
# MEETING FUTURE ENERGY NEEDS:

## FINAL REPORT OF THE TCCRI ENERGY AND ENVIRONMENT TASK FORCE

JANUARY 2009

A PRINCIPLED APPROACH TO GOVERNMENT

**Primary Recommendation:**

Diversify and expand generation capacity utilizing coal, natural gas, nuclear, wind, and biomass.

**Other Recommendations:**

- Repeal natural gas generation target in the Utilities Code.
- Maintain regulatory certainty in the permitting process for new power plants.
- Expedite permits for new power plants.
- Expedite waste water permits for nuclear plants.
- Ensure that wind incentives are reasonable.
- Use the System Benefit Fund for its intended purpose by subsidizing smart meters and in home customer usage monitoring devices.
- Expand the use of alternative fuels in government vehicles.
- Abolish the Office of Public Interest Council at the Texas Commission on Environmental Quality.
- Establish a home energy audit property tax exemption.
- Create an energy company property tax exemption.
- Require that Low-Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP) funds are used to purchase alternative fuel vehicles.

# ENERGY AND ENVIRONMENT TASK FORCE
# FINAL REPORT

For more information about any of the recommendations contained in this document, please contact the Texas Conservative Coalition Research Institute:

Brent Connett, Task Force Director and Policy Analyst – brent@txccri.org

Tom Aldred, Policy Analyst – tom@txccri.org

Texas Conservative Coalition Research Institute

P.O. Box 2659, Austin, TX 78768

(512) 474-6042

www.txccri.org

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# ABOUT TCCRI TASK FORCES

The Texas Conservative Coalition Research Institute's Task Forces are the backbone of the Institute's research and education efforts. Based on the conservative principles of limited government, individual liberties, free enterprise, and traditional values, the Institute's Task Forces develop legislative leaders and sound public policy ideas by bringing together legislators, experts, industry leaders, and stakeholders in a unique forum that fosters discussion and debate among public and private sector leaders. This approach has proven to be very successful.

## THE 2007-08 ENERGY AND ENVIRONMENT TASK FORCE

Chaired by State Representative Lois Kolkhorst (R-Brenham), the TCCRI Energy and Environment Task Force met throughout the 2007-08 Interim. The Task Force was convened to address ways in which Texas can meet the energy demands of a growing economy and population, while protecting the environment: The debate about how Texas meets its growing energy needs is inextricably linked to state environmental policy. The two objectives – more energy and less pollution – are not necessarily at odds but environmental groups have made it so.

The Energy and Environment Task Force discussed policies that are pro-growth and pro-environment, while examining the proper role of the state in Texas' energy markets to determine workable, free market solutions for meeting the energy needs of a growing state while protecting the environment.

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## 1. Overview

During the past year or more, rising oil prices brought energy issues sharply into public focus. With gasoline prices shooting above $4 per gallon, issues such as energy independence and offshore drilling became focal points for public and political debates. Increased public attention on these issues yielded results: In September 2008, Congress voted to lift the ban on offshore oil drilling[i] and energy issues became part of the national debate. Oil billionaire T. Boone Pickens' much-publicized "Pickens Plan" advocated a move toward energy independence by diversifying America's energy portfolio to include more wind and solar power.

However, in the last quarter of 2008, oil prices fell, gasoline prices followed suit, and the immediacy of the energy issue lessened. Nevertheless, policy makers should not be lulled into a false sense of security. The fundamental issues remain: America is reliant on foreign oil for transportation, Texas is reliant on natural gas for electricity, ANWAR remains closed to development, the President-Elect has threatened to "bankrupt" the coal industry,[ii] and adoption of alternative fuels and green power is in its infancy.

The next time oil or gas prices spike, the U.S. and Texas will be in the same situation unless action is taken. For example, current Texas law requires half of all new electric generation capacity to use natural gas. This requirement may have appeared economically beneficial when it was introduced in 1999 when natural gas prices were low; but as prices have risen it has become evident that such a requirement is anathema to the principles of the free market and may cause unintended adverse consequences. Even if the statutory provision has not impacted generation development to date, it has impacted price, and could have an impact on development in the future; this provision must be repealed.

As Texas grows, so will its need for energy. This need must be met by expanding generation capacity and making efforts to conserve and use energy as efficiently as possible. Energy conservation and efficiency will help alleviate demand and environmental concerns.

Inevitably, the debate about how Texas must meet its growing energy needs is inextricably linked to the state's environmental policy. The two objectives – more energy and less pollution – are not necessarily at odds, but environmental groups have made them appear to be in conflict.

The dual objectives of lawmakers must be to facilitate economic growth while protecting the environment.

Juxtaposed to the need to expand energy and industrial infrastructure are calls for greater environmental protection. Global warming, for example, is speculated to be caused by human activity, such as greenhouse gas emissions. Many use global warming as a justification to stop new power projects and industrial development despite the fact that significant greenhouse gases emanate from many other sources. To date, environmental opposition has stood in the way of new coal and nuclear power plants, of production of vast on and offshore natural resources, of constructing new refineries (which contributed to the spike in gasoline prices in 2008), of new electric transmission lines, and impeded new pipeline projects that get products to consumers faster and at less cost.

Opposition to all non-renewable forms of power exacerbates what is already a slow and arduous state permitting process for new electricity generation facilities, which takes up to two years to complete. The process is needlessly bogged down, even for existing facilities attempting to obtain permits to expand or incorporate new technologies which would reduce emissions. The same constraints have affected our refineries, chemical plants, and manufacturing industry, resulting in the loss of jobs to other states and countries.

It is almost depressing that despite years of safe and effective nuclear energy projects, particularly in France and Japan and, indeed, across the U.S., that the United States is nearly crippled in development of new nuclear projects. It has been well over two years since NRG Energy announced plans to expand an existing nuclear facility in South Texas, yet the proposal is still pending at the Nuclear Regulatory Commission.[iii] This situation paints a fine illustration of the self-strangulation of American industrial and economic power.

In short, the price of electricity and gasoline should not determine whether or not Texas, and indeed, the nation engage in a reasoned and serious national debate about energy and the environment. The failure to take action at this crucial juncture – the transfer of power Washington, a shifting in affairs in the Middle East and a crippling economic conditions across the globe – will only exacerbate the fundamental cracks in America's infrastructure, while continuing to shift manufacturing to developing countries without the concomitant shift to new or proven technologies that can secure America's energy future without sacrificing the environment.

## 1a. Addressing Environmental Concerns

The beginning of the 80th Texas Legislature in 2007 was marked in part by carefully orchestrated protests against the approval of eleven new coal-fired power plants proposed by TXU. These protests – organized by the Texas Clean Sky Coalition – were the hyperbolic manifestation of environmental extremism. Designed to provoke fear and outrage rather than a reasoned debate about the economic benefits and environmental safety of coal-fired facilities, the anti-coal demonstrators used images of soot-faced children to prophesize a public health disaster if the coal plants were given the go-ahead. *The Dallas Morning News* was rightfully critical:

> The faces of the organization's ad campaign are clearly a studio-created fantasy; even Texas' dirtiest coal plants don't rain down thick clouds of visible dust that make people look like 19th-century coal miners. [iv]

While the campaign was misleading, it made an important, if accidental point: Too frequently, the energy versus environment debate is commandeered by extremist environmentalists who use the politics of fear to persuade public opinion that theirs is the only way. A poster of a child's face smeared with coal is always more likely to sway public opinion than are warnings by a government agency that some amount of economic activity could potentially be lost because generation capacity is not sufficient to meet projections of future economic and population growth.

This leaves elected officials and government agencies in a difficult position. Construction of new power plants is a process that looks long into the future and one that will rarely win votes at the ballot box; in contrast, opposing construction of new plants feeds on public sensitivities to campaigns such as the one coordinated by the Texas Clean Sky Coalition. However, both sides of the debate would probably agree that having enough electricity to power homes, businesses, schools, and hospitals is as important as protecting the environment from the harmful effects that are speculated to be associated with certain types of electric generation.

In this context, it is clear that a purely punitive approach to new power plants or to the emissions they produce is not a realistic path for a state like Texas with a growing economy and population. More generation capacity must be constructed; the question for policy makers is how to achieve this with the minimum possible harm to the environment.

It should be recognized that the development of new plants often will displace the use of older, less efficient, and more polluting generation resources. For example, the 2007 coal opponents failed to recognize that any new coal plant will always be cleaner than an older one.

Ultimately, opposing construction of new coal plants simply means that older, dirtier, and less efficient plants will have to be relied upon for longer to meet the electrical needs of the state. This is borne out by the Environmental Integrity Project's 2007 report of the "50 Dirtiest Plants" in America. Texas has six coal plants on the list of the nation's top carbon dioxide emitting power plants. These six plants range in age from 26 to 37 years; with two of the dirtiest having been constructed in 1971. Without construction of new coal plants, Texas will continue to rely on these old plants for many years to come, which will be more environmentally damaging than allowing new plants to take their place.

**Texas' Environmental Accomplishments**

In contrast to the federal government and some other states – notably California – Texas' approach to protecting the environment has focused not on punitive action toward the energy industry, but on working with the industry to establish reasonable goals for renewable generation capacity and other environmentally-friendly approaches. The state has also focused its efforts on demand-side measures that reduce energy consumption. A time-line of Texas' recent legislation pertaining to renewable energy follows:

| Year | Legislation | Purpose |
|---|---|---|
| **1999:** | **Senate Bill 7(76R)** | The bill that deregulated aspects of the electric utility industry also established a renewable energy generation target of 2,880 megawatts by January 2009.[v] |
| **2001:** | **Senate Bill 5 (77R)** | Established the Texas Emissions Reduction Plan (TERP). TERP is a comprehensive range of incentive programs aimed at improving air quality in Texas. Three main incentive programs are operated through TERP are emissions reduction grants, rebate grants for the replacement of certain vehicles, and new research and development grants. |

**2005:** **Senate Bill 712 (79R)** Clarified the development of energy efficiency programs.

**House Bill 2129 (79R)** Enacted various consumer oriented emission reduction strategies and directed the Energy Conservation Office to examine the feasibility of setting new environmental standards for consumer appliances that were not already regulated. Established a process to incent the deployment of advanced metering systems that will enable customers to better understand and control their use of electricity.

**Senate Bill 20 (79S1)** Expanded the state's renewable energy generation goal from 2,880 megawatts of generating capacity to 5,880 megawatts by 2015 and 10,880 megawatts by 2025. Initiated development of Competitive Renewable Energy Zones (CREZ) which will result in approximately $5 billion in new transmission lines to bring west Texas wind and other generation resources to urban areas The bill also encouraged at least 500 megawatts of the renewable target to be derived from non-wind sources.

**2007:** **House Bill 1090 (80R)** Established incentives for the development of biomass-generated energy and removed statutory and regulatory impediments to the expansion of renewable energy in Texas.

**House Bill 1386 (80R)** Provided a mechanism through which nuclear plant owners must demonstrate that they can fund the safe decommissioning of the plant when it closes. This protects the environment and ensures that taxpayers are not burdened with nuclear decommissioning costs.

**House Bill 2293 (80R)** Requires at least ten percent of the vehicles purchased by state agencies to low-emission and fuel-efficient, assuming that this is commercially viable for the type of vehicle in question.

**House Bill 2994 (80R)** Allows local communities to leverage the Texas Economic Development Act to offer incentives to encourage nuclear power-generating facilities or integrated gasification combined cycle facilities to locate or expand in Texas.

**House Bill 3693 (80R)** Increased the state's energy efficiency goals in order to provide reductions in consumption and demand to protect the reserve margin and avoid crises during peak periods.

As a result of these legislative and other efforts to improve the environment and improve the efficient use of electricity, Texas has drastically reduced its harmful emissions. Texas ranks as one of the cleanest in the nation for emissions of key pollutants by electric generators. Emissions of Nitrogen Oxide ($NO_x$),

sulfur dioxide ($SO_2$), carbon monoxide (CO), particulate matter, and volatile organic compounds ($VOC_S$) in Texas have decreased significantly since 1985, exceeding that of the nation as a whole.

Since 1997, Nitrogen Oxide ($NO_x$) emissions recorded under the Texas Commission on Environmental Quality (TCEQ) 1-hour ozone State Implementation Plan (SIP) rule have been reduced as follows[vi]:

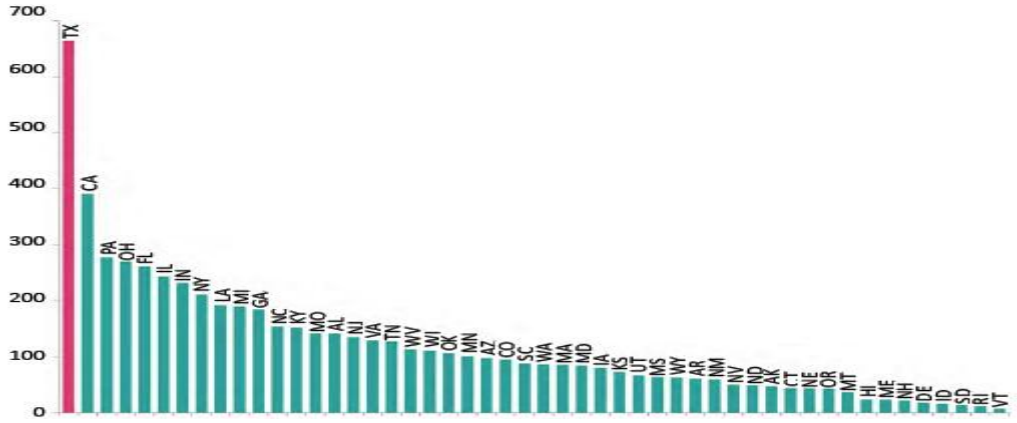
- Houston-Galveston: 86 percent $NO_x$ reduction.
- Dallas-Fort Worth: 88 percent $NO_x$ reduction.
- Beaumont-Port Arthur: 45 percent $NO_x$ reduction.
- East Texas: 51 percent $NO_x$ reduction.

In general, when adjusted for the volume of energy generated, Texas' rate of $NO_x$ emissions is lower than the national average: On average the nation as a whole emits 0.255 lbs of $NO_x$ for each mmBtu[vii] of energy produced; in Texas, only 0.111 lbs of $NO_x$ is emitted per mmBtu. Looking specifically at Texas' electric generating plants, statistics from the U.S. Environmental Protection Agency (EPA) show that Texas has the seventh cleanest $NO_x$ emissions rate in the nation. Taking $NO_x$ emissions alone, only California, Rhode Island, Maine, Idaho, Connecticut, and Massachusetts have cleaner power plants.

In terms of carbon dioxide ($CO_2$) emissions, which are believed by some to be a contributor to climate change, the EPA reports that Texas leads the nation in $CO_2$ emissions; however, this statistic must be taken in the context of three important facts. First, $CO_2$ is a natural occurrence in our environment, all animals produce $CO_2$ – it is not inherently harmful substance. In fact, certain levels of $CO_2$ are required in our blood for us to function. $CO_2$ is only potential harmful in that it increases the trapping of sunlight, thereby raising temperatures in our climate.

Second, Texas generates more electricity than any other state in the nation, and third, much of the $CO_2$ emitted in Texas is the result of much heavy industry being located in the state – this industry creates hundreds of thousands of jobs and brings economic prosperity to the state. Specifically, EPA figures show that Texas emits around 660 million metric tons of carbon per year from fossil fuel combustion (electricity generation), which is almost 75 percent more than the 390 million tons emitted by California, the second-ranked carbon emitting state:

$CO_2$ EMISSIONS FROM FOSSIL FUEL COMBUSTION, BY STATE (MILLIONS OF TONS)




*Source: Environmental Protection Agency and the 2008 State Energy Plan, July 2008.*

However, this in only half of the story: Texas' electric generating plants are among the cleanest in the nation. When the volume of $CO_2$ emitted is adjusted for the amount of electricity generated, Texas has the 15th cleanest $CO_2$ emission rate in the country. According to the Associated of Electric Companies of Texas, "the ratio of the amount of $CO_2$ emitted per MWh of electricity generated in Texas is lower than half of the states that have more than a nominal amount of coal-fired or oil-fired electricity generation."[viii]

In addition to electricity generation, Texas is home to a number of other industries that produce $CO_2$. For example, 60 percent of the petrochemicals produced in the United States are produced in Texas and 30 percent of U.S. gasoline and diesel refining occurs in Texas. This heavy industry is essential for the country and as such, Texas is shouldering a huge share of the burden of providing bulk refined materials for the rest of the country's industry (plastics, fertilizers, etc...). Texas should not be penalized for shouldering this load; rather, the federal government should consider a weighted approach to emissions based on economic output with consideration of the types of products produced.

It is also evident that these industries bring great economic and employment benefits to the state; figures from the Texas Workforce Commission show that, conservatively, at least 718,000 jobs are attributable to the industries that contribute in some way to the state's $CO_2$ emissions:

**TEXAS EMPLOYMENT IN INDUSTRIES ASSOCIATED WITH $CO_2$ EMISSIONS**

| **Industry** | **Employment (Nov. 2008)** |
|---|---|
| Natural resources and mining | 228,400 |
| Oil and gas extraction | 81,500 |
| Petroleum and coal products manufacturing | 25,100 |
| Chemical and basic chemical manufacturing | 106,500 |
| Electric power generation, transmission, and distribution | 34,100 |
| Natural gas distribution | 6,800 |
| Trucking transportation | 118,000 |
| General freight trucking | 81,400 |
| Specialized freight trucking | 36,600 |
| **TOTAL:** | **718,000** |

*Source: Texas Workforce Commission, Labor Market Information, Employment estimates (November, 2008).*

Measures that mandate $CO_2$ emission reductions – whether at the state or federal level – should be carefully weighed by policymakers because of the important role played in Texas economy by the industries listed above. Indeed, the *Wall Street Journal* (December 12, 2008) reported that Governor Perry described proposed federal regulation of carbon dioxide emissions as "absolutely economically disastrous [for Texas]…If you put that type of regulation in place in America, it will stifle innovation and strangle the American economy."[ix]

**Innovation, not Opposition: Wind Power and Enhanced Oil Recovery**

Innovation has long been at the core of the energy industry in Texas, and it is far less economically damaging than adopting a punitive approach to carbon emissions. The growth of Texas' wind energy sector and the development of enhanced oil recovery are just two examples of this phenomenon. Texas' wind energy industry is discussed in detail in the following section; in short, with the assistance of incremental subsidies and generation targets established by the Legislature, Texas now has the most installed wind generation capacity of any state in the nation, and well over twice the generation of capacity of California, the second ranked state.[x]

Similarly, Texas is at the forefront of technological developments that use $CO_2$ in enhanced oil recovery operations (EOR). According to the Texas Bureau of Economic Geology:

> CO2 enhanced oil recovery (EOR) technology allows operators to recover oil that would normally be left in the ground when a field reaches the end of its conventional economic life. Texas is currently the leader of CO2-EOR, producing 3 to 4 times the volume of the rest of the states combined. There is potential for significant growth in CO2-EOR in Texas. Conservative estimates predict an economic value of over $200 billion and the creation of 1.5 million jobs.[xi]

While the supply of $CO_2$ for EOR projects comes primarily from natural $CO_2$ reservoirs, $CO_2$ captured from power plants and other sources is beginning to become economically viable. In February 2008, Tenaska, Inc. announced plans to:

> [C]onstruct a technologically advanced coal-fueled electric generating plant able to capture up to 90 percent of the carbon dioxide that would otherwise enter the atmosphere. The carbon dioxide would be sold for use in enhancing oil production in the Permian Basin, resulting in geologic storage.[xii]

These examples demonstrate that incentives to encourage development of new technologies are a more effective way to balance environmental *and* economic concerns than simply adopting a punitive approach toward industries that emit byproducts such as carbon and nitrogen oxide. Texas has shown that it can build new power plants and expand industrial capacity while improving the environment. This path must be continued and punitive measures that would threaten both the reliability of the electric grid as well as the economic growth driven by many of Texas most robust industries, must be rejected by legislators.

## 1b. Expanding Generation and Transmission Capacity

Texas is growing. Projections by the Comptroller of Public Accounts indicate that the Gross State Product will double in the next twenty years from $887.75 billion to $1.61 trillion. Similarly, the Texas State Data Center projects a 2030 population as high as 41 million; nearly double our current

population. A growing state needs affordable and reliable energy and a robust infrastructure that includes water, highways, pipelines, and electricity, along with a clean environment.

The growing Texas economy and population will demand more energy to cool and heat homes and sustain the expanding manufacturing base. This energy must be both reliable and affordable if it is to continue to underpin Texan's quality of life and the state's strong economic growth. New generation capacity will need to be built. At the same time, though, conservation, energy efficiency and demand-side management also are all tools that must be expanded. It is imperative to meet future demand in a manner that is mindful of both free markets and the environment.

In projecting future electricity demand, the Electric Reliability Council of Texas (ERCOT) calculates estimated peak demand and adds a 12.5 percent reserve margin to reflect a reasonable level of generation capacity that the state needs in order to maintain a reliable electric generation and transmission system.

According to these projections, ERCOT's anticipated peak summer demand in 2014 (not including the 12.5 percent reserve margin) will be approximately 71,678 megawatts. In 2008, ERCOT's peak demand was 62,266 MW on August 4.[xiii] The following table shows ERCOT's projections of peak summer demand and total generation resources between 2009 and 2013[xiv]:

**CAPACITY, DEMAND, AND RESERVES IN THE ERCOT REGION, 2008 – 2013**

| | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|
| **Summer Peak Forecast (MW)** | 62,266 (actual) | 65,222 | 66,283 | 67,654 | 68,932 | 70,408 | 71,678 |
| **Total Resources (MW)** | 72,503 | 74,051 | 78,768 | 78,792 | 79,717 | 81,529 | 81,529 |
| **Reserve Margin (Minimum 12.5% required)** | 16.4% | 15.8% | 21.2% | 18.7% | 17.8% | 17.9% | 15.8% |

*Source: ERCOT "2008 Report on the Capacity, Demand, and Reserves in the ERCOT Region (December 2008 Update").*

The "total resources" shown in the table above assumes construction of new capacity each year between 2008 and 2014. As the table reveals, as long as this planned construction takes place, Texas will retain a reserve margin in excess of the 12.5 percent minimum.

According to a recent forecast by ERCOT, required generation capacity (including a 12.5 percent reserve margin) will grow to 88,530 megawatts by 2018, 96,381 megawatts by 2023 and to 105,443 megawatts by 2028.[xv] In short, Texas needs to increase its electric generation capacity by roughly one-third over the next twenty years. If capacity is not expanded and the growth of demand not lessened through greater efficiency, the increasing demand for electricity will drive rates higher and put the reliability of the grid in jeopardy.

This concern is not misplaced: In summer 2006, 1.5 million Californians and 100,000 residents of New York City went without electricity at times because supply was insufficient to meet demand. Texas' population growth puts the state on a similarly disastrous track if additional and dependable generation and transmission capacity is not brought on line. While increasingly efficient use of electricity can slow the progress down this track, it nonetheless remains necessary to add additional generation capacity. And only through continued technological innovation will Texas be able to meet future energy demand with affordable, reliable, and environmentally-sound electricity generation.

The State of California experienced power supply problems, including rolling blackouts, throughout 2000 and 2001. Similarly, in late July, 2006, a heat wave caused consumption in California to strain the supply that an aging energy infrastructure could provide, leaving 1.5 million at least temporarily without power across the state. [xvi] At the same time, in the New York City borough of Queens, approximately 100,000 people temporarily went without power thanks to an antiquated supply network which was insufficient to meet the borough's demand.[xvii]

Analyzing the power supply problems in California in 2000 and 2001, the Federal Energy Regulatory Commission (FERC) noted a number of factors that had contributed to the crisis. According to the Commission, these included:

> **[A] low rate of generation having been built in California in the preceding years making California dependent on imports of electricity**…a rupture and subsequent capacity constraints on a major pipeline supplier of natural gas to California markets (California was heavily dependent on gas-fired generation due to state air standards); **strong economic growth and thus increased electricity demand throughout the west**; and unusually high temperatures coupled with an increase in unplanned plant outages of older plants that were being run to meet increased demand in California. Further, transmission line constraints within California, both for imports and exports of electricity, exacerbated an already marginal situation during this time period.[xviii] *[Bolded emphasis added]*

Analyses of the power outages in New York City in summer 2006 pointed to systemic transmission problems as the root cause of the blackouts. *The New York Times* (July 24, 2006) wrote that:

> Underground cables had burned out … apparently overloaded by the utility's decision to keep the power flowing to most of the 400,000 residents of western Queens despite the loss of 10 major feeder cables that power the area.[xix]

These transmission problems had been anticipated earlier that year by FERC Chairman Joseph T. Kelliher:

> New York City and Long Island pose long-standing challenges for the electric system… During the last two weeks, two of four major transmission lines into New York City from upstate New York have failed. They will be [out] for some time…the loss of these two lines means that New York City as well as Long Island will be tested during any periods of sustained hot weather.[xx]

As determined by the FERC, the causes of these power outages in California and New York can be summarized as follows:

- Insufficient construction of generation capacity;
- Heavy dependency on one type of generation fuel;
- Rapid economic growth driving increased demand for power;
- Environmental standards inhibiting construction or diversification of generation capacity;
- Extreme weather conditions;
- Reliance on antiquated, unreliable generation units and/or transmission infrastructure; and,
- Insufficient transmission infrastructure.

Since Texas already exhibits at least three of these seven features (heavy reliance on natural gas as a generation fuel, rapid economic growth, and relatively frequent extreme weather conditions), it is vital that Texas addresses each of these issues so that power losses can be avoided in the future.

**Avoiding the California and New York Crises:**

**Transmission**

In "The Energy Report 2008," the Office of the Comptroller noted that "meeting the growing demand for electricity in Texas will require new generation and transmission capacity." Construction of new transmission infrastructure is overseen by ERCOT, which currently "projects $3.1 billion in spending on transmission lines from 2007 through 2011 and that another $3 billion will need to be invested from 2011 through 2016 in order to ensure adequate transmission capacity." The cost of this investment is built into the rate base Transmission and Distribution Utilities (TDUs) that the Public Utility Commission (PUC) approves and allows the TDUs to charge Retail Electric Providers as a wholesale cost of providing service to their retail customers. As the Comptroller's report explains:

> [T]he transmission and distribution of electricity over wires remains regulated. This is because transmission wires and poles are viewed as a natural monopoly, in that it would not be economically efficient for multiple companies to duplicate transmission-line networks.[xxi]

ERCOT's "Long Term System Assessment," issued in December 2006 outlines the major transmission improvement and expansion work that will need to be completed through 2016. As noted above, this is currently projected to cost $6.1 billion: No legislative action is required to ensure that this new transmission infrastructure is constructed. It should be recognized, however, that the unique status of ERCOT provides Texas an advantage over the rest of the nation in the efficient construction of transmission capacity in that only a single regulatory authority (the PUC) is involved in the approval process. In other locations in the nation, both state and federal authorities often must be coordinated.

**Generation**

Turning to expansion of generation capacity, it is important to note that expanding capacity helps address many of the causes of power outages listed above. While building new capacity obviously addresses the issue of "insufficient construction of generation capacity," it also helps the state meet the demands of a growing economy and population. Equally, construction of new capacity abates reliance on antiquated power plants and facilities; improves the environment by allowing new and cleaner plants to replace dirtier plants that have been in service for decades; gives the state an opportunity to diversify its energy portfolio; and, creates a higher overall generation capacity that would potentially mitigate the negative effects of extreme weather conditions (such as the loss of one or more generation facilities).

While a detailed discussion of expanding and diversifying generation capacity follows in Section 2 of this report, it is worth noting the economic and human costs that could ensue if the state does not continue to expand generation capacity to keep pace with economic and population growth. As noted elsewhere, in calculating required future generation capacity, ERCOT builds in a 12.5 percent reserve margin to account for uncertainties inherent to the electric grid, such as extreme weather conditions and the failure of one or more power plants: According to research by the North American Electric Reliability Council, "fossil-fueled power plants are typically out for scheduled maintenance about 4 percent of the time and out for unexpected reasons about 6 percent of the time."[xxii]

**The Economic Impact of Power Outages**

Even with this 12.5 percent reserve margin, ERCOT had to initiate rotating outages in April 2006 in order to avoid broader, uncontrolled outages.[xxiii] Uncontrolled outages – similar to the ones in California and New York discussed above – have a far greater impact economic impact than do the rotating outages. According to the Comptroller:

> Such an event occurred on August 14, 2003, when the largest blackout in American history affected eight states in the northeastern U.S. and parts of Canada. The blackout affected 50 million people and caused the loss of between $4.5 billion and $12 billion in economic activity.[xxiv]

The same report underscores how even small uncontrolled outages, of which businesses have no prior warning, frequently impose significant economic burdens on those affected:

> [E]ven brief outages and disruptions can cause significant problems for some manufacturers. For example, Samsung, a multi-national technology company with a manufacturing plant in Austin, experienced a 10-minute localized outage in June 2006. This brief outage forced Samsung to shut down for a week to clean, test and recalibrate its equipment before resuming production. Another technology company in Austin, Freescale Semiconductor, Inc., reports that four power outages over four years have cost it between $15 million and $20 million.

The potential economic impact of outages such as this cannot be overstated. Survey research conducted by the Connecticut Business and Industry Association revealed that "34 percent of

respondents said they would shift business operations out of their state if they experienced ten or more 1-hour to 1-day unanticipated power losses over a quarter of a year."[xxv]

Perhaps most notable is the effect that potential power outages will have on business decisions. An unreliable grid that is subject to frequent outages will make businesses less likely to locate in Texas, and will ultimately reduce investment and job creation in the state. These problems have already been experienced by California as that state continues to grapple with grid reliability problems. According to the National Renewable Energy Laboratory:

> Intel Corp. Chief Executive Craig Barrett made headlines during the summer of 2001 when he said that the world's largest chipmaker would not locate a new factory in California until power supplies became more reliable. Intel hasn't built a factory in California since 1988.[xxvi]

Over the past decade or more, Texas has built a well-earned reputation for solid economic growth and a strong business climate. As a result, the state has been the nation's leading exporter for each of the past six years, is home to more Fortune 500 companies than any other state, and is the country's foremost creator of new jobs: More than half of the nation's new jobs over the past year were created in Texas.[xxvii]

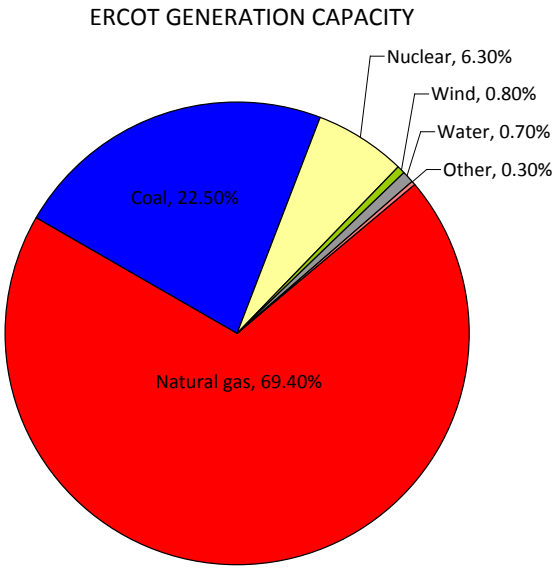
Maintaining this economic strength – especially during a global downturn – will require modern and reliable electric generation and transmission with sufficient capacity to accommodate future growth of the state. In a *Dallas Morning News* commentary (December 16, 2008) Governor Rick Perry, Lt. Governor David Dewhurst, and Speaker Tom Craddick underscored this very point:

> Our state's future economic viability also depends on our ability to provide Texas families, businesses, churches and schools the energy they need. We will strengthen our state's position as an energy leader with an all-of-the-above approach including nuclear, fossil fuels, wind, solar and more. These deliberate steps, shaped by careful planning, spirited debate and a shared passion for our state, will keep Texas moving forward.[xxviii]

While it is clear that Texas must build more capacity and more transmission, concern about the impact of such development on the environment remains the single biggest obstacle to the future reliability of Texas' electric infrastructure.

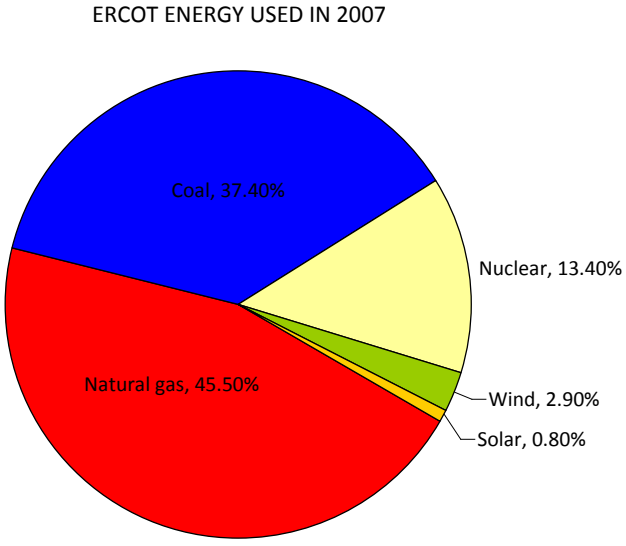
## 2. Generation Sources

Much of the new electric generating capacity built in Texas since 1990 relies on natural gas. As a result, Texas continues to have a significant share of its installed capacity fueled by natural gas. As the chart below shows, antural gas accounts for about 70 percent of generation capacity; coal accounts for about 23 percent; and nuclear for about 6 percent[xxix]:




*Source: PUC Chairman Barry T. Smitherman, Presentation to the House Select Committee on Electric Generation Capacity and Environmental Effects, February 6, 2008.*

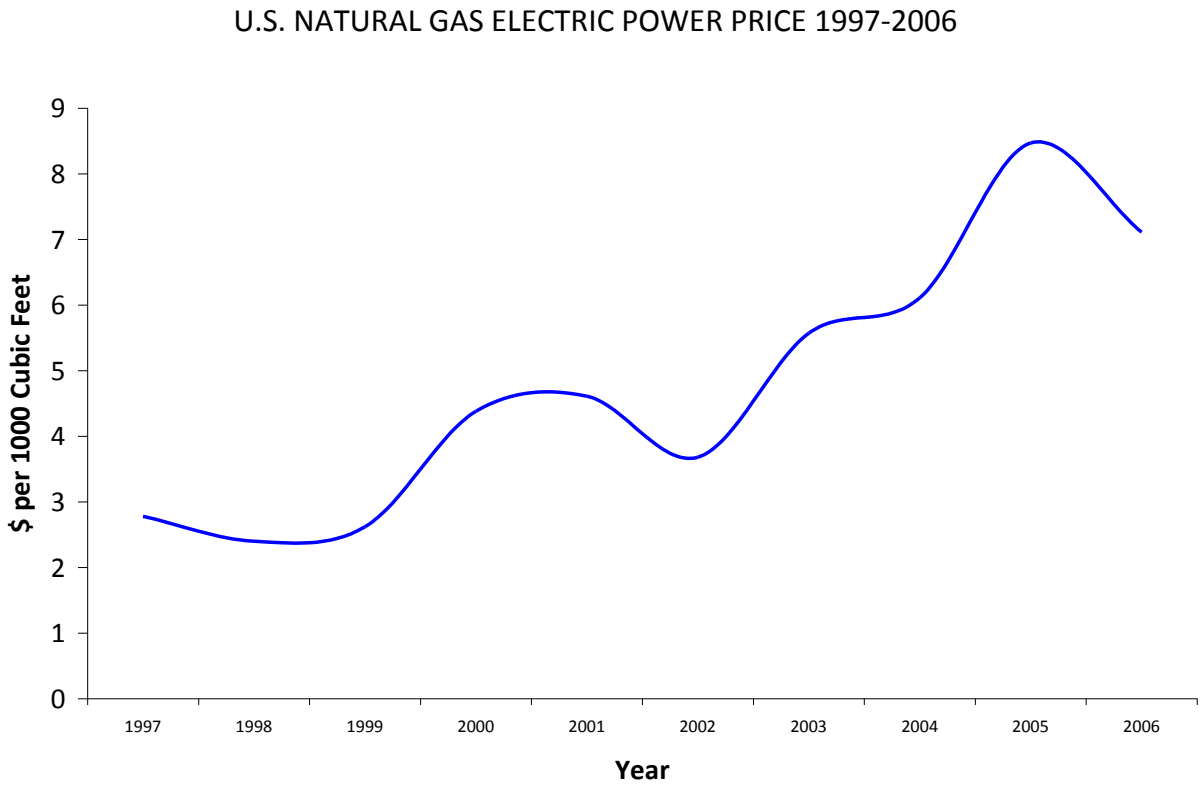
However, while the installed capacity of natural gas-fired plants is almost 70% of the state's generation, it is noteworthy that the amount of energy generated by these resources is not as great:




*Source: PUC Chairman Barry T. Smitherman, Presentation to the House Select Committee on Electric Generation Capacity and Environmental Effects, February 6, 2008*

This difference in the relative amount of energy generated versus the relative amount of installed capacity demonstrates the importance of gas-fired plants in following changing demand over time. While nuclear and coal plants tend to be run to the maximum extent possible, gas-fired plants are used to follow changes in demand and respond to the variability of other generation resources.

There can be no doubt that changes in the price of natural gas have impacted the cost of wholesale electricity in Texas. A review of the price of natural gas over the past decade reveals the extent of that impact:

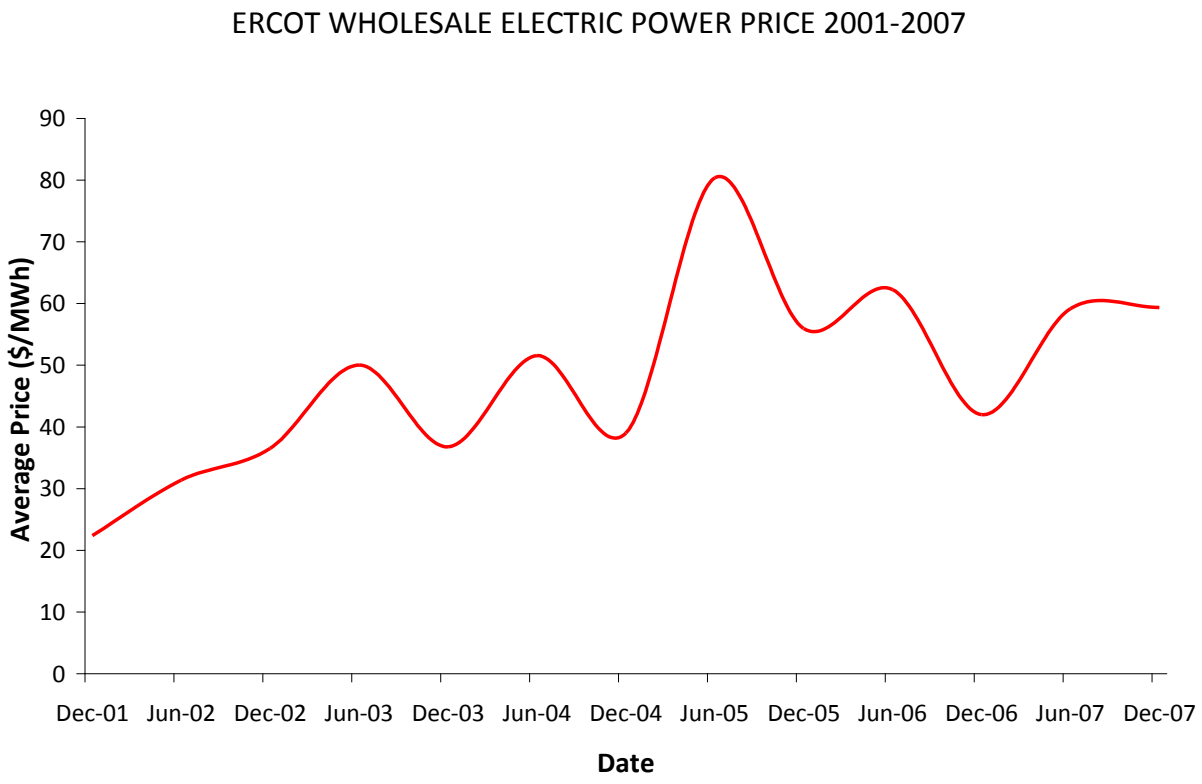



*Source: U.S. Energy Information Administration, U.S. Natural Gas Electric Power Price by Year 1997-2006.*

As the chart shows, in 1997 natural gas used for electric power generation cost less than $3 per thousand cubic feet. This price increased gradually toward the end of the decade and despite a brief lull in 2001/02, it continued to rise sharply from the end of 2002 through to the beginning of 2006, at which point natural gas cost more than $8 per thousand cubic feet. Ultimately, the cost of natural gas used for electric power generation increased by 205 percent between 1997 and 2005. More recently, while not reflected in this EIA data, the nation saw a dramatic increase in natural gas prices during the summer of 2008, which has significantly mitigated since then.

For a state like Texas, which relies on natural gas to fuel a significant portion of its generation capacity, spikes in the cost of natural gas inevitably have an impact on the cost of wholesale electricity. In turn, the cost of wholesale electricity will ultimately be reflected in the retail price paid by consumers.

Statistics from the U.S. Energy Information Administration bear out the impact that natural gas price increases have had on the cost of wholesale electricity in Texas' ERCOT region:




*Source: U.S. Energy Information Administration, Wholesale Day Ahead Prices at Selected Hubs, 2001-2008.*

Although wholesale electric power prices in the ERCOT region have evident seasonal fluctuations, the chart shows a demonstrable increase in wholesale prices between 2001 and the end of 2007. The December 2001 average price per megawatt hour of $22.38 had increased to $59.35 by December 2007; a 165 percent increase. The peak price during the period was $80.35 in June 2005, which correlates directly with the peak price of natural gas of $8.47 per thousand cubic feet, which also occurred in 2005.

The relationship between Texas' reliance on natural gas for electricity generation, the rising cost of natural gas as an input, and wholesale electricity prices in Texas makes a clear case that the state must make greater efforts to diversify its electricity generation capacity.

Electricity generating sources such as coal and nuclear will clearly be an important part of this diversification process, but renewable sources – and especially wind energy – must also continue to play a role.

As generators in Texas pursue the construction of a diverse portfolio of generation resources, including coal, nuclear, wind, biomass, and others, it is critical that the Legislature repeal the statutory requirement enacted in 1999 by Senate Bill 7 (76R) , which requires that "50 percent of the megawatts of generating capacity installed in this state after January 1, 2000, use natural gas." This provision, as

well as the requirement in the Utilities Code (Section 39.9044) that requires the Public Utility Commission to "establish the minimum annual natural gas generation requirement for each power generation company", is inconsistent with the development of a diversity of generation resources. These requirements must be repealed so that diversification will be unhindered by state mandates.

This echoes the Governor's Competitiveness Council, which recommended in 2008 that "[t]he Legislature should repeal the presumption in PURA in favor of gas-fired plants in order to ensure that a diverse mix of resources is developed in Texas."[xxx]

**Diversifying Texas' Energy Portfolio**

As noted above, the relationship between Texas' reliance on natural gas for electricity generation, the rising cost of natural gas as an input, and wholesale electricity prices in Texas makes a clear case that the state should allow the private sector complete latitude to determine fuel sources for generation of electricity.

The real choice facing Texas is not which generation source to develop, but how to ensure that a stable, cost-effective, and environmentally-sound electric generation system can be developed to meet expected future demand. Shifting the balance away from natural gas is necessary, but construction of new gas plants must not be precluded: *any new plant will be more efficient and have lower emissions than an older plant*.

The following is an overview of Texas' current energy portfolio and analysis of the potential future role for each fuel source:

## 2a. Coal

### *Fuel cost: $20 per megawatt hour; currently about 23 percent of generation capacity; 500-850 MW per generating unit.*

Pulverized coal plants currently have the lowest overall cost for generation of any non-renewable fuel unit. Coal is also a readily available domestic fuel which utilizes well-established technology and can reliably produce power continually. Aside from the moderately high cost of constructing coal plants, environmental concerns are the largest barrier to new coal-powered plants. The development of clean coal and coal gasification technology may address concerns over air emissions and make development of new coal plants less controversial.

## 2b. Natural Gas

### *Fuel cost: $78 per megawatt hour; currently about 70 percent of generation capacity; 500-1,000 MW per generating unit.*

Combined cycle natural gas plants have many benefits, including low air emissions, well established technology, reliability, and the flexibility to respond quickly to changes in demand. Despite recent price increases (400 percent since 2002), natural gas remains the backbone of electric generation in Texas and

will play a central role in meeting expected future demand. Natural gas can also be efficiently used as a feedstock for petrochemical facilities, or as a fuel for fleets of vehicles.

Coal and natural gas are both well-established fuel sources, for which regulatory certainty is most important. The existing permitting process, which focuses primarily on regulating emissions, should not be altered.

The Governor's Competitiveness Council recently recommended that:

> Texas should not institute any new power plant permitting processes, as this would insert costly delay, erect barriers to entry, and eliminate the ability for Texas' competitive marketplace to respond quickly to changing market signals. Legal and regulatory certainty is critical for the competitive marketplace to function. Numerous states have lengthy and costly permitting processes for wind, and gas- and coal-fired generation; Texas has avoided this by permitting only emission and water aspects of generation plants.[xxxi]

For established fuel sources like coal and natural gas, any changes to the current permitting process (other than fast-tracking applications) will reduce regulatory certainty, increasing the time and cost required to construct a new generation facility, and will ultimately make Texas less able to meet future demand for electricity.

The state should also encourage the development of Integrated Gasification Combined Cycle (IGCC) clean coal power plants. These plants – which are an emerging technology – can capture the bulk of the carbon dioxide emissions they produce. Texas is currently competing with New Mexico to attract a large-scale IGCC power plant that would be the first of its kind in the world, and result in a $3 billion investment in Texas. To encourage this type of investment, the Public Utility Commission should give dispatch priority to clean coal facilities over wind energy plants in the newly-established Competitive Renewable Energy Zones. Dispatch priority will ensure that clean coal plants can continue to operate without being curtailed during periods of high wind generation, which will make such projects more economically feasible.

## 2c. Nuclear

### *Fuel cost: $5 per megawatt hour; currently about 6 percent of generation capacity; 1,000-1,250 MW per generating unit.*

Nuclear power has lower fuel costs than both coal and natural gas and also benefits from a large domestic fuel base. Nuclear power has a safe and reliable operating record over the last 25 years, and also has zero air emissions. However, nuclear plants cost more to construct than either gas or coal plants. In addition, permitting and construction timescales for nuclear plants are much longer than gas or coal, meaning that completion of a new nuclear plant in Texas is probably at least a decade away. Waste disposal also remains a central concern of large-scale use of nuclear power.

The scale of nuclear power is large enough to make a sizable contribution toward meeting forecasted demand for electric and thermal power over the coming decades, both in Texas and the nation as a whole. However, the federal government holds the key to new nuclear generation, and the cost and

magnitude of new nuclear projects and technologies are driven in large part by federal government requirements. Ultimately, nuclear projects have long licensing and construction schedules as well as high capacity costs and therefore are inherently more risky for investors than most other established methods of generating electricity.

Investors prefer shorter projects, which has tended to result in an under-investment in new nuclear capacity. Furthermore, an ample skilled workforce and sufficient manufacturing supply chain are necessary for nuclear power to be feasible.

The question of disposal of spent nuclear fuel is also significant. Currently, the federal government is responsible for disposal of used nuclear fuel: According to the Heritage Foundation, the Nuclear Waste Policy Act of 1982:

> [C]harged the federal government with disposing of used nuclear fuel and created a structure through which users of nuclear energy would pay a set fee for the service…These payments would go to the Nuclear Waste Fund, which the federal government could access through congressional appropriations to pay for disposal activities.[xxxii]

However, the U.S. Department of Energy (DOE) has not yet fulfilled its obligation to dispose of spent nuclear fuel:

> The government has spent billions of dollars without opening a repository, has yet to receive any waste, and is amassing billions of dollars of liability. Furthermore, the strategy has removed any incentive to find more workable alternatives. For those that actually produce waste and would benefit most from its efficient disposal, this strategy has created a disincentive for developing sustainable, market-based waste-management strategies.[xxxiii]

Together with other states that would benefit from expansion of the nuclear power industry, Texas should encourage the federal government and the DOE to fulfill their obligations regarding spent nuclear fuel.

Reprocessing of spent nuclear fuel, if permitted by the federal government, would enable more than 90 percent of the useable material from nuclear plant spent fuel to be recovered, and would therefore significantly reduce the volume of high-level waste that will eventually have to be placed in a long-term repository. Countries such as the United Kingdom, France, and Japan have been safely reprocessing spent nuclear fuel for decades. Texas should join with other states to encourage the federal government to advocate for reprocessing of spent nuclear fuel.

More broadly, states should also encourage the federal government to remove or financially balance the regulatory uncertainties that plague the nuclear industry, support investment in longer construction capital intensive solutions, and put nuclear power back on track toward making America more energy independent.

## 2d. Wind

*Fuel cost: $0 per megawatt hour; currently about 3 percent of electricity generated in ERCOT; a typical wind farm can have a capacity of several hundred MWs.*

Wind power has three main advantages over traditional non-renewable resources: wind energy has zero air emissions, requires no water to produce energy, and has no fuel cost price (wind is free). Operating costs are also relatively stable, which means that the most significant costs arise in constructing and maintaining transmission lines from wind farm locations to the urban areas of the state where power is most needed. Wind energy is intermittent in nature; with no cost effective, large-scale energy storage available in the near term, diversification of generation resources is necessary to ensure power availability at all times.

**Competitive Renewable Energy Zones**

In July 2007, the Public Utility Commission designated eight areas of the state as Competitive Renewable Energy Zones; the zones are located in three broad geographical areas – one is in West Texas around McCamey in Upton County, one is comprised of areas around Abilene and Sweetwater, and the third is located in the Panhandle. The purpose of the designation is to ensure that the areas of the state where wind energy is most feasible are adequately connected – via transmission lines – to the areas where the energy will be used.

The establishment of Competitive Renewable Energy Zones means that Texas can continue to grow its wind generation capacity with the knowledge that the power generated by future wind farms will have the necessary transmission infrastructure to direct it to where it is needed. According to the Public Utility Commission, as a result of Competitive Renewable Energy Zones, wind power projects in Texas could account for 18,000 megawatts of total capacity in ERCOT."[xxxiv]

In July 2008, the Public Utility Commission approved one of five CREZ proposals, paving the way for almost $5 billion of investment in transmission lines to connect wind farms in the Panhandle and West Texas to the state's rapidly growing urban areas.[xxxv]

**Cost-Effectiveness of Wind Power**

According to ERCOT, the transmission proposal adopted by PUC could ultimately cut wholesale electricity costs by at least $3.4 billion per year.[xxxvi] These projected cost savings are supported by estimates calculated by a transmission proposal submitted to the PUC by Electric Transmission Texas L.L.C. (ETT).

ETT projected that the typical generation production costs savings are likely to be as high as $130,000 per year per megawatt of wind power, and that these "production cost savings more than offset the construction cost of the transmission plan [being] proposed."[xxxvii]

Ultimately, the ETT proposal drew the conclusion that construction of transmission infrastructure for Competitive Renewable Energy Zones could be achieved in such a way that "consumers in ERCOT would not only benefit from lower energy costs, but would have the added benefit of a robust EHV [Extra High

Voltage] backbone transmission system that enables access to other types of generation and enhances system wide reliability."[xxxviii]

**Environmental and Economic Benefits**

With Texas' demand for energy projected to grow to around 88,530 megawatts by 2018, and to 105,443 megawatts by 2028, the stable generating costs and environmental benefits of wind power will be hard to overlook. There has been special interest opposition to the proposed construction of new coal power plants in Texas[xxxix], and however misplaced this concern may be, wind energy has no emissions and therefore improves air quality because it can displace generation from sources that produce air emissions, a major consideration for urban non-attainment areas.

Unlike thermally powered generating plants (coal, natural gas and nuclear), wind consumes no water for the production of power. Water resources and consumption has gained increased attention as population growth forecasts will strain existing sources; thermal electric generation is a significant percentage of water consumption. Wind energy is also a sound way for the state to increase its generating capacity to help meet projected future demand by spurring development in large, sparsely (or declining) populated areas of Texas. An economic analysis of a proposal by Mesa Power to construct a 4,000 megawatt wind farm in the Panhandle highlights the economic development potential of wind power:

> [S]ince oil and gas production reached its peak in the last quarter of the 20th century, the region is in need of an economic development Project to replace the loss of economic base that has been taking place … The [wind farm] Project will generate an estimated 609 jobs during the construction phase and 720 during a typical year of the operation phase. This job growth will add about 6.2% to employment in the Project Investment Zone.[xl]

Wind power's environmental and economic development advantages cannot be overlooked as Texas searches for ways to increase its generation capacity over the coming decades.

In 2006, Texas surpassed California as the nation's leader in wind generation, and the latest statistics from the American Wind Energy Association show that Texas – by a wide margin – has the highest installed wind generation capacity of any state in the nation, and far more installed wind capacity than its adjacent states.

WIND POWER GENERATION CAPACITIES BY STATE (2008)

| State | Capacity (MW) | Rank |
|---|---|---|
| Texas | 6,297 | 1 |
| California | 2,493 | 2 |
| Minnesota | 1,377 | 3 |
| Colorado | 1,067 | 6 |
| Oklahoma | 689 | 9 |
| New Mexico | 496 | 10 |
| Arkansas | 0.1 | 35 |
| Louisiana | 0.0 | --- |

*Source: The American Wind Energy Association, 3rh Quarter 2008 Market Report.*

## 2e. Biomass

Biomass generation capacity is a much smaller proportion of the total generation capacity compared to fuel sources such as coal and natural gas. Only 67 megawatts of biomass capacity have been installed since the passage of Senate Bill 7 in 1999. In the same time frame, an incentive program implemented in Germany has spurred biomass to energy production from less than 100 megawatts to over 1270 megawatts by the end of 2007.[xli] Developing the biomass to energy industry in Texas may require a State level program similar to the Renewable Portfolio Standard which promoted development of the wind energy industry.

Biomass feedstock can range from energy crops to paper and pulp operations to animal waste. With Texas being a leading agricultural state with an average of seven million cattle in confined animal feeding operations, combined with a multitude of other organic waste, we have an abundant source of biomass for conversion to clean energy.

Employing advanced biomass to energy technologies to convert biomass such as agricultural waste will also mitigate environmental issues facing the State of Texas by reducing runoff and subsequent contamination of water sheds, as well as minimize the release of carbon and methane into the atmosphere. Further, the process can yield byproducts such as organic fertilizers, reducing dependency on those chemical fertilizers which are energy intensive to produce.

The Water Environment Federation and Garvey Resources Inc. have completed numerous case studies on the benefits of utilizing biomass as a source of energy and the quantification of the carbon sequestered by various types of biomass even considering the elimination of placing the waste in a landfill. [xlii]

State legislators and regulators are in a difficult position to provide the population with the needed power and electricity for homes and industries in a state that is growing more rapidly than any other in the country, while maintaining a clean environment and mitigating man made activities are speculated to cause global warming. The proper utilization of biomass energy can help achieve these goals.

Texas' approach to protecting the environment has not focused on punitive action toward industry but on establishing reasonable goals for renewable energy generation and environmentally-friendly approaches. The development and proper utilization of biomass energy coupled with recently developed technology will provide the elected officials the opportunity to raise the bar and not only produce energy from a home grown renewable source, but also protect the environment and mitigate past harmful practices.

## 2f. Solar

Compared to the other generation sources (except biomass), solar energy is in its infancy in Texas. While solar energy has a number of benefits, such as low fuel costs (sunlight is free) and no air emissions; there are also many issues that negatively impact the extent to which solar energy can

supplant generation capacity that is currently born by more established technologies like coal, natural gas, nuclear, and wind. Specifically, according to the Texas State Energy Plan, "the capital investment costs of solar central station generation and photo-voltaic panels are extremely high and generation is intermittent."[xliii]

However, the same report makes it abundantly clear that the potential for the development of an extensive solar energy industry is high – "Texas has a solar intensity base that is among the best in the country" – and suggests that Texas has a substantial number of old coal- and oil- fired power plants that could be retrofitted with solar technology to create hybrid plants generating energy from solar-heated steam during daylight hours and from coal-fired steam during the night. However, the report cautions that these technologies:

> [D]o not appear to currently be economically viable…projects in other states suggest the capital costs of concentrated solar plants are as high or higher than new nuclear plants, while producing much less energy.[xliv]

Because of this lack of economic viability, the state may have a role to play in the development of a solar energy industry in Texas, such as through a developer grant program, customer incentive program, or a modification to the current Renewable Portfolio Standard. A more detailed discussion of the role of incentives and subsidies follows in Part 3 of this report.

*[Fuel cost sources: "Texas State Energy Plan," prepared by ICF International for the Governor's Competitiveness Council. "Natural Gas Combined Cycle" and "Pulverized Coal" each represents an average of available options without CO2 Sequestration.]*

## 3. The Role of the State

Having considered Texas' need to diversify and expand its energy portfolio, it is instructive to discuss how the state can effectively intervene in the market to encourage the diverse energy portfolio that will be needed over the coming decades.

The principles of limited government and free enterprise underpin the conservative approach to state intervention through incentives and subsidies. Unnecessary spending should be avoided and, wherever possible, free markets should be left to their own devices in the absence of a compelling reason to intervene.

The energy sector is changing rapidly, and recent events that led to high energy prices have shown the need to embrace these changes. Texas legislators have taken a leadership role in advancing new technologies and fuels that make Texas more secure, competitive, efficient, and diverse in its electric power supply.

### 3a. Incentives and Subsidies

Appropriate incentives and subsidies, when carefully considered, narrowly targeted, cost-effectively implemented, and time-limited can be successful. In Texas and elsewhere, they have been shown to accelerate commercialization of technologies or fuels by removing market, governmental, and/or technical barriers. When implemented ineffectively, an undisciplined approach by government results in the waste of taxpayer resources and usually produces unintended consequences that are worse than doing nothing at all.

Subsidies and incentives have been implemented in the past when the private sector has been unable to produce the optimal outcome on its own. For example, the production tax credit for wind energy created by Congress essentially created a market for the technology that would not otherwise have existed.[xlv] Circumstances change, however, even when an intervention is originally well founded. Today, the market for wind power in Texas has matured to the point where continued support is now diverting resources from other necessary but less developed renewable energy technologies.

Legislation passed in the 79th and 80th sessions has several measures to promote energy goals through policy instruments. This includes legislation on nuclear decommissioning, energy efficiency, and legislation to develop advanced clean energy, including coal generation with carbon capture. Other legislative provisions encourage deployment of *Smart Grid* and advanced metering systems to improve electric system reliability and help consumers better manage their energy use (discussed below in Section 3b.)

**The Success and Failure of Incentives and Subsidies**

Incentives and subsidies are intended to correct imbalances in markets to achieve a more optimal outcome, such as greater levels of investment that are needed to bring new technology to the market place more quickly. Historically, legislative intervention has been concentrated on research and

development. Over time, however, the focus has shifted to a later stage in the product development process, with a much greater emphasis today on commercializing the best technologies and increasing market interest.

Texas' greatest success is perhaps the Renewable Portfolio Standard (RPS), which has been largely successful at supporting a market for wind power development, but has had some unintended consequences for grid operation and reliability. In contrast, the failure of government intervention is typically evidenced through either an excessive or an insufficient subsidy, an intervention that rewards those who would have made an investment anyway (free riders), excessive bureaucracy, and the absence of an exit strategy that requires the commercial process or technology to stand alone when the subsidy is removed.

One of the most critical of the many potential problems with incentives and subsidies is that subsidies often exhibit an on-again/off-again pattern, particularly related to tax credits. This effect creates uncertainty for producers and consumers, making investment and product utilization problematic. Similarly, subsidies often go on too long, creating market inefficiency: this is true of generating technologies such as wind, and could be said of many fossil fuel subsidies. For example, the RPS in Texas has successfully expanded wind generation capacity, however, now that the renewable generation capacity goal has been achieved, it should not be changed. Targeted wind subsidies have achieved their goal in Texas and the value of the subsidies will automatically decrease as long as the renewable portfolio target is not increased above 5,880 megawatts of installed capacity. Extending this target would result in increased subsidization of a technology that has now become commercially viable.

Over time both free ridership and unrealistic expectations of permanent subsidization erode the drive for the technology to be cost-effective. The ultimate objective of a subsidy, incentive, or other government intervention must be to fundamentally alter markets so the result is sustainable in the absence of government support.

**Conservative Principles for Government Intervention**

The ultimate effectiveness of government intervention will always depend on the kind of incentive or subsidy, its magnitude, direction and market circumstances. The minimum threshold for viability is a situation in which the economic cost of the incentive or subsidy does not exceed the total benefit that is achieved; with benefits taking many forms, including reduced consumer cost, greater demand, improved reliability, reduced emissions or greater energy security.

Incentives and subsidies, if used correctly, can induce changes in specific markets by creating opportunities and influencing motivations. The principles shown below draw upon historic lessons. It is these principles that should provide the basis upon which legislative decisions should be made.

**PRINCIPLES FOR SUBSIDIES AND INCENTIVES**

| | |
|---|---|
| **TARGETED** | Based on careful analysis of the importance of the outcome and ability to provide the necessary focus. |
| | Remove specific barriers that hold a potentially valuable resource back from being economically viable. |
| | Certainty of reaching those for whom it is intended. |
| | Competitively neutral, should not pick winners and losers. |
| **COST-EFFECTIVE** | Balance the costs of administration against expected benefits. |
| | Should not be duplicative. |
| | Encourage service at least cost. |
| | Create transparency so that stakeholders can see the costs and benefits. |
| | Should not undermine the efficient use of a product or service by suppliers, providers, or consumers. |
| **TIME-LIMITED** | The duration should be established at the outset so investors know what to expect. |
| | It should ensure that the market actors (producers, providers, customers) do not come to expect a subsidy as a right. |
| | Subsidy should expire as the technology becomes commercial (no free riders). |

Application of the principles set forth above can inform a public policy dialogue and help achieve a more optimal result. These principles should be considered in the context of potential goals for specific fuels or technologies. During the 81st Legislature, these goals could include:

- Increasing non-wind renewable energy investment (solar energy, for example);
- Promoting deployment of clean coal through carbon capture and sequestration technology; and,
- Supporting a "smart grid" advanced metering infrastructure to improve system reliability and efficiency.

*Note: The first two goals are discussed below; the smart grid goals are discussed in detail in Section 3b.*

**Non-wind Renewable Energy:**

As discussed above, it is clear that the Renewable Portfolio Standard established by Senate Bill 7 (76R) in 1999 and modified during subsequent sessions has been very successful in encouraging the building of new wind generation in Texas. Wind has become commercially viable in this market and has already exceeded the 5880 megawatt target for 2015 set in 2005. It is obvious that this program has far exceeded its goal in pushing wind power to commercial viability. However, no other renewable resource has been able to compete economically with wind at this point.

The state could now turn its sights to other renewable energy resources, such as solar and biomass, and establish a limited incentive for those resources. Any new incentive should have the goal of commercializing non-wind renewable energy, while ensuring that the net costs to consumers are reasonable, and allowing sufficient time to see if the new technology can become commercially viable. The incentive would need a firm sunset date to provide certainty for investors in the new technology (so that potential investors do not have to guess whether the state is going to stop or start the incentive), and ensure the state is using its limited resources most effectively.

**Carbon Capture and Sequestration:**

The benefits of supporting carbon capture and sequestration are enormous for a state such as Texas that is rich with lignite coal and oil and gas reserves. Legislation defining "ultra clean energy projects" and setting standards and providing tax incentives was enacted in 2007 (HB3732, 80R). Eligible power plants will reduce sulfur dioxide emissions by 99 percent and mercury emissions by 95 percent. Nitrogen oxide emission rates will be limited to 0.05 lbs/MMBTU, and $CO_2$ and sequestration will be enhanced.

Increasing America's energy independence, captured carbon can be used for Enhanced Oil Recovery (EOR), which has the potential to produce 50,000 barrels of oil per day by 2013 in West Texas alone.[xlvi] Targeted, cost-effective, time-limited support for demonstration projects will provide greater fossil fuel options and benefits to the state. Public and private investments will be necessary because the cost of carbon capture and sequestration is currently so high and the projects so complex that it is difficult for a single company to act alone.

**Portfolio Approaches to Subsidies and Incentives**

In general, state subsidies should be managed like an investment portfolio that considers a diversified mix of the most promising technologies and fuels. This includes technologies at various stages in the innovation cycle, with an emphasis on the stages in which the private sector is not investing. An optimal strategy considers a range of policy goals and different tools. The goals may include accelerating commercialization, reducing environmental impact, enhancing reliability and/or reducing consumer cost.

Policy tools may include funding demonstration projects such as for carbon sequestration, reducing first cost through subsidies and improving infrastructure through workforce education or streamlined permitting. For example, a Texas portfolio could include incentives for:

i) Non-wind renewable energy;

ii) Carbon capture and sequestration from lignite coal plants;

iii) Nuclear workforce and manufacturing development;

iv) Siting for nuclear waste that cannot be reprocessed; and,

v) Plug-in electric vehicles.

## 3b. Energy Conservation

Consumer-oriented energy conservation measures such as advanced metering and energy-efficient appliances and light bulbs will help Texans make better use of electricity. Advanced metering allows consumers to measure their energy use and link it to the cost of electricity in real time, which is a significant improvement from the current standard monthly or quarterly billing approach.

This provides Texas a unique opportunity for consumer education and energy consumption awareness that will lead to reduced consumption and lower electric prices. Electronic meter readings also reduce traffic congestion and air emissions by eliminating the need for monthly meter reading trips.

To be effective on a statewide scale, energy conservation requires high levels of participation and genuine competition between providers so that consumers have enough information to make knowledgeable decisions.

**Smart Grid and Advanced Metering Systems (AMS)**

Without limited, targeted incentives, the full potential benefits of a smart grid and AMS technology may not be realized in Texas. Legislation in 2005 (HB2129, 79R) removed a barrier to the deployment of advanced meters. Transmission and Distribution Utilities can now get approval of advanced metering projects without the barrier of slow or uncertain cost approvals. This approval of real-time cost recovery will allow projects to move forward and incent companies to deploy these new technologies for the benefit of consumers.

The benefits of this legislation are overwhelming in the creation of an improved energy infrastructure, the use of a state-of-the-art technology that reduces meter reading cost and risk, enables customers to better-manage reliability, storm outages, and cost. Appropriate incentives can encourage the more rapid development and deployment of AMS, which is the cornerstone of efforts to modernize the electric grid, as well as the availability and adoption of customer information devices that enable customers to access AMS information to better understand their electric use and the cost of their use in real-time.

**The Role of the System Benefit Fund**

The System Benefit Fund (SBF) was established in 1999 by the 76th Legislature to help ensure that low-income Texans would benefit from lower electricity prices in the wake of deregulation of the state's electric market. Revenue is generated for the Fund through a charge added to electricity bills in Texas that cannot exceed $0.65 per megawatt hour.

Senate Bill 7 (76R), which deregulated the electric market in Texas and created the System Benefit Fund, amended the Utilities Code to require that funds from the SBF should be used only for the following purposes:

(1) programs to assist low-income electric customers provided by Subsections (f)-(l);
(2) customer education programs; and
(3) the school funding loss mechanism provided by Section 39.901.[xlvii]

The legislation went on to provide that the programs funded by the SBF must include:

(1) reduced electric rates as provided by Subsections (h)-(l); and
(2) targeted energy efficiency programs to be administered by the Texas Department of Housing and Community Affairs in coordination with existing weatherization programs.[xlviii]

Despite these clear provisions in Chapter 39 of the Utilities Code, since 2005 the balance of the fund has been streamed into General Revenue to help balance the budget and fund other programs. This diversion of funds from a program that is intended to help low-income families with the cost of electricity must be ended.

Governor Perry's budget for the 2008-09 biennium applied the principle of truth-in-taxation by asserting that "a tax or fee collected for a specific purpose should be used for that purpose, or returned." The Governor's budget specifically noted that "balances should not be accumulated for the purpose of balancing the state budget," and requested that the $408.7 million balance in the System Benefit Fund should either be returned to taxpayers or used for its intended purpose.[xlix]

It is important that all dedicated state funds, such as the SBF, are used for their intended purpose so that taxpayers and other stakeholders can see where and how their money is being spent. In Texas, diverting dedicated funds to other purposes is common, and has created a complex budget system in which many funds are collected for one purpose but used for another.

By using System Benefit Fund revenues for their intended purpose, the state can expand the use of "smart" meters to alleviate future demand and help keep electric rates down.

The Office of the Comptroller estimates that during the 2008-09 biennium, the System Benefit Fund will accrue $329 million in revenue. This will leave the fund with a revenue balance of $561 million available for certification by the Comptroller.[l]

These funds must be used to help low income Texans with the temporarily high cost of electricity. Ideally, weatherization and energy assistance programs administered by the Texas Department of Housing and Community Affairs (TDHCA), which help low income Texans use energy more efficiently, should be the focus of SBF funding. According to TDHCA, the Weatherization Assistance Program:

> Provides for energy-related improvements to homes, and educates consumers about energy conservation. The program goal is to reduce the energy cost burden of low income households through energy efficiency.[li]

These "energy-related improvements" could include tools to access "smart" meters to help households monitor and control their energy consumption. Adopting this approach will enable low income Texans to save energy and therefore energy costs in the long term, and is better public policy than simply subsidizing the energy expenditures without having any expectation for improved energy efficiency.

## 4. Alternative Fuels

Looking beyond the role of the energy industry, effective environmental policy must also consider the role of vehicles. According to the 2008 State Energy Plan, 29 percent of all $CO_2$ emissions in Texas are attributable to transportation (compared to 67 percent attributable to electric generation and industrial activity combined).

The state can directly impact transportation emissions by improving the vehicles that it owns and operates. The Office of Vehicle Fleet Management (OVFM) reported in January 2007 that the "state fleet is currently comprised of 26,818 active vehicles distributed among 95 independent agencies and universities."[lii]

The OVFM reports that 28 percent of the state fleet (7,398 vehicles) is capable of using alternative fuels, which are defined in statute as: Propane (LPG); compressed natural gas (CNG); ethanol; methanol; electricity; and, bio-diesel.

73 percent of the state fleet that runs on alternative fuel uses propane, while vehicles using compressed natural gas account for six percent of the alternative fuel fleet. According to the OVFM report:

> The area of growth in the state's alternative fueled fleet is electric, hybrid, and vehicles capable of using bio-diesel and E85, a mixture of ethanol and gasoline that is 85 percent ethanol…OVFM anticipates that the number of CNG and LPG vehicles within the state's fleet will continue to decline as other more viable alternative fuels become commercially available.[liii]

The Legislature should encourage further conversion of the state fleet to alternative fuels, and should consider the comparative cost of fuels in order to reverse the decline of CNG and LPG vehicles as a percentage of the total fleet.

**Environmental and Economic Benefits**

According to the US Department of Energy, natural gas is a particularly beneficial fuel:

> Natural gas is a domestically available, inherently clean-burning fuel. Using compressed natural gas (CNG) and liquefied natural gas (LNG) as vehicle fuels increases energy security, paves the way for fuel cell vehicles, and improves public health and the environment.[liv]

Compressed natural gas will typically be more effective at reducing harmful emissions – such as nitrogen oxide (NOx) and particulate matter (PM) – than other alternatives. [lv]

Natural gas is also more readily available than other fuel sources. According to the US Energy Information Administration and Clean Energy Fuels Corp., there are 77 years of domestic natural gas reserves available at the current rate of consumption. This represents 30-40 years more than domestic oil resources. In addition, world natural gas reserves are currently estimated to be *three times greater* than the world's oil reserves. Therefore, using natural gas as a vehicle fuel is a long-term strategy that is ideally suited to an environment in which gasoline and diesel will become ever-more scarce and expensive. Texas should begin to make this transition now, not only because of the environmental benefits, but also to take advantage of current market conditions.

Using compressed natural gas currently has significant economic benefits over both gasoline and other alternative fuels. The Department of Energy's April 2008 Clean Fuel Report notes that "CNG is about a $1.40 less than gasoline on an energy-equivalent basis." The report shows that CNG, propane, and ethanol are all currently cheaper than traditional gasoline and diesel. The report also reveals that while the price of CNG has remained stable at around $2 per GGE (gasoline gallon equivalent) since March 2007, the average price of gasoline has increased from $2.30 to $3.43 per gallon, or 49 percent. CNG is also currently cheaper than ethanol, propane, and bio-diesel on an energy-equivalent basis.

It is important that the state does not mandate the use of one fuel or another, or base the type of fuel used by the state fleet on one factor alone (such as cost or environmental impact). Doing so could tie the state to certain types of fuel that either become more expensive in the future or comparatively less environmentally beneficial than they are now. However, the state should empower its agencies to balance costs and environmental factors when determining the fuels that should be used by vehicles in the state fleet.

For example, Section 2171.103(a) of the Government Code provides that:

> The office of vehicle fleet management may act as necessary to encourage and facilitate the conversion and use of motor vehicles that are capable of using alternative fuels, especially compressed natural gas.

It is clear that the cost of traditional fuels such as gasoline and diesel have risen significantly and that both CNG and propane are less costly on an energy-equivalent basis. Further, CNG and propane emit fewer ozone-forming pollutants than gasoline and diesel.[lvi]

Therefore, Section 2171.103(a) of the Government Code should be amended so that the Office of Vehicle Fleet Management is required to balance the cost and environmental impact of the fuels used in the state's fleet – 72 percent of the fleet is currently incapable of using alternative fuels – and ensure that the state fleet is as cost-effective and environmentally harmless as possible. Under current market and environmental conditions, this would require conversion of the state fleet from gasoline and diesel to alternative fuels such as CNG and propane.

## 5. Conclusion and Summary of Recommendations

### Primary recommendation:

### 5a. Support diversification and expansion of electric generation capacity utilizing coal, natural gas, nuclear, wind, and biomass.

Expansion of electric generation capacity is necessary to meet future demand arising from population and economic growth. A more diverse generation portfolio will bring wholesale price stability and deliver the energy that is needed while heeding environmental concerns. Expanding and diversifying generation capacity will require a balanced approach from legislators and regulators; financial intervention by the state must be cost-effective, targeted, and time-limited, while regulation must not thwart the overall goal of meeting future demand.

### Other recommendations:

### 5b. Repeal natural gas generation target in Utilities Code.

Much of the new electric generating capacity built in Texas since 1990 relies on natural gas. Today, natural gas accounts for about 70 percent of generation capacity; coal accounts for about 23 percent; and nuclear for about 6 percent.[lvii]

As generators in Texas pursue the construction of a diverse portfolio of generation resources, including coal, nuclear, wind, biomass, and others, it is critical that the Legislature repeal the statutory requirement enacted in 1999 by Senate Bill 7 (76R), which requires that "50 percent of the megawatts of generating capacity installed in this state after January 1, 2000, use natural gas." This provision, as well as the requirement in Utilities Code, Section 39.9044 that requires the Public Utility Commission to "establish the minimum annual natural gas generation requirement for each power generation company", is inconsistent with the development of a diversity of generation resources. These requirements must be repealed so that diversification will be unhindered by state mandates.

### 5c. Maintain regulatory certainty in the permitting process for new plants and expedite permits where possible.

For well-established fuel sources such as coal and natural gas, regulatory certainty is most important. The existing permitting process, which focuses primarily on regulating emissions, should not be altered.

The Governor's Competitiveness Council recently recommended that:

> Texas should not institute any new power plant permitting processes, as this would insert costly delay, erect barriers to entry, and eliminate the ability for Texas' competitive marketplace to respond quickly to changing market signals. Legal and regulatory certainty is critical for the competitive marketplace to function. Numerous states have lengthy and costly permitting processes for wind, and gas- and coal-fired generation; Texas has avoided this by permitting only emission and water aspects of generation plants.[lviii]

Any changes to the current permitting process (other than fast-tracking applications) will reduce regulatory certainty, increasing the time and cost required to construct a new generation facility, and will ultimately make Texas less able to meet future demand for electricity.

### 5d. Expedite waste water permits for nuclear plants.

Although the permitting of new nuclear facilities rests with a federal agency (the Nuclear Regulatory Commission), the state plays a role in the permitting of wastewater as it pertains to nuclear facilities. The Legislature should ensure that this state-level permitting does not impede the development of new nuclear plants in Texas:

> To encourage the development of nuclear power in Texas, the TCEQ should expedite necessary water and wastewater permits associated with new nuclear power plants. While all design and site permits reside with the Nuclear Regulatory Commission, ensuring that these state permits do not delay development is critical.[lix]

### 5e. Ensure that wind incentives are reasonable.

The establishment of Competitive Renewable Energy Zones means that Texas can continue to grow its wind generation capacity with the knowledge that the power generated by future wind farms will have the necessary transmission infrastructure to direct it to where it is needed. Texas has already surpassed California as the nation's leader in wind generation, and the latest statistics from the American Wind Energy Association show that Texas – by a wide margin – has the highest wind generation capacity of any state in the nation, and far more wind capacity than its adjacent states.

Wind has become commercially viable in Texas and has already exceeded the 2015 goal of 5880 MWs set by the legislature in 2005. It is obvious that the Renewable Portfolio Standard and development of CREZ have far exceeded their goal of pushing wind power to commercial viability. However, no other renewable energy source has been able to economic compete with wind up to this point. The state should now turn its sights to other renewable energy resources such as solar and biomass, and establish a limited incentive for those resources.

### 5f. Use the System Benefit Fund (SBF) for its intended purpose.

Consumer-oriented energy conservation measures such as advanced metering and energy-efficient appliances and light bulbs will help Texans make better use of electricity. Advanced metering allows consumers to measure their energy use and link it to the cost of electricity in real time, which is a significant improvement from the current standard monthly or quarterly billing approach. To be effective on a statewide scale, energy conservation requires high levels of participation and genuine competition between providers so that consumers have enough information to make knowledgeable decisions.

The System Benefit Fund (SBF) was established in 1999 by the 76th Legislature to help ensure that low-income Texans would benefit from lower electricity prices in the wake of deregulation of the state's electric market. Despite clear provisions in Chapter 39 of the Utilities Code, since 2005 the balance of

the fund has been streamed into General Revenue to help balance the budget and fund other programs. This diversion of funds from a program that is intended to help low-income families with the cost of electricity must be ended. Using the SBF to subsidize the deployment of advanced meters and availability of in-home devices that will enable customers to access their meter information would ensure that program funds are used in a manner consistent with their intended purpose and would help the state's energy conservation efforts.

### 5g. Expand the use of alternative fuels in government vehicles.

Section 2171.103(a) of the Government Code provides that:

> The office of vehicle fleet management may act as necessary to encourage and facilitate the conversion and use of motor vehicles that are capable of using alternative fuels, especially compressed natural gas.

It is clear that the cost of traditional fuels such as gasoline and diesel have risen significantly and that both CNG and propane are less costly on an energy-equivalent basis. Further, CNG and propane emit fewer ozone-forming pollutants than gasoline and diesel.[lx]

Therefore, Section 2171.103(a) of the Government Code should be amended so that the Office of Vehicle Fleet Management is required to balance the cost and environmental impact of the fuels used in the state's fleet – 72 percent of the fleet is currently incapable of using alternative fuels – and ensure that the state fleet is as cost-effective and environmentally harmless as possible. Under current market and environmental conditions, this would require conversion of the state fleet from gasoline and diesel to alternative fuels such as CNG and propane.

### 5h. Abolish the Office of Public Interest Counsel at the Texas Commission on Environmental Quality

The Office of Public Interest Counsel at the Texas Commission on Environmental Quality:

> …works independently of other TCEQ offices to bring forward relevant issues from a public interest perspective. The office's goal is to ensure that all relevant evidence is developed and made part of the record so that the Commission may make informed decisions and issue permits that are protective of human health and the environment.[lxi]

Most of OPIC's key responsibilities are the same as those of the TCEQ. TCEQ's mission statement reads as follows:

> The Texas Commission on Environmental Quality strives to protect our state's human and natural resources consistent with sustainable economic development. Our goal is clean air, clean water, and the safe management of waste.[lxii]

The role of TCEQ is that of a watchdog agency to protect the environment; a separate entity within the watchdog agency to represent the public interest is not required. The TCEQ notes that to accomplish its goal of "clean air, clean water, and the safe management of waste", the Commission will "ensure meaningful public participation in the decision-making process."[lxiii] This approach is more than adequate and underscores the futility of the Office of Public Interest Counsel.

## 5i. Establish a home energy audit property tax incentive program

An energy audit of a home or business evaluates factors such as insulation, the efficiency of appliances such as air conditioners and heat-pump filters, the condition of windows, doors and other entryways, as well as any other factors that may affect the amount of energy that is used to heat or cool the property. After undertaking an energy audit, a property owner can voluntarily upgrade their property to improve its energy efficiency. Individual property owners benefit from energy audits because they can save money on their energy bills, while all energy consumers, as well as the environment benefit from reduced energy consumption.

The Texas Property Tax Code already contains a range of exemptions and incentives related to energy efficiency and renewable energy devices. Another exemption could be created so that a property owner is entitled to an energy audit property tax exemption that deducts $15,000 from the appraised value of a property for the life of the energy savings measures implemented as a result of an energy audit. Local property taxes levied by cities, counties, school districts, and special districts present an opportunity for the creation of a meaningful incentive program.

A property tax incentive would be a more effective approach than has been adopted by some local jurisdictions in Texas. The City of Austin, for example, recently passed a mandate requiring a homeowner to undertake an energy audit before they can put their home up for sale. The problem with the City's proposal is that it does not require a homeowner to act on the outcome of the audit, so there is no guarantee that energy efficiency would be improved.

The energy audit itself does not improve efficiency, but instead makes recommendations on improvements that will increase efficiency. Furthermore, the City proposal only adds yet another cost to the already expensive, time-consuming, and arcane home-sale closing process.

In contrast, a property tax exemption for implementing the recommendations of an energy audit would be far more effective: the property tax exemption would be earned only when the necessary energy efficiency improvements are actually made by the homeowner. Unlike the Austin's plan, the property tax exemption would provide homeowners and businesses with a significant incentive to improve the energy efficiency of their property even if they are not considering selling their home.

## 5j. Create an energy company property tax exemption

Chapter 23, Subchapter C of the Tax Code currently provides a method of appraisal for land used in agriculture or timber production that, according to the Comptroller, costs school districts about $1.8 billion per year in lost property tax revenue.[lxiv] Commonly known as the "agriculture exemption," this feature of the tax code was intended to provide land-intensive industries – such as agriculture and

timber – some relief from property taxation. However, as the Texas economy has developed, reliance on the land to generate income has diminished.

The energy industry has become Texas' economic engine, employing hundreds of thousands of people in sectors such as mining, oil and gas extraction, manufacturing of petroleum and coal products, chemical manufacturing, and electric power generation, transmission, and distribution. Many of these sectors are capital and land-intensive and therefore are severely impacted by Texas' punitive system of property taxation. Creating a property tax exemption for companies in the energy sector will help Texas retain its position as the nation's energy leader, and will promote continued economic and employment growth within the state's energy sector.

### 5k. Require that Low-Income Vehicle Repair Assistance, Retrofit, and Accelerated Vehicle Retirement Program (LIRAP) funds are used to purchase alternative fuel vehicles.

Under Section 382.209 of the Health and Safety Code, the LIRAP program provides grants of up to $3,500 to low-income Texans whose vehicles have failed the state emissions test or do not meet certain other environmental requirements.[lxv] The program is intended to enable low-income Texans to purchase newer vehicle that will emit fewer pollutants; as such, the program is only open to residents of the state's largest urban areas (Austin, Dallas-Fort Worth, and Houston-Galveston-Brazoria).

Currently, grants are available as follows:

- $3,000 for a car, current model year or up to three model years old
- $3,000 for a truck, current model year or up to two model years old
- $3,500 for hybrid vehicle, current or previous model year

The LIRAP grant system should be amended so that funds are only available for the purchase of vehicles that rely entirely or partially on alternative fuels such as compressed natural gas or propane. As noted in Section 4 of this report, these alternative fuels have significant environmental and air-quality benefits over gasoline or diesel. Therefore, focusing LIRAP funds on alternative fuels will enhance the program's ability to improve the air quality in Texas' urban counties.

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