1999-2004. As a result, peak demand will reach to 21,440 MW in 1999 and 24,030 MW in 2004.

### Adjustments to Demand

The TU Electric Conservation and Load Management forecast is based on TU Electric's goal of offsetting 20 percent of the increase in peak demand through Conservation and Load Management programs. The load reduction from load management programs is reported by active and passive load management. Active and passive load management have



fundamentally different impacts on the Company. Passive load management programs include programs such as efficient heating, ventilation, and air conditioning (HVAC) equipment, and building structures and lighting. Once these programs are in place they reduce load regardless of any action on the part of the Company. Active load control, on the other hand, can be controlled at the discretion of the Company. Active load control includes interruptible load and direct control of HVAC and water heating equipment.

The current Conservation and Load Management programs include:

- Energy Action New Residential Program
- Energy Action Existing Residential Program
- Energy Action Non-Residential Program
- Energy Action Room Unit Program
- Energy Action Electric Water Heater Assist Program
- Energy Action Geothermal Heat Pump Program
- Energy Action Thermal Storage Program
- Energy Action Lighting Program
- Energy Action Operation Load Shift Program (Time-of-Day Rates)
- Energy Action Interruptible Load Program

In addition to the programs currently contained in the 1990 Energy Action Program, the 1990 Demand Side Resource Plan forecast includes estimates of demand reduction for future programs that are not currently specified in the program. These future programs include but are not limited to:

- Residential Lighting Program
- Direct Load Control
- Other Future Technology

The forecast of passive demand-side program savings over the 1990-1999 time frame is a 793-MW reduction in 1999 peak demand. The forecast for active load management during the same period is a 524-MW reduction in peak demand. Exogenous factors, primarily the effects of the National Appliance Energy Conservation Act of 1987, should result in conservation of 649 MW in 1999. Subtraction of the load-management savings from the System peak load forecast yields the firm demand that must be served by the supply-side options.



## Supply-Side Plan

TU Electric annually prepares a System Resource Plan that combines a Demand-Side Plan and a Supply-Side Plan, which, when implemented, provide the additional capability needed to serve anticipated future load growth, to replace retired generating capacity, and to replace expired purchased power contracts.

There are many criteria which must be considered when creating a plan of capacity additions to adequately serve anticipated future loads. Following are the major criteria considered for each supply-side plan alternative:

- maintaining system reliability
- creating a plan with low revenue requirements consistent with Company guidelines regarding construction expenditures
- complying with environmental and regulatory requirements
- maintaining TU Electric's minimum generating reserve criteria while considering the ERCOT planning criteria
- maintaining both fuel and capacity diversity
- ensuring adequate plan flexibility to respond to unforeseeable changes

When the Company prepares its annual Supply-Side Plan for use in the System Resource Plan, the various generating capacity options available are determined based upon system capacity needs after consideration of the various factors that influence the planning process, such as fuel cost and availability, capital costs, total revenue requirements, system reliability, and flexibility to respond to future changing conditions.

**Installed Capacity** In 1989, TU Electric owned or operated 70 generating units with a total capacity of 18,389 MW. Gas-fired plants make up 68.2 percent of this capacity; and lignite-fired stations, 31.8 percent. As of December 31, 1988, TU Electric's gas, oil, and lignite production plant in service carried a total historical cost of \$3,121,200,625.

**Net System Capacity** Installed capacity plus the net of firm off-system sales and purchases yields net system capacity. This is the capacity shown in Figure 2.3. The purchases of firm 2,059 MW from other utilities, cogenerators, and other small power producers, no firm sales, and installed capacity of 18,389 MW resulted in a net system capacity of 20,448 MW in 1989.



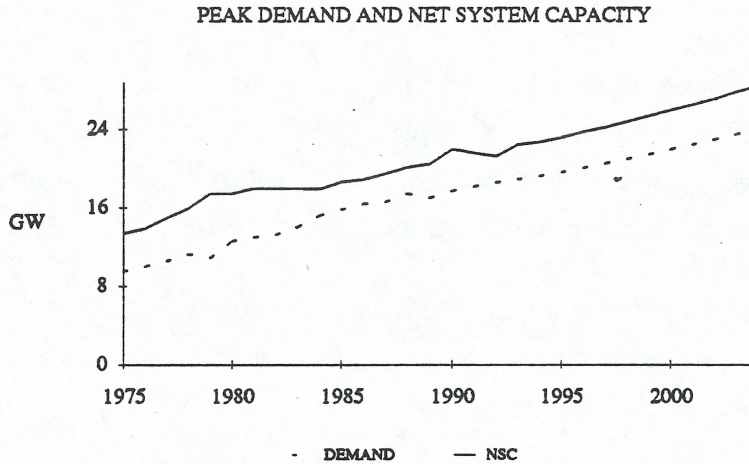
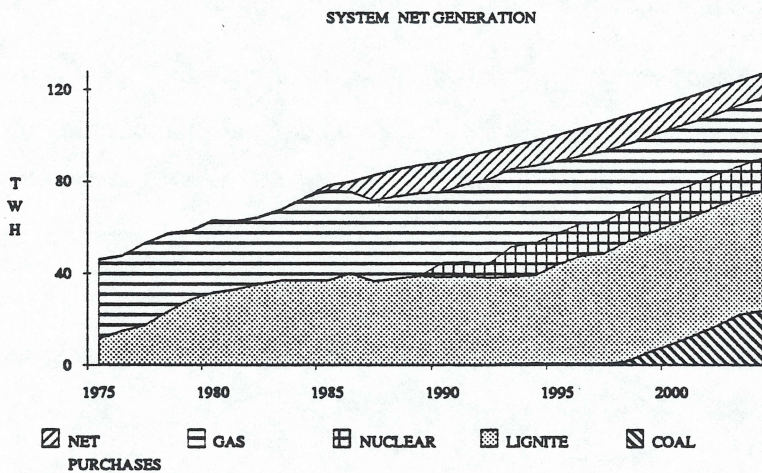


Figure 2.3

account for a large portion of the purchased capacity. Suppliers of capacity include Aluminum Company of America; Tex-La Electric Cooperative of Texas, Inc.; CoGen Lyondell, Inc.; Power Resource, Inc.; CoGenron, Inc.; Wichita Falls Energy Company; Texasgulf, Inc.; Encogen One Partners, Ltd.; Tenaska III Texas Partners; Dow Chemical Company; Rayburn Country Electric Cooperative, Inc.; and Bio-Energy Partners.

**Net Generation**

For the year 1989, gas and oil provided 48.0 percent of the



(TWH: Terawatt-hours, or Million MWH)

Figure 2.4

reliance on fossil fuels by adding nuclear-fueled units to its net generation. Comanche

The Company plans no firm off-system sales for the forecast period. Firm purchases made up about 10.0 percent of net system capacity in 1989 and are projected to decrease to 7.0 percent in 1999. Purchases from cogenerators

energy generated and lignite 52.0 percent, as seen in Figure 2.4. This differs only slightly from the generation mix in 1979, which shows gas and oil supplied 50.5 percent and lignite 49.5 percent.

TU Electric is diversifying its



TEXAS UTILITIES ELECTRIC COMPANY

Peak Unit One was turned over to the TU Electric dispatcher for inclusion in the daily generation plan in August 1990. Unit Two is now scheduled for 1993.

**System Expansion** Planned capacity additions will increase total installed generating capacity (shown in Figure 2.5) by over 29 percent over the next ten-year period to 23,764 MW. A policy of diversifying the fuel mix is evidenced by the Comanche Peak nuclear plant under construction in Somervell and Hood Counties. TU Electric added 1,150 MW of nuclear capacity in 1990 and anticipates adding an additional 1,150 MW in 1993. Nuclear power will account for 5.8 percent of total installed capacity in 1990 and 9.7 percent in 1999. Additions to lignite capacity in 750-MW increments from Twin Oak 1 and 2 in Robertson County in 1995 and 1996 and Forest Grove 1 in Henderson County in 1998 will provide baseload capacity. Additions to gas capacity will involve six new 65-MW gas combustion turbines (390 MW total) and one new combined cycle combustion turbine at 375 MW for a total of 765 MW over the next ten-year forecast period. Eleven gas generating units with a total of 590 MW capacity are scheduled to be retired by 1999, resulting in a net addition to installed gas capacity of 175 MW. While the period beyond 1999 does not represent an official forecast of TU Electric, projected demand may require additional generating capacity, represented at the present time by five coal-fired units and approximately 1,600 MW of combustion turbine capacity.

Two major transmission system projects will take place in 1990, involving construction of 17.4 miles of 345-KV circuit and installation of a 600-MVA, 345/138-KV autotransformer in Dallas County, and 12.7 miles of 138-

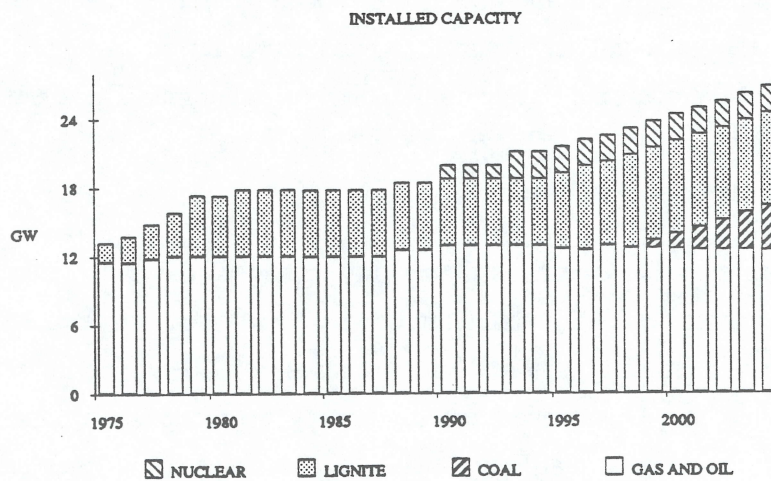


Figure 2.5

KV circuit in Tarrant County. In 1991 four major transmission projects are planned. These include construction of 40.7 miles of 345-KV circuit in Johnson, Tarrant, Parker,



and Somervell Counties; 16.0 miles of 345-KV circuit in Titus County in a joint project with Southwestern Electric Power Company; 27.0 miles of 138-KV circuit in Ector and Crane Counties; and 16.5 miles of 138-KV circuit in Smith County. In 1992, two major transmission projects are planned, one involving 33 miles of 345-KV circuit in Parker and Tarrant Counties and the other involving 40 miles of 138-KV circuit in Midland and Andrews Counties. The only significant transmission system addition planned for 1993 is 2.4 miles of 138-KV circuit in Collin County. The two major projects for 1994 involve 88 miles of 345-KV circuit through Freestone, Navarro, Ellis, and Dallas Counties and 20 miles of 138-KV circuit in Collin County. For the period 1995 through 1999, there are twelve 345/138-KV autotransformers planned and approximately 350 miles of 345-KV circuit planned.

**Changes Since the 1987 Filing**

The information reported above from the Company's 1989 filing reflects several changes that have been made since the Company's 1987 filing. A number of power plant construction projects have been deferred. The on-line date for Comanche Peak Unit 2 has been deferred from 1992 to 1993, and TU Electric has agreed to purchase the ownership interests of the Texas Municipal Power Agency, Brazos Electric Power Cooperative, Inc., and Tex-La Electric Cooperative of Texas, Inc. in Comanche Peak. The planned dates of commercial operation for Twin Oak Units 1 and 2 have been deferred from 1994 and 1995 to 1995 and 1996, respectively. Forest Grove 1, previously expected to be in commercial operation in 1997, has been deferred one year to 1998. The 390 MW capacity of combustion turbines has been deferred from 1996 to 1997 and changed to a 375-MW combined cycle combustion turbine unit. These deferrals reflect lower demand forecasts and overall growth rates as well as the continued availability of firm cogeneration purchases.

With regard to purchased capacity changes, the 1987 filing identified 2,185 MW of purchases in 1997, which included 770 MW of unspecified resources, while the 1989 filing identified 1,689 MW of purchases in 1997, which included 450 MW of unspecified resources. Unspecified resources may be made up of one or more of the following: purchases from qualifying facilities, purchases from other utilities, deferred retirements, simple-cycle or combined-cycle combustion turbines, additional reduction in demand resulting from conservation or load management programs, or solid-fueled base-loaded generating units. The drop in purchases from the 1987 filing to the 1989 filing is



*TEXAS UTILITIES ELECTRIC COMPANY*

primarily due to a reduction in the firm, peak-load forecast growth from 2.6 percent per year to 2.2 percent per year over the corresponding ten-year forecast periods. The 1989 filing identifies a total of 1,574 MW of purchases by 1999, which includes 750 MW of unspecified resources.



**RESOURCE PLAN FILED WITH PUCT**

**TABLE 2.1**

**TU ELECTRIC COMPANY  
NUMBER OF CUSTOMERS**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RETAIL			ALL OTHER	
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	WHOLESALE
1975	1,079,128	138,217	16,230	10,513	61
1976	1,106,602	143,586	16,560	10,943	61
1977	1,139,823	150,435	16,961	11,177	59
1978	1,189,435	156,665	17,602	11,301	61
1979	1,252,657	162,622	18,317	11,455	71
1980	1,326,771	167,280	19,193	11,445	77
1981	1,392,678	174,650	20,183	10,377	79
1982	1,451,429	182,227	21,145	10,111	72
1983	1,516,023	193,914	21,959	10,195	63
1984	1,615,015	204,763	23,446	10,258	62
1985	1,721,791	212,164	23,985	12,230	61
1986	1,795,922	216,948	24,086	12,875	61
1987	1,830,517	218,589	23,913	13,378	64
1988	1,847,357	219,237	23,919	13,853	64
1989	1,861,206	220,333	23,727	15,067	67
1990	1,884,679	222,523	24,335	14,911	61
1991	1,914,224	225,939	25,026	15,125	61
1992	1,948,886	230,595	25,754	15,399	61
1993	1,985,310	235,212	26,443	15,675	61
1994	2,024,996	239,836	27,248	15,951	61
1995	2,067,066	244,456	28,190	16,227	61
1996	2,109,982	249,064	29,187	16,503	61
1997	2,152,917	253,659	30,195	16,779	61
1998	2,195,783	258,239	31,241	17,055	61
1999	2,238,567	262,806	32,331	17,328	61
2000	2,281,202	267,353	33,460	17,600	61
2001	2,323,516	271,881	34,640	17,867	61
2002	2,365,480	276,390	35,878	18,131	61
2003	2,407,110	280,872	37,143	18,395	61
2004	2,448,382	285,328	38,391	18,659	61

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 12



TEXAS UTILITIES ELECTRIC COMPANY

TABLE 2.2

TU ELECTRIC COMPANY

ANNUAL SALES BY SECTOR (MWH)

(After Adjustments for Exogenous Factors and DSM Programs)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RETAIL SALES			ALL OTHER		TOTAL SYSTEM	TOTAL OFF-SYSTEM
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	WHOLESALE		
1975	14,575,846	11,026,495	12,962,019	1,333,765	2,912,637	42,810,762	39,253
1976	14,548,407	11,338,371	13,917,588	1,425,665	3,100,357	44,330,388	
1977	16,642,382	12,347,755	15,678,254	1,565,518	3,445,380	49,679,289	23
1978	17,943,224	13,117,202	16,469,636	1,728,056	3,869,018	53,127,136	107,143
1979	17,394,404	13,264,435	17,275,859	1,669,727	4,155,815	53,760,240	365,202
1980	19,844,409	14,683,104	17,581,265	1,796,988	4,454,706	58,360,472	138,795
1981	18,676,240	15,383,162	17,992,261	1,692,108	4,417,993	58,161,764	255,780
1982	19,945,086	16,475,251	17,526,411	1,730,272	4,612,885	60,289,905	90,237
1983	20,162,506	17,366,562	18,690,077	1,790,473	4,670,437	62,680,055	29,871
1984	22,693,288	19,026,268	20,343,557	1,920,422	5,127,042	69,110,577	15,196
1985	24,300,789	20,349,335	20,921,532	2,324,782	5,396,133	73,292,571	77,325
1986	24,604,110	21,453,433	21,013,279	2,385,169	5,398,768	74,854,759	400,015
1987	25,716,080	22,324,328	21,420,706	2,499,980	5,501,169	77,462,263	310,389
1988	26,634,150	23,187,120	22,287,734	2,613,602	5,740,711	80,463,317	261,230
1989	27,204,857	23,836,336	22,163,404	2,690,158	5,825,941	81,720,696	221,819
1990	27,432,234	23,785,267	23,102,760	2,701,258	5,842,431	82,863,950	222,778
1991	28,276,743	24,386,567	23,731,118	2,772,937	6,046,651	85,214,016	222,778
1992	29,058,782	24,977,753	24,374,647	2,844,753	6,260,671	87,516,606	222,778
1993	29,582,510	25,535,464	25,052,461	2,911,188	6,490,949	89,572,572	222,778
1994	30,162,934	25,957,513	25,769,368	2,963,771	6,699,333	91,552,919	222,778
1995	30,831,990	26,539,679	26,541,300	3,034,549	6,936,075	93,883,593	222,778
1996	31,612,014	27,130,648	27,448,955	3,107,209	7,177,262	96,476,088	222,778
1997	32,400,049	27,722,794	28,254,232	3,180,038	7,422,828	98,979,941	222,778
1998	33,226,533	28,330,833	29,289,534	3,254,892	7,672,252	101,774,044	222,778
1999	34,057,692	28,938,095	30,198,416	3,329,943	7,926,207	104,450,353	222,778
2000	34,927,043	29,560,676	31,100,154	3,406,925	8,184,845	107,179,643	222,778
2001	35,808,503	30,186,286	32,244,187	3,484,611	8,447,774	110,171,361	222,778
2002	36,732,936	30,829,889	33,267,875	3,564,678	8,715,563	113,110,941	222,778
2003	37,669,326	31,477,905	34,311,656	3,645,383	8,987,992	116,092,262	222,778
2004	38,602,498	32,123,737	35,391,974	3,725,860	9,265,228	119,109,297	222,778

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



**RESOURCE PLAN FILED WITH PUCT**

**TABLE 2.3**

**TU ELECTRIC COMPANY  
ANNUAL PEAK DEMAND AND RESERVE MARGINS(MW)  
AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
1975	9,674		169		9,505	13,352	40.5%
1976	10,240		238		10,002	13,864	38.6%
1977	10,798		273		10,525	14,919	41.7%
1978	11,548		316		11,232	15,932	41.8%
1979	11,202		322		10,880	17,432	60.2%
1980	12,970		379		12,591	17,412	38.3%
1981	12,970				12,970	17,957	38.5%
1982	13,204				13,204	17,957	36.0%
1983	14,029				14,029	17,957	28.0%
1984	15,265		76		15,189	17,905	17.9%
1985	15,898		129		15,769	18,614	18.0%
1986	16,537		130		16,407	18,854	14.9%
1987	16,680		113		16,567	19,465	17.5%
1988	17,620		160		17,460	20,115	15.2%
1989	17,146		202		16,944	20,448	20.7%
1990	18,067	12	295	75	17,685	21,945	24.1%
1991	18,667	23	336	168	18,140	21,545	18.8%
1992	19,268	101	357	248	18,562	21,245	14.5%
1993	19,749	180	377	304	18,888	22,395	18.6%
1994	20,231	258	400	360	19,213	22,695	18.1%
1995	20,811	336	425	436	19,614	23,169	18.1%
1996	21,444	414	449	522	20,059	23,697	18.1%
1997	22,077	493	474	608	20,502	24,222	18.1%
1998	22,735	571	499	699	20,966	24,803	18.3%
1999	23,406	649	524	793	21,440	25,338	18.2%
2000	24,097	727	549	891	21,930	25,946	18.3%
2001	24,802	805	573	992	22,432	26,491	18.1%
2002	25,541	884	597	1,100	22,960	27,101	18.0%
2003	26,288	962	621	1,209	23,496	27,767	18.2%
2004	27,033	1,040	645	1,318	24,030	28,403	18.2%

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 1



TEXAS UTILITIES ELECTRIC COMPANY

TABLE 2.4

TU ELECTRIC COMPANY

NET GENERATION BY FUEL TYPE (MWH)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS/OIL	COAL	LIGNITE	NUCLEAR	TOTAL
1975	34,363,854		11,499,088		45,862,942
1976	32,533,915		15,039,941		47,573,856
1977	35,729,122		17,427,113		53,156,235
1978	34,022,809		23,173,268		57,196,077
1979	29,341,762		28,709,667		58,051,429
1980	31,140,813		31,724,828		62,865,641
1981	29,533,522		32,913,891		62,447,413
1982	29,011,849		35,212,877		64,224,726
1983	30,730,441		36,976,153		67,706,594
1984	35,545,693		37,036,944		72,582,637
1985	39,484,319		36,871,077		76,355,396
1986	35,538,822		39,929,049		75,467,871
1987	35,145,809		36,733,116		71,878,925
1988	35,538,345		37,955,052		73,493,397
1989	35,953,518		38,971,877		74,925,395
1990	30,671,000		38,221,000	6,583,000	75,475,000
1991	33,725,000		38,912,000	6,122,000	78,759,000
1992	36,406,000		38,029,000	6,450,000	80,885,000
1993	33,610,000	795,000	37,726,000	13,310,000	85,441,000
1994	33,297,000	1,040,000	38,034,000	14,385,000	86,756,000
1995	31,350,000	862,000	43,037,000	13,690,000	88,939,000
1996	29,495,000	661,000	46,937,000	14,060,000	91,153,000
1997	30,487,000	641,000	47,990,000	14,082,000	93,200,000
1998	28,476,000	1,905,000	51,637,000	14,112,000	96,130,000
1999	28,102,000	5,936,000	51,562,000	14,112,000	99,712,000
2000	27,872,000	9,430,000	51,715,000	14,156,000	103,173,000
2001	26,979,000	13,315,000	51,700,000	14,112,000	106,106,000
2002	26,299,000	17,386,000	51,832,000	14,112,000	109,629,000
2003	26,387,000	22,270,000	50,563,000	14,112,000	113,332,000
2004	26,296,000	24,003,000	52,011,000	14,156,000	116,466,000

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 16



RESOURCE PLAN FILED WITH PUCT

TABLE 2.5  
 TU ELECTRIC COMPANY  
 NET SYSTEM CAPACITY BY SOURCE - TOTAL SYSTEM (MW)  
 AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS & OIL	COAL	LIGNITE	NUCLEAR	FIRM	PURCHASES	FIRM	NET
					PURCHASES	FROM	FROM	OFF-SYSTEM
					UTILITIES	NON-UTILITIES	SALES	CAPACITY
1975	11,492		1,725		75	60		13,352
1976	11,469		2,300		35	60		13,864
1977	11,774		3,050		35	60		14,919
1978	12,037		3,800		35	60		15,932
1979	12,037		5,300		35	60		17,432
1980	12,017		5,300		35	60		17,412
1981	12,017		5,845		35	60		17,957
1982	12,017		5,845		35	60		17,957
1983	12,017		5,845		35	60		17,957
1984	11,965		5,845		35	60		17,905
1985	11,959		5,845		450	360		18,614
1986	11,959		5,845		50	1,000		18,854
1987	11,959		5,845		50	1,611		19,465
1988	12,544		5,845		50	1,676		20,115
1989	12,544		5,845		50	2,009		20,448
1990	12,934		5,845	1,150		2,016		21,945
1991	12,934		5,845	1,150		1,616		21,545
1992	12,934		5,845	1,150		1,316		21,545
1993	12,934		5,845	2,300		1,316		22,395
1994	12,934		5,845	2,300		1,616		22,695
1995	12,658		6,595	2,300		1,616		23,169
1996	12,513		7,345	2,300		1,539		23,697
1997	12,888		7,345	2,300		1,689		24,222
1998	12,719		8,095	2,300		1,689		24,803
1999	12,719	650	8,095	2,300		1,574		25,338
2000	12,651	1,300	8,095	2,300		1,600		25,946
2001	12,551	1,950	8,095	2,300		1,595		26,491
2002	12,511	2,600	8,095	2,300		1,595		27,101
2003	12,527	3,250	8,095	2,300		1,595		27,767
2004	12,465	3,900	8,095	2,300		1,643		28,403

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.
- 3) Beginning in 1995, "Purchases from Non-Utilities" includes "Unspecified Resources," which may be made up of one or more of the following: purchases from qualifying facilities, purchases from other utilities, deferred retirements, simple-cycle or combined-cycle combustion turbines, additional reduction in demand resulting from conservation or load management programs, or solid-fueled base-loaded generating units.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



## CHAPTER THREE

### HOUSTON LIGHTING AND POWER COMPANY

Houston Lighting & Power Company (HL&P) is a public utility engaged in generating, purchasing, transmitting, and distributing electricity. The utility's service area covers an estimated 5,000 square miles in the Texas Gulf Coast Region, including the City of Houston. HL&P is a member of ERCOT.

HL&P is an investor-owned company. The Company's 1988 total electric operating revenues were \$3,063,573,000 while total assets as of December 31, 1988 were valued at \$9,183,737,000.

HL&P is a summer peaking utility with annual peak demand usually occurring during the months of either July or August. The 1988 peak firm demand occurred on August 9 and was 10,422 MW. Due to mild weather during both July and August, the 1989 peak firm demand of 10,456 MW (including wholesale sales to Texas-New Mexico Power Company) was set on September 1. This represents the first September peak since 1963 and an all-time record demand despite the relative mildness of the summer. At the time of peak, there was an additional load of 1,086 MW of interruptible service and 190 MW of off-system sales to Rayburn County and Tex-La Electric Cooperative. The 1988-1989 winter peak occurred on February 6 and was 8,829 MW. However, more recently, an all-time record winter peak demand of 9,651 MW was on Friday, December 22, 1989, which was followed the next day by record cold temperatures and what some consider a statewide power crisis. Total 1989 system sales amounted to 56,959,602 MWH. Currently, HL&P has 13,644 MW of installed capacity in addition to contracts for 956 MW of firm cogeneration power.

In 1989, about 39 percent of the total net energy for load was generated by the utility using gas as the primary fuel. Cogeneration, primarily gas fired, represented another 15 percent of total energy. The remaining electricity was generated utilizing either coal, lignite, or nuclear sources of energy. With both of the South Texas Project's nuclear



generating units now in commercial operation, it is projected that the share of energy produced by coal, lignite and nuclear sources will increase to 47 percent in 1990.

## Demand Forecast

In formulating its forecasts, HL&P uses the Data Resources, Inc. projection of the national economy to drive the HL&P Service Area Model. This model generates a forecast of local population, employment, income, price deflators, and other economic variables. In addition, HL&P uses information from Pace Consultant's chemical outlook, estimates of self-generation, electricity and gas prices, residential appliance efficiencies, appliance market penetration, and weather data in its econometric and end-use modeling systems. The results of these models then are adjusted for the impact of demand-side management programs.

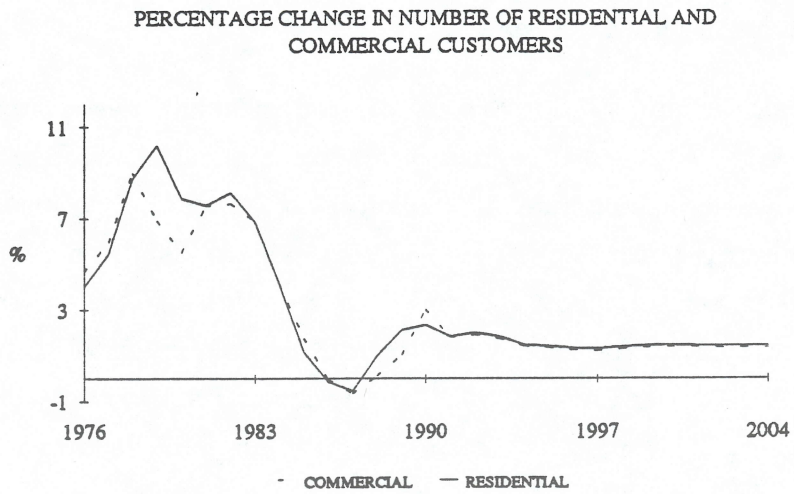
HL&P's official forecast, designated Case 89-A-204, is the forecast which incorporates all of the above steps and adjustments. It reflects the impact of HL&P's conservation, load management, and sales promotion programs. For clarification and to facilitate complying with PUCT reporting requirements, HL&P has prepared an intermediate case which is identified as the "raw" forecast, Case 89-R-204. The "raw" forecast represents a projection of load before adjustments for self-generation, appliance efficiency standards mandated in the National Appliance Energy Conservation Act, and demand-side management activities. The first column in Table 3.3, "Peak Demand Prior to Adjustments" is equivalent to Case 89-R-204, and HL&P's official forecast of *firm* demand equals the figures listed in the final column, "Peak Demand After Adjustments."

**Number of Customers** HL&P provided electric service to an average of 1,183,022 residential customers in 1989. Reflecting Houston's improving economy, Figure 3.1 shows that the number of residential customers has grown steadily since the downturns in the summers of 1986 and 1987. HL&P projects a 1.6 percent annual growth rate for this class for the years 1989-1999 and a 1.4 percent annual rate over 1999-2004. In contrast, the residential class grew at 6.9 percent and 0.7 percent during the years 1979-1984 and 1984-1989, respectively. Other classes are also projected to grow at annual rates in the range of 1.3 percent to 1.6 percent which, similar to the residential class, are considerably less than those experienced in the late 1970s and early 1980s.



**HOUSTON LIGHTING AND POWER COMPANY**

Overall, the customer projections reflect a continuation of Houston's economic recovery with a moderate and sustainable growth rate in the future.

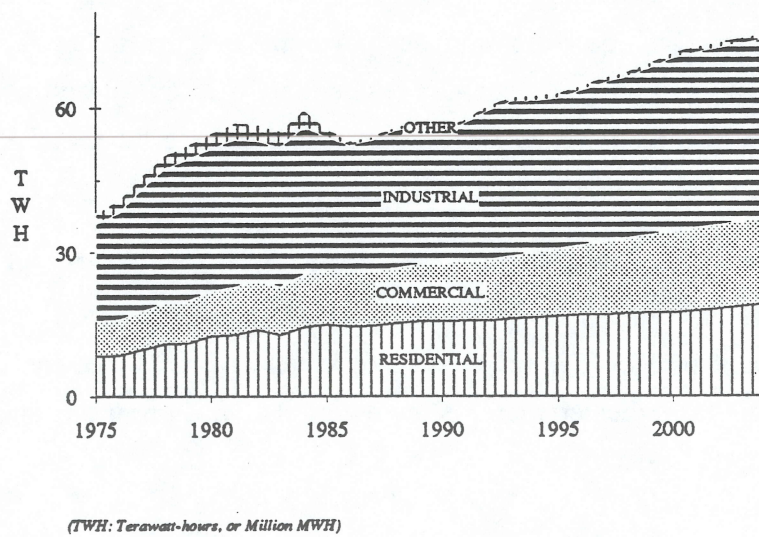


*Figure 3.1*

**Sales**

System MWH sales are projected to grow at 1.9 percent per year during the period 1989-1999 and at 1.7 percent per year from 1999-2004. The residential class is projected to grow only 1.0 percent annually over the 10-year period due to a decline in usage per customer, which is impacted by improvements in appliance efficiencies mandated in the National Appliance Energy Conservation Act of 1987.

**TEXAS SALES BY SECTOR**



(TWH: Terawatt-hours, or Million MWH)

*Figure 3.2*

Commercial and industrial sales are forecast to grow at annual rates of 3.2 percent and 1.8 percent, respectively. Contributing to lower industrial growth rate are a projected



slowdown of the U. S. economy in 1990 and increases in self-generation. Sales by sector are shown in Figure 3.2.

**Peak Demand** System demand including interruptible service is projected to grow 1.5 percent annually through 1999. Reflecting some conversion of interruptible loads to firm service, firm demand is forecast to grow at 2 percent per year through 1999. From 1999 to 2004 firm demand is forecast to slow to 1.9 percent annually. Included in the demand forecast are 150 MW to represent contingencies for standby service and 190 MW by 1999 of firm service to Texas-New Mexico Power Company (TNP). Service to TNP primarily involves meeting daily load swings and a projected annual growth in the TNP Southeast Division of approximately 12 MWs per year.

**Adjustments to Demand** The 89-A-204 load forecast incorporates numerous demand-side adjustments in addition to self-generation and appliance efficiency adjustments. These adjustments include the promotion of sales, load management, and conservation programs. Examples of sales promotion programs include economic development and the industrial motors activities. Load management programs include residential A/C control and commercial thermal storage, while examples of conservation programs include the Good Cents new home and home energy audit programs.

HL&P projects that interruptible loads will total 726 MW in 1999. The net impact of HL&P strategic sales promotion, conservation, and load management programs is an increase of 386 MW at the time of system peak. Since the filing of this forecast data, HL&P has indicated that it is reviewing its DSM programs and may eliminate some sales promotion activities.

## **Supply-Side Plan**

**Installed Capacity** HL&P had an installed capacity of approximately 13,644 MW in 1989. In addition, HL&P had 820 MW of cogenerated power under contract on a firm basis. HL&P's generation mix included 9,099 MW of gas-fired capacity of which 4,668 MW had a dual fuel capability to burn fuel oil. Significant amounts of coal and lignite capacity were also in use. These sources represented 2,335 MW and 1,440 MW, respectively. A total of 770 MW of nuclear capacity, representing



HL&P's 30.8 percent share of the South Texas Project, is now operational. Table 3.5 shows installed capacity by fuel type.

**Net System Capacity**

Net system capacity for 1989 is 14,464 MW. This includes 820 MW of firm, cogenerated power. In 1990, 136 MW were added through contract with Applied Energy Systems, Inc. Net system capacity and peak demand after adjustments are shown in Figure 3.3, where the reserve margin is the distance between the two.

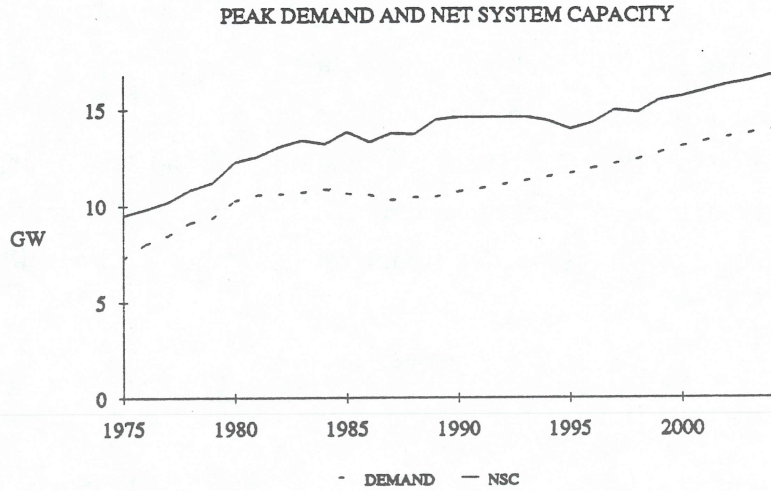
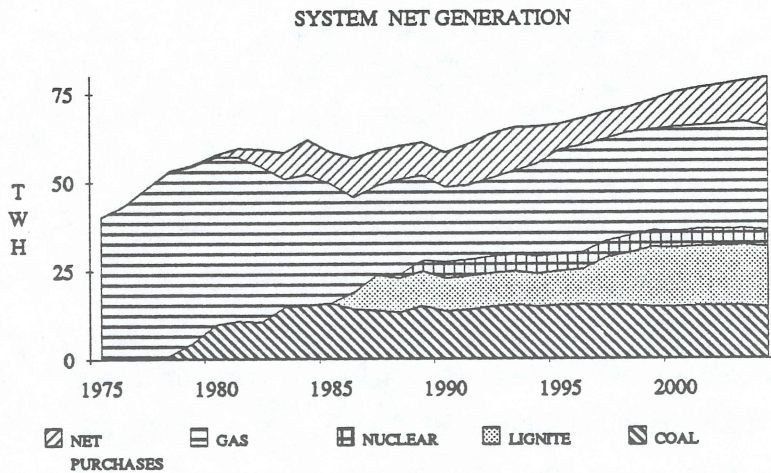


Figure 3.3

**Net Generation**

Net energy for load is projected to grow at about 2.0 percent annually from 1989-1999. Net generation by fuel type is shown in Figure 3.4. As projected, the energy from coal and lignite will surpass that from natural gas, not



(TWH: Terawatt-hours, or Million MWH)

Figure 3.4



counting cogeneration or other purchases, by 1998. The nuclear output is projected to remain fairly constant throughout the forecast period.

**System Expansion** System net capacity is projected to increase by 935 MW during 1990-1999. As shown in Figure 3.5, the next capacity addition is planned for 1995 and will consist of two gas turbines rated at a combined 160 MW. Additionally, six existing gas turbines are planned for conversion to combined-cycle operation in 1996, which will add an additional 160 MW of capacity. HL&P's resource plan also includes the construction of two 645 MW lignite generating units at its Malakoff site with respective commercial operation commencing in 1997 and 1999.

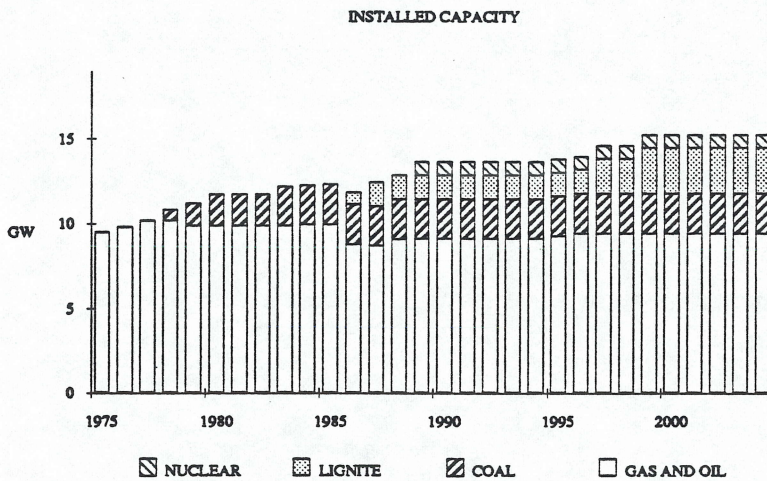


Figure 3.5

Although the expansion plan indicates that the existing cogeneration contracts expire in the mid-1990s, by no means has HL&P abandoned cogeneration as a potentially viable resource option. As the current long term, firm cogeneration contracts

expire, HL&P will have a wide array of alternative resources from which to choose to meet its future needs. However, HL&P must first define the resource plan with the lowest reasonable cost, excluding purchased capacity, to ensure that a viable plan to meet expected needs is in place should cogeneration not be available. Thus, the "Firm Purchases from Utilities" listed in Table 3.5 beginning in 1996 may come from any source, including DSM, cogeneration, new generating units, as well as purchased power as listed.



### **Changes Since the 1987 Filing**

In comparison to the forecast filed in December 1987 (designated Case 87-112), the current forecast (Case 89-A-204) is similar in most respects. A few differences are worthy of mention, however. One change involves methodology: The Residential End-use Energy Planning System model (REEPS) is now used in place of the SHAPES model to estimate residential sales. The economic outlook for Houston has improved more quickly than previously forecasted. Consequently, the actual number of residential customers in 1989 is approximately 20,000 more than the 1987 projection for 1989. The extent of Houston's economic recovery and the expectation of good performance in the future has been incorporated into the current forecast. Another change of interest is a recently negotiated long-term agreement with Texas-New Mexico Power Company for the purchase of power from Houston Lighting & Power. While 1987's forecast projected no sales to TNP after 1991, contracts filed in PUCT Docket 8636 provide for sales beyond this date.



RESOURCE PLAN FILED WITH PUCT

TABLE 3.1

HOUSTON LIGHTING AND POWER COMPANY  
NUMBER OF CUSTOMERS

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RETAIL			ALL OTHER RETAIL	WHOLESALE	TOTAL SYSTEM
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL			
1975	623,865	88,460	1,193	71	6	713,595
1976	648,806	92,593	1,297	74	6	742,776
1977	684,064	98,111	1,418	75	6	783,674
1978	743,634	106,915	1,499	80	6	852,134
1979	819,297	114,279	1,550	80	6	935,212
1980	883,755	120,552	1,597	70	6	1,005,980
1981	950,577	129,660	1,660	70	6	1,081,973
1982	1,027,751	139,544	1,725	71	6	1,169,097
1983	1,097,946	149,113	1,768	72	6	1,248,905
1984	1,142,903	155,262	1,786	73	6	1,300,030
1985	1,155,891	157,975	1,801	75	6	1,315,748
1986	1,154,063	157,896	1,762	78	6	1,313,805
1987	1,147,463	156,833	1,767	79	8	1,306,150
1988	1,158,605	157,006	1,771	79	8	1,317,469
1989	1,183,022	158,594	1,792	81	6	1,343,495
1990	1,210,729	163,347	1,807	82	8	1,375,973
1991	1,232,894	166,280	1,836	82	6	1,401,098
1992	1,257,436	169,475	1,869	82	6	1,428,868
1993	1,280,309	172,422	1,899	82	6	1,454,718
1994	1,299,080	174,824	1,922	82	6	1,475,914
1995	1,317,493	177,169	1,946	82	6	1,496,696
1996	1,334,792	179,364	1,968	82	6	1,516,212
1997	1,352,137	181,562	1,990	82	6	1,535,777
1998	1,370,810	183,928	2,015	82	6	1,556,841
1999	1,390,415	186,414	2,041	82	6	1,578,958
2000	1,410,617	188,973	2,068	82	6	1,601,746
2001	1,431,035	191,560	2,095	82	6	1,624,778
2002	1,451,444	194,148	2,123	82	6	1,647,803
2003	1,472,150	196,776	2,151	82	6	1,671,165
2004	1,493,156	199,443	2,180	82	6	1,694,867

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 12



HOUSTON LIGHTING AND POWER COMPANY

TABLE 3.2

HOUSTON LIGHTING AND POWER COMPANY

ANNUAL SALES BY SECTOR (MWH)

(After Adjustments for Exogenous Factors and DSM Programs)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER		TOTAL	TOTAL
				RETAIL	WHOLESALE	SYSTEM	OFF-SYSTEM
1975	8,427,429	7,346,187	20,124,216	89,884	2,158,832	38,146,548	
1976	8,529,177	7,491,637	22,243,925	91,798	2,502,164	40,858,701	
1977	9,759,137	8,012,512	25,370,150	96,943	2,646,982	45,885,724	
1978	10,956,914	8,568,635	27,808,895	103,049	2,838,273	50,275,766	
1979	11,078,887	8,813,791	29,309,384	106,847	3,051,593	52,360,502	
1980	12,566,097	9,324,496	29,672,733	91,307	3,143,646	54,798,279	5,341
1981	12,917,958	9,901,638	30,564,666	92,740	3,403,017	56,880,019	345
1982	13,876,081	10,365,640	28,866,303	94,244	3,327,122	56,529,390	
1983	12,910,640	10,000,706	28,944,329	96,465	3,266,412	55,218,552	7,583
1984	14,423,832	10,944,623	30,693,441	99,341	3,586,916	59,748,153	
1985	14,981,112	11,490,874	27,418,046	103,808	1,653,429	55,647,269	321,447
1986	14,627,569	11,437,464	26,192,806	107,039	721,093	53,085,971	921,586
1987	14,701,438	11,188,926	27,441,200	108,176	637,478	54,077,218	1,834,108
1988	15,250,510	11,552,427	28,475,671	108,369	713,962	56,100,939	1,012,404
1989	15,699,502	11,775,557	28,689,553	109,160	685,830	56,959,602	838,605
1990	15,713,613	12,066,212	27,075,415	109,821	626,610	55,591,671	
1991	15,748,296	12,255,325	28,818,863	110,437	713,468	57,646,389	
1992	15,817,808	12,643,354	30,966,521	111,047	886,060	60,424,790	
1993	16,164,290	13,035,696	32,047,343	111,632	902,224	62,261,185	
1994	16,394,462	13,490,579	31,551,783	112,187	918,388	62,467,399	
1995	16,793,057	14,011,579	31,186,049	112,719	934,553	63,037,957	
1996	17,022,851	14,517,740	31,997,242	113,226	950,717	64,601,776	
1997	17,012,256	15,026,878	33,089,604	113,711	966,881	66,209,330	
1998	17,257,846	15,584,901	33,487,975	114,174	983,046	67,427,942	
1999	17,434,038	16,186,810	34,540,274	114,616	999,210	69,274,948	
2000	17,459,911	16,810,597	35,946,210	115,038	1,015,374	71,347,130	
2001	17,804,717	17,215,699	36,438,809	115,441	1,015,374	72,590,040	
2002	18,242,057	17,440,712	36,697,126	115,826	1,015,374	73,511,095	
2003	18,691,410	17,668,212	36,958,266	116,193	1,015,374	74,449,455	
2004	19,153,124	17,898,484	37,222,495	116,544	1,015,374	75,406,021	

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



TABLE 3.3  
HOUSTON LIGHTING AND POWER COMPANY  
ANNUAL PEAK DEMAND AND RESERVE MARGINS (MW)  
AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs.	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
1975	7,465		213		7,252	9,494	30.9%
1976	8,219		200		8,019	9,810	22.3%
1977	8,645		200		8,445	10,170	20.4%
1978	9,362		248		9,114	10,828	18.8%
1979	9,602		266		9,336	11,193	19.9%
1980	10,535		269		10,266	12,244	19.3%
1981	10,819		279		10,540	12,544	19.0%
1982	10,744		116	34	10,594	13,044	23.1%
1983	11,051		302	74	10,675	13,396	25.5%
1984	11,326		345	130	10,851	13,200	21.6%
1985	11,324		519	188	10,617	13,813	30.1%
1986	11,474		714	203	10,557	13,284	25.8%
1987	11,524		1,016	206	10,302	13,755	33.5%
1988	11,662		1,075	165	10,422	13,675	31.2%
1989	11,563	46	1,086	(25)	10,456	14,464	38.3%
1990	12,010	287	1,061	(74)	10,736	14,600	36.0%
1991	11,778	390	814	(296)	10,870	14,600	34.3%
1992	12,012	468	951	(484)	11,077	14,600	31.8%
1993	12,441	657	992	(480)	11,272	14,600	29.5%
1994	12,810	1,047	754	(473)	11,482	14,375	25.2%
1995	13,207	1,322	683	(453)	11,655	13,940	19.6%
1996	13,622	1,430	701	(446)	11,937	14,300	19.8%
1997	13,955	1,511	718	(439)	12,165	14,945	22.9%
1998	14,389	1,698	739	(430)	12,382	14,809	19.6%
1999	14,804	1,748	761	(421)	12,716	15,454	21.5%
2000	15,237	1,813	781	(421)	13,064	15,654	19.8%
2001	15,425	1,744	786	(421)	13,316	15,954	19.8%
2002	15,565	1,673	794	(421)	13,519	16,254	20.2%
2003	15,706	1,599	802	(421)	13,726	16,454	19.9%
2004	15,848	1,522	810	(421)	13,937	16,754	20.2%

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 1



HOUSTON LIGHTING AND POWER COMPANY

TABLE 3.4

HOUSTON LIGHTING AND POWER COMPANY

NET GENERATION BY FUEL TYPE (MWH)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS	COAL	LIGNITE	NUCLEAR	TOTAL
1975	40,101,806				40,101,806
1976	43,167,408				43,167,408
1977	48,367,469				48,367,469
1978	51,905,025	1,006,000			52,911,025
1979	49,807,672	4,688,000			54,495,672
1980	47,339,219	9,696,000			57,035,219
1981	46,105,733	10,885,000			56,990,733
1982	43,874,109	10,425,000			54,299,109
1983	36,226,786	14,612,000			50,838,786
1984	37,024,408	15,112,000			52,136,408
1985	33,630,872	15,616,012	189,909		49,436,793
1986	26,682,183	13,989,740	4,835,643		45,507,566
1987	25,222,288	13,738,569	9,837,289		48,798,146
1988	26,801,419	13,174,942	9,581,867	1,167,747	50,725,975
1989	23,971,440	15,015,667	9,816,689	3,017,990	51,821,786
1990	21,021,000	13,549,000	9,223,000	4,637,000	48,430,000
1991	21,096,000	13,931,000	9,384,000	4,637,000	49,048,000
1992	22,215,000	14,771,000	9,401,000	4,706,000	51,093,000
1993	23,406,000	15,415,000	9,330,000	4,796,000	52,947,000
1994	26,057,000	14,688,000	9,406,000	4,797,000	54,948,000
1995	29,482,000	15,252,000	9,406,000	4,797,000	58,937,000
1996	30,134,000	15,329,000	10,002,000	4,812,000	60,277,000
1997	28,695,000	15,232,000	13,315,000	4,797,000	62,039,000
1998	29,170,000	15,126,000	14,733,000	4,797,000	63,826,000
1999	28,406,000	14,671,000	16,871,000	4,595,000	64,543,000
2000	29,298,000	14,645,000	16,652,000	4,678,000	65,273,000
2001	29,167,000	14,988,000	16,721,000	4,779,000	65,655,000
2002	29,658,000	15,013,000	16,742,000	4,780,000	66,193,000
2003	29,973,000	15,050,000	16,946,000	4,780,000	66,749,000
2004	28,932,000	14,397,000	17,007,000	4,780,000	65,116,000

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 16



TABLE 3.5  
HOUSTON LIGHTING AND POWER COMPANY  
NET SYSTEM CAPACITY BY SOURCE (MW)  
AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS AND OIL	COAL	LIGNITE	NUCLEAR	FIRM PURCHASES FROM UTILITIES	FIRM PURCHASES FROM NON-UTILITIES	FIRM OFF-SYSTEM SALES	NET SYSTEM CAPACITY
1975	9,494							9,494
1976	9,810							9,810
1977	10,170							10,170
1978	10,168	660						10,828
1979	9,873	1,320						11,193
1980	9,873	1,871			500			12,244
1981	9,873	1,871			800			12,544
1982	9,873	1,871			1,300			13,044
1983	9,869	2,327			1,200			13,396
1984	9,948	2,327			700	225		13,200
1985	9,948	2,370			700	795		13,813
1986	8,773	2,335	720		500	956		13,284
1987	8,685	2,335	1,440		475	820		13,755
1988	9,080	2,335	1,440			820		13,675
1989	9,099	2,335	1,440	770		820		14,464
1990	9,099	2,335	1,440	770		956		14,600
1991	9,099	2,335	1,440	770		956		14,600
1992	9,099	2,335	1,440	770		956		14,600
1993	9,099	2,335	1,440	770		956		14,600
1994	9,099	2,335	1,440	770		731		14,375
1995	9,259	2,335	1,440	770		136		13,940
1996	9,419	2,335	1,440	770	200	136		14,300
1997	9,419	2,335	2,085	770	200	136		14,945
1998	9,419	2,335	2,085	770	200			14,809
1999	9,419	2,335	2,730	770	200			15,454
2000	9,419	2,335	2,730	770	400			15,654
2001	9,419	2,335	2,730	770	700			15,954
2002	9,419	2,335	2,730	770	1,000			16,254
2003	9,419	2,335	2,730	770	1,200			16,454
2004	9,419	2,335	2,730	770	1,500			16,754

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.
- 3) Firm Purchases from Utilities beginning in 1996 are unspecified resources (see page 3.7).

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



## CHAPTER FOUR

### **GULF STATES UTILITIES COMPANY**

Gulf States Utilities Company (GSU) is a public utility primarily in the business of generating, purchasing, transmitting, and distributing electricity in portions of southeastern Texas and southcentral Louisiana. GSU also operates as a retail gas utility in and around Baton Rouge, Louisiana. The utility's service area extends 350 miles westward from Baton Rouge, Louisiana, to a point about 50 miles east of Austin, Texas. The 28,000 square mile service area encompasses the northern suburbs of Houston, and the cities of Conroe, Huntsville, Port Arthur, Orange, and Beaumont, Texas; Lake Charles and Baton Rouge, Louisiana. GSU is a member of the Southwest Power Pool electric reliability council.

GSU is an investor-owned company. Its revenues for 1989 totaled \$1,607,406,261, while total assets as of December 31, 1989 were \$6,726,591,199. The Company's capital structure at that date was comprised of 39.8 percent common equity, 12.9 percent preferred and preference stock, and 47.3 percent long-term debt.

The Company holds four wholly-owned subsidiaries. In July 1987, the Company sold the oil and gas reserves of Prudential, which was in the business of exploring, developing, and operating oil and gas properties in Texas and Louisiana. Varibus operates intrastate gas pipelines in Louisiana to serve the Company's generating stations. Varibus also, through a division known as Vari Tech, markets computer-aided engineering and drafting technologies and related computer equipment and services. Finance was incorporated under the laws of the Netherland Antilles for the purpose of borrowing funds outside the U.S. and lending the funds to the Company and its subsidiaries. GSG&T, Inc. owns Lewis Creek station, a 530-MW gas fired generating plant which is leased and operated by GSU.

GSU is a summer peaking utility, reporting a 1989 peak demand after adjustments of 4,970 MW. The Texas portion of that peak was 2,194 MW. Total system sales in 1989



were 27,466,189 MWH with 12,089,744 MWH sold in Texas. GSU has 6,438 MW of installed capacity. In 1989, about 60 percent of the total electricity distributed by the utility used gas as the primary fuel, with nuclear, coal, and oil providing the rest of the energy.

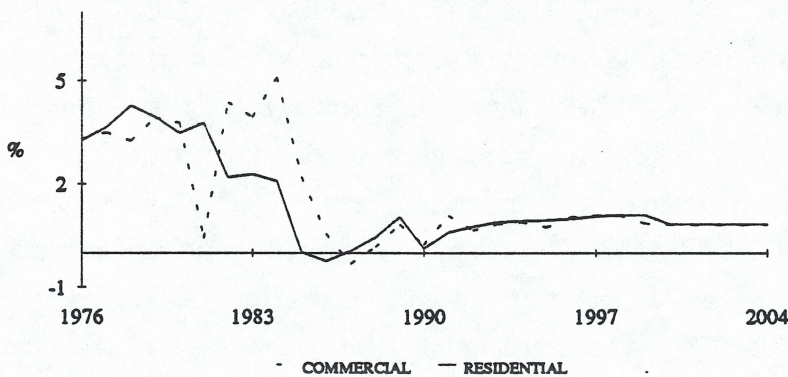
### Demand Forecast

GSU uses an end-use approach to arrive at a total sales forecast. For the residential sector, the Residential End-use Energy Planning System (REEPS) enumerates the major household energy-using activities, appliance acquisitions, operating efficiencies, and load patterns to project sales. The Commercial End-use Modeling System (CEDMS), run as a complement to econometric models, factors in square footage of commercial space and the saturation of commercial electrical appliances, including lighting to project sales. Discussions with major industrial customers round out the forecast of total sales. The Company uses the sales forecast and a load shape by end-use as inputs to the Hourly Electric Load Model (HELM) to distribute the energy forecast over time and arrive at the forecast of peak demand.

**Number of Customers**

As of December 1989, GSU provided electric service to 247,235 residential customers in Texas. The historical data for the period

PERCENTAGE CHANGE IN NUMBER OF RESIDENTIAL AND COMMERCIAL CUSTOMERS TEXAS ONLY



from 1979 through 1989 reflect an annual growth rate of 1.6 percent for this class of customers. As shown in Figure 4.1, GSU expects growth from 1990 at approximately one percent annually through 1999. In Texas, the Company served 28,588 commercial customers as of December 1989. Growth experienced from 1979 to 1989 averaged 2

Figure 4.1

customers as of December 1989. Growth experienced from 1979 to 1989 averaged 2



**GULF STATES UTILITIES COMPANY**

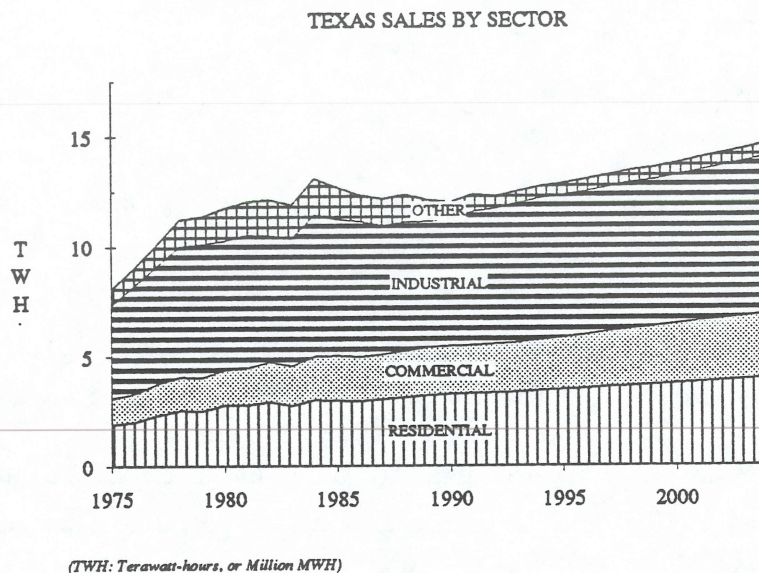
percent per year and the Company projects growth to continue at 1.2 percent annually over the forecast period. GSU does not project the number of industrial customers.

**Sales** System sales for 1989 totalled 27,466,189 MWH. The total for the Texas portion of the system was 12,089,744 MWH. Figure 4.2 shows the sales for the Texas service area. Total retail sales in Texas amounted to 11,264,855 MWH in 1989. Texas retail sales are projected to grow at the rate of approximately 1.6 percent annually through 1999 to total 13,140,543 MWH and at a similar rate over the 1999-2004 period to total 14,190,709 MWH.

As seen in Figure 4.2, the industrial class is the primary customer of power in the GSU service area, having purchased 12,332,664 MWH, or 45 percent of total system sales in 1989. Industrial customers in Texas purchased 47 percent of the sales, or 5,730,475 MWH. Industrial

sales declined by an average 0.5 percent yearly over the past decade. GSU projects growth in industrial sales in Texas to occur at an annual rate of 1.5 percent, reaching 6,644,714 MWH by 1999.

In 1989, the second largest contributor to total sales was the residential sector. Sales to residential customers comprised 24 percent of total system sales and 27 percent of Texas system sales. In 1989, the residential sector in Texas purchased 3,220,486 MWH of electricity. The Company projects an annual growth rate for sales to the residential sector in Texas of 1.4 percent, down from the 2.5 percent average per year experienced from 1979 through 1989.



*Figure 4.2*



Historically, the Texas commercial sector exhibited an average growth rate of 3.6 percent annually. GSU predicts 2 percent growth yearly through 1999 in sales to commercial customers, increasing its share to 20 percent of sales excluding wholesale.

The remaining retail sales are composed primarily of sales to municipalities for street lighting and other purposes. These sales amounted to 136,247 MWH in 1989, or about one percent of the retail sales in Texas for that year. GSU projects growth at one percent per year for this category.

The 824,889 MWH purchased at wholesale in Texas from the Company in 1989 amounts to 7 percent of the total Texas sales. GSU expects a decline in sales to wholesale customers over the forecast horizon.

**Peak Demand** Over the period from 1979 through 1989, GSU experienced a total decline of 0.5 percent in the annual peak demand for its total system, but the Texas region grew at a 0.2 percent annual rate. The Company projects growth from 1989 to 1999 to occur at about 1.1 percent annually for both the total system peak and the Texas peak, and growth from 1999-2004 at 1.4 percent for the system and at 1.5 percent in Texas. GSU anticipates a peak demand of 5,561 MW for its total system by 1999 and 5,965 MW in 2004.

The residential sector accounted for about 43 percent of the total system coincident-peak demand in 1990 and the industrial about 30 percent. The sector with the highest non-coincident peak in Texas for 1990, the residential sector, is projected to require 1,074 MW at some point in 1990, the industrial sector 790 MW, and the commercial sector 551 MW.

**Adjustments to Demand** The Company assumes that its program impacts of conservation and load management activities are embedded in the historic data and, as a result, reports no adjustments to its projections of peak demand due to future conservation and load management activity other than interruptible load. In 1989, GSU contracted for 177 MW of interruptible load in Texas. Of this, 63 MW were available to GSU for interruption at the time of the 1989 summer peak.



## Supply-Side Plan

**Installed Capacity** In 1989, GSU operated 16 generation units with an installed capacity of approximately 6,438 MW of electricity. Seventy-eight percent of this capacity is fueled by gas. The Company owns 612 MW of coal-fired capacity and 655 MW of nuclear-powered generating capacity. GSU reported its production plant balance as of December 31, 1989 of \$4.589 billion less accumulated depreciation of \$0.890 billion for a book value of \$3.699 billion.

### Net System Capacity

In 1989, the net system capacity for the total system was 6,609 MW. Firm purchases, for the total system, amounted to 192 MW in 1989, and firm off-system sales totaled 21 MW.

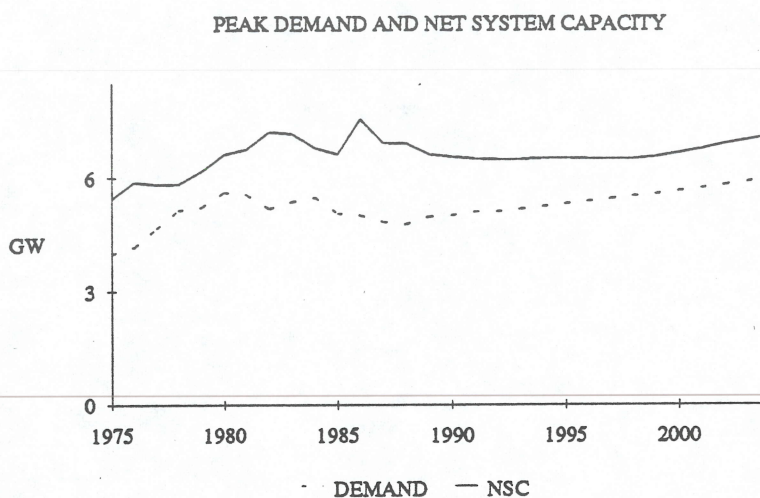


Figure 4.3

The Company projects no firm off-system sales. Firm

purchases are projected to decline to 57 MW in 1999. GSU attributed a 33.0 percent reserve margin to the total system in 1989. With installed capacity remaining below 6,500 MW and purchases declining, the system reserve margin is predicted to decline slowly to 17.7 percent in 1999.

### Net Generation

Gas was used to generate 17,478,534 MWH, or 73 percent of the 23,955,660 MWH produced in 1989 by the total system. As seen in Figure 4.4, the percentage of generation by gas has been falling at an average annual rate of 2 percent since 1977 and is projected to continue falling through the forecast period, although at a slower rate of less than 1 percent per year.



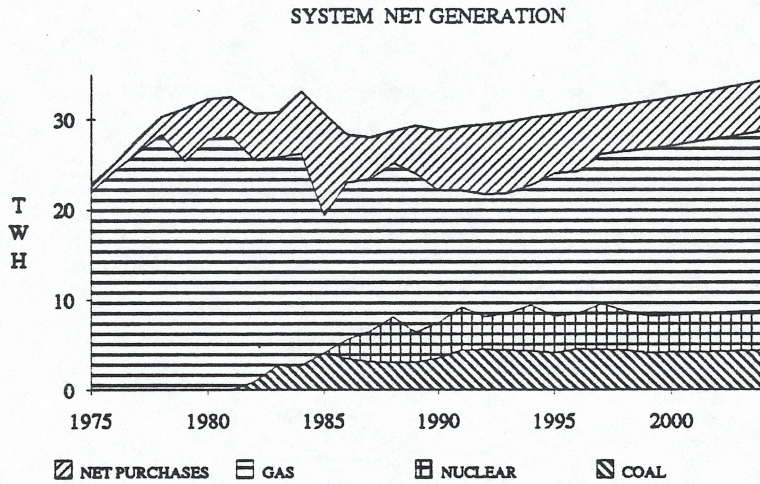


Figure 4.4

Generation from coal amounted to 13 percent of the 1989 total. Purchase made up 18 percent of the total MWH at the source in 1989. Purchase are projected to decline to 16 percent in 1999. The River Bend nuclear plant provided 14 percent. Coal is projected to provide more energy in the future.

**System Expansion**

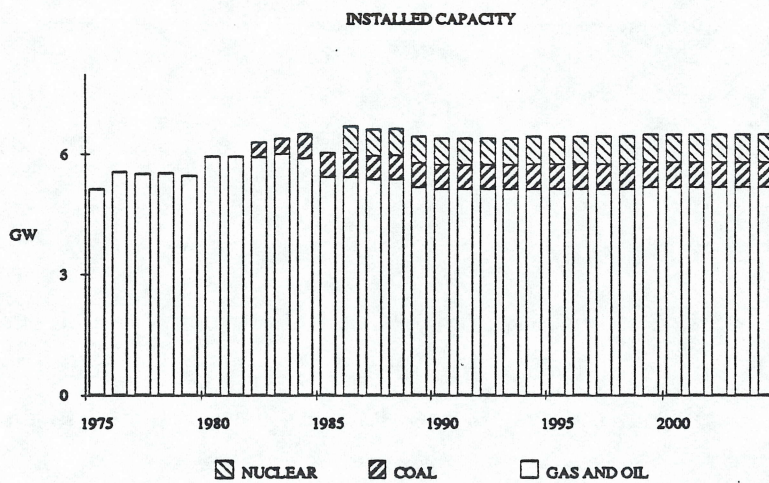


Figure 4.5

GSU plans no other additions or reductions to the generating capacity over the forecast period, as shown in Figure 4.5, other than minor maintenance-related rating changes to existing units. Additional capacity may be required in the period

1999-2004. Certain GSU power plant sites were initially established for generating units not now planned to be installed over the next ten years. However, the potential for adding initially planned capability is limited by financial, water, environmental, and transmission requirements, site layout, and fuel supply. Specific units, listed in



*GULF STATES UTILITIES COMPANY*

"Potential Additions at Existing Sites," may also be limited by ambient air quality standards, station water balance, cooling pond temperature, water discharge permit, and solid waste handling and storage. Site-specific studies would be needed to determine the best technology and size of any unit additions.

GSU plans two transmission construction projects in Texas and Louisiana of 500-KV line for 1995 and 1996 totaling 61 miles and 88 miles.



**RESOURCE PLAN FILED WITH PUCT**

**TABLE 4.1A**

**GULF STATES UTILITIES COMPANY**

**NUMBER OF CUSTOMERS - TEXAS**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER	
				RETAIL	WHOLESALE
1975	179,496	21,245	3,236	709	53
1976	186,085	21,695	3,600	755	54
1977	194,190	22,253	4,334	774	51
1978	203,150	22,706	4,138	824	51
1979	209,927	23,403	3,635	865	56
1980	217,533	24,250	3,632	934	56
1981	226,178	24,859	3,648	948	56
1982	232,163	25,662	4,082	966	56
1983	237,258	26,583	4,257	1,041	53
1984	242,572	27,821	3,957	1,094	54
1985	241,457	28,221	3,626	1,214	41
1986	241,977	28,444	3,330	1,298	39
1987	242,520	28,225	3,262	1,319	37
1988	244,116	28,299	3,442	1,441	26
1989	247,235	28,588	3,536	1,468	12
1990	248,913	28,670	3,555	1,468	12
1991	251,445	28,951	3,574	1,468	12
1992	254,340	29,260	3,593	1,468	12
1993	257,275	29,600	3,613	1,468	12
1994	260,167	30,037	3,632	1,468	12
1995	263,142	30,455	3,652	1,468	12
1996	266,111	30,921	3,671	1,468	12
1997	269,170	31,389	3,691	1,468	12
1998	272,252	31,864	3,711	1,468	12
1999	275,370	32,315	3,731	1,468	12
2000	278,153	32,703	3,751	1,468	12
2001	280,963	33,096	3,771	1,468	12
2002	283,803	33,493	3,792	1,468	12
2003	286,671	33,896	3,812	1,468	12
2004	289,567	34,303	3,833	1,468	12

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 12



GULF STATES UTILITIES COMPANY

TABLE 4.1B

GULF STATES UTILITIES COMPANY  
 NUMBER OF CUSTOMERS - TOTAL SYSTEM  
 AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER	
				RETAIL	WHOLESALE
1975	365,335	44,281	5,970	1,052	93
1976	377,302	45,752	6,855	1,080	95
1977	391,031	47,352	7,768	1,101	90
1978	407,761	48,892	7,696	1,113	100
1979	423,850	50,807	6,665	1,117	108
1980	438,560	52,731	6,768	1,145	117
1981	455,160	52,955	6,723	1,151	79
1982	465,162	55,265	7,297	1,124	75
1983	475,782	57,446	7,770	1,188	70
1984	485,711	60,372	7,226	1,278	72
1985	485,825	61,712	6,586	1,408	53
1986	484,608	62,059	5,978	1,427	55
1987	484,838	61,861	5,761	1,395	56
1988	486,993	61,958	6,040	1,575	42
1989	492,054	62,469	6,149	1,603	27
1990	492,672	62,620	6,160	1,603	27
1991	495,556	63,295	6,171	1,603	27
1992	499,273	63,705	6,182	1,603	27
1993	503,767	64,233	6,193	1,603	27
1994	508,467	64,806	6,204	1,603	27
1995	513,312	65,290	6,215	1,603	27
1996	518,336	65,969	6,226	1,603	27
1997	523,787	66,690	6,237	1,603	27
1998	529,576	67,411	6,248	1,603	27
1999	535,429	67,986	6,259	1,603	27
2000	539,900	68,546	6,270	1,603	27
2001	544,409	69,110	6,281	1,603	27
2002	548,955	69,678	6,292	1,603	27
2003	553,539	70,252	6,303	1,603	27
2004	558,162	70,830	6,314	1,603	27

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 12



**RESOURCE PLAN FILED WITH PUCT**

**TABLE 4.2A**

**GULF STATES UTILITIES COMPANY**

**ANNUAL SALES BY SECTOR - TEXAS (MWH)**

*(After Adjustments for Exogenous Factors and DSM Programs)*

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER RETAIL	WHOLESALE	TOTAL SYSTEM	TOTAL OFF-SYSTEM
1975	1,922,457	1,191,848	4,222,743	75,497	660,716	8,073,261	3,199
1976	2,021,021	1,280,640	4,914,939	81,310	737,762	9,035,672	4,493
1977	2,333,212	1,398,751	5,341,201	91,535	898,995	10,063,694	5,630
1978	2,562,313	1,494,929	5,938,679	98,977	1,119,425	11,214,323	6,935
1979	2,513,666	1,517,014	6,065,241	103,306	1,170,304	11,369,531	2,584
1980	2,781,238	1,612,190	5,867,206	114,758	1,354,777	11,730,169	1,059
1981	2,778,862	1,697,824	6,023,816	115,095	1,411,648	12,027,245	1,355
1982	2,926,368	1,816,427	5,727,550	115,851	1,532,371	12,118,567	3,010
1983	2,751,044	1,813,822	5,782,414	116,604	1,425,244	11,889,128	36,989
1984	3,030,827	1,987,281	6,398,581	129,313	1,531,584	13,077,586	2,783
1985	2,986,631	2,048,831	6,168,759	127,691	1,334,614	12,666,526	128,791
1986	2,955,654	2,027,337	6,137,405	132,144	1,082,932	12,335,472	133,069
1987	3,033,318	2,042,643	5,831,324	134,909	1,114,941	12,157,135	112,257
1988	3,138,613	2,085,870	5,865,354	135,539	1,129,910	12,355,286	158,117
1989	3,220,486	2,177,647	5,730,475	136,247	824,889	12,089,744	172,776
1990	3,279,790	2,187,410	5,755,738	138,685	638,781	12,000,404	
1991	3,312,426	2,196,142	6,057,181	139,648	652,817	12,358,214	
1992	3,340,711	2,208,148	6,175,424	140,617	394,973	12,259,873	
1993	3,375,954	2,250,718	6,321,320	141,594	397,935	12,487,521	
1994	3,432,342	2,307,477	6,428,179	142,578	400,920	12,711,496	
1995	3,476,317	2,366,419	6,462,555	143,568	403,927	12,852,786	
1996	3,520,291	2,433,002	6,516,853	144,565	406,956	13,021,667	
1997	3,592,646	2,506,134	6,585,956	145,570	410,008	13,240,314	
1998	3,642,390	2,583,632	6,646,010	146,581	413,084	13,431,697	
1999	3,702,380	2,645,849	6,644,714	147,600	416,182	13,556,725	
2000	3,756,435	2,699,560	6,739,069	148,942	419,303	13,763,309	
2001	3,811,279	2,754,361	6,834,764	150,296	422,448	13,973,148	
2002	3,866,923	2,810,274	6,931,817	151,664	425,617	14,186,295	
2003	3,923,380	2,867,323	7,030,249	153,044	428,809	14,402,805	
2004	3,980,662	2,925,530	7,130,079	154,438	432,025	14,622,734	

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



GULF STATES UTILITIES COMPANY

TABLE 4.2B

GULF STATES UTILITIES COMPANY  
 ANNUAL SALES BY SECTOR - TOTAL SYSTEM (MWH)  
 (After Adjustments for Exogenous Factors and DSM Programs)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER RETAIL	WHOLESALE	TOTAL SYSTEM	TOTAL OFF-SYSTEM
1975	4,004,412	2,949,440	10,530,131	2,675,200	1,421,961	21,581,144	275,500
1976	4,198,447	3,170,084	11,901,070	2,988,182	1,544,216	23,801,999	284,014
1977	4,789,629	3,486,192	13,239,841	3,182,951	1,838,603	26,537,216	331,838
1978	5,198,421	3,738,111	14,489,776	3,213,731	2,251,489	28,891,528	302,168
1979	5,147,436	3,759,289	15,005,270	3,399,477	2,430,478	29,741,950	246,374
1980	5,682,016	3,969,392	14,908,109	3,148,992	2,876,972	30,585,481	465,451
1981	5,717,714	4,178,127	15,116,637	3,109,686	2,574,859	30,697,023	507,043
1982	5,991,578	4,359,739	13,776,639	2,808,451	2,032,096	28,968,503	491,673
1983	5,686,439	4,341,094	14,313,068	2,793,953	1,870,933	29,005,487	297,474
1984	6,209,347	4,745,055	15,981,753	2,860,348	1,897,392	31,693,895	113,292
1985	6,224,555	4,964,417	13,637,482	2,542,782	1,636,026	29,005,262	238,624
1986	6,174,568	4,920,882	12,201,261	2,408,742	1,243,563	26,949,016	1,090,479
1987	6,208,961	4,911,378	11,827,917	2,456,165	1,215,864	26,620,285	845,102
1988	6,326,088	5,023,754	12,085,214	2,544,003	1,217,533	27,196,592	882,422
1989	6,473,021	5,197,356	12,332,664	2,546,816	916,332	27,466,189	260,320
1990	6,497,118	5,207,948	12,353,717	2,432,739	720,394	27,211,916	
1991	6,525,697	5,258,057	13,334,526	1,862,708	734,493	27,715,481	
1992	6,604,633	5,299,139	13,577,857	1,872,590	477,386	27,831,605	
1993	6,644,957	5,389,796	13,842,599	1,879,422	479,876	28,236,650	
1994	6,709,601	5,504,706	14,068,490	1,886,338	481,436	28,650,571	
1995	6,804,711	5,612,854	14,149,785	1,893,392	489,392	28,950,134	
1996	6,904,082	5,735,352	14,246,780	1,901,664	493,137	29,281,015	
1997	7,035,260	5,880,055	14,352,561	1,910,099	493,201	29,671,176	
1998	7,122,820	6,013,469	14,457,577	1,918,715	499,743	30,012,324	
1999	7,238,144	6,134,956	14,501,261	1,927,514	504,412	30,306,287	
2000	7,322,830	6,241,091	14,736,181	1,936,808	508,397	30,745,307	
2001	7,408,507	6,349,062	14,974,908	1,946,161	512,413	31,191,051	
2002	7,495,187	6,458,900	15,217,501	1,955,573	516,461	31,643,622	
2003	7,582,881	6,570,639	15,464,025	1,965,043	520,541	32,103,129	
2004	7,671,600	6,684,311	15,714,542	1,974,574	524,654	32,569,681	

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



RESOURCE PLAN FILED WITH PUCT

TABLE 4.3A

GULF STATES UTILITIES COMPANY  
 ANNUAL PEAK DEMAND AND RESERVE MARGINS - TEXAS (MW)  
 AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs.	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
1975	1,568				1,568	2,188	39.5%
1976	1,697				1,697	2,396	41.2%
1977	1,882				1,882	2,351	24.9%
1978	2,088				2,088	2,371	13.6%
1979	2,142				2,142	2,527	18.0%
1980	2,243				2,243	2,646	18.0%
1981	2,256				2,256	2,746	21.7%
1982	2,259				2,259	3,153	39.6%
1983	2,355				2,355	3,149	33.7%
1984	2,408				2,408	2,982	23.8%
1985	2,352		83		2,269	3,025	33.3%
1986	2,355		83		2,272	3,564	56.9%
1987	2,302		92		2,210	3,258	47.4%
1988	2,250		92		2,158	3,160	46.4%
1989	2,232	(25)	63		2,194	2,942	34.1%
1990	2,244	(25)	59		2,210	2,957	33.8%
1991	2,293	(26)	63		2,256	2,955	31.0%
1992	2,267	(26)	63		2,230	2,909	30.5%
1993	2,304	(27)	63		2,268	2,923	28.9%
1994	2,345	(28)	63		2,310	2,953	27.8%
1995	2,374	(29)	63		2,340	2,955	26.3%
1996	2,408	(30)	63		2,375	2,951	24.2%
1997	2,453		63		2,390	2,888	20.8%
1998	2,491		63		2,428	2,897	19.3%
1999	2,522		63		2,459	2,919	18.7%
2000	2,561		63		2,498	2,967	18.8%
2001	2,600		63		2,537	3,016	18.9%
2002	2,640		63		2,577	3,083	19.6%
2003	2,681		63		2,618	3,133	19.7%
2004	2,721		63		2,658	3,182	19.7%

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 1



GULF STATES UTILITIES COMPANY

TABLE 4.3B

GULF STATES UTILITIES COMPANY  
ANNUAL PEAK DEMAND AND RESERVE MARGINS - TOTAL SYSTEM (MW)  
AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs.	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
1975	3,977				3,977	5,445	36.9%
1976	4,162				4,162	5,876	41.2%
1977	4,657				4,657	5,819	25.0%
1978	5,138				5,138	5,835	13.6%
1979	5,229				5,229	6,169	18.0%
1980	5,604				5,604	6,610	18.0%
1981	5,542				5,542	6,745	21.7%
1982	5,164				5,164	7,208	39.6%
1983	5,348				5,348	7,152	33.7%
1984	5,475				5,475	6,780	23.8%
1985	5,139		83		5,056	6,610	30.7%
1986	5,089		83		5,006	7,548	50.8%
1987	4,991		170		4,821	6,926	43.7%
1988	4,910		149		4,761	6,895	44.8%
1989	5,015	(25)	70		4,970	6,609	33.0%
1990	5,079	(25)	97		5,007	6,548	30.8%
1991	5,150	(26)	83		5,093	6,490	27.4%
1992	5,165	(26)	83		5,108	6,480	26.9%
1993	5,228	(27)	83		5,172	6,480	25.3%
1994	5,299	(28)	83		5,244	6,517	24.3%
1995	5,364	(29)	83		5,310	6,517	22.7%
1996	5,434	(30)	83		5,381	6,497	20.7%
1997	5,518		83		5,435	6,497	19.5%
1998	5,587		83		5,504	6,497	18.0%
1999	5,656		95		5,561	6,547	17.7%
2000	5,735		95		5,640	6,645	17.8%
2001	5,814		95		5,719	6,745	17.9%
2002	5,895		95		5,800	6,885	18.7%
2003	5,977		95		5,882	6,985	18.8%
2004	6,060		95		5,965	7,087	18.8%

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 1



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**TABLE 4.4**

**GULF STATES UTILITIES COMPANY  
NET GENERATION BY FUEL TYPE - TOTAL SYSTEM (MWH)  
AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

<u>YEAR</u>	<u>NATURAL GAS/OIL</u>	<u>COAL</u>	<u>NUCLEAR</u>	<u>TOTAL</u>
1975	21,950,302			21,950,302
1976	24,336,097			24,336,097
1977	26,295,869			26,295,869
1978	28,299,011			28,299,011
1979	25,381,996			25,381,996
1980	27,775,374			27,775,374
1981	28,115,700			28,115,700
1982	24,578,688	944,824		25,523,512
1983	23,063,252	2,782,986		25,846,238
1984	23,514,986	2,703,081		26,218,067
1985	15,135,641	4,138,127	12,246	19,286,014
1986	17,338,972	3,538,208	2,132,103	23,009,283
1987	16,839,090	3,153,876	3,428,733	23,421,699
1988	16,978,009	3,094,483	5,074,287	25,146,779
1989	17,502,828	3,103,326	3,349,506	23,955,660
1990	14,575,281	3,580,728	3,941,845	22,097,854
1991	12,875,429	4,419,014	4,821,961	22,116,404
1992	13,569,211	4,493,493	3,648,902	21,711,606
1993	13,221,142	4,463,669	4,108,353	21,793,164
1994	13,312,511	4,379,836	5,036,645	22,728,992
1995	15,771,688	4,128,607	4,127,953	24,028,248
1996	15,700,498	4,605,253	3,916,273	24,222,024
1997	16,622,936	4,483,887	5,066,322	26,173,145
1998	17,626,265	4,480,296	4,344,736	26,451,297
1999	18,521,273	4,151,698	4,056,982	26,729,953
2000	18,780,875	4,209,890	4,113,846	27,104,611
2001	19,053,159	4,270,925	4,173,489	27,497,573
2002	19,329,613	4,332,894	4,234,045	27,896,552
2003	19,610,305	4,395,814	4,295,528	28,301,647
2004	19,895,300	4,459,698	4,357,955	28,712,953

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 16



GULF STATES UTILITIES COMPANY

TABLE 4.5A

GULF STATES UTILITIES COMPANY  
 NET SYSTEM CAPACITY BY SOURCE - TEXAS (MW)  
 AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS & OIL	COAL	NUCLEAR	FIRM PURCHASES FROM UTILITIES	FIRM PURCHASES FROM NON-UTILITIES	FIRM OFF-SYSTEM SALES	NET SYSTEM CAPACITY
1975	5,132			126			2,188
1976	5,563			128			2,396
1977	5,506			126			2,351
1978	5,522			127			2,371
1979	5,456			292			2,527
1980	5,944			267			2,646
1981	5,944			326			2,746
1982	5,920	378		398			3,153
1983	6,010	378		336			3,149
1984	5,899	605		121			2,982
1985	5,429	605		268		5	3,025
1986	5,429	605	655	412		6	3,564
1987	5,361	605	655	150		7	3,258
1988	5,361	612	655	124	5	7	3,160
1989	5,171	612	655	81	5	9	2,942
1990	5,125	612	655	65	5		2,957
1991	5,125	612	655	40	5		2,955
1992	5,125	612	655	35	5		2,909
1993	5,125	612	655	35	5		2,923
1994	5,125	627	688	30	5		2,953
1995	5,125	627	688	30	5		2,955
1996	5,125	627	688	21	5		2,951
1997	5,125	627	688	20	5		2,888
1998	5,125	627	688	21	5		2,897
1999	5,175	627	688	21	5		2,919
2000	5,175	627	688	64	5		2,967
2001	5,175	627	688	109	5		3,016
2002	5,175	627	688	172	5		3,083
2003	5,175	627	688	217	5		3,133
2004	5,175	627	688	263	5		3,182

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



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TABLE 4.5B

GULF STATES UTILITIES COMPANY  
 NET SYSTEM CAPACITY BY SOURCE - TOTAL SYSTEM (MW)  
 AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS & OIL	COAL	NUCLEAR	FIRM	FIRM	FIRM	NET
				PURCHASES FROM UTILITIES	PURCHASES FROM NON-UTILITIES	OFF-SYSTEM SALES	SYSTEM CAPACITY
1975	5,132			313			5,445
1976	5,563			313			5,876
1977	5,506			313			5,819
1978	5,522			313			5,835
1979	5,456			713			6,169
1980	5,944			666			6,610
1981	5,944			801			6,745
1982	5,920	378		910			7,208
1983	6,010	378		764			7,152
1984	5,899	605		276			6,780
1985	5,429	605		586		10	6,610
1986	5,429	605	655	872		13	7,548
1987	5,361	605	655	319		14	6,926
1988	5,361	612	655	271	11	15	6,895
1989	5,171	612	655	181	11	21	6,609
1990	5,125	612	655	145	11		6,548
1991	5,125	612	655	87	11		6,490
1992	5,125	612	655	77	11		6,480
1993	5,125	612	655	77	11		6,480
1994	5,125	627	688	66	11		6,517
1995	5,125	627	688	66	11		6,517
1996	5,125	627	688	46	11		6,497
1997	5,125	627	688	46	11		6,497
1998	5,125	627	688	46	11		6,497
1999	5,175	627	688	46	11		6,547
2000	5,175	627	688	144	11		6,645
2001	5,175	627	688	244	11		6,745
2002	5,175	627	688	384	11		6,885
2003	5,175	627	688	484	11		6,985
2004	5,175	627	688	586	11		7,087

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



## CHAPTER FIVE

### **CENTRAL POWER AND LIGHT COMPANY**

Central Power and Light Company (CPL) is a public utility in the business of generating, purchasing, transmitting, and distributing electricity throughout South Texas. The Company serves over one-half million customers in an area of approximately 44,000 square miles with an estimated population of more than 1.8 million. The three largest cities CPL serves are Corpus Christi, Laredo, and McAllen. It also supplies power to five rural cooperatives and two municipalities.

The Company is an investor-owned subsidiary of Central and South West Corporation (CSW) and a member of the Electric Reliability Counsel of Texas (ERCOT). Its operating revenues in 1988 totaled \$790,432,000 with total assets of \$3,760,432,000 as of December 31, 1988. The Company has a capital structure consisting of 44.37 percent common equity, 10.19 percent preferred stock, and 45.44 percent long-term debt. CPL is normally summer-peaking with its annual peak demand usually occurring in August.

The summer peak demand in 1989 reached 2,957 MW while total system sales were 14,366,648 MWH. The Company has installed capacity for generating up to 4,399 MW, of which 452 MW are in long-term storage. In 1989, 58.8 percent of the total electricity was generated using gas as the primary fuel. Either coal, hydroelectric, or nuclear power was used as the source of energy to generate the remaining electricity requirements.

#### **Demand Forecast**

The Company uses a set of econometric models that forecast energy consumption based on a stratification of customers into homogeneous groups. These groups exhibit similar responses to electric prices and general economic conditions. By targeting the modeling process to individual customers with similar characteristics,

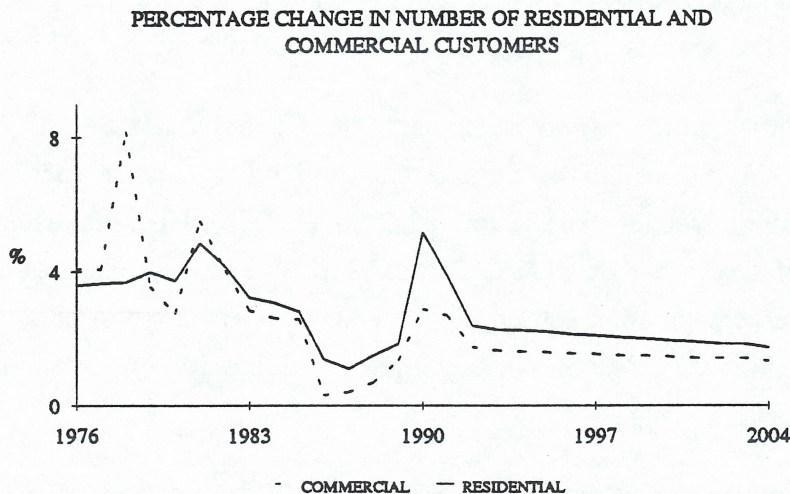


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certain of the end-use aspects related to energy efficiency and conservation effects are implicitly captured. It is important to note that CPL also uses other forecasting approaches which are a combination of load factor models and Company staff judgment. This is the case in the development of projections for the large industrial customers. In general, projections which are based on monthly data are summed to obtain the annual values. Econometric projections are based on specific assumptions about weather, economic conditions, technology, governmental activity, and company activity.

**Number of Customers**

Figure 5.1 shows the annual change in the number of residential and commercial customers by sector. In 1989, CPL



*Figure 5.1*

1999. The Company had 72,241 customers in the commercial class in 1989. A growth rate of 1.75 percent is projected for this class over the next 10 years. This class grew at the rate of 2.4 percent over the 1979-1989 period. CPL served approximately 5,584 industrial customers in 1989.

**Sales**

The annual sales by sector are shown in Figure 5.2. Total system sales are projected to grow at an annual rate of 3.3 percent through 1999 and at just over 2 percent during the 1999-2004 period. System sales grew at a rate of 2.2 percent annually from 1979-1989.

provided electric service to 474,859 residential customers. This sector showed an annual growth rate of 2.9 percent from 1979 to 1989 and is expected to grow at an annual rate of 2.5 percent into



## CENTRAL POWER AND LIGHT COMPANY

In 1979, the residential sector was ranked second in contributions to total company sales, with approximately 26 percent of the total. Sales to residential customers in 1989 amounted to 5,277,961 MWH and

TEXAS SALES BY SECTOR

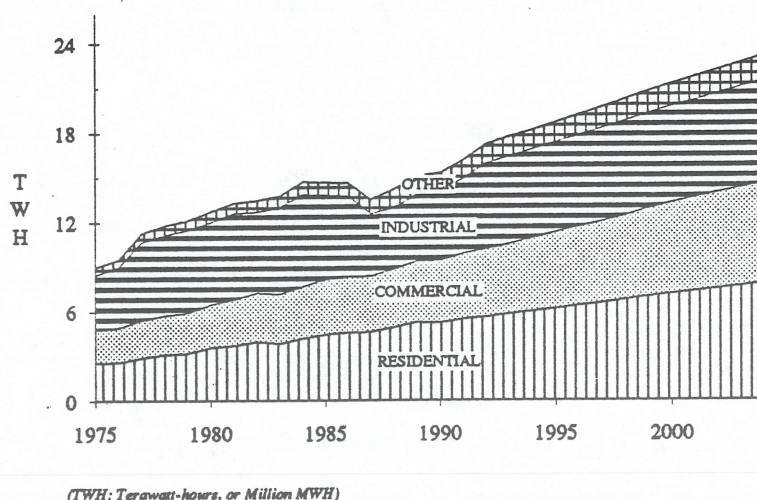


Figure 5.2

places the residential sector as the largest customer class, with 35 percent of total system sales. Over the next decade, this sector is projected to grow at an average annual rate of 2.9 percent. By 1999, the residential sector will still be the major purchasing sector with 34 percent of system sales.

The commercial sector's annual growth rate for 1979-1989 was 4.1 percent. The Company projects a growth rate of 3.8 percent for the period from 1989 to 1999. The total sales for the commercial sector in 1989 were 4,086,607 MWH, or about 27 percent of total sales. This makes the commercial class the third largest class in contributions to total sales.

The industrial class is the second largest energy consuming sector. The total industrial sales in 1989 amounted to 4,440,697 MWH, or 30 percent of total system sales. Although there has been some decline in energy consumption by this class during the last decade due to large industrial customers turning to self-generation and cogeneration, the Company expects a reversal of this trend over the next ten years. CPL is projecting a 3.7 percent annual growth rate through 1999 for this sector. The industrial class is expected to maintain its position as the second largest contributor to total sales through 2004.



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The remaining retail sales belong to the following groups: cotton gins, irrigation, street lighting, and municipalities. The combined sales of these groups for 1989 equal 541,835 MWH, or nearly 4 percent of the total. These classes as a group are projected to grow at about one percent per year over the next decade.

Sales to the wholesale sector in 1979 accounted for approximately 2 percent of system sales. By 1989, sales to this sector grew to 533,822 MWH, or about 4 percent of system sales. The wholesale sector is expected to grow over the next ten years to 915,987 MWH when it will represent over 4 percent of total system sales.

**Peak Demand**            The Company experienced a 2.15 percent annual growth in its peak demand from 1979 to 1989. Peak demand increased from 2,390 MW in 1979 to 2,957 MW in 1989. CPL expects a 2.8 percent growth in peak demand over the next ten years. During 1989, the estimated coincident peak of the residential sector accounted for 40 percent of the total system peak demand, the commercial sector 33 percent, the industrial sector 16 percent, and the wholesale sector 2 percent. During the last six years (1984-1989), the residential sector has consistently had the highest non-coincident peak. The commercial sector was second and the industrial sector was third.

**Demand-Side Adjustments**        The Company intends to provide a reliable electric service at the lowest reasonable cost by promoting load factor improvement. To achieve this objective, CPL has developed ten demand-side programs for its customers. Most of these programs offer incentives to residential and commercial customers and to new home builders to benefit from new technologies and building materials. In this way customers can improve and upgrade their cooling and heating equipment and their buildings' overall thermal integrity. Special attention is paid to the proper sizing of heating, cooling, and lighting equipment. For agricultural and municipal customers, there are programs targeted toward improving overall pumping efficiency. To industrial customers, the Company offers energy cost reductions through waste heat recovery systems. A variety of interruptible load services are also offered, as is an off-peak rate. These and other programs are a part of CPL's involvement in economic development activities to promote the development and location of new industry facilities in the area to increase or maintain cost-effective electricity consumption. CPL adjusts its



## CENTRAL POWER AND LIGHT COMPANY

forecast for the impacts of loss of load due to self-generation and interruptible loads. Table 5.3 shows the projected impacts on the peak demand of these programs.

### Supply-Side Plan

**Installed Capacity** CPL has the installed capacity, including several units with a combined capacity of 452 MW in long-term storage, to generate up to 4,399 MW of electricity. Over 70 percent of this capacity is fired using gas. The remainder of the installed capacity is fueled using nuclear (14.3 percent), coal (14.9 percent) or hydro-electric power. As of November 30, 1989, CPL reported the acquisition cost of its production plants as \$2.9 billion with a book value of \$2.5 billion.

### Net System Capacity

CPL obtains net system capacity by adding the net of firm off-system sales without reserves and purchases to installed capacity. This is shown in Figure 5.3 along with peak demand after adjustments. The net

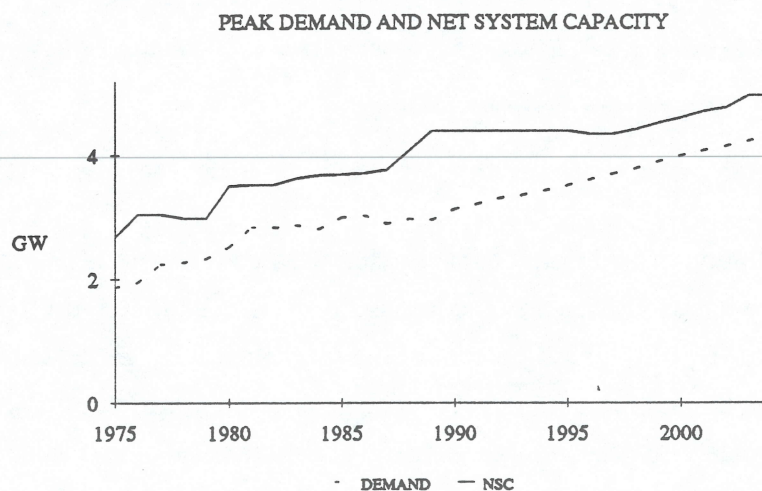


Figure 5.3

system capacity for CPL was 2,986 MW in 1978, the result of a total installed capacity of 2,976 MW, and firm purchases of 10 MW. The utility maintained a 31.3 percent reserve margin in that year. In 1989, CPL reported a total installed capacity of 4,399 MW. The utility's reserve margin for 1989 was calculated to be 48.5 percent. Projections of off-system sales without reserves range from 3 MW to 92 MW annually, with 92 MW anticipated in 1999. The projected installed capacity of

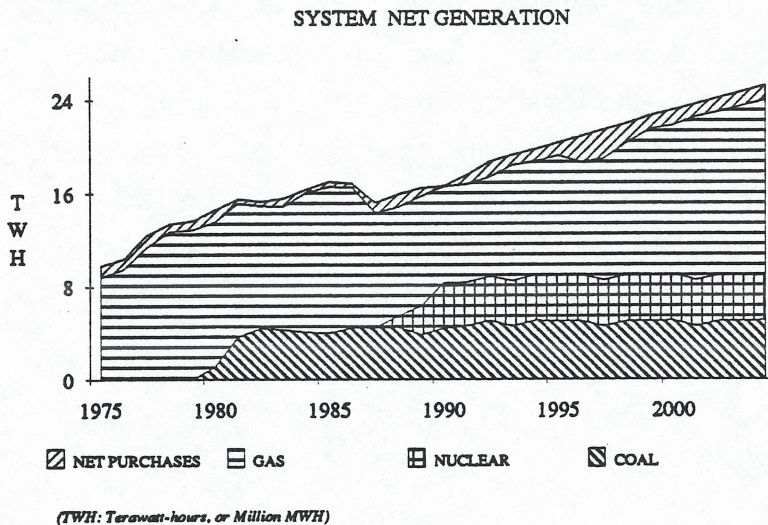


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4,617 MW in 1999 combined with the net of sales and purchases for that year yield a net system capacity of 4,525 MW for the system. This net capacity would yield a reserve margin of 16.1 percent for 1999. By 2004, installed capacity is projected to be 4,969 MW with a reserve margin of 15.1 percent.

**Net Generation.**

As shown in Figure 5.4, CPL generated 99.6 percent of its electricity in 1978 using gas and fuel oil. The remaining electricity was generated using hydroelectric power. In 1980, the utility began using coal. The



*Figure 5.4*

installation of additional capacity that used coal enabled CPL to diversify its fuel mix somewhat from the 1978 composition. In 1988, the utility began using nuclear power. By 1989, 58.8 percent of the total electricity generated by the utility still used gas as the source of energy. Coal generation contributed 24.7 percent of the total. Hydroelectric-powered generation accounted for the remaining 0.3 percent and nuclear approximately 16.2 percent. By 1999, the Company expects to generate 58.0 percent of its electricity using gas, 23.4 percent using coal, 18.4 percent using nuclear energy, and 0.3 percent using hydro. Most of the projected increase in net generation from 1999 to 2004 comes from gas-fired units.

**System Expansion**

CPL has recently added 630 MW of capacity to its system. This figure represents approximately 25.2 percent ownership



## CENTRAL POWER AND LIGHT COMPANY

of the South Texas Nuclear Project in Matagorda County, Texas. This station began commercial operation in August 1988 for Unit 1 and, as seen in Figure 5.5, June 1989 for Unit 2.

Through 1999, CPL currently has plans to retire one gas plant, La Palma Unit 7. The utility projects the cessation of commercial operation of this generating station will take place in October of 1995. This

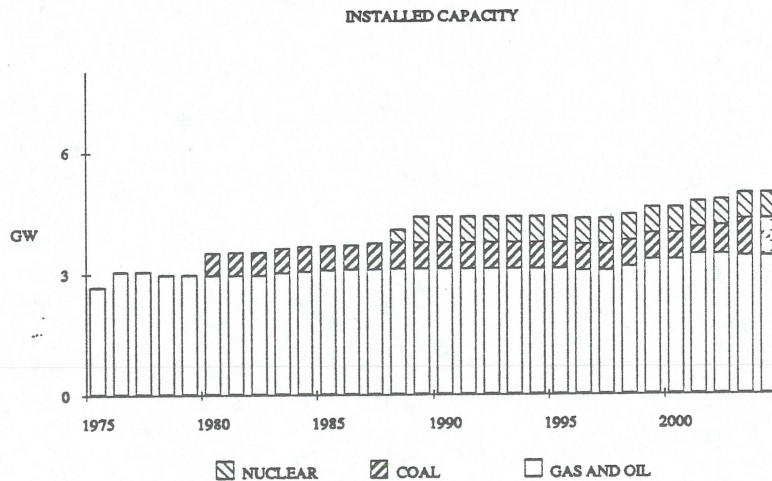


Figure 5.5

retirement will result in a total 47 MW reduction in the CPL system. Certain CPL power plant sites were initially designed for generating units not now planned to be installed over the next ten years. However, the potential for adding initially planned capability is limited by financial, water, environmental and transmission requirements, site layout, and fuel supply. Unit additions may also be limited by ambient air quality standards, station water balance, cooling pond temperature, water discharge permit, and solid waste handling and storage. Site-specific studies would be needed to determine the best technology and size of any unit addition.

Included in CPL's planned construction work are two major transmission line projects. The earliest of these projects is scheduled to be completed by December of 1991. This line is located in Goliad, Bee, Nueces, and San Patricio Counties and will consist of 70 miles of 345-KV line. The total cost of this project will be an estimated \$33,000,000. The second project is a direct current (DC) transmission tie to the South West Power Pool. The utility specifies the date of completion as March 1995. This project is expected to cost CPL \$27,663,000.



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**TABLE 5.1**

**CENTRAL POWER AND LIGHT COMPANY**

**NUMBER OF CUSTOMERS**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RETAIL SALES			ALL OTHER	
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	WHOLESALE
1975	307,834	47,102	4,257	3,661	35
1976	318,868	49,026	4,421	3,746	35
1977	330,458	51,022	4,562	3,782	35
1978	342,592	55,198	4,755	3,851	36
1979	356,286	57,158	4,869	3,935	34
1980	369,525	58,727	5,155	3,980	34
1981	387,462	61,972	5,420	4,098	35
1982	403,589	64,479	5,655	4,113	36
1983	416,579	66,310	5,687	4,076	39
1984	429,345	68,043	5,802	4,150	38
1985	441,411	69,799	5,832	4,180	33
1986	447,554	70,017	5,632	4,140	32
1987	452,449	70,310	5,557	4,181	31
1988	459,190	70,798	5,604	4,253	29
1989	467,672	71,753	991	4,296	29
1990	491,864	73,816	5,596	4,355	29
1991	510,893	75,795	5,620	4,444	29
1992	523,089	77,117	5,632	4,510	29
1993	534,972	78,391	5,650	4,566	29
1994	547,019	79,663	5,671	4,625	29
1995	559,089	80,935	5,693	4,680	29
1996	571,065	82,202	5,717	4,735	29
1997	582,990	83,474	5,739	4,790	29
1998	594,898	84,723	5,763	4,845	29
1999	606,753	85,988	5,784	4,896	29
2000	618,544	87,248	5,805	4,947	29
2001	630,301	88,497	5,834	4,994	29
2002	641,968	89,755	5,864	5,044	29
2003	653,756	91,029	5,892	5,090	29
2004	665,053	92,243	5,925	5,136	29

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 12



CENTRAL POWER AND LIGHT COMPANY

TABLE 5.2

CENTRAL POWER AND LIGHT COMPANY

ANNUAL SALES BY SECTOR (MWH)

(After Adjustments for Exogenous Factors and DSM Programs)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	RETAIL SALES			ALL OTHER	WHOLESALE	TOTAL	TOTAL
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL		SYSTEM	OFF-SYSTEM
1975	2,569,781	2,232,369	3,644,754	322,699	189,354	8,958,957	284,365
1976	2,609,140	2,320,717	4,040,815	339,779	196,513	9,506,963	326,626
1977	2,907,853	2,516,669	5,250,509	374,125	217,472	11,266,627	545,883
1978	3,108,554	2,639,511	5,371,493	402,968	240,325	11,762,851	890,565
1979	3,202,731	2,722,915	5,552,954	401,824	250,841	12,131,266	825,665
1980	3,574,220	2,884,508	5,543,225	443,929	280,453	12,726,335	551,728
1981	3,735,943	3,085,350	5,760,581	412,749	294,743	13,289,366	949,166
1982	3,988,259	3,277,484	5,399,641	465,631	326,482	13,457,497	778,807
1983	3,863,839	3,299,036	5,802,871	438,941	338,639	13,743,326	785,386
1984	4,208,804	3,481,149	6,140,895	481,751	379,553	14,692,151	824,250
1985	4,469,561	3,692,795	5,639,522	465,976	416,016	14,683,870	831,730
1986	4,567,793	3,744,043	5,389,642	475,999	429,857	14,607,334	495,631
1987	4,630,264	3,736,173	4,205,457	468,099	459,137	13,499,129	619,349
1988	4,945,516	3,899,118	4,114,184	519,293	706,507	14,184,619	704,782
1989	5,277,961	4,086,607	4,440,697	541,835	695,013	15,042,113	959,672
1990	5,236,750	4,161,790	4,678,311	510,027	690,293	15,277,171	268,000
1991	5,483,053	4,387,777	5,005,873	521,237	728,603	16,126,544	79,000
1992	5,628,717	4,550,666	5,737,796	530,383	767,663	17,215,225	120,700
1993	5,811,978	4,710,540	5,875,434	539,941	795,832	17,733,725	257,100
1994	6,000,575	4,898,569	5,962,907	548,643	748,183	18,158,876	206,200
1995	6,193,545	5,089,392	6,052,405	557,226	785,371	18,677,939	305,800
1996	6,386,927	5,283,702	6,141,111	565,679	831,292	19,208,711	101,200
1997	6,572,697	5,473,990	6,226,219	573,655	859,615	19,706,176	97,200
1998	6,762,229	5,665,350	6,315,003	581,423	887,861	20,211,866	250,900
1999	7,005,986	5,914,403	6,378,948	590,592	915,987	20,805,916	304,200
2000	7,181,786	6,096,714	6,462,700	597,490	943,958	21,282,649	270,300
2001	7,338,276	6,271,600	6,541,945	603,639	971,816	21,727,277	427,000
2002	7,511,242	6,447,397	6,640,905	610,120	999,513	22,209,177	313,700
2003	7,669,846	6,608,256	6,751,230	615,844	1,027,270	22,672,446	286,200
2004	7,838,044	6,779,696	6,851,419	621,723	1,054,501	23,145,382	311,200

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Request 5



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**TABLE 5.3**

**CENTRAL POWER AND LIGHT COMPANY**

**ANNUAL PEAK DEMAND AND RESERVE MARGINS (MW)**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs.	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
1975	1,870				1,870	2,680	43.3%
1976	1,956				1,956	3,054	56.1%
1977	2,247				2,247	3,054	35.9%
1978	2,341	(21)	88		2,274	2,986	31.3%
1979	2,390	(68)	127		2,331	2,986	28.1%
1980	2,505	(73)	56		2,522	3,504	38.9%
1981	2,734	(219)	111		2,842	3,523	24.0%
1982	2,825	(91)	85		2,831	3,523	24.4%
1983	2,869	(95)	90		2,874	3,636	26.5%
1984	2,832	(85)	100		2,817	3,681	30.7%
1985	3,022	(108)	128		3,002	3,695	23.1%
1986	2,974	(100)	44		3,030	3,717	22.7%
1987	2,881	(38)	24		2,895	3,765	30.1%
1988	3,013	(59)	94		2,978	4,077	36.9%
1989	3,044	(47)	134		2,957	4,399	48.8%
1990	3,269	(48)	185		3,132	4,399	40.5%
1991	3,404	(42)	231		3,215	4,399	36.8%
1992	3,525	(51)	268		3,308	4,399	33.0%
1993	3,577	(53)	272		3,358	4,399	31.0%
1994	3,667	(41)	277		3,431	4,396	28.1%
1995	3,760	(42)	282		3,520	4,396	24.9%
1996	3,857	(43)	287		3,613	4,346	20.3%
1997	3,949	(43)	292		3,700	4,347	17.5%
1998	4,041	(44)	296		3,789	4,416	16.5%
1999	4,153	(45)	301		3,897	4,525	16.1%
2000	4,256	(46)	306		3,996	4,610	15.4%
2001	4,338	(46)	311		4,073	4,710	15.6%
2002	4,423	(47)	316		4,154	4,774	14.9%
2003	4,507	(48)	320		4,235	4,969	17.3%
2004	4,592	(49)	325		4,316	4,969	15.1%

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 1



**CENTRAL POWER AND LIGHT COMPANY**

**TABLE 5.4**

**CENTRAL POWER AND LIGHT COMPANY**

**NET GENERATION BY FUEL TYPE (MWH)**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	NATURAL GAS/OIL	COAL	NUCLEAR	HYDRO	TOTAL
1975	8,826,617			44,865	8,871,482
1976	9,503,268			40,423	9,543,691
1977	11,381,281			32,055	11,413,336
1978	12,720,103			51,381	12,771,484
1979	12,852,113			51,371	12,903,484
1980	12,342,113	1,174,823		54,801	13,571,737
1981	11,439,566	3,705,215		59,571	15,204,352
1982	10,522,076	4,409,204		54,535	14,985,815
1983	10,549,005	4,308,626		51,158	14,908,789
1984	11,982,243	4,075,023		47,507	16,104,773
1985	12,585,786	4,002,559		59,448	16,647,793
1986	12,041,930	4,462,034		57,244	16,561,208
1987	9,809,806	4,483,691		58,192	14,351,689
1988	9,308,266	4,513,122	963,241	52,005	14,836,634
1989	9,418,669	3,871,858	2,469,050	52,078	15,811,655
1990	8,304,000	4,421,000	3,866,000	55,800	16,646,800
1991	8,372,000	4,632,000	3,766,000	55,800	16,825,800
1992	8,512,000	5,056,000	3,795,000	55,800	17,418,800
1993	9,865,000	4,572,000	3,923,000	55,800	18,415,800
1994	9,716,000	5,043,000	3,950,000	55,800	18,764,800
1995	10,240,000	5,022,000	3,951,000	55,800	19,268,800
1996	9,588,000	5,031,000	3,964,000	55,800	18,638,800
1997	10,430,000	4,572,000	3,950,000	55,800	19,007,800
1998	11,341,000	5,029,000	3,951,000	55,800	20,376,800
1999	12,491,000	5,038,000	3,952,000	55,800	21,536,800
2000	12,761,000	5,060,000	3,963,000	55,800	21,839,800
2001	13,979,000	4,576,000	3,951,000	55,800	22,561,800
2002	13,937,000	5,030,000	3,952,000	55,800	22,974,800
2003	14,452,000	5,034,000	3,954,000	55,800	23,495,800
2004	14,913,000	5,043,000	3,964,000	55,800	23,975,800

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 16



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TABLE 5.5

CENTRAL POWER AND LIGHT COMPANY

NET SYSTEM CAPACITY BY SOURCE (MW)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS & OIL	COAL	NUCLEAR	HYDRO	FIRM	FIRM	FIRM	NET
					PURCHASES FROM UTILITIES	PURCHASES FROM NON-UTILITIES	OFF-SYSTEM SALES	SYSTEM CAPACITY
1975	2,670				10			2,680
1976	3,044				10			3,054
1977	3,044				10			3,054
1978	2,976				10			2,986
1979	2,976				10			2,986
1980	2,954	550						3,504
1981	2,954	569						3,523
1982	2,954	569						3,523
1983	3,010	609		6	11			3,636
1984	3,052	609		6	14			3,681
1985	3,073	609		6	14		7	3,695
1986	3,093	604		6	14			3,717
1987	3,095	657		6	7			3,765
1988	3,103	653	315	6				4,077
1989	3,109	654	630	6				4,399
1990	3,109	654	630	6				4,399
1991	3,109	654	630	6				4,399
1992	3,109	654	630	6				4,399
1993	3,109	654	630	6				4,399
1994	3,109	654	630	6			3	4,396
1995	3,109	654	630	6			3	4,396
1996	3,062	654	630	6			6	4,346
1997	3,062	654	630	6			5	4,347
1998	3,152	654	630	6			26	4,416
1999	3,327	654	630	6			92	4,525
2000	3,327	654	630	6			7	4,610
2001	3,467	654	630	6			47	4,710
2002	3,467	704	630	6			33	4,774
2003	3,407	926	630	6				4,969
2004	3,407	926	630	6				4,969

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



## CHAPTER SIX

### **CITY PUBLIC SERVICE OF SAN ANTONIO**

City Public Service of San Antonio (CPS) is one of the largest municipally-owned utilities in the United States, providing San Antonio and surrounding areas with electric and natural gas service. CPS provides electric service to a population of over 1.2 million in an area encompassing all of Bexar County and small portions of seven adjoining counties.

The annual system peak demand of CPS normally occurs during the summer months of July, August, or September. In 1989, the peak demand after adjustments was 2,697 MW. Total annual energy sales for 1989 were 11,648,333 MWH. CPS has installed capacity to generate up to 3,670 MW, including its 28 percent share of the South Texas Project nuclear plant. Other primary fuel sources used for generation are coal and natural gas, which supply the majority of power for the CPS system.

#### **Demand Forecast**

CPS develops long range forecasts of the number of customers and energy sales by rate class, and total system net generation and peak demand. The basis of these forecasts are economic and population projections for the U.S. and San Antonio metropolitan area developed with the assistance of outside consultants. Econometric models utilizing various economic and demographic variables have been developed by CPS and are employed in the projection of customers and energy usage per customer in the major rate classes. For the residential sector, a household and housing unit allocation model and an appliance saturation and usage model are utilized to project, respectively, the number of customers and energy use per customer in this class. Energy sales for each major rate class are then obtained by multiplying the projection of customers by the projection of use per customer. For the miscellaneous small classes, a time series trend analysis is performed for each. Energy sales by rate class are then aggregated to obtain the total CPS system sales,



and an analysis of system losses enables a projection of total net generation for the system. Peak demand is forecast by utilizing its relationship with load factor and net generation. Load factor is projected using a trend of historical data, which since the mid-1970s has been positive. CPS has not made explicit adjustments to its forecasts for conservation and demand side management, but the effects of these are included in the forecast results. Loads from time-of-use and interruptible rates are quantified.

**Number of Customers**

In 1989, CPS provided electric service to 409,099 residential customers. From 1975 to 1989, the number of residential

customers grew at an average annual compound growth rate of 4.0 percent, while the projected average growth rate to the year 2004 is 2.3 percent. Figure 6.1 shows the annual change in residential and commercial

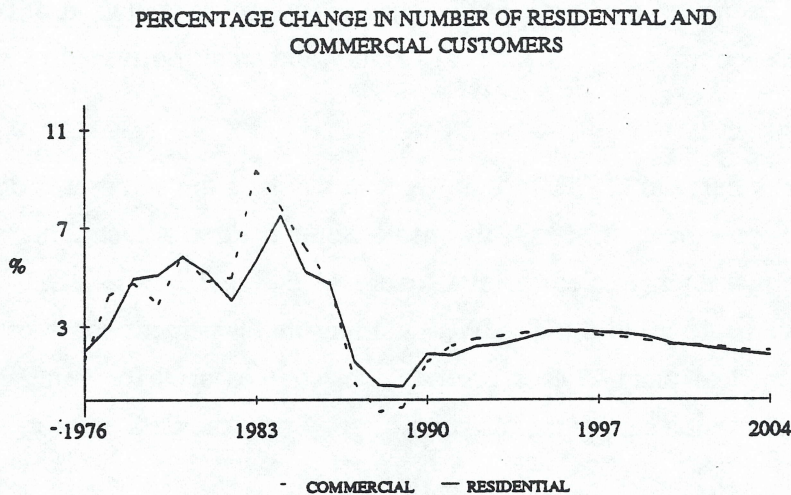


Figure 6.1

customers in percent. One of the reasons for the rapid historical growth in residential customers is that a large number of master-metered apartment complexes converted to individual metering during this period. CPS served 45,667 commercial customers and 1,420 industrial customers in 1989. From 1975 to 1989, the number of commercial customers increased at an average rate of 4.1 percent, while industrial customers declined at an average rate of 0.9 percent. The primary reason for the decline in industrial customers was simply a reclassification of some customers from the industrial to the commercial category as they found it more advantageous to be served on the commercial rate. During the next 15 years, the number of commercial and industrial customers are projected to increase at average rates of 2.3 percent and 1.3 percent, respectively.

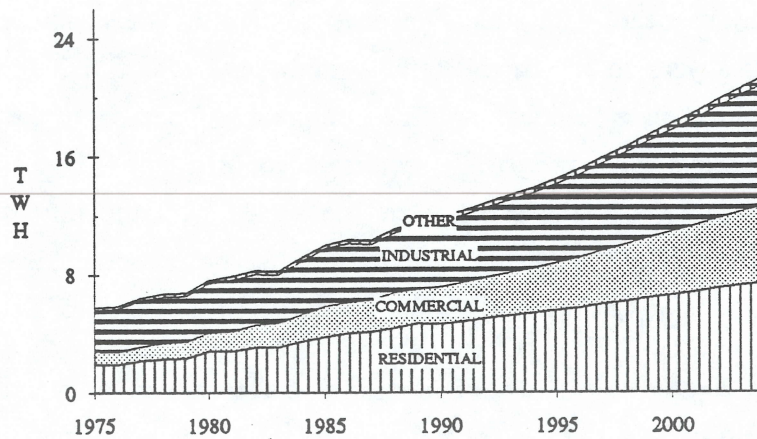


*CITY PUBLIC SERVICE OF SAN ANTONIO*

**Sales** System sales totaled 11,648,333 MWH in 1989 and are projected to increase at an annual rate of 4.1 percent over the next 15 years. In 1989, sales of electricity to the residential sector amounted to 4,684,991 MWH, 40 percent of the energy consumed by all CPS customers. As shown in Figure 6.2, this makes the residential class the largest of the customer sectors. Residential class sales are projected to grow at an average annual compound rate of 3.1 percent during the next 15 years compared to an actual rate of six percent since 1975. As in the case of customer growth, the growth of residential energy sales during the last 15 years has been influenced by the conversion of master-metered apartment complexes, previously classified as commercial or industrial, to individual metering under the residential rate. In 2004, the residential class contribution to total sales is projected to be 35 percent.

Sales to the commercial class totaled 2,373,596 MWH in 1989. This amounted to 20 percent of total sales, making the commercial class the third largest among major customer sectors. Historical sales to

TEXAS SALES BY SECTOR



(TWH: Terawatt-hours, or Million MWH)

Figure 6.2

commercial customers have grown at an annual rate of 6.7 percent since 1975, while the growth rate over the next 15 years is projected to average 5.4 percent.

The industrial class is currently the second largest customer class in terms of sales. Sales to this class amounted to 4,300,158 MWH in 1989, 37 percent of the total for all customers. Since 1975, sales to the industrial class have increased at an annual rate of 3 percent, while the annual rate projected to the year 2004 is 4.4 percent. As



## **RESOURCE PLAN FILED WITH PUCT**

pointed out previously, historical growth rates of the customer classes have been influenced by apartment conversions to individual metering as well as rate shifting by customers between the commercial and industrial classes.

The remaining electric sales are composed of sales to municipalities, street lighting, and other purposes. These combined sales amounted to 289,588 MWH in 1989, 2 percent of the total. The historical average growth rate for this combination of customers has been 3.5 percent since 1975, and the growth rate over the next 15 years is projected to be about 4 percent.

**Peak Demand**            Between 1975 and 1989, annual peak demand on the CPS electric system increased from 1,493 MW to 2,697 MW, an average annual compound rate of 4.3 percent. During the next 15 years, system peak demand is projected to grow at an average rate of 3.8 percent annually, reaching 4,731 MW in the year 2004.

The most recent data allocating peak demand to the various customer classes is for 1988, a year in which the total system peak was 2,663 MW. At that time, the residential class coincident peak amounted to 52 percent of the total system, while the commercial and industrial sectors accounted for 21 percent and 25 percent, respectively. In the same year, the sector with the highest non-coincident peak demand was the residential at 1,934 MW. The non-coincident peak of the industrial sector was 864 MW, followed by the commercial sector at 728 MW.

**Adjustments to Demand**            CPS does not make explicit adjustments to its forecast for conservation and demand-side management programs. However, the effects of the NAECA are included in the forecast results through the appliance saturation and use model. CPS also quantifies the loads from time-of-use and interruptible rates.

## **Supply-Side Plan**

**Installed Capacity**    In 1989, upon the commercial operation of the second unit of the South Texas Project, CPS had an installed capacity of about 3,895 MW. Of this total, 61 percent is represented by gas-fueled generation, 21 percent coal, and 18 percent nuclear.



**Net System Capacity**

Figure 6.3 shows the peak demand after adjustments and the net system capacity. The net system capacity for CPS in 1979 was 3,344 MW which represented a reserve margin of 95.9 percent, computed by taking the ratio of the net system capacity minus peak demand to the peak demand.

By 1989, the net system capacity had increased to 3,670 MW and the reserve margin had dropped to 36.1 percent. CPS is projecting an increase in net system capacity to 5,809 MW in the year 2004,

which would represent a reserve margin of 22.8 percent.

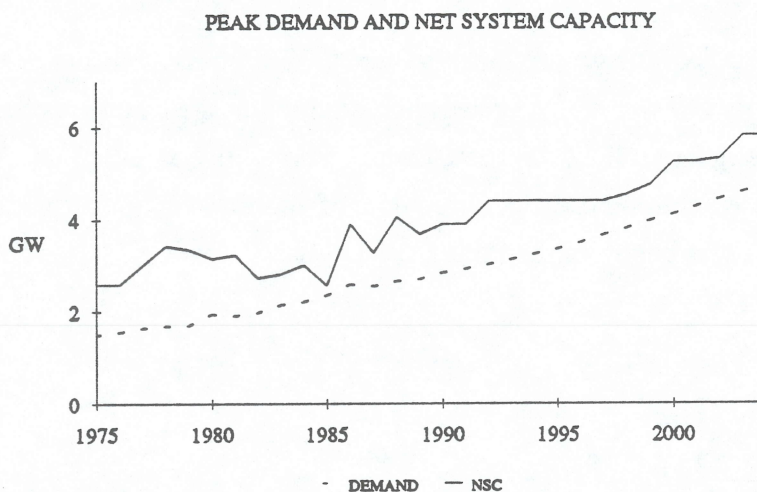
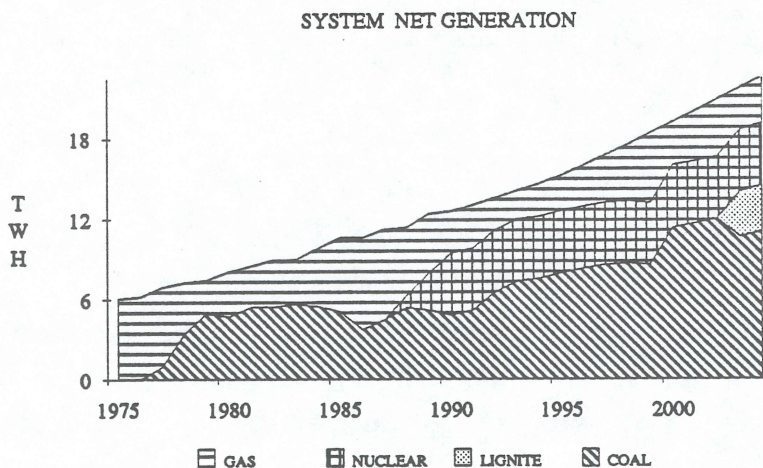


Figure 6.3

**Net Generation**

As shown in Figure 6.4, gas-fueled units provided 34 percent of the net system generation in 1979 while 66 percent of the generation was produced from coal. CPS has pursued fuel di-



(TWH: Terawatt-hours, or Million MWH)

Figure 6.4



RESOURCE PLAN FILED WITH PUCT

versification as a primary goal, and with the commercial operation of the nuclear-fueled South Texas Project in August 1988 (Unit 1) and June 1989 (Unit 2), the generation fuel mix has now become 29 percent gas, 38 percent coal and 33 percent nuclear. A continuation of this diversification program is expected to produce a generation fuel mix in the year 2004 of 15 percent gas, 49 percent coal, 15 percent lignite, and 21 percent nuclear to supply a projected total generation of 22,581 GWH.

**System Expansion** At this time, CPS is committed to construction of a 498-MW generation addition at the Calaveras Lake site. This unit will be designated J. K. Spruce Unit 1 and will be fueled by Western coal with an expected commercial operation date of June, 1992. Construction on the J. K. Spruce Unit 1 was begun in the fall of 1988.

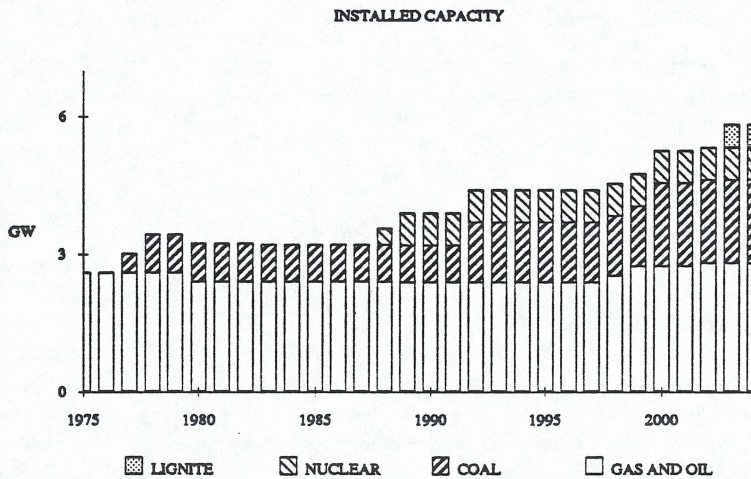


Figure 6.5

Additional units scheduled in the resource expansion plan within the time frame of this study can be seen in Figure 6.5 and include two 70-MW combustion turbine peaking units in 1998; three 70-MW combustion turbine peaking units in 1999; a 498-MW coal-fired unit at Calaveras Lake (J. K. Spruce Unit 2) in the year 2000; a 70-MW combustion turbine peaking unit in 2002; and the first of four units scheduled to be fueled with Texas lignite coming on line in 2003 with added capacity of 498 MW. This schedule brings the total added capacity in this period to 1,914 MW, of which 996 MW is coal, 498 MW is lignite, and 420 MW consists of gas-fired combustion turbine peaking units.



*CITY PUBLIC SERVICE OF SAN ANTONIO*

**Changes Since the  
1987 Filing**

There are no major differences between the current forecast produced in 1989 and the one produced in 1987. Both forecasts have taken into account the efficiency standards mandated by the National Appliance Efficiency Conservation Act of 1987. The 1989 forecast does reflect a somewhat slower recovery of the local economy and slightly lower expectations of employment and income growth during the forecast period than did the 1987 forecast. Consequently, electric sales and peak demand are projected to grow at slightly slower rates in the 1989 forecast. Between 1990 and 1997, sales and peak demand in the 1989 forecast are projected to grow at average rates of 4.3 percent and 3.7 percent, respectively, compared to growth rates in the 1987 forecast of 4.4 percent and 3.8 percent. There are no current plans for firm contract sales of off-system power during the forecast period, although short duration sales of power on an emergency, economy, or short-term firm basis are likely to occur from time to time as has been the case in the recent past.



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**TABLE 6.1**

**CITY PUBLIC SERVICE - SAN ANTONIO**

**NUMBER OF CUSTOMERS - TOTAL SYSTEM**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

<b>YEAR</b>	<b>RESIDENTIAL</b>	<b>COMMERCIAL</b>	<b>INDUSTRIAL</b>	<b>ALL OTHER RETAIL</b>
1975	237,265	25,926	1,619	6,245
1976	241,987	26,344	1,678	6,687
1977	249,267	27,469	1,741	6,933
1978	261,553	28,769	1,731	7,139
1979	274,866	29,896	1,708	7,314
1980	290,839	31,648	1,681	7,580
1981	305,855	33,175	1,667	7,791
1982	318,191	34,826	1,500	8,016
1983	336,152	38,084	1,280	8,097
1984	361,328	41,074	1,369	8,042
1985	380,171	43,617	1,351	7,924
1986	398,141	45,702	1,362	7,940
1987	404,340	46,027	1,345	7,966
1988	406,818	45,805	1,314	8,274
1989	409,099	45,667	1,420	8,935
1990	416,853	46,368	1,335	8,955
1991	424,407	47,390	1,345	9,107
1992	433,583	48,569	1,356	9,258
1993	443,311	49,825	1,370	9,409
1994	454,360	51,181	1,387	9,560
1995	466,945	52,604	1,412	9,711
1996	480,077	54,057	1,449	9,862
1997	493,172	55,464	1,486	10,013
1998	506,439	56,867	1,523	10,164
1999	519,356	58,232	1,560	10,315
2000	531,197	59,518	1,597	10,466
2001	542,655	60,832	1,632	10,617
2002	553,714	62,136	1,666	10,768
2003	564,271	63,381	1,698	10,919
2004	574,496	64,631	1,728	11,070

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 12



**CITY PUBLIC SERVICE OF SAN ANTONIO**

**TABLE 6.2**

**CITY PUBLIC SERVICE - SAN ANTONIO**

**ANNUAL SALES BY SECTOR (MWH)**

*(After Adjustments for Exogenous Factors and DSM Programs)*

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	ALL OTHER		TOTAL SYSTEM	TOTAL OFF-SYSTEM
				RETAIL	WHOLESALE		
1975	1,947,209	896,064	2,755,950	178,079		5,777,302	
1976	1,929,099	880,511	2,897,190	183,946		5,890,746	
1977	2,177,129	969,383	3,094,911	194,400		6,435,823	
1978	2,328,656	1,050,237	3,159,390	202,340		6,740,623	
1979	2,367,590	1,099,862	3,121,970	209,760		6,799,182	314,369
1980	2,819,217	1,266,473	3,363,933	222,334		7,671,957	78,686
1981	2,852,291	1,343,195	3,477,955	225,218		7,898,659	
1982	3,109,066	1,496,617	3,441,829	236,458		8,283,970	236,534
1983	3,092,422	1,636,950	3,272,950	239,657		8,241,979	30,819
1984	3,503,724	1,807,795	3,594,688	246,527		9,152,734	21,296
1985	3,806,460	2,071,457	3,875,328	254,668		10,007,913	252,774
1986	4,027,561	2,113,839	3,956,626	259,259		10,357,285	93,999
1987	4,122,148	2,186,109	3,740,150	263,791		10,312,198	68,013
1988	4,417,510	2,366,473	4,026,379	278,495		11,088,857	
1989	4,684,991	2,373,596	4,300,158	289,588		11,648,333	
1990	4,647,505	2,527,890	4,408,446	296,992		11,880,833	
1991	4,845,874	2,635,548	4,555,390	308,618		12,345,430	
1992	5,046,399	2,764,201	4,716,654	320,809		12,848,063	
1993	5,219,352	2,903,517	4,889,312	333,612		13,345,793	
1994	5,379,695	3,058,547	5,080,368	347,057		13,865,667	
1995	5,556,078	3,232,732	5,308,476	361,172		14,458,458	
1996	5,745,822	3,428,059	5,591,375	376,001		15,141,257	
1997	5,983,424	3,636,536	5,890,913	391,581		15,902,454	
1998	6,173,003	3,845,250	6,190,286	407,947		16,616,486	
1999	6,425,542	4,072,194	6,518,413	425,154		17,441,303	
2000	6,620,261	4,285,599	6,852,296	443,251		18,201,407	
2001	6,819,433	4,503,516	7,187,122	462,265		18,972,336	
2002	7,065,285	4,737,547	7,537,285	482,271		19,822,388	
2003	7,257,972	4,967,400	7,882,641	503,310		20,611,323	
2004	7,434,791	5,202,589	8,227,470	525,442		21,390,292	

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 5



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**TABLE 6.3**

**CITY PUBLIC SERVICE - SAN ANTONIO**

**ANNUAL PEAK DEMAND AND RESERVE MARGINS (MW)**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	ADJUSTMENTS TO PEAK DEMAND				PEAK DEMAND After Adjs.	NET SYSTEM CAPACITY	RESERVE MARGIN
	PEAK DEMAND Before Adjs.	EXOGENOUS FACTORS	ACTIVE DSM	PASSIVE DSM			
	1975	1,493					
1976	1,560				1,560	2,588	65.9%
1977	1,641				1,641	3,006	83.2%
1978	1,688				1,688	3,424	102.8%
1979	1,707				1,707	3,344	95.9%
1980	1,950				1,950	3,146	61.3%
1981	1,911				1,911	3,236	69.3%
1982	1,984				1,984	2,736	37.9%
1983	2,148				2,148	2,810	30.8%
1984	2,210				2,210	3,010	36.2%
1985	2,350				2,350	2,560	8.9%
1986	2,596	3		7	2,586	3,900	50.8%
1987	2,551				2,551	3,275	28.4%
1988	2,663				2,663	4,050	52.1%
1989	2,697				2,697	3,670	36.1%
1990	2,837				2,837	3,895	37.3%
1991	2,931				2,931	3,895	32.9%
1992	3,026				3,026	4,393	45.2%
1993	3,134				3,134	4,393	40.2%
1994	3,240				3,240	4,393	35.6%
1995	3,361				3,361	4,393	30.7%
1996	3,493				3,493	4,393	25.8%
1997	3,660				3,660	4,393	20.0%
1998	3,803				3,803	4,533	19.2%
1999	3,973				3,973	4,743	19.4%
2000	4,110				4,110	5,241	27.5%
2001	4,274				4,274	5,241	22.6%
2002	4,444				4,444	5,311	19.5%
2003	4,595				4,595	5,809	26.4%
2004	4,731				4,731	5,809	22.8%

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 1



**CITY PUBLIC SERVICE OF SAN ANTONIO**

**TABLE 6.4**

**CITY PUBLIC SERVICE - SAN ANTONIO**

**NET GENERATION BY FUEL TYPE (MWH)**

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL			TOTAL
	GAS	COAL	NUCLEAR	
1975	6,071,800			6,071,800
1976	6,211,400			6,211,400
1977	5,962,100	954,500		6,916,600
1978	3,806,300	3,460,800		7,267,100
1979	2,500,500	4,953,100		7,453,600
1980	3,371,600	4,708,100		8,079,700
1981	3,043,718	5,462,006		8,505,724
1982	3,459,067	5,454,699		8,913,766
1983	3,338,466	5,653,654		8,992,120
1984	4,282,036	5,492,090		9,774,126
1985	5,516,302	5,091,670		10,607,972
1986	6,836,667	3,781,193		10,617,860
1987	6,730,171	4,483,059		11,213,230
1988	5,091,633	5,406,943	888,524	11,387,100
1989	4,479,412	5,192,732	2,726,421	12,398,565
1990	3,099,600	4,803,900	4,654,800	12,558,300
1991	3,209,800	5,193,000	4,640,000	13,042,800
1992	2,377,100	6,543,700	4,655,500	13,576,300
1993	2,110,100	7,348,400	4,640,500	14,099,000
1994	2,468,100	7,540,000	4,640,100	14,648,200
1995	2,641,100	7,995,700	4,640,800	15,277,600
1996	3,057,100	8,290,200	4,655,000	16,002,300
1997	3,567,300	8,599,000	4,640,800	16,807,100
1998	4,217,600	8,694,800	4,640,500	17,552,900
1999	5,222,100	8,570,100	4,640,500	18,432,700
2000	3,218,400	11,353,000	4,655,700	19,227,100
2001	3,726,600	11,671,000	4,640,400	20,038,000
2002	4,279,300	12,019,000	4,640,000	20,938,300
2003	3,114,700	10,636,700	4,640,800	18,392,200
2004	3,432,300	11,050,200	4,655,500	19,138,000

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 16



RESOURCE PLAN FILED WITH PUCT

TABLE 6.5

CITY PUBLIC SERVICE - SAN ANTONIO

NET SYSTEM CAPACITY BY SOURCE (MW)

AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS

YEAR	NATURAL GAS & OIL	COAL	LIGNITE	NUCLEAR	FIRM PURCHASES FROM UTILITIES	FIRM PURCHASES FROM NON-UTILITIES	FIRM OFF-SYSTEM SALES	NET SYSTEM CAPACITY
1975	2,588							2,588
1976	2,588							2,588
1977	2,588	418						3,006
1978	2,588	836						3,424
1979	2,588	836					80	3,344
1980	2,400	836					90	3,146
1981	2,400	836						3,236
1982	2,400	836					500	2,736
1983	2,400	810					400	2,810
1984	2,400	810					200	3,010
1985	2,400	810					650	2,560
1986	2,390	810			900		200	3,900
1987	2,390	810			350		275	3,275
1988	2,390	810		350	500			4,050
1989	2,385	810		700	100		325	3,670
1990	2,385	810		700				3,895
1991	2,385	810		700				3,895
1992	2,385	1,308		700				4,393
1993	2,385	1,308		700				4,393
1994	2,385	1,308		700				4,393
1995	2,385	1,308		700				4,393
1996	2,385	1,308		700				4,393
1997	2,385	1,308		700				4,393
1998	2,525	1,308		700				4,533
1999	2,735	1,308		700				4,743
2000	2,735	1,806		700				5,241
2001	2,735	1,806		700				5,241
2002	2,805	1,806		700				5,311
2003	2,805	1,806	498	700				5,809
2004	2,805	1,806	498	700				5,809

NOTES:

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

SOURCE: Load Forecast 1989 Filing, Requests 14 & 15.



## CHAPTER SEVEN

### **SOUTHWESTERN PUBLIC SERVICE COMPANY**

Southwestern Public Service Company ("Southwestern" or SPS) is a fully integrated, investor owned, multi-jurisdictional electric utility serving approximately 348,000 customers. The principal business of Southwestern is the generation, transmission, distribution, and sale of electric energy. Southwestern serves a population of approximately one million in a 52,000 square mile area which includes the Panhandle and South Plains area of Texas, eastern New Mexico, the Oklahoma Panhandle, and a small part of southwestern Kansas. Major cities served include Amarillo, Lubbock, and Plainview in Texas; Clovis, Roswell, and Hobbs in New Mexico; Guymon in Oklahoma; and Elkhart in Kansas. Customer density is approximately 6.7 customers per square mile. The major economic activities in the area include petroleum production and the agriculture industry.

Total sales for 1989 were 18,771,453 MWH, up from 17,099,458 MWH in 1988. The system peak was 2,989 MW in 1989. Total FERC jurisdictional sales account for 36 percent of total sales.

Texas retail jurisdictional sales are approximately 50 percent of the total Company sales, with Texas residential, 9 percent; commercial, 7 percent; industrial, 31 percent; and municipal, 2 percent of total Company sales. Sales for resale in Texas comprise about 13 percent of total Company sales.

SPS basically utilizes two fuels: coal and natural gas. Coal continues to be SPS's primary fuel, accounting for 76.0 percent of fuel dollars spent and 81.3 percent of electric generation. In 1989, the cost of coal paid by SPS to generate a KWH of electricity decreased 6 percent, while the cost paid for natural gas to generate a KWH increased 1.8 percent. The average cost that Southwestern paid for fuel to generate a KWH decreased 3.9 percent.



## *RESOURCE PLAN FILED WITH PUCT*

The revenues for the latest fiscal year which ended August 31, 1989 totaled \$798,732,000. The total capitalization of SPS is \$1,301,149,000 of which 48.6 percent is common stock, 7.8 percent is preferred stock, and 43.6 percent is long-term debt.

Southwestern is a summer peaking utility. The 1989 net firm peak of 2,989 MW occurred in August, and the estimated Texas portion of that peak was 2,233 MW. The winter net firm peak of 2,327 MW occurred in December of 1989. SPS has an installed net capacity of 4,051 MW, of which 53.7 percent uses coal as a primary fuel, 46.0 percent uses gas, and 0.3 percent uses other fuel.

At present, SPS has seven principal stations, two of which are coal-fueled (2,146 MW net capacity), and five gas-fueled stations (1,862 MW net capacity). It is estimated that coal fuel will produce 78.5 percent of 1990 total system energy requirements with gas fuel supplying 19.1 percent, purchased energy 1.3 percent, and "other" 1.1 percent of the total. Included in purchased energy is the output of two cogenerators of 20- and 28-MW installed capacities. About 20 small, power, wind generators are connected with Southwestern.

SPS is a member of the Southwest Power Pool and is interconnected through a synchronous 230-KV transmission line to Public Service Company of Oklahoma (PSO) from Amarillo to Elk City, Oklahoma, and a synchronous 345-KV transmission line to PSO from near Lubbock to the Oklaunion power plant. Two direct current asynchronous ties, rated 200 MW each, interconnect SPS to the Western States Coordinating Council. The direct current terminals are located at Artesia and Clovis, New Mexico, and are connected with El Paso Electric, Texas-New Mexico Power, and Public Service Company of New Mexico, respectively. These four inter-ties have greatly enhanced the efficient use of SPS's generation resources as well as the reliability of the system.

### **Demand Forecast**

In formulating its forecasts, SPS employs an Auto-Regressive Integrated Moving Average model using historical monthly system energy data obtained from Company



**SOUTHWESTERN PUBLIC SERVICE COMPANY**

records. The Company adjusts this forecast to allow for factors such as performance of the economy and industrial loads.

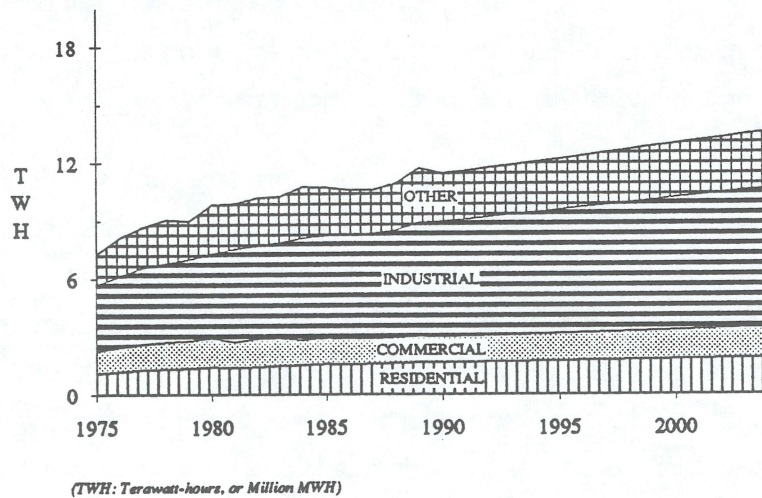
**Number of Customers** SPS provided electric service to 193,638 residential customers, 31,281 commercial customers, and 2,505 industrial customers in 1989 in Texas. SPS's forecasts do not include forecast numbers of customers.

**Sales** Total on-system sales of 15,669,845 MWH in 1989 are projected to increase at about one percent per year through 1999. The Texas geographical portion of sales represents about 75 percent of total on-system sales and is also projected to increase at about one percent per year through the forecast period.

The residential sector is the third largest customer class with Texas sales of 1,666,242 MWH in 1989 representing 14 percent of Texas geographical on-system sales. As shown in Figure 7.1, the Company projects a one percent annual compound growth rate for residential sales over the forecast period.

The commercial sector is the fourth largest customer class with Texas sales of 1,358,869 MWH in 1989 representing 11.6 percent of total sales. The Company projects a 1.1 percent annual compound growth rate for the commercial sector during the forecast period.

**TEXAS SALES BY SECTOR**



*Figure 7.1*



*RESOURCE PLAN FILED WITH PUCT*

The industrial sector is the primary consumer of power at SPS with Texas sales of 5,882,101 MWH in 1989 representing just over 50 percent of total sales. The Company projects a 1.4 percent annual compound growth rate for the industrial sector over the forecast period.

The remaining retail sectors are composed of cotton gins, irrigation, street lighting, municipalities, and guard lights. The sales for this group amounted to 480,874 MWH in 1989 or 4 percent of Texas geographical on-system sales. The Company projects a 1.3 percent annual compound growth rate for these remaining retail sectors in the forecast period.

The wholesale sector represents 20 percent of total sales with sales of 2,341,415 in 1989. A 1.2 percent annual compound growth rate is projected for this sector for the forecast period.

Texas geographical off-system sales of 126,844 MWH were higher than forecasted for 1989. Sales for 1990 are expected to return to a level of 95,662 MWH. The forecast period is projected to experience a one percent annual compound growth rate in Texas geographical off-system sales.

**Peak Demand**                      The Company system peak of 2,989 MW occurred in August of 1989. The Texas portion of the peak was 2,233 MW. The total system peak demand and the Texas portion are both projected to have a 1.3 percent annual growth rate for the forecast period.

**Demand Side  
Adjustments**                      The Company's primary energy efficiency goal is to improve the load factor by using strategic load growth, valley filling, strategic conservation, and peak clipping. Existing and proposed end-user programs are designed to accomplish this goal. Several of these programs provide incentives to encourage participation, such as programs for new installation and replacement installation of high efficiency appliances and heat pumps. SPS adjusts its peak demand forecast to reflect the impact of interruptible loads.



## SUPPLY-SIDE PLAN

SPS's supply-side energy efficiency goals are to improve the heat rate, reduce line losses and increase plant efficiency and reliability. These goals are being achieved through programs focusing on improving plant performance, along with programs emphasizing the reduction of transmission line losses.

**Installed Capacity** In 1989, the Company had a total system installed capacity of 4,051 MW. Coal is the primary fuel for 53.7 percent of this capacity; gas accounts for 46.0 percent; and other fuels account for 0.3 percent.

### Net System Capacity

In 1989, the total system net capacity was 4,251 MW with Texas allocated 3,175 MW of the total. In 1990, the total net system capacity is 4,061 MW with Texas representing 3,011 MW of the total. The

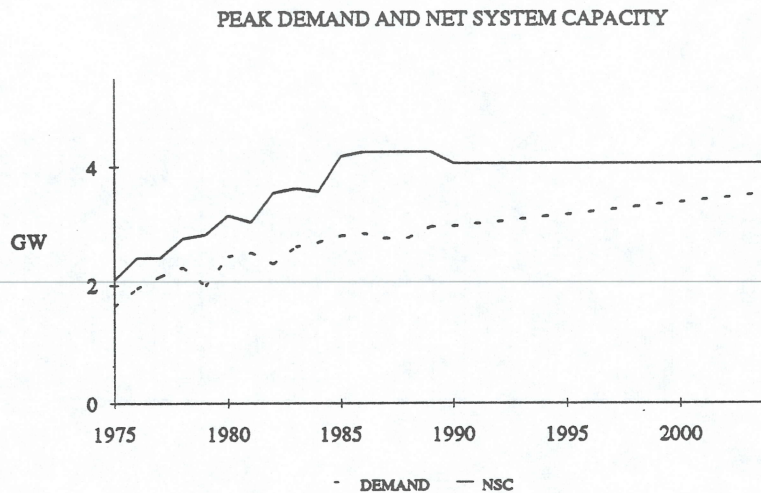


Figure 7.2

decrease in net system capacity occurs primarily because of the expiration of a purchase-power contract. The reserve margin for SPS in 1989 was calculated to be 42.2 percent and is represented in Figure 7.2 as the area between net system capacity and peak demand after adjustments.

**Net Generation** In 1975, SPS generated all its electricity using gas-fueled units. The following year, the first coal-fueled unit was



added to the system. Today, after the addition of several coal-fueled units and the retirement of many gas fueled units, the coal-fueled units account for over 81 percent of the total electricity generated.

**System Expansion** A previously retired 10-MW gas turbine unit has been relocated to the Maddox Plant in New Mexico and is scheduled to become operational in the spring of 1990. This unit will provide the system with black-start capability. As seen in Figure 7.3 no other changes in the Company's capacity are planned at this time.

SPS continues to negotiate with the U.S. Department of Energy for repowering an older natural-gas-fueled generating unit with clean-coal technology. This project would demonstrate the feasibility of the technology for large power plants.

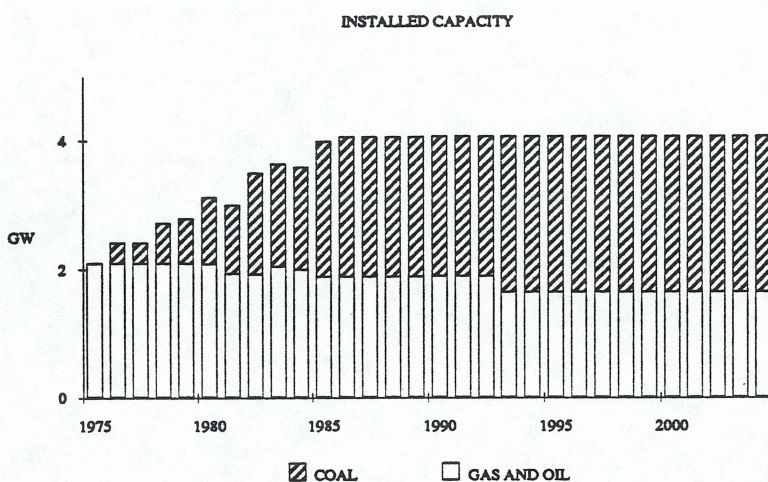


Figure 7.3

SPS plans to implement six transmission line construction projects. The largest project is a new 345-KV transmission line between Tolk Station in Texas and the Company's Eddy County interchange near

Artesia, New Mexico. The 157-mile line is necessary to ensure the efficiency and reliability of the electric system as demand for power increases. The project is scheduled to start in November of 1990 with completion twelve months later at a cost of \$37,300,000. Three of the five remaining projects are for 115-KV transmission lines in New Mexico with a total cost of \$1,869,400. The other two projects are both in Texas. One is a 230-KV line with an associated cost of \$3,480,000 to be completed in April of 1993. The other one is a 115-KV line with an associated cost of \$2,710,000 to be completed in June of 1994.



*SOUTHWESTERN PUBLIC SERVICE COMPANY*

**Changes Since the  
1987 Filing**

There are no significant differences between the 1989 filing  
and the 1987 filing.



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**TABLE 7.1A**

**SOUTHWESTERN PUBLIC SERVICE COMPANY**

**NUMBER OF CUSTOMERS - TEXAS**

**AS REPORTED TO THE PUBLIC UTILITY COMMISSION OF TEXAS**

YEAR	RETAIL			ALL OTHER	WHOLESALE
	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	RETAIL	
1975					
1976					
1977					
1978	169,355	27,415	2,202	17,409	22
1979	172,907	27,990	2,248	17,777	22
1980	178,518	25,772	2,936	16,739	100
1981	183,384	27,729	1,779	17,491	100
1982	187,121	28,435	1,930	18,033	13
1983	189,872	30,625	2,160	18,176	15
1984	193,429	30,764	2,315	18,634	17
1985	194,325	31,062	2,385	18,708	17
1986	194,318	30,959	2,510	18,949	16
1987	194,000	30,927	2,525	19,061	17
1988	194,017	30,966	2,550	19,307	16
1989	193,638	31,281	2,505	19,527	17
1990	194,874	31,803	2,596	20,079	16
1991	195,167	32,100	2,621	20,450	16
1992	195,459	32,400	2,645	20,829	16
1993	195,753	32,703	2,670	21,215	16
1994	196,046	33,009	2,695	21,610	16
1995	196,340	33,317	2,720	22,014	16
1996	196,635	33,629	2,746	22,426	16
1997	196,930	33,929	2,771	22,847	16
1998	197,188	34,203	2,794	23,219	16
1999	197,447	34,480	2,817	23,598	16
2000	197,706	34,759	2,840	23,984	16
2001	197,965	35,040	2,863	24,377	16
2002	198,225	35,323	2,886	24,777	16
2003	198,485	35,609	2,910	25,185	16
2004	198,745	35,897	2,934	25,600	16

**NOTES:**

- 1) Data from 1975 through 1989 is actual; data from 1990 to 2004 is projected.
- 2) If data was not provided by the utility it was interpolated by Electric Division staff as necessary.

**SOURCE:** Load Forecast 1989 Filing, Request 12