2007

REPORT ON DEMAND FOR
ELECTRIC GENERATION

power OUTAGE

STATE DATA REVEALS THAT TEXAS' DEMAND FOR ELECTRICITY IS FAR OUT-STRIPPING PREVIOUS PROJECTIONS

SPECIAL REPORT: TRACKING ENERGY CONSUMPTION IN TEXAS

CLEAN COAL
TECHNOLOGY
FOUNDATION
of
TEXAS

what TEXANS are saying…

The rapidly increasing demand for electricity in Texas, and the state's generating capacity, are front and center in the 2007 policy debate over how best to supply enough power to match that demand. Here is a sample of what Texans are saying about our electricity future:

Texas Governor
Rick Perry

"Our population exceeds 22 million and is expected to double by 2050, and energy demand is forecast to grow 35 percent by 2025. To meet these growing demands, Texas must begin building additional energy generation now. Our population is booming, our electricity demand is growing, and our future is at stake."

Texas Governor Rick Perry
Dallas Morning News, Sept. 17, 2006

Texas Railroad Commissioner
Michael L. Williams

"Electricity is the fuel that keeps our robust Texas economy vibrant; demand for power is expected to grow 12 percent in the next five years. In order to make certain that our electricity is reliable, both for our homes and businesses, we must not delay in building additional generating capacity."

Texas Railroad Commissioner Michael L. Williams
Chairman, Governor's Clean Coal
Technology Council

"Coal is key to meeting the demand in Texas for dependable, affordable, clean power. Our electricity demands are growing at a rate that cannot be met without coal. Much of the expected 34 percent increase in demand by 2015 will be met by coal, and the Governor's Clean Coal Technology Council will work to ensure that it is done cleanly. Coal will be a star of our energy future."

Texas Railroad Commissioner Michael L. Williams
Chairman, Governor's Clean Coal Technology Council

"The fact is that there is an extreme element of the environmental community that opposes additional energy capacity no matter what. They are opposed to coal plants, shifting the focus of their protests from air emissions to global warming. They are opposed to nuclear power because they are concerned about the storage issues. And many are opposed to wind energy because the turbines disrupt the skyline and the migratory bird flight pattern …I would argue that they want to return us to the era of horse and buggy – except they would probably complain about the methane gas from horse manure, too."

Texas Governor Rick Perry
Dallas Morning News, Sept. 17, 2006

"We have a responsibility to provide reliable energy to Texas at a cost that is economically sustainable, while minimizing state and federally regulated pollutants and greenhouse gases."

Houston Mayor Bill White
Texas Cities for Clean Air Coalition press release, August 31, 2006

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DONNA MCDONALD

Administrative Director
Clean Coal Technology
Foundation of Texas

Texas needs more electricity… and it needs it NOW

Unless the utility companies that serve Texas begin building additional capacity immediately, the rolling blackouts that shocked consumers across this state in April of 2006 could become all too commonplace.

This is not conjecture. This is not opinion. And it is not a scare tactic.

It is the studied opinion of the state officials who oversee the electricity grid in Texas and who are assigned the task of ensuring that we have a dependable supply of power.

On Sept. 5, 2006, Texas Public Utility Commission (PUC) Chairman Paul Hudson offered the following assessment to the Regulated Industries Committee of the Texas House of Representatives:

"My message today is a simple one. I believe Texas will require tremendous investment in energy assets in the coming decades.

"Demographic trends suggest that our population will double sometime around 2040.

"The DOE (U.S. Department of Energy) projects we will need 45 percent more electricity in the United States by 2030. ERCOT's (Electric Reliability Council of Texas) projections suggest that we will need an investment equivalent to nearly doubling our current peak load of 63,000 MW (megawatts) in that same timeframe."

One megawatt (1 million watts) can provide electricity for about 300 homes.

Other members of the PUC, the state agency responsible for regulation and oversight of the telecommunication and electric services in Texas, have also sounded the alarm.

In testimony to the Texas Senate Committee on Natural Resources in July, PUC Commissioner Barry T. Smitherman made it clear that the need for power is an immediate one.

"By 2009, existing power plants will not be able to provide enough power," Smitherman said. "Renewable generation cannot reliably deliver power when customers need it. New coal and nuclear plants are a necessity."

The immediacy of the situation was underscored by ERCOT in a June 2005 report on capacity and demand that estimates peak demand for electricity will grow 1.6 percent through 2011. (ERCOT now projects demand growth at 2.3 percent.)

The addition of 1,500 MW of new, efficient electric generation capacity each year would be needed to keep up with that demand.

ERCOT's mission is to direct and ensure reliable and cost-effective operation of Texas' electric grid.

ERCOT Says Texas Reserve Margins in Jeopardy in 2007

In summarizing the outlook for long-term electricity reliability in Texas, Bill Bojorquez, ERCOT director of system planning, made these points during a Sept. 6, 2006, joint meeting of the Committee on Regulated Industries and the Committee on Energy Resources of the Texas House of Representatives:

- ERCOT projects reserve margins to be near or below minimum levels beginning in 2007. (That means to accommodate load growth and offset the retirement of older power plants, new generating capacity is essential to ensuring Texas has a reliable electricity system after 2007.)
- Significant additional generation has been publicly announced but not yet committed with interconnection agreements. This new generation will be available no earlier than 2009.
- New resources are essential to system reliability.
- The region also needs additional fuel diversity to mitigate high dependence on a single fuel type – natural gas.

The evidence is as overwhelmingly clear as it is stark: Unless Texas acts now to produce more electricity, the reliable power system that we have taken for granted for decades will be jeopardized.

Mindful of the technology that exists to protect air quality, our state's leading energy officials have identified coal's importance in the diversified fuel mix that will be required to once again put Texas on a path to an electric system that is second-to-none in the nation.

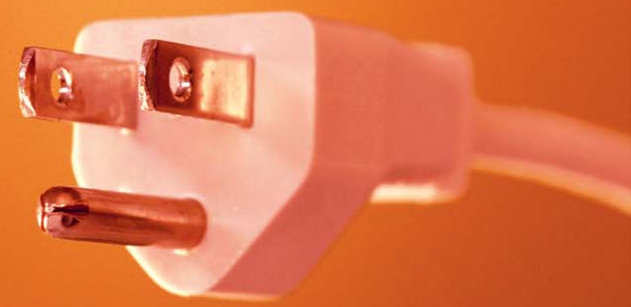
The Clean Coal Technology Foundation of Texas is prepared to play an active role as interested parties craft practical, affordable solutions to this state's energy needs.

The first step on the road to finding a solution is to establish a clear understanding of the problem. This publication, Power Outage 2007, attempts to establish that baseline. It is an unvarnished examination of state data regarding the state's immediate and long-term power supply needs.

We hope this is a starting point that helps Texas find consensus and solutions to our electric power needs.

Donna McDonald
Administrative Director

"Unless Texas acts now to produce more electricity, the reliable system that we have taken for granted for decades will be jeopardized."



Unmet Power Needs

The adequacy and reliability of Texas' electricity system will decline noticeably unless substantial improvements are made soon in its generating capacity, fuel diversity and transmission facilities.

This warning about the vulnerability of one of modern society's most basic – and indispensable - commodities is being sounded from the state to the national level by the very officials who operate and monitor our electric generation and distribution systems.

Unmet power needs could translate into very real problems, including California-style blackouts

Public comments and data released in 2006 by the Public Utility Commission of Texas (PUC), Electric Reliability Council of Texas (ERCOT), U.S. Department of Energy (DOE) and North American Electric Reliability Council (NERC) paint a clear picture: Current trends will result in unmet power needs in Texas, if plans for more electricity don't move forward soon.

"Unmet power needs" could translate into very real problems, including California-style blackouts that would endanger Texans' health, comfort, safety and economic well-being.

As part of its ongoing research into Texas energy and air quality issues, the Clean Coal Technology Foundation of Texas takes a closer look at the adequacy of the state's electric system in this report, *Power Outage 2007*. It is based on testimony and statistics provided by PUC, ERCOT, NERC and DOE.

An Undisputed Problem

Power Outage 2007 shows the booming demand for power in Texas is not a function of wastefulness or bad stewardship. Despite increased energy conservation, as our economy grows and our population increases, we naturally need more and more power.

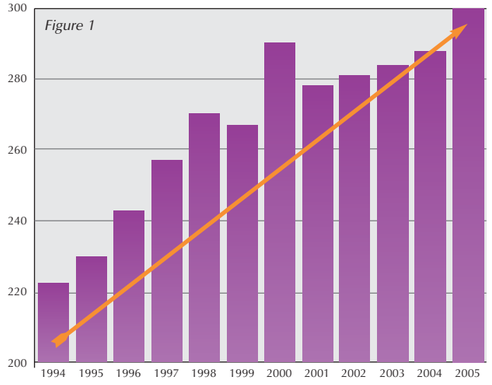
Undisputed projections show electricity shortages in Texas could begin in earnest as early as 2008, denying consumers and businesses power during the peak summer months, when they need it most.

The early warning signs are unmistakable.

Electric usage has exceeded the peak demand of a few years ago and actual peak load spiked above projections for 2006.

Between 1999 and 2004, the average peak demand in the ERCOT region was 50,032 MW (megawatts). The peak load forecast for 2006 was 60,544 MW. That was surpassed on July 17 when demand hit 62,396 MW (*figure 1*). And it was only one month later, on August 17, 2006, that peak demand hit 62,429 MW – 1,885 MW higher than the forecast.

Texas Sets New Demand for Electricity



PEAK HISTORY

1999: 54,849 MW
2000: 57,606 MW
2001: 55,201 MW
2002: 56,248 MW
2003: 60,095 MW
2004: 58,531 MW
2005: 60,274 MW
07/06: 62,396 MW

Source: PUC Chairman Paul Hudson, Texas Electricity Status and Regulation October 4, 2006

Texas Power Facts

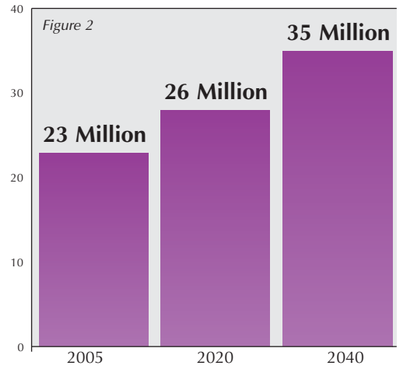
- By 2009, existing power plants will not be able to provide enough power
- Natural gas is an expensive option
- Renewable generation cannot reliably deliver power when customers need it
- New coal and nuclear plants are a necessity

Source: PUC Commissioner Barry T. Smitherman, 07/13/06

In April 2006, electric customers and businesses were unexpectedly plunged into darkness when rolling blackouts rippled across Texas as temperatures hit 100 degrees and several generating plants were not operating due to scheduled maintenance. Those blackouts cost the North Texas economy at estimated $10 million a minute.

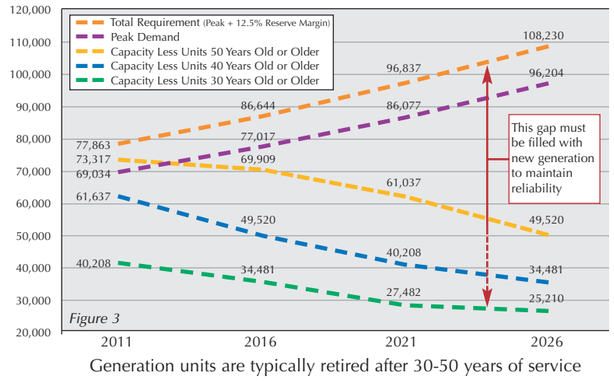
The frequency of power failures in the United States is no less than it was 25 years ago, according to the summer 2006 edition of Issues in Science and Technology, a publication of the National Academy of Sciences, National Academy of Engineering and Institute of Medicine, and electricity reliability has not improved. If the data show any trend in the past years, it is toward lower reliability.

Texas' Projected Population Growth



Source: Texas State Data Center

ERCOT Generation Capacity and Demand Projections



Generation units are typically retired after 30-50 years of service

Source: PUC Chairman Paul Hudson; Texas Electricity Status and Regulation, October 4, 2006

For example, the average U.S. customer loses power for 214 minutes per year compared to 70 in the United Kingdom, 53 in France, 29 in the Netherlands and six in Japan. In Japan, the average customer loses power once every 20 years, while in the United States it is once every nine months.

According to the Electric Power Research Institute, outages cost the U.S. economy about $100 billion a year, which is 1 percent of the gross national product, or roughly 50 cents for every dollar spent on electricity. EPRI predicts the economic loss could rise to $300 billion per year unless substantial investments are made in the U.S. delivery systems and power supplies.

PUC Commissioner Barry Smitherman made it clear how urgently Texas needs new, low-cost sources of electricity during testimony to the Texas Senate Natural Resources Committee on July 13, 2006.

"By 2009, existing power plants will not be able to provide enough power," Smitherman noted in his presentation, adding demand for electricity is projected to grow at a rate of 2.3 percent, spurred, in part, by the addition of 6 million new Texas residents by 2016.

PUC Chairman Paul Hudson shares Smitherman's assessment.

"I believe Texas will require tremendous investment in energy assets in the coming decades," Hudson told the Texas House Regulated Industries Committee on Sept. 5, 2006.

Texas' power consumption needs parallel DOE's estimate that the United States will require 45 percent more electricity by 2030.

"ERCOT's projections suggest that we will need an investment equivalent to nearly doubling our

current peak load of 63,000 MW in that same timeframe," Hudson said, later saying that the forecast load with the reserve margin will approach 100,000 MW by 2025.

ERCOT reports a current resource availability of 70,756 MW, which represents a reserve margin of 13.3 percent for the 2006 peak load. This does not include mothballed units.

Texas' energy plight attracted national attention in October when a long-term reliability assessment by the North American Electric Reliability Council identified Texas as one of the regions that is most likely to face power grid failures and further blackouts in the next few years unless significant improvements occur.

Possible ERCOT Generation Capacity Needed

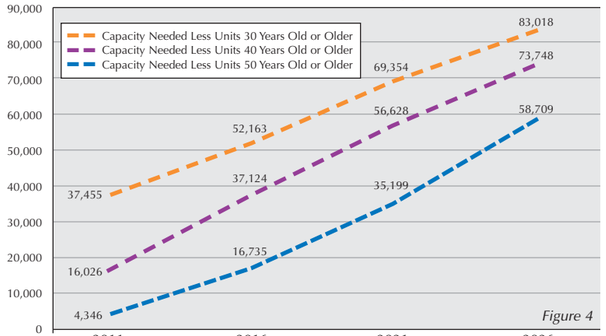


Figure 4

Source: PUC Chairman Paul Hudson; Texas Electricity Status and Regulation, October 4, 2006

Capacity margins in Texas, which is the amount by which available electricity exceeds peak demand, will fall below minimum target levels by 2008, according to the NERC report.

The enormity of the challenge is underscored by the fact that when it comes to building new power plants, Texas hasn't been standing still. According to PUC Commissioner Smitherman, 33,000 MW of new generating capacity has been built in Texas since 1995 at a cost of more than $15 billion.

PUC Chairman Hudson and Commissioner Smitherman also agree that Texas must maintain a mix of fuel sources.

"It's my opinion that new base load plants are a necessity to meet future needs," Hudson said, reminding the Gulf Coast Power Association that nuclear plants require about 10 years to permit and construct.

Smitherman told the Senate panel, "Renewable generation cannot reliably deliver power when customers need it. High gas prices have created new opportunity for investment in coal and nuclear generation facilities. New coal and nuclear plants are a necessity."

Smitherman described using natural gas as a fuel source as "an expensive option."

He noted natural gas prices are more than twice the 2001-2002 levels and are projected to continue rising, and the United States is likely to increase its reliance on imported natural gas.

How will Texas Meet its Mushrooming Electricity Needs?

The mounting demand for electricity in Texas is a sign of prosperity: the population and economy are booming. But, the good news presents a hard challenge: Texas must expand its sources of electricity or face a grim future, with costs that go beyond dollars and cents.

If the shortfall isn't addressed soon, experts say, the consequences will be dire: the very economic health of Texas will rise or fall on the adequacy of its power supplies.

exceeding CAPACITY

Dr. M. Ray Perryman

Long range, the consequences of a power shortage could be much more drastic, says economist Dr. M. Ray Perryman, who recently studied and wrote about electricity demand:

Beyond population, Texas is leading the pace in terms of major corporate locations, job growth, and output gains. From export related activity to technology oriented manufacturing, the industrial base in the Lone Star State is strong and growing.

This economic vitality has contributed to an increasing need for power. In fact, analysis by The Perryman Group (TPG) indicates that for every 1 percent increase in the state's Real Gross Product (RGP), energy usage grows by approximately 0.72 percent.

Texas is well positioned to be an economic growth leader in the decades to come. In addition, the population of the state continues to expand.

Using dynamic simulations of future electric usage within the context of the firm's Texas Econometric Model, TPG estimates that even when gains in efficiency and changes in the economy are accounted for, electricity usage is projected to increase by more than 63 percent by 2025.

Because much of energy usage is not sensitive to the factors that determine peak demand, it is not unusual for usage to increase by a larger percentage than demand.

The Electric Reliability Council of Texas (ERCOT) estimated in a June 2005 report that demand for electricity will rise by some 20 percent by 2015 and 43 percent by 2025 given current growth rates. Total requirements are expected to exceed existing capacity in the next few years. When aging of today's facilities is factored in, the need for new capacity rises even faster.

ERCOT estimates that Texas will require up to 46,700 additional MW of capacity by 2025 if plants at least 30 years old are retired.

The state's electric generation and transmission capacity must expand to ensure sufficient power is available for residential, commercial, and industrial uses.

NEW Planned Generation in the ERCOT Region

2007 - 2011 Capacity in MW (Data as of August, 2006)

Fuel Source	Under Development	Publicly Announced	Not Publicly Announced	Total
Natural Gas	550	2,300	4,445	6,745
Coal	750	11,709	4,652	16,361
Wind	1,576	2,944	13,578	16,523
Other	0	12	1,112	1,124
TOTALS	**2,876**	**16,965**	**23,788**	**40,753**

Current resource availability in the ERCOT region: 70,756 MW

Figure 5

COMMITTED

For these projects, signed interconnection agreements (contracts between generators and transmission owners) have been completed.

Source: Electric Reliability Council of Texas, September 2006

UNCOMMITTED

These are projects for which ERCOT has received transmission interconnection requests:

- *Projects are under consideration or in planning, and may or may not be built*
- *Excludes some announced projects, such as nuclear and offshore wind, which do not yet have the interconnection requests on file*

"The state's electric generation and transmission capacity must expand to ensure sufficient power is available for residential, commercial, and industrial uses," said Dr. M. Ray Perryman, one of Texas' leading economists.

The state's electricity providers, acutely aware of the stakes, have proposed a solution, an expansion of capacity that would meet the state's needs for reliable electricity for decades to come.

In recent months, the general public – and the news media – also have recognized the looming problem.

As the state's population and economy grow, state and federal agencies, the electric utility industry, environmental and conservation interest groups alike have all warned of the potential shortage of electricity.

Texans have already gotten a nasty hint of a future without additional production capacity, when spikes in demand outpaced supplies in April 2006, leading to occasional electricity shortages and rolling blackouts.

Heading off such shortages is a complex and immediate challenge, rooted in the simple and inescapable rules of supply and demand. While parties may disagree on the best way to address electricity supply issues, there's little dispute that existing electricity production plants will be insufficient to meet the growing needs of Texas in years to come.

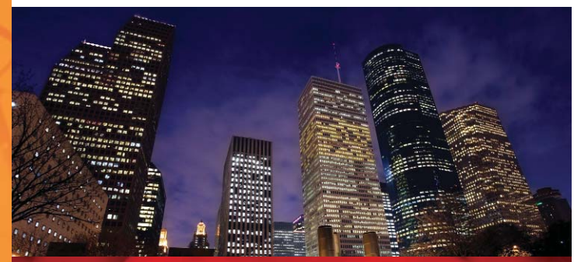
As early as 2003, one environmental interest group was already predicting Texas' electrical power supply would be sufficient to last only through 2008.

"It is believed that Texas has enough electric power today to meet demand for the next five years," noted a 2003 analysis by Texas Environmental Profiles, a joint project of the Texas Center for Policy Studies and Environmental Defense.[1]

In further explaining the assessment that Texas had enough power in 2003 to last until 2008, and no further, the analysis noted: "Plans to build another 14 permitted power plants are on hold. It was expected that the new power plants would replace the old, inefficient and more polluting plants, and that has happened, but not as much as anticipated.

"Unlike other states in the country, Texas's electricity grid has limited interconnection with other states. Due to this lack of infrastructure, Texas is not able to connect its electricity beyond its own borders."

That interest group, often aligned against utilities on regulatory and policy issues, cited statistics from the leading, impartial authority on anticipated energy demand, the Energy Information Agency (EIA) of the U.S. Department of Energy.



Texas Power Facts

- "Texas will require tremendous investment in energy assets in the coming decades"
- "ERCOT's projections suggest that we will need an investment equivalent to nearly doubling our current peak load of 63,000 MW by 2030"
- Forecast load with reserve margin in 2025 approaches 100,000 MW

Source: PUC Commissioner Paul Hudson, 10/04/06 and 09/05/06

BLACKOUTS: THE COST

The rolling blackouts in California during 2001 illustrate the havoc caused when the supply of electricity fails to keep pace with demand.

- Spot shortages of gasoline resulted as some petroleum refineries required up to two weeks to resume operations.
- At a large Internet retailer, a 20-minute power failure deleted 20,000 product orders and $500,000 in revenue when a backup power system failed during a rolling blackout.
- A semiconductor manufacturer lost $50,000 in production and damaged products during a two-hour blackout.
- A fiber-optic component maker lost $3 million in product.
- Traffic snarls and more accidents occurred as signals were turned off or malfunctioned.
- Intel temporarily froze its California hiring.
- Miller Brewing Co. laid off 260 workers in Southern California for the duration of the blackouts.

Source: Issues in Science and Technology, Summer 2006

Meeting Demand: A Nationwide Challenge

The EIA says Texas is not unique in facing booming demand: The agency's scientists and economists predict that over the next quarter century, the nation's electricity sales will increase by half, from 3,567 billion kilowatt hours in 2004 to 5,341 billion kilowatt hours in 2030.[2]

Increases in demand won't be concentrated in any one sector of customers: fueled by population growth and economic expansion, the nationwide boom will be only partially offset by improvements in efficiency and boosts in on-site electricity production in the industrial sector, the EIA predicts.

"The largest increase is in the commercial sector, as service industries continue to drive economic growth. By customer sector, electricity demand grows by 75 percent from 2004 to 2030 in the commercial sector, by 47 percent in the residential sector, and by 24 percent in the industrial sector," the agency wrote in its Annual Energy Outlook 2006.[3]

And, that report notes, in Texas and across the nation, existing surpluses cannot meet future needs:

"Most areas of the United States currently have excess generation capacity, but all electricity demand regions … are expected to need additional, currently unplanned, capacity by 2030."[4]

"Companies are not building power plants and power lines fast enough to meet growing demand"

A Texas Close-Up

Another neutral, national authority describes the picture in Texas as especially urgent, citing the state as one of a handful where shortages could affect reliability not within decades, but within several years. That prediction, and its impli-cations for electricity customers, caught the eye of the press, including The New York Times, which reported:

"Companies are not building power plants and power lines fast enough to meet growing demand, according to a group recently assigned by the federal government to assure proper operation of the power grid.

"The group, the North American Electric Reliability Council, in its annual report … said the amount of power that could be generated or transmitted would drop below the target levels meant to ensure reliability on peak days in Texas, New England, the Mid-Atlantic area and the Midwest during the next two to three years."[5]

The North American Electric Reliability Council (NERC) is the entity assigned by the federal government to assure proper operation of the nation's power grid, a charge the council was given after massive blackouts across the Midwest and Northeast United States in 2003.

The report released in October 2006 was the first assessment of long-term reliability of electricity supplies since NERC received its Congressional mandate.

To forecast electricity demand in Texas, experts at the both the federal Energy Information Agency and the North American Energy Reliability Council turn to the Electric Reliability Council of Texas (ERCOT), which regularly forecasts peak energy demand and supply, using a complex economic formula.

In its report, NERC rolled back by two years – from 2011 to 2009 – its previous estimate of the date that rising demand is expected to cause Texas' electricity supply to dip below industry standard safety margins. (NERC attributed that rollback in part to both increased demand and shortfalls in the amount of power available from wind-generation.)[6]

NERC's prediction relied on data from ERCOT, which announced in June 2006 that surplus electricity supply will drop below 11 percent in 2009. But, Texas has a stricter standard than NERC: In 2002, the

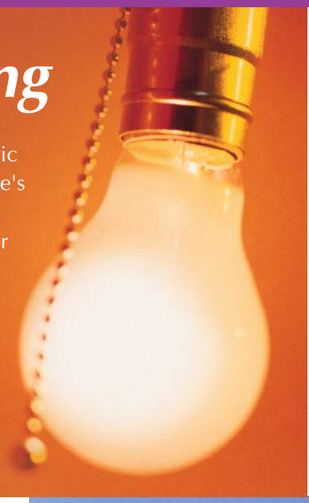
Surplus Electricity in Texas	2006	2007	2008	2009	2010	2011
Firm Load Forecast (Megawatts) *	60,544	62,110	63,206	64,838	66,436	67,922
Total Resources	70,756	71,753	70,690	70,628	71,205	71,242
Margin	16.4%	14.8%	11.4%	8.5%	6.8%	4.5%
Margin If No "Mothballed" Facilities Returned to Service	16.4%	11.6%	8.6%	5.8%	4.1%	1.8%
Margin If No "Mothballed"	16.5%	15.0%	11.6%	19.7%	24.5%	23.5%

Red = surplus margin falls below minimum reserve target of 12.5%

* Summer peak demand minus interruptible land (large industrial customers under contract to curtail usage if needed for grid reliability), which counts as a resource.

Source: Electric Reliability Council of Texas

ERCOT: *keeping the power flowing*



The Electric Reliability Council of Texas (ERCOT) is the organization entrusted to keep electric power flowing to approximately 20 million Texas customers - representing 85 percent of the state's electric load and about 75 percent of the Texas land area.

As the Independent System Operator for its region, ERCOT manages the scheduling of power on an electric grid consisting of 70,000 megawatts of active generation capacity and 38,000 miles of transmission lines. As one of 10 regional reliability councils in North America, ERCOT monitors and enforces industry reliability standards for grid and utility operations.

ERCOT is a non-profit corporation regulated by the Public Utility Commission of Texas and subject to oversight by the Texas Legislature. ERCOT's members include retail consumers, investor- and municipal-owned electric utilities, rural electric co-ops, river authorities, independent generators, power marketers and retail electric providers.

ERCOT Board approved a minimum reserve margin target of 12.5 percent for the ERCOT Region. By that measure, the margin will shrink below acceptable levels a year earlier, in 2008. (Figure 6)

And, if no mothballed power production facilities are brought back online, the situation will be even more dire, ERCOT predicts, with surpluses dipping below target levels as early as 2007. (Figure 6)

In a surprise, end-of-the-year development, TXU informed ERCOT that to help meet short-term demand it will keep some gas-fired plants online into 2009 and bring other plants out of mothball, according to news reports.

This announcement, in turn, prompted PUC officials to change a draft report on electricity to the Texas Legislature to say that instead of being slightly below the safety margin in 2008 "…ERCOT projects that the targeted reserve margin of 12.5 percent will be met in 2008."

The draft report still notes electricity supply problems could arise beyond 2008 "unless new generation resources that have been announced are completed," according to news reports, and a TXU official confirmed the need for additional coal-fueled capacity.

One of ERCOT's duties is to alert policy makers and the power industry about future needs.

"The importance of getting these numbers out is to allow time for the market to develop new resources to avoid falling below the 12.5 percent minimum in 2008 or later," said Bill Bojorquez, ERCOT director of system planning, explaining the significance of the June numbers.

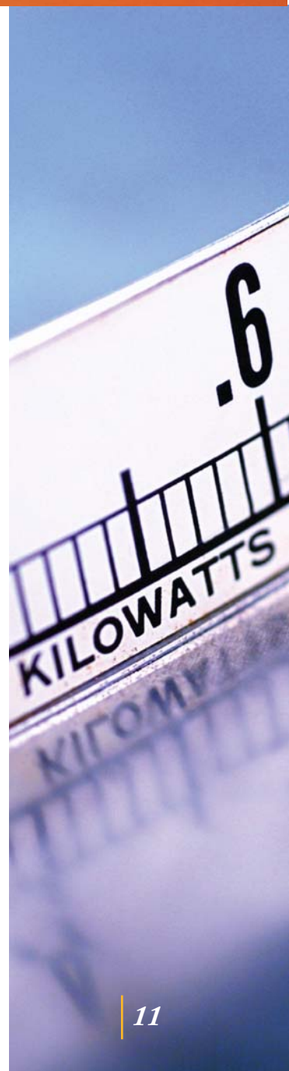
Even in advance of ERCOT's June announcement, TXU began the permitting process on a $10-billion project to construct and operate 11 new clean-coal power generation facilities. The company says those plants would increase generation by nine gigawatts (enough to serve 6.5 million residents), and provide adequate supply through the year 2015.

TXU's new plants could go online as soon as fall of 2008, in time to bolster supply and help head off the drop of reserves below stable levels. Also announced are four other coal plants, including one by LS Power and another by City Public Service, San Antonio's municipal power company.

ERCOT states that with these new facilities, reserve margin remains will dip to 11.6 percent for one year, then quickly climb above the target of 12.5 percent, and as high as 24 percent in 2010 (bottom line in figure 6).

As the energy writer for The Dallas Morning News observed in April 2006, the Texas blackouts that spring were prompted by freak heat during a time when power generators were down for maintenance:

"But Texans shouldn't relax. Population growth is pushing electricity demand higher, and supply could get uncomfortably tight in about four years unless power companies build more plants."[7]



An additional caveat to consider is the time required to bring a new power unit on-line. The typical construction time for a coal plant is four years, one year for a wind generator, two years for gas and 10 years for a nuclear power plant. Texas' available supply of electricity could become much tighter much quicker if the projects ERCOT identified in making its margin projections are delayed, either through legislative action, permitting or construction delays, or other developments.

Not Chicken Little

These predictions are not worst-case scenarios. They factor in conservation efforts, expected increases in use of alternative energy and on-site industrial production of electricity.

As such, the forecasts do not cast energy consumers as voracious, insatiable energy wasters. In fact, the federal Energy Information Agency reveals that over the last 25 years, overall energy use per capita has risen only slightly, and energy use per dollar of Gross National Product has fallen steeply – trends that are expected to continue. (Figure 7).

Rather, shortfalls are expected to result nationally from economic and population factors that as a matter of public policy are desirable - separate from the debate over electricity production. Electricity demand goes hand-in-hand with economic growth, increased use of technology by consumers and stepped-up industrial output.

"The need for new generating capacity, particularly coal-fired capacity, is influenced by economic growth," the EIA noted in its Annual

Energy Use Per Capita and Per Dollar of Gross Domestic Product, 1980 - 2030

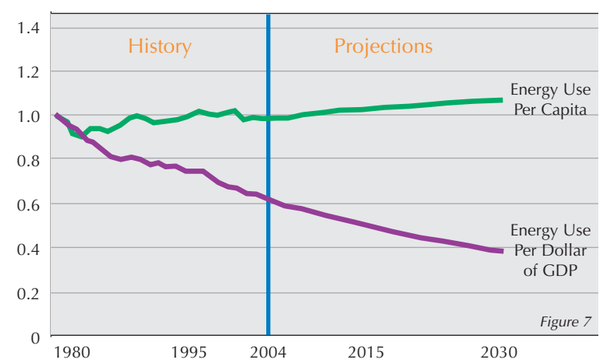


Figure 7

Source: Energy Information Agency of the U.S. Department of Energy

Relative Size of Texas Electricity Market

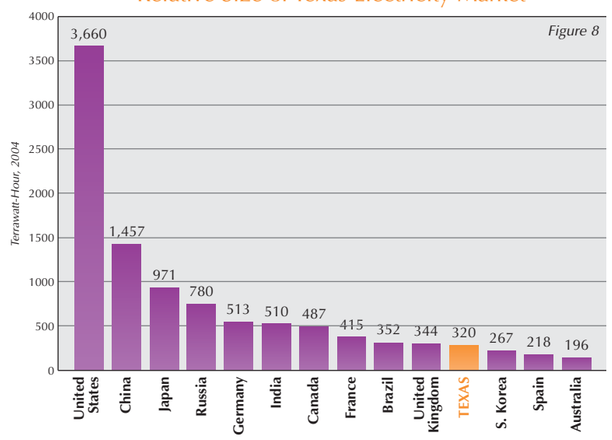


Figure 8

Source: Energy Information Agency of the U.S. Department of Energy

Texas Power Facts

- Reserve margins to be *near or below minimum levels* beginning in 2007
- Significant additional generation announced, but available no earlier than 2009
- New resources are essential to system reliability
- Region needs additional fuel diversity to mitigate high dependence of natural gas

Source: PUC Commissioner Barry T. Smitherman, 07/13/06

Energy Outlook 2006, adding, "Population growth is a key determinant of total energy consumption, closely linked to rising demand for housing, services, and travel."[8]

Looking more specifically at electricity consumption, the EIA explained, "Past trends in electricity consumption are expected to continue, with future increases resulting from strong growth in commercial floorspace, continued penetration of electric appliances in the residential sector, and increases in industrial output."[9]

Texas' electricity market is one of the largest in the world (Figure 8), with demand equivalent to that of New York, Connecticut, New Hampshire, Vermont, Maine, Massachusetts and Rhode Island combined.

The general population and economic trends driving electricity demand certainly hold true here. Lone Star State population is expected to increase by 5.7 million during the next 10 years.

And, economists predict that economic and population growth in Texas will continue – if the state's power needs are met. (Figures 8 and 9).

Over the short haul, energy shortages would mean power won't be there during peak summer seasons, when Texans need it most.

Historic and Projected Population in Texas 1995-2030

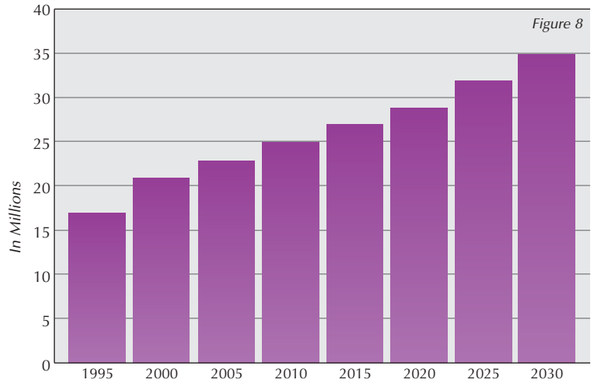


Figure 8

Source: The Perryman Group

Historical and Projected Real Gross Product (RGP) for Texas, 1995-2030

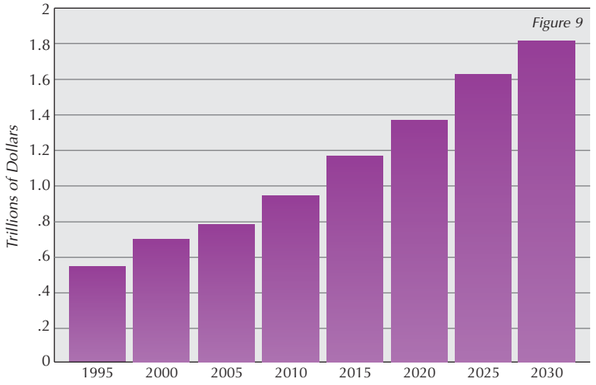


Figure 9

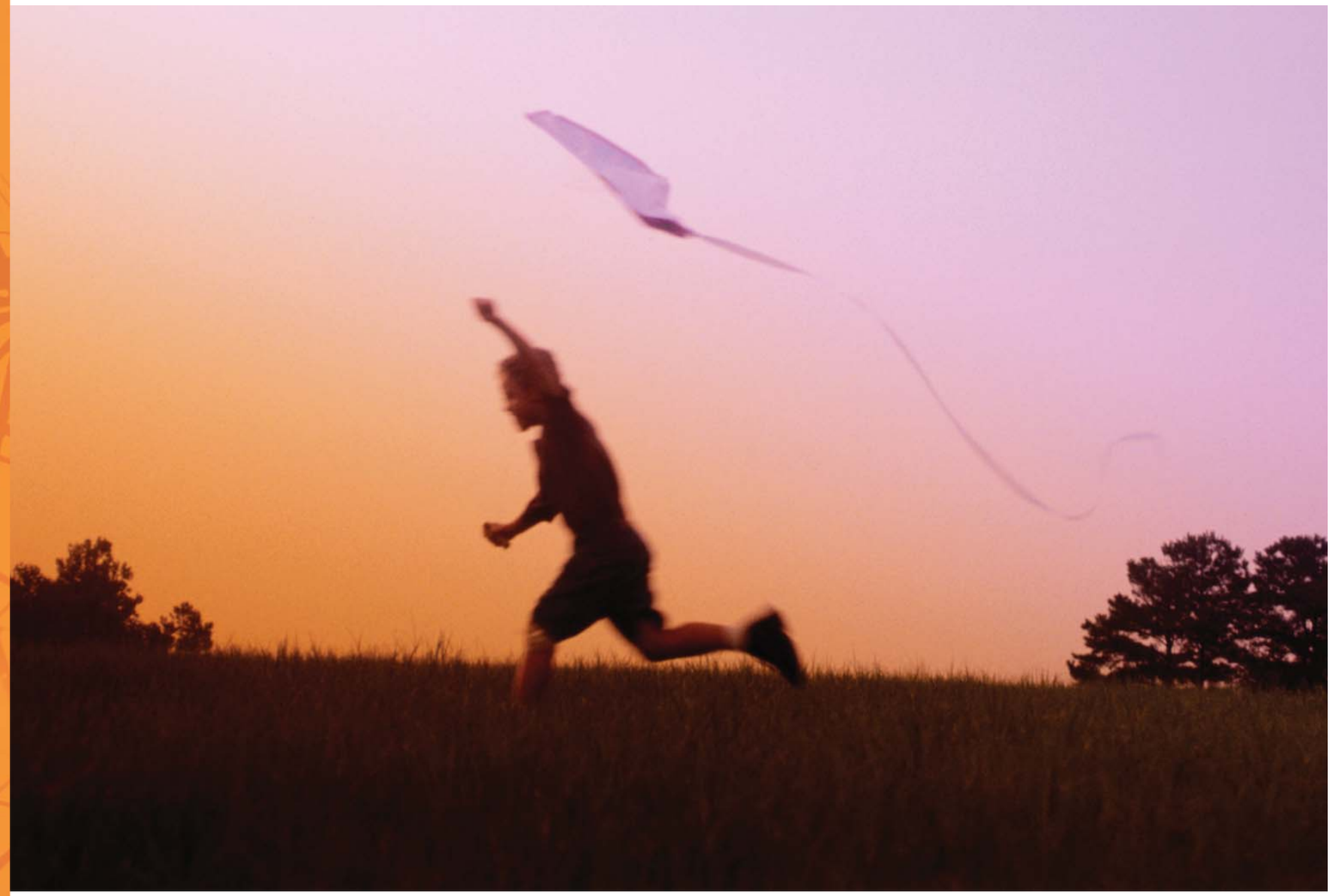
Source: The Perryman Group

An Answer

The answers to this potential crisis lie in the marketplace: For example, a leading energy provider in Texas has laid plans that would head off the problem, and ensure a reliable reasonably priced supply of electricity for decades to come.

TXU has launched an effort to create the nation's cleanest large-scale coal fleet, which would provide nine gigawatts of new low-cost, efficient power generation. New emissions control technology and TXU's adoption of the largest voluntary emissions reduction program ever will bring this capacity online in an environmentally responsible manner.

The company is also transforming its transmission and distribution network into the nation's first broadband-enabled electric smart grid, which will dramatically enhance its ability deliver power and let customers to better manage electricity use.



conclusion

Faced with the need to bring substantial new amounts of electricity to market as quickly as possible, Texas must look at all the options to meet that demand, including solar, nuclear, renewables and hydro.

What cannot be overlooked in this mix are the abundant domestic coal resources that now provide Texas with almost 38 percent of its electricity and have the obvious potential to play an even larger role. The key to use of this natural resource is to make coal as clean as possible through technology. The expertise is available. The resource is available. The challenge is to strike the balance that will foster the responsible use of coal.

As the private sector develops answers, it's vital for public policymakers to allow the implementation of proven solutions. Accurate information is the key to good decision-making, and all parties concerned agree on the urgency of the issue:

To hold its place as a national leader in economic activity and quality of life, Texas will need more electricity, and soon.

End Notes: [1] http://www.texasep.org/html/nrg/nrg_2ele.html; [2] *Annual Energy Outlook 2006*, Energy Information Agency at page 77; [3] Id.; [4] Id., at page 78; [5] *A Power-Grid Report Suggests Some Dark Days Ahead* by Matthew Wald, The New York Times, March 16, 2006; [6] NERC 2006 Long-Term Reliability Assessment at 15 (ftp://www.nerc.com/pub/sys/all_updl/docs/pubs/LTRA2006.pdf); [7] *Blackouts a fluke now, but in 2010? Texas must build plants - and soon, experts say*, By Elizabeth Souder, *The Dallas Morning News;* [8] *Annual Energy Outlook 2006*, Energy Information Agency at page 65; [9] Id, at page 66

About The Report

The Clean Coal Technology Foundation of Texas believes the discussion about how best to secure Texas' energy future must be based on the facts. That is the purpose of *Power Outage 2007* – to provide impartial information on the scope of the electricity demand facing Texas so policymakers, energy providers and the public can then tackle the vital question of how best to generate more electricity.

The baseline data, comments and projections contained in *Power Outage 2007* come from the Public Utility Commission of Texas, Electric Reliability Council of Texas, North American Electric Reliability Council and U.S. Department of Energy.

By making this information available in *Power Outage 2007*, the Foundation's goal is to move the debate forward to the critical questions of how Texas will produce more electricity in a responsible way, consistent with sound energy and environmental policies.

Donna McDonald
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Clean Coal Technology Foundation of Texas

Clean Coal Technology Foundation of Texas

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