TXU'S EXPANSION PROPOSAL: A RISK FOR INVESTORS

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This report was commissioned by **Ceres**, a national coalition of investors, environmental groups and other public interest organizations working with companies to address sustainability challenges such as global climate change. Ceres directs the Investor Network on Climate Risk (INCR), a network of more than 50 institutional investors with collective assets totaling $3.7 trillion. For more information, visit www.ceres.org.

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Table of Contents

I. EXECUTIVE SUMMARY

Electric utilities have proposed 153 new coal-fired power plants with a combined 93 GW of capacity across the United States. Coal's popularity is booming at the moment due to high natural gas prices, relatively cheap supplies of coal, difficulties in bringing new nuclear power to market, and desires to boost America's energy security by increasing reliance on domestic sources of energy. Most of the new plants proposed are pulverized coal plants being built with no controls for capturing carbon dioxide (CO_2), which contributes to global warming. These new plants pose wide-ranging financial risks for investors, including shareholders of the power companies and of the banks financing the project. Investors (whether public or private) should carefully examine proposals to finance their construction.

Of particular concern is a proposal by TXU Corp. to build eleven new coal-fired electric power units in Texas with a combined capacity of 9,000 MW and at an estimated cost of $10 billion. The TXU plan warrants an especially close look because none of the facilities are being built with carbon control technologies and because the plan would add more coal-fired electricity capacity than has been added in the entire United States in the last ten years.

TXU's proposal does not adequately account for some key trends affecting all new coal plant construction – trends that will pose financial risks for investors, whether as public shareholders in TXU or as private investors financing the projects. These trends include:

- rising construction costs to build new coal plants;
- growing likelihood of national climate change regulation, which will limit and thus put a cost on CO_2 emissions;
- increasing momentum in Texas and the rest of the country to boost energy efficiency, which will slow the growth of electricity demand, including the demand for new power from TXU's 11 new coal plants;
- growing competitive pressure from wind, solar, and other renewable energy sources, which are seeing unprecedented growth in Texas and other parts of the U.S. due to their increasing cost-competitiveness with fossil-fuel-based power sources; and
- increasing reputational and litigation risks associated with high carbon-emitting companies.

Key Findings about the TXU Proposed Expansion

TXU's failure to adequately account for these trends, coupled with other factors, creates significant risks for the company and its investors. In Texas's deregulated electricity market, the costs of these risks will likely be borne by shareholders and bondholders, not passed through to ratepayers. In other words, TXU's shareholders and other financial backers bear the risks. Specifically, these risks include the following:

1) ***Unrealistic Cost Assumptions:*** *TXU makes unrealistically optimistic assumptions about the costs and logistics of this project*, *which currently carries a $10 billion price tag*. Recent construction cost figures from NRG Energy, Inc., which has more experience in building coal-fired power plants than TXU and which is proposing a similar but smaller expansion in Texas, indicate that **the total cost of TXU's project could rise by more than 35 percent to $13.6 billion.** Similarly, Duke Energy recently announced that building a new coal-fired power plant in North Carolina will be 50 percent more expensive than planned because of rising material costs and labor costs. TXU's project will be affected by the same economic forces and thus **overall project costs could increase to as high as $15 billion.** TXU may also have underestimated the costs of controlling air pollutants in order to comply with the Clean Air Act. These likely higher

costs mean that TXU will probably require additional capital, either debt or equity, thereby depressing share values and making TXU's debt less attractive in the marketplace.

2) ***Potential Carbon Regulation:*** *Carbon regulation at the national level is inevitable and likely to happen in the near future, and high carbon emitters like TXU will be at a disadvantage when they must pay for their carbon emissions.* Coal-fired power plants emit especially high amounts of carbon dioxide. Although TXU promises to make its new facilities "carbon capture ready," it has not provided any clear timeline or costs for those technologies. Therefore, TXU will need to purchase CO_2 credits until such technologies are commercially available and cost-competitive. It is likely that the baseline for GHG reductions established in national regulations will be set prior to construction of these plants (i.e., they will not be grandfathered), which means TXU will have to pay for its emissions. Assuming TXU has to pay for 100% of its emissions from the expansion and 25% of its existing emissions under national regulations, **the company's costs will likely range from $917 million to nearly $2.3 billion annually, or 9 to 23 percent of its estimated cost for the entire project**, according to our analysis. (These costs assume CO_2 emissions at $10 to $25/ton, a price tag consistent with how CO_2 has traded in the European Union.) It is unclear to what extent TXU has incorporated the costs of carbon emission allowances or the costs of carbon capture and storage technology into its proposal. Once realized in full, those costs will reduce profits, erode shareholder returns, and increase the possibility that TXU must refinance its loans at unfavorable rates.

3) ***Impact of Efficiency Measures:*** *Electricity demand growth may be lower than TXU's aggressive projections because technological advances and higher electricity prices are making energy efficiency measures cost-effective. This means TXU may experience lower revenues due to unused capacity.* A recent NRDC/Ceres analysis, done by Optimal Energy, found that aggressive investments in efficiency and other energy-saving programs would have a $38 billion net economic benefit for Texas while also reducing peak electric demand by 4,000 MW by 2011 and 18,500 MW by 2021. Legislative proposals are currently under consideration in the Texas legislature to increase efficiency, which could reduce TXU's revenues due to lower demand. Because TXU operates in a deregulated electricity market in which rates are set competitively and in which increased costs cannot easily be passed on to ratepayers, lower revenues may depress share value and make it more difficult for TXU to pay off loans.

4) ***Competition from Renewable Energy:*** *Electric power from renewable sources is becoming increasingly cost-competitive with power generated from fossil fuels.* Texas is now the largest producer of wind-generated power in the U.S., and there is enormous potential in the state for more renewables. In fact, the state has mandated that wind generation nearly double by 2015 and nearly double again by 2025. With mandates like that and costs that are competitive – $23 to $59/MWh for wind versus $56 to $83/MWh for coal (including potential costs of controlling carbon dioxide) – **wind power is a growth area that could cut into demand for some of TXU's power**. While wind resources are intermittent and therefore not a baseload generation source, wind's cost-competitiveness enables it to compete with coal, especially during off-peak hours. Again, this means TXU will experience lower revenues due to unused capacity, which may depress share value and make it more difficult for TXU to pay off loans.

5) ***Climate Litigation Risk:*** *Courts may become increasingly receptive to claims of harm from greenhouse gas emissions, and high-emitting companies like TXU will be likely legal targets.* If TXU builds all of its new plants, the company will become the third largest emitter of carbon dioxide emissions among U.S. electric utilities. **Climate**

litigation could lead to potential liability for companies in the trillions of dollars, according to the co-chair of the Environment, Energy, and Natural Resources section of the American Bar Association. At a minimum, climate suits would entail substantial legal costs and harm to the company's reputation. Such litigation may also drive away customers, reduce stock value, and make debt more expensive.

6) ***Reputational Harm:*** *The perception of environmental irresponsibility could result in regulatory backlash, litigation, and unfavorable public opinion.* Two-thirds of Texans oppose new coal-fired power plants in the state, and three of four would rather rely first on conservation. Several lawsuits have already been filed against TXU regarding the project's environmental impacts, and the Texas legislature is considering several proposals that could impact the project. **Regulatory backlash, litigation, and unfavorable public opinion will increase project costs and negatively impact customer attraction and retention in Texas's deregulated electric power market**, thereby reducing profits and shareholder returns.

Each of these risks is described in more detail in this report, in the context of relevant trends.

What Investors Are Doing

Concerned investors are already voicing their concerns with TXU and the banks financing the project. Several of the company's largest shareholders, in fact, have formally requested that the company disclose how it is planning to address many of the risks described in this report. Additionally, investors should call on TXU to expand its disclosure to include:

- Projections of total CO_2 emissions in 2010, 2015, and 2020;
- An anticipated timeline for development of carbon reduction technologies, including estimated costs;
- How the company's growth strategy and existing power plants might be affected by different realistic regulatory scenarios for greenhouse gas reductions, possible litigation, and other potential hurdles;
- Cost estimates for CO_2 allowances purchased under different regulatory scenarios with clearly explained assumptions on key issues such as emissions baseline and auctioning of allowances; and
- How state policies to increase energy efficiency, renewable energy use, and demand management could affect demand for TXU's coal-fired electricity power.

Investors are also asking the financial institutions that may be backing the TXU project to set climate policies requiring extensive due diligence regarding carbon cost analysis, assess reputational risk issues, and reduce the carbon footprint of their lending portfolios. Investors should continue asking these questions of the banks.

II. KEY INVESTOR RISKS

TXU is making an aggressive bet on coal, proposing to add more coal-fired electricity capacity than has been added in the entire United States in the last ten years. As explained below, TXU's plan is fraught with risks for the company and its investors. In Texas's deregulated electricity market, the costs of these risks will likely be borne by shareholders and bondholders, not passed through to ratepayers. In other words, TXU's financial backers bear the risks.

Risk 1: Unrealistic Assumptions about Costs and Logistics

TXU makes unrealistically optimistic assumptions about the costs and logistics of this project, which currently carries a $10 billion price tag. TXU's financing plan already contains significant risk, and the company's overly optimistic assumptions could well mean that TXU will require additional capital, either debt or equity, thereby depressing share values and making TXU's debt less attractive in the marketplace.

Key Points

- TXU has likely underestimated construction costs. Labor and material (e.g., steel) shortages have driven up the cost of building coal-fired power plants by 50 percent, which means that TXU's expansion project could overrun projected costs by several billion dollars. If recent construction cost estimates from NRG Energy are used, the project's costs could rise by more than 35 percent to $13.5 billion. If one relies instead on estimates from Duke Energy's November 2006 announcement concerning the sharply rising costs of building coal-fired power plants, the total cost of TXU's project could increase fifty percent to $15 billion.
- Public opposition threatens to delay permit issuance, which would make impossible the realization of TXU's tight construction schedule. TXU has acknowledged that permitting delays would increase construction costs.
- Sulfur dioxide emission allowance costs have risen sharply in the past two years, and forecasts show that they will continue to increase. Yet recent financial analyses of TXU's proposal have assumed sulfur dioxide costs that are 60 percent lower than current market rates, thereby underestimating annual sulfur dioxide control costs for TXU's new and existing facilities combined by $86 to $127 million.
- TXU plans to finance this project through $11 billion in non-recourse financing, which means that lenders would be forced to recover any amount owed (should something go wrong) by foreclosing on the property by which the loan is secured. The scale, degree of leverage, and absence of long-term power price hedges represent real concerns about TXU's financing plan.

Context and Trends

The price of natural gas has risen in the past few years, driving many utilities to develop plans for new coal-fired facilities. According to the Department of Energy, 153 new coal-fired power plants with a combined 93 GW of capacity are currently under consideration (Department of Energy 2006a).

Industry cost estimates for building new supercritical pulverized coal (SCPC) generators range from $1,150/kW (Bechtel and GE estimates) to $1,500/kW (Electric Power Research Institute estimates). However, labor and supplies (e.g., steel) for coal-fired power plant construction are in short supply (D. Dalton 2006, Wynne 2006). Duke Energy's CEO has indicated that the costs of building a 1,600 MW coal-fired plant have risen by fifty percent from $2 billion to $3 billion ($1,875/kW) (M. Dalton 2006).

Utilities' financing costs are also rising due to uncertainty about the compliance costs and content of environmental regulations; this uncertainty adds substantially to the financial risk of power plants (Edison Foundation 2006). Those risks are magnified many times over for any coal-fired power plant proposal, since such facilities emit carbon dioxide, mercury, sulfur dioxide, and nitrogen oxides. Carbon dioxide regulations do not yet exist at the federal level in the United States, although as detailed below under Risk 2, business leaders regard national carbon regulation as a foregone conclusion.

Regulations for sulfur dioxide, however, are well established. The costs of controlling sulfur dioxide emissions are generally on the rise and are expected to rise even further as the new federal Clean Air Interstate Rule (CAIR) takes effect over the next few years. Auction allowance prices for sulfur dioxide jumped sharply in 2003-04 from approximately $200/ton in late 2003 to $700/ton in mid-2004, leveling off to $660 in September 2006 (Chicago Climate Futures Exchange 2006a, 2006b). Underlying factors for this price surge include: a lower supply of tradable allowances; anticipated regulatory changes that will drive up compliance costs; expansion of power generation capacity; labor and equipment shortages for pollution control device construction and installation (in part because China is placing great demands on the pollution control equipment market); and higher prices for nickel and steel, which are crucial for the manufacture of selective catalytic reduction pollution control units (Chicago Climate Exchange 2006a, Dalton 2006). Projections out to 2015 performed for the Regional Greenhouse Gas Initiative show costs (in 2004 dollars) of $1,315/ton for sulfur dioxide (Burtraw 2006).

Analysis of TXU's Proposal

Despite the industry-wide wave of plans to build new coal-fired power plants, TXU's proposal for 9,000 MW of new capacity at eleven new supercritical pulverized coal (SCPC) steam turbine generators (*see Figure 1*) is enormous even by the utility industry's standards, exceeding in scale the coal-fired capacity additions of the entire U.S. utility industry over the last ten years (Wynne 2006). Given the scale of TXU's proposed expansion, it is critical that the company's cost estimates are well considered and properly account for project cost overruns and possible delays.

TXU is assuming construction costs of $1,100/kW. Although this estimate is only marginally lower than the level cited by GE and Bechtel, and although Wynne (2006a) points out that TXU might experience "economies of scale by ordering eight identical units at once," one would expect TXU's cost estimate to be higher than that of an equipment supplier like Bechtel because TXU will also incur other costs (e.g., construction and business interruption insurance, development and project management costs).

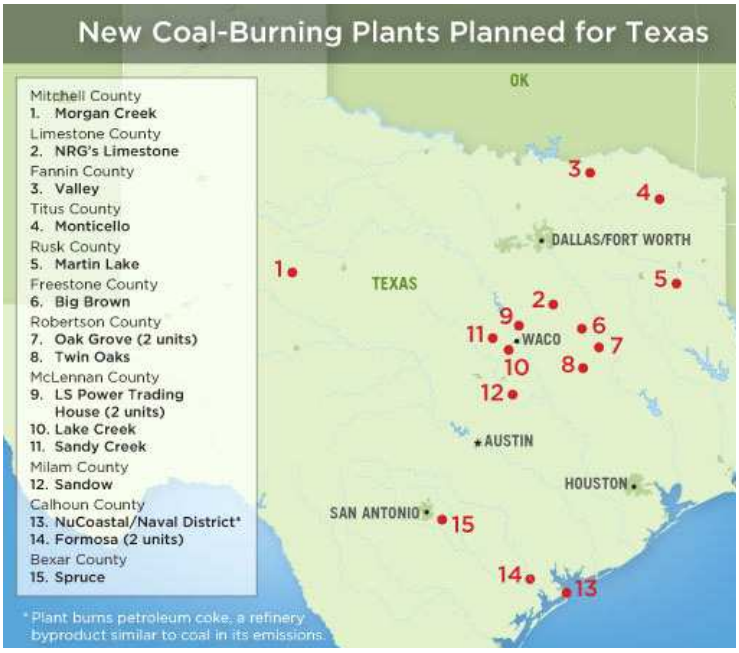

Figure 1 *Of these 15 proposed new units, 11 are TXU's: Morgan Creek (1), Valley (3), Monticello (4), Martin Lake (5), Big Brown (6), Oak Grove (2 units) (7), Trading House (2 units) (9), Lake Creek (10), and Sandow (12) (National Public Radio 2006)*

Most importantly, TXU's estimate does not reflect the recent sharp

increases in materials and labor. The CEO of Duke Energy, which is considering comparable projects, estimates that a new 1,600 MW coal fired power plant will cost $3 billion rather than $2 billion. If comparable increases apply to TXU, its project could cost 50 percent more than currently estimated, or $15 billion.

TXU's projection also seems overly optimistic in light of the higher costs that competitor NRG Energy is estimating for a similar expansion in Texas. Both companies' expansion proposals share similar situational advantages in that both are building at existing sites, minimizing such costs as permitting, site acquisition, and rail access. Yet NRG estimates its costs will be $1,500/kW to build, more than one-third greater than TXU's projected costs of $1,100/kW. NRG also anticipates a much lengthier construction schedule (66 months) than does TXU (45 months) (Wynne 2006a). Given that NRG has much more experience in building coal-fired plants than TXU, which has not built a coal-fired power plant in 25 years (Wynne 2006), investors have reason to be concerned about TXU's assumptions.

A recent independent analysis of TXU's proposed expansion highlighted some of the logistical concerns:

> *Not only TXU's aggressive costs estimates but the huge scale of TXU's 9,000 MW capacity expansion at a time of robust international demand for power generation equipment, rising commodity prices and a relative scarcity of skilled labor in the United States may complicate the negotiation of a firm price EPC contract with Bechtel. . . . Bechtel will be taking on a commitment to build coal-fired power plants on a scale not seen in the United States since the early 1990s. To do so, it will need to deploy, by TXU's estimate, some 40,000 construction workers, many of them skilled craftsmen, and rotate them across nine construction sites, with no more than a month's delay between the scheduled completion of one project and the next. (Wynne 2006, 15)*

As explained below in Risk 6, TXU's proposal has already encountered resistance that may translate into delays, raising doubts about the feasibility of the tight proposed schedule. For instance, several lawsuits have already been filed against TXU regarding the project's environmental impacts. And in February 2007, a Texas judge ruled against the governor's plan to fast-track TXU's permit process, leading administrative judges to push the permitting process back by four months, clearly delaying TXU's proposed schedule (Reuters 2007; Associated Press 2007).

In addition to construction delays and logistics, prospective carbon allowance costs are another concern. TXU has not explicitly considered the potential costs of carbon dioxide emissions allowances – as recently as 23 October 2006, TXU spokesperson Kim Morgan rejected the idea of considering carbon in the company's planning (Truini 2006). Yet, as explained further under Risk 2, substantial regulatory changes in the area of greenhouse gas emissions are widely seen as inevitable and will likely add several hundred million dollars to the cost of TXU's project.

Similarly, it is not clear what TXU's calculations are concerning sulfur dioxide emissions allowance costs. As noted above, these costs have risen sharply over the past few years, and forecasts show that they will continue to increase. TXU's overall sulfur dioxide emissions will range from 218,000 tons/year (TXU's goal for total after-control emissions, which assumes reductions at existing facilities) to 323,000 tons/year (current existing facility emissions plus those for the new units) (TXU 2006; Public Citizen 2006). TXU has not released its assumptions concerning sulfur dioxide control costs, but assuming that TXU's analysis mirrors that of a recent financial analysis supporting the economic robustness of TXU's proposal (Wynne 2006), the assumed sulfur dioxide costs are forty-five percent lower ($265/allowance)

than current market rates ($480/allowance) (Chicago Climate Futures Exchange 2006b). This translates to underestimating annual sulfur dioxide control costs by $47 to $69 million.

These flaws in TXU's overly optimistic assumptions suggest that the cost of its expansion proposal could well be significantly higher. This means that TXU will probably require additional capital, either debt or equity, thereby depressing share values and making TXU's debt less attractive in the marketplace.

In addition, TXU's financing plan already contains significant risk. TXU is seeking $11 billion in project debt for a $10 billion coal-fired power plant expansion, an unconventional arrangement in that the loan amount exceeds construction cost, the financing plan contemplates only 1,000 to 2,000 MW (out of 9,000 MW total) in long-term power purchase agreements, and the plan has a price hedging program that extends only until 2012 (the second full year of the plants' operation). Morgan Stanley, Merrill Lynch, and Citigroup are leading the deal, and other banks are expected to participate, taking second-tier roles. TXU plans for this $11 billion to be non-recourse financing, which means the lenders would be forced to recover any amount owed (should something go wrong) by foreclosing on the property by which the loan is secured. The scale, degree of leverage, and absence of long-term power price hedges represent real concerns about TXU's financing plan, leading one analysis to deem the financing "the weakest link in TXU's expansion plan" (Wynne 2006).

The higher costs, logistical difficulties, and financing risks will negatively affect TXU's financial backers. In Texas's partially deregulated market, the costs of TXU's expansion cannot be passed along automatically to ratepayers. This means that the risks are borne by the project's investors –the banks and TXU's shareholders.

Risk 2: Potential Carbon Dioxide Regulation

Carbon regulation at the national level is inevitable and likely to happen in the near future. High carbon emitters like TXU will be at a disadvantage when they must pay for their greenhouse gas emissions. It is likely that the baseline for GHG reductions established in national regulations will be set prior to construction of these plants (i.e., they will not be grandfathered), which means TXU will have to pay for all emissions from its proposed plants. If TXU is forced to pay for its emissions, the resulting annual cost could be hundreds of millions dollars, thereby reducing profits, eroding shareholder returns, and increasing the possibility that TXU must refinance its loans at unfavorable rates.

Key Points

- TXU's new facilities will emit approximately 78 million tons of carbon dioxide into the atmosphere annually, an amount that equals almost one-quarter of the European Union's entire emission reduction goal under the Kyoto Protocol. All of TXU's facilities combined (existing plus new) will emit 133 million tons of carbon dioxide annually, making TXU the third largest source of carbon dioxide among U.S. electric utilities.
- There is a growing consensus among business leaders, policymakers, and economists that national action to reduce greenhouse gas emissions in the U.S. is inevitable. National legislative activity has increased, and climate change regulation is already advancing among the states, especially in the Northeast and California.
- It is quite likely that the baseline for GHG reductions established in national regulations will be set prior to construction of TXU's plants, and the company will have to purchase allowances for its CO_2 emissions. If TXU were forced to pay for 100% of its emissions from the expansion and 25% of its existing emissions under national regulations at a price of $10 to $25/ton, the company's costs will likely range from $917 million to nearly $2.3 billion annually, or 9 to 23 percent of its estimated cost for the entire project, according to our analysis – a cost that TXU has not explicitly considered.
- TXU's decision to "wait and see" on carbon regulation will cost the company, its shareholders, and its ratepayers hundreds of millions of dollars annually when carbon is regulated at the national level. Although TXU promises to make its new facilities "carbon capture ready," TXU has failed to indicate when those plants will actually capture and store carbon or how much it will cost. Retrofitting conventional power plants to control carbon will likely be expensive, especially by comparison with integrated coal gasification. It is unclear to what extent TXU has incorporated the costs of carbon emission allowances or the costs of carbon capture and storage technology into its proposal.

Context and Trends

Any plants built now will be around for decades to come, well into the age of carbon regulation, and thus their owners must explicitly account for a range of carbon costs in long-term planning. Globally, the biggest contributor to greenhouse gas emissions is power generation, and the largest contributor among sources of power is coal (Duncan 2006). Coal combustion emits carbon at the highest rate of any fuel, so energy companies that rely on coal will be significantly affected when national greenhouse gas limits are in place. In contrast, companies that invest now in energy efficiency and low-carbon technology will be better positioned to make money from national or international carbon cap and trade programs.

The list of major companies supporting climate change regulation is growing. They include: Alcoa, Bank of America, BP, Calpine, Caterpillar, Duke Energy, DuPont, Exelon Corporation, FPL Group, General Electric, Lehman Brothers, NRG Energy, PG&E Corporation, PNM

Resources, Shell Oil, Wal-Mart, and Xcel Energy (David Gardiner & Associates 2006; Pew Center on Global Climate Change 2007). The U.S. Climate Action Partnership, which in January 2007 issued its call for the federal government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions, includes in its membership several high profile businesses (USCAP 2007). Among the reasons given for supporting national legislation is the desire for certainty.

In a September 2006 speech to the Merrill Lynch Power & Gas Leaders Conference, David Crane, CEO of the independent power producer (and TXU competitor) NRG Energy, Inc., explained his support for mandatory carbon constraints somewhat differently:

> *We are talking about the type of business issue that comes along, perhaps only once in a century. . . . While some forward thinking power industry executives have taken a stand on carbon, the broader utility industry view as represented by the official position of the utility trade association can best be described as – see how this works: 'See no carbon, hear no carbon, and speak no carbon.'*
>
> *A carbon position based on voluntary restraints to me is unwise and ultimately self-defeating because it's increasingly out of touch with the rapidly hardening position of main stream America on the issues of carbon emissions and global warming and what will be even more infuriating to the public is the blazing cynicism of the power industry's position – advocating reliance solely on voluntary restraints at a time when the American power industry itself is proposing to construct nearly 100 gigawatts of new coal-fired generation. (Environmental and Energy Study Institute 2006)*

These corporations' views are gaining currency within the utility industry, where there is a growing consensus that carbon regulation is unavoidable and even desirable. In January 2007, the Electric Power Supply Association announce its support for "comprehensive, mandatory federal legislation to require steps to minimize the impact of greenhouse gases on the environment." In response to what they consider to be the regulatory wave of the future, four of the largest U.S. power companies and most utilities in the West have incorporated carbon pricing into their long-term planning (Anonymous 2006, Wiser and Bolinger 2005).

This corporate trend follows, and in some cases has spurred, regulation by governments around the world. Every industrialized nation except the United States and Australia has ratified the Kyoto Protocol. Since 2000, the European Union has launched a variety of greenhouse gas regulatory programs, including the cap-and-trade Emission Trading Scheme, which affects electric utilities (among other industries) (Thomson 2006).

On the domestic front, many national regulatory proposals have been advanced, and the pace of legislative activity has increased steadily. In the 109th Congress, 106 proposals were introduced (Pew Center on Global Climate Change 2007a), and at least 6 cap-and-trade bills alone have been introduced so far in the 110th (*see Figure 2*) (World Resources Institute 2007). Regulatory action is already happening at the state level. A consortium of seven Northeast states and, more recently, the state of California, have initiated programs. In California, the goal is to stabilize emissions in 2020 at 1990 levels. The California Public Utilities Commission also requires companies in their long-term planning to include an adder of $8/ton to account for carbon emissions (California Energy Commission 2005). The goal of the Regional Greenhouse Gas Initiative (RGGI) is to cap Northeast power plant emissions in 2009 at current levels and then to reduce those levels by ten percent by 2019 (Regional Greenhouse Gas Initiative 2006). In February 2007, the governors of Illinois and New Jersey joined several other states in announcing their own aggressive targets, cutting emissions to 1990 levels by 2020 and to 80% below current levels (NJ) and to 60% below 1990 levels (IL) by 2050 (New Jersey 2007; Illinois 2007).

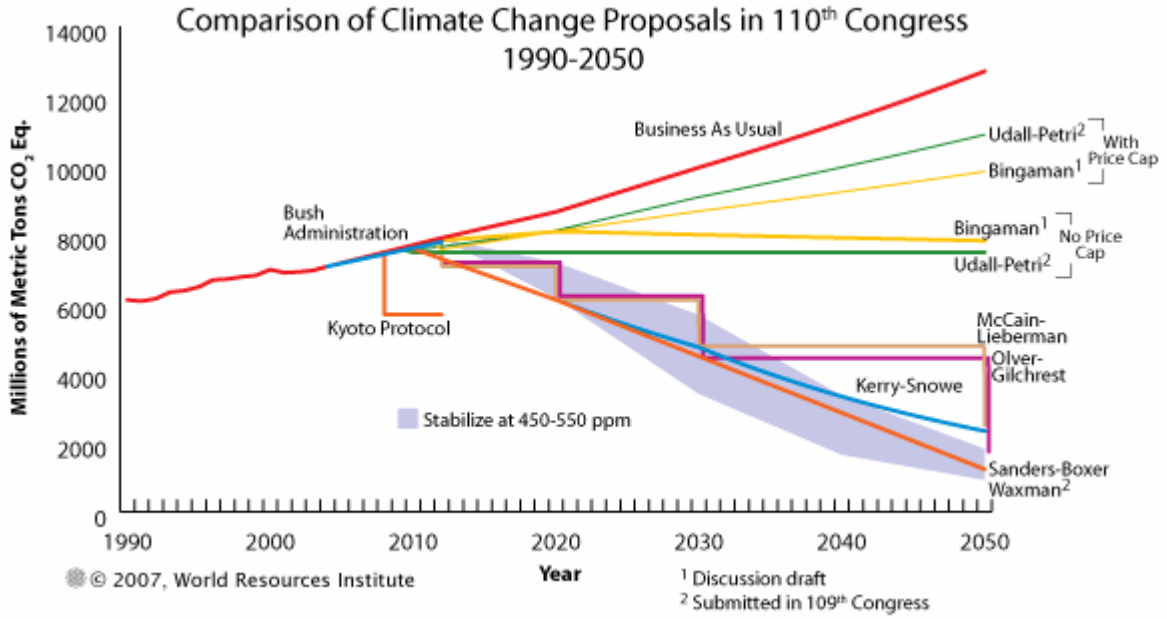

Figure 2 *How different proposals in the 110th Congress would cap U.S. emissions compared to business as usual, the Bush Administration's intensity target, and the range needed to stabilize GHG concentrations between 450 and 550 ppm CO2e (World Resources Institute 2007)*

Any domestic national program for greenhouse gases will likely involve a cap-and-trade program, which involves issuing a set number of pollution allowances that can then be bought and sold. While impending domestic greenhouse gas reduction programs may issue some carbon allowances for free, all indications are that a substantial portion will be sold through an auction. Under the Regional Greenhouse Gas Initiative regulatory program, which covers electric utilities in the northeastern United States, a minimum of 25 percent of CO_2 allocations must be sold or auctioned. Some states, such as New York, Vermont, and Massachusetts, have recently announced intentions to auction 100 percent of their RGGI allowances (New York State 2006; Point Carbon 2007). Similarly, the McCain-Lieberman Climate Stewardship Act of 2003, one of the leading congressional frameworks for national greenhouse gas legislation, provides for the sale of allowances to support the Climate Credit Corporation. In February 2007, the National Energy Commission recommended that national cap-and-trade programs issue for free at most fifty percent of carbon allowances (Resources for the Future 2007).

When carbon regulation happens in the U.S., high-carbon emitters like coal-fired power plants will have to pay for their carbon dioxide emissions, whereas low-carbon emitters will benefit from lower costs of control and the possibility of generating revenue through sale of carbon credits.

Analysis of TXU's Proposal

TXU's new coal-fired facilities will emit an estimated 78 million tons of carbon dioxide into the atmosphere (Environmental Defense 2006; Natural Resources Defense Council 2006a). This is roughly equivalent to almost one-quarter of the European Union's entire emission reduction goal under the Kyoto Protocol (Thomson 2006) or all of the projected carbon dioxide emission reductions from the Renewable Portfolio Standards programs in nineteen states combined (Clemmer 2006). TXU's existing facilities emit 55 million tons of carbon dioxide (Natural Resources Defense Council 2006), meaning that all of its facilities combined will emit 133 million tons of carbon dioxide annually. This will make TXU the third largest source of carbon dioxide among U.S. electric utilities (Natural Resources Defense Council 2006). Texas already emits more CO_2 than any other state (Anonymous 2006a).

When challenged by shareholders in 2003 and 2004 to say what the company was doing about

climate change, TXU commissioned a study that concluded, among other things, that by postponing action until a national regulatory regime unfolds, the company could ensure that ratepayers and not shareholders would bear the eventual costs of reducing carbon emissions. TXU also seemed concerned that if the company took early action to reduce carbon emissions, it would not receive as many grandfathered (free) allowances should a national mandatory cap-and-trade scheme be implemented (Harrison et al. 2004).

However, it is quite likely that the baseline for GHG reductions established in national regulations will be set prior to construction of TXU's plants. In other words, TXU's plants likely will not be grandfathered into the emissions baseline. Senators Jeff Bingaman and Barbara Boxer, the chairs of the Senate Energy and Environment Committees respectively, wrote the following in a January 2007 *Dallas Morning News* op-ed:

> *[C]ompanies that appear to be inflating their emissions right before legislation is passed are likely to find themselves in a position of having to make even larger emissions reductions than companies that do not attempt this strategy. We do not envision that any successful legislative proposal will contain a provision that would allow those building traditional coal-fired power plants to economically benefit from coming in "under the wire" and being considered part of the emissions baseline – in fact, the opposite is likely to occur. Any company planning to spend billions of dollars on new coal-fired power plants, and any investor in such a company, should think carefully about how to spend their funds so as to be part of the solution to climate change, not a part of the problem. (Bingaman & Boxer 2007)*

TXU has stated that it intends to make its new plants "carbon capture and storage-ready" but has not provided any clear timeline or costs for the technologies. Therefore, since TXU's plants likely will not be grandfathered into the emissions baseline, the company will have to purchase allowances for its CO_2 emissions. Analytical estimates of the cost of reducing carbon dioxide emissions in the U.S. vary with the underlying assumptions and with the stringency of the regulatory scenarios analyzed. If TXU were forced to pay for 100% of its emissions from the expansion (since those emissions likely will not be grandfathered into the baseline) and 25% of its existing emissions (the minimum auction amount under the Regional Greenhouse Gas Initiative) under national regulations at a price of $10 to $25/ton (roughly reflecting how carbon has traded for Phase II of the European Union Emissions Trading Scheme), **the company's costs will likely range from $917 million to nearly $2.3 billion annually, or 9 to 23 percent of its estimated cost for the entire project**, according to our analysis – a cost that it appears TXU has not explicitly considered (New Energy Finance 2006; Synapse Energy Economics 2006; Wynne 2006). In addition, Wynne (2006) estimates that every $10/ton increase in the cost of CO_2 emissions allowances will raise the 24-hour price of power generation by $7/MWh. But as recently as 23 October 2006, TXU spokesperson Kim Morgan rejected the idea of considering carbon in the company's planning: "It would be pretty poor business on our side if we based $10 billion in decisions on regulations that may or may not be in effect 15, 20 years down the road." (Truini 2006)

Furthermore, in Texas's deregulated electric utility market, TXU will not be able to pass on all of the costs of greenhouse gas regulation to its ratepayers if, through its heavy investment in carbon-rich coal, the company emits more carbon dioxide than its competitors. TXU's decision to "wait and see" on carbon regulation exposes the company, its shareholders, and its ratepayers to risks of costs in the hundreds of millions of dollars annually when carbon is regulated at the national level. These costs could reduce profits, erode shareholder returns, and increase the possibility that TXU must refinance its loans at unfavorable rates.

Risk 3: Efficiency Measures May Reduce Demand Growth

Electricity demand growth may be lower than TXU projects because technological advances are making energy efficiency measures cost-effective. This means TXU will experience lower revenues and unused capacity. Because TXU operates in a deregulated electricity market in which rates are set competitively and in which increased costs cannot easily be passed on to ratepayers, lower revenues may depress share value and make it more difficult for TXU to pay off loans.

Key Points

- The potential gains from efficiency are substantial. One recent study by McKinsey found that energy efficiency measures could reduce the annual growth rate in worldwide energy demand through 2020 from 2.2 percent to six-tenths of a percent. An analysis by Environmental Defense shows that modest investment in energy efficiency measures can reduce Texas's near-term (2011) additional needs by 3,500 MW, which means TXU's proposal could include several thousand MW of unnecessary capacity. And another recent analysis by Optimal Energy found that investing the $11 billion not in coal plants but in boosting markets for more efficient products, lighting, cooling, heating, and industrial processes could eliminate over 80% of forecast growth in electricity demand – and could completely eliminate load growth with the additional use of demand response and combined heat and power – while reducing air pollution and resulting in $38 billion of net benefit to the Texas economy.
- Efficiency measures aside, TXU is not utilizing realistic assumptions about electricity demand. TXU's current expansion proposal would expand its current capacity by 9,000 MW over the next five years, which exceeds official load growth forecasts for Texas by 1,500 MW.

Context and Trends

The United States is increasingly an "electrified" country. Reputable analyses predict that overall national demand for electricity will continue to rise in the foreseeable future at rates ranging from eleven to seventeen percent between 2006 and 2014 (Edison Foundation 2006).

Energy efficiency has been an important element of ensuring adequate power supplies. Even as overall energy consumption in the United States has risen, we have become more energy efficient. Although the U.S. economy has grown by nearly 200 percent since 1970, energy consumption has increased by only 50 percent over that same period. This trend is expected to continue – while electric power will be increasingly in demand, "electricity consumption per dollar of GDP is expected to drop by more than 25 percent over the next 20 years" (Edison Foundation 2006, 29).

The potential savings from energy efficiency are substantial. The power industry's own figures point to the substantial possibilities for electricity savings through achievable measures, which are those that consider the rates at which consumers and businesses might actually adopt energy saving practices. Electricity savings of 1.2 percent per year are achievable now, which would reduce annual electricity growth by fifty percent (Edison Foundation 2006). Another recent study found that energy efficiency measures could reduce the annual growth rate in worldwide energy demand through 2020 from 2.2 percent to six-tenths of a percent (McKinsey Global Institute 2006).

Investment in and support for energy efficiency measures has been growing among political and industry leaders. The 2005 Energy Policy Act provided near-term impetus for energy efficiency investments through tax incentives to home owners, builders, car buyers, and product

manufacturers (Department of Energy 2006). Further, the Department of Energy published in 2006 a National Action Plan for Energy Efficiency, and many utility leaders have publicly committed themselves to the Plan's goals. For example, Seattle City Light will try to fill all new electricity demand through countervailing conservation or efficiency measures, and PNM Resources will adopt energy efficiency as one of its five corporate environmental sustainability goals (Environmental Protection Agency 2006b). In addition, GridPoint has partnered with Goldman Sachs (and its subsidiary Cogentrix Energy) to market demand response and energy conservation solutions to electric utilities; during periods of peak demand for electricity, a single utility that has deployed 100,000 GridPoint products across its service territory can draw upon 500 MW of stored capacity, equivalent to the amount of electricity generated by an $800 million coal-fired power plant (Anonymous 2006c).

California has been at the forefront of efficiency efforts in the U.S., and the average California resident uses much less electricity than the average American. Using mandates, regulations, high prices, and efforts to de-couple utility profits from energy consumption, California's per-capita energy consumption has basically flattened since 1974, while per-capita energy use for the whole United States jumped 50 percent (Mufson 2007; Electric Power Research Institute 2006). The California Energy Commission estimates the savings in peak demand due to California's energy efficiency programs and standards between 1976 and 2003 to be about 22% (*see Figure 3*) (EPRI 2006a). PG&E'S energy efficiency programs in California over the past 30 years have prevented 61 million tons of greenhouse gas emissions, saved customers almost $10 billion, and helped California escape the need to build 25 additional large power plants (Alliance to Save Energy 2006).

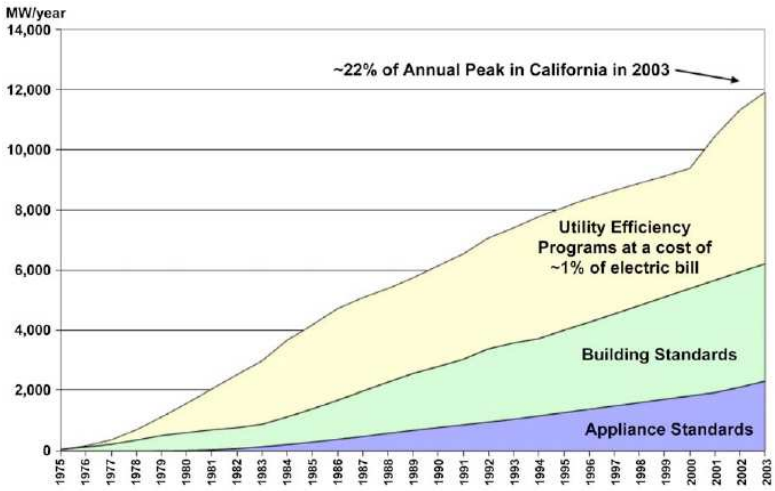

Figure 3 *Annual Peak Savings in California from Efficiency Programs and Standards (EPRI 2006a)*

Like California, the European Union's efforts to save energy continue to demonstrate what is possible in the energy efficiency arena. Energy consumption in the EU-15 and the EU-25 has grown more slowly than GDP since 1995, with particular improvements in the energy and services sectors (European Environment Agency 2006). The EU Council of Ministers has embraced the European Commission's Energy Plan, which finds that 20 percent savings in energy use can be accomplished cost-effectively by 2020, thereby saving €100 billion annually and cutting the EU's carbon dioxide emissions more than twice as much as required under the Kyoto Protocol (European Union 2006).

Analysis of TXU's Proposal

Texas's population is projected to more than double in sixty years, from 21 million in 2000 to 46 million in 2060, suggesting that Texas's power needs will continue to grow (Texas Water Development Board 2006). Texas has experienced rolling blackouts in the past year (Dyer 2006), reinforcing the need for new sources of power.

But TXU's expectations concerning energy demand growth fail to adequately consider the impact that energy efficiency measures may play in reducing that growth. High prices tend to dampen demand and encourage installation of energy efficiency measures, and electricity prices in Texas are higher than those in the rest of the country. Texans pay on average 15 to 19 cents/kilowatt-hour, double the national average of 8 cents/kilowatt-hour (Smith 2006).

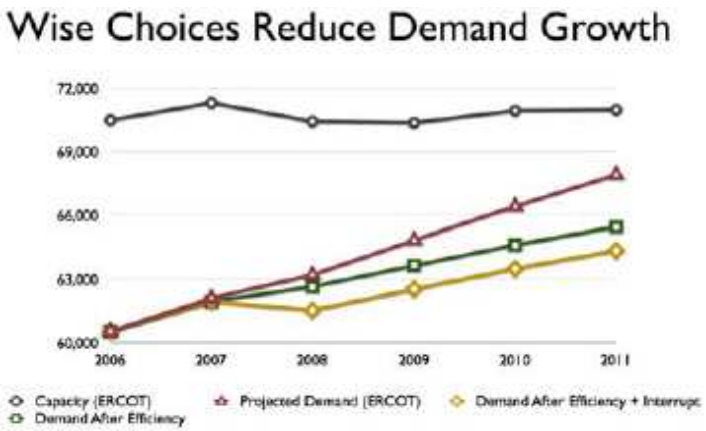

Figure 4 *Impact of demand reduction strategies on Texas's peak electricity demand through 2011 (Environmental Defense 2006b)*

One recent analysis, which was vetted by utility industry experts, shows that modest investment in energy efficiency measures can reduce Texas's near-term (2011) additional needs by 3,500 MW (Environmental Defense 2006b) (*see Figure 4*). Another recent analysis by Optimal Energy found that investing the $11 billion not in coal plants but in boosting markets for more efficient products, lighting, cooling, heating, and industrial processes could eliminate over 80% of forecast growth in electricity demand in Texas – and could completely eliminate load growth with the additional use of demand response and combined heat and power – while reducing air pollution and resulting in $38 billion of net benefit to the Texas economy (Optimal Energy 2007) (*see Figure 5*).

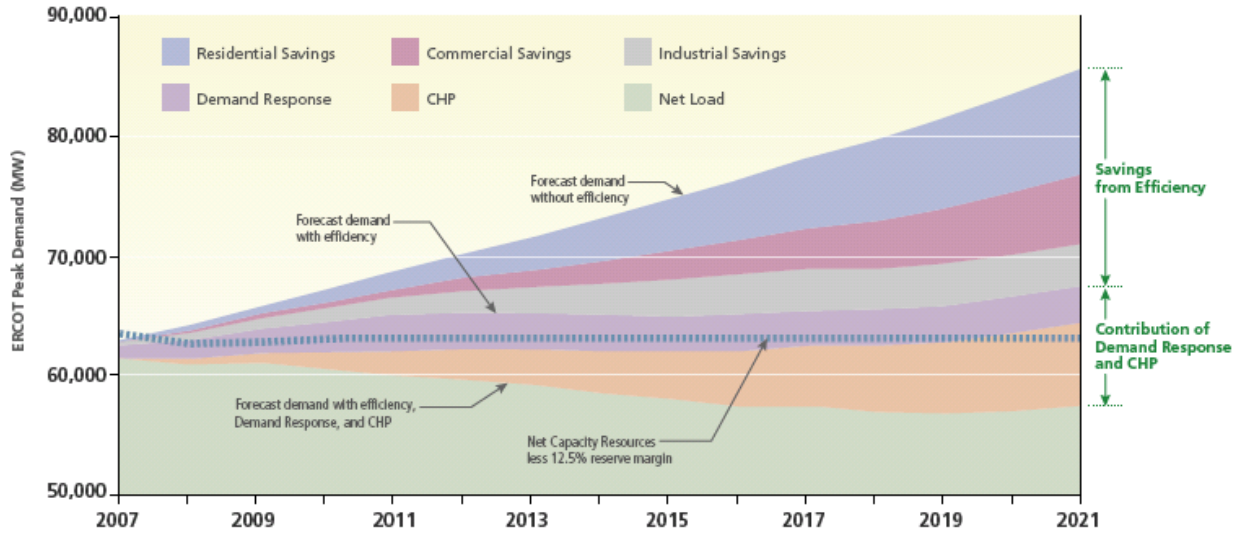

Figure 5 *Effect of Demand-Side Resources on ERCOT Forecast and Reserve Margin (Optimal Energy 2007)*

If these measures are pursued, TXU's proposal could include several thousand MW of unnecessary capacity. Although TXU's 10-K statement warns that "electricity demand could be reduced by increased conservation efforts and advances in technology, which could … significantly reduce the value of TXU Corp.'s power plants and electric delivery facilities", the company does not seem to be planning for that eventuality.

Energy efficiency considerations aside, TXU's expansion plan anticipates growth that is far higher than the demand growth needs projected by Texas authorities. The Electric Reliability Council of Texas (ERCOT) shows annual growth of 2.3 percent annually in electricity demand between now and 2011, which amounts to an overall increase of approximately 7,500 MW

(ERCOT 2006). TXU's current proposal would expand its current capacity by 9,000 MW over the next five years, which exceeds by about 1,500 MW ERCOT's projected load forecast (ERCOT 2005).

There are also other reasons for investor concern about TXU's demand assumptions. For instance, a TXU competitor, NRG Energy, has announced plans to develop 3,500 MW of new generation capacity in Texas, so TXU may face lower demand when NRG's plants come on-line between 2012 and 2015 (Wynne 2006a). Similarly, several Texas energy companies offered a proposal in February 2007 to spend about the same amount as TXU to build 4,200 MW of wind power, 2,000 MW of gas-fired power, and 1,800 MW of coal-fired power, presenting another possible alternative to TXU for customers (Landers and Souder 2007). Furthermore, TXU plans to hedge only 22 percent of its capacity expansion with long-term power contracts. If realized demand does not match expected demand, the proposed plants may become more costly to operate than predicted (Wynne 2006).

Because TXU operates in a deregulated electricity market in which rates are set competitively and in which increased costs cannot easily be passed on to ratepayers, lower revenues may depress share value and make it more difficult for TXU to pay off loans.

Risk 4: Competition from Renewable Energy

Electric power from renewable sources, particularly wind, is becoming increasingly cost-competitive with power generated from fossil fuels. While wind resources are intermittent and therefore not a baseload generation source, wind's cost-competitiveness enables it cut into demand for some of TXU's coal-fired power, especially during off-peak hours.

Key Points

- Utilities in the West are including renewable sources in their portfolios not only because many states require it but also because the costs of wind power compare favorably with those of fossil fuel-generated power.
- Texas is the number one wind power generating state in the nation, and the Texas Energy Planning Council has mandated that wind generation nearly double by 2015 and nearly double again to have 10 percent of its power generated from wind sources by 2025. Given the state mandates and competitive costs – $23 to $59/MWh for wind versus $56 to $83/MWh for coal (including potential costs of controlling carbon dioxide) – wind power is a growth area that could cut into demand for some of TXU's power, especially during off-peak hours. Again, this means TXU will experience lower revenues due to unused capacity, which may depress share value and make it more difficult for TXU to pay off loans.
- Investors in renewable energy have recently enjoyed healthy returns. Stocks tracked in the NEX, which follows $276 billion of global investments in alternative energies, rose more than 30 percent in 2006.

Context and Trends

Investment in renewable sources of power generation is already strong – and it is growing. Investors in renewable energy have recently enjoyed healthy returns. Stocks tracked in the WilderHill new energy global innovation index (or NEX), which follows $276 billion of global investments in alternative energies, rose more than 30 percent in 2006, and over the past 3 years returned an annualized 27.2 percent, topping the global market by nearly 13 percentage points annually (New Energy Finance 2006; Uhlfelder 2006).

Across the country, twenty-two states and the District of Columbia have established a Renewable Portfolio Standard (RPS) (Pew Center on Global Climate Change 2006). California requires electricity retailers to achieve twenty percent of their portfolios from renewable sources (not counting nuclear and hydropower) by 2017, with the state's energy agencies committed to reaching that goal by 2010 (California Energy Commission 2006, 2006a). Utilities in other western states are committing to power generation from renewables as well, and many are acting on their own, not just in response to state regulatory pressures. Utilities like Idaho Power – located in a state with no RPS standards – have decided to rely more on renewable energy because their internal assessments favor those sources. The costs of wind power increasingly are competing favorably with those of fossil fuel-generated power (WorldWatch Institute and Center for American Progress 2006, Union of Concerned Scientists 2006), leading western utilities like PG&E, PSE, Idaho Power, and SDG&E predict that, by 2010, eight to sixteen percent of their load will be handled through renewable sources (Wiser and Bolanger 2005).

Wind farms have been erected in 35 states, and collectively they now generate 9,000 MW of power (Mahony 2006). Multinational firms like Shell are investing in wind power. GE built one-half of the wind turbines in the U.S. last year (Nijhuis 2006). The U.S. now ranks third in the world (behind Germany and Spain) in wind power generation, in large part because of tax incentives, renewable portfolio programs, and loan funds (Mahony 2006). Advances in federal

and state policies, as well as research abroad, have pushed technological innovation substantially. Wind turbines have become more powerful and less disruptive to birds (Fairley 2007).

Texas has been a leader in the RPS arena. The state met its 2,000 MW renewable goal three years earlier than mandated, and the legislature has set new goals of 5,880 MW for 2015 and 10,000 MW for 2025. The Texas Energy Planning Council has recommended that the state generate 10 percent of its power from wind sources by 2025 (Texas Office of the Governor 2006). Because of its abundant winds, Texas has become the number one wind power generating state in the nation (Texas State Energy Conservation Office 2006). In October 2006, Governor Perry announced that he had collected $10 billion in commitments from investors for an additional 7,000 MW of new wind energy in the state. According to the Electric Reliability Council of Texas (ERCOT), which operates the electric grid and manages the deregulated electric power market, West Texas in particular has great potential for wind power generation, although wind power development along the Gulf Coast is possible, too. The state is studying ways to enhance transmission capability from the largely rural western portion of the state – where wind generation sometimes exceeds existing transmission capacity – to more densely populated East Texas (ERCOT 2005, Texas State Energy Conservation Office 2006).

Complementing the state-sponsored support for more reliance on renewable sources of power is leadership from the Western Governors' Association Clean and Diversified Energy Initiative, which has agreed to additional development of 30,000 MW of clean energy by 2015, an increase of 20 percent in energy efficiency by 2020, and better positioning of the Western energy system to respond to new environmental challenges (Western Governors' Association 2006).

Analysis of TXU's Proposal

TXU acknowledges in its 2005 Financial Statement the growth potential for competitors who invest in renewable electricity:

> *Research and development activities are ongoing to improve existing and alternative technologies to produce electricity. ... It is possible that advances in these or other alternative technologies will reduce the costs of electricity production from these technologies to a level that will enable these technologies to compete effectively with traditional power plants like TXU Corp. … Consequently, where TXU Corp. has facilities, the market value of TXU Corp.'s power production could be significantly reduced. (TXU 2005, 23)*

Western utilities have modeled wind power costs ranging from $23/MWh to $59/MWh (Wiser and Bolanger 2005). These costs compare very favorably with TXU's projected costs, which are estimated at $56 to $60/MWh assuming a relatively low carbon price of $10/ton CO_2eq and $79 to $83/MWh assuming a higher CO_2 allowance price of $30/ton CO_2eq (Wynne 2006).

TXU Coal Costs vs. Wind Power Costs

Modeled wind power generation costs:
$23 to $59/MWh

TXU project costs:
$56 to $83/MWh (range reflects variable costs of controlling carbon dioxide)

Given the state's mandates and incentives, and given these competitive costs, wind power is a growth area that could cut into demand for some of TXU's power. While wind resources are intermittent and therefore not a baseload generation source, wind's cost-competitiveness enables it to compete with coal, especially during off-peak hours. For instance, several Texas energy companies offered a proposal in February

2007 to spend about the same amount as TXU to build 4,200 MW of wind power, 2,000 MW of gas-fired power, and 1,800 MW of coal-fired power, presenting a possible alternative to TXU for customers. Again, this means TXU will experience lower revenues due to unused capacity, which may depress share value and make it more difficult for TXU to pay off loans.

Risk 5: Potential Liability in Litigation

Courts may become increasingly receptive to claims of harm from greenhouse gas emissions, and high-emitting companies like TXU will be likely legal targets. Litigation could lead to potential liability for companies in the trillions of dollars, according to the co-chair of the Environment, Energy, and Natural Resources section of the American Bar Association. At a minimum, these suits could entail substantial legal costs and harm to the company's reputation. Carbon litigation may also drive away customers, reduce stock value, and make debt more expensive.

Key Points

- One lawsuit has already been filed against the five highest-emitting U.S. electric utilities for their contributions to climate change.
- With its existing and new carbon dioxide emissions combined, TXU will become the third largest emitter of carbon dioxide emissions among electric utilities. TXU would thus be a likely defendant in future tort suits by states, localities, environmental groups, public health organizations, or individual citizens. Potential liability could be substantial.
- Even if these types of lawsuits prove unsuccessful, such litigation involves substantial costs, harms the company's reputation, and makes investment a risky proposition.

Context and Trends

States, localities, environmental groups, public health groups, and individual citizens are all potential plaintiffs in tort actions against power companies that emit large quantities of carbon dioxide. Plaintiffs have already brought lawsuits against power companies and automobile makers on the theory that their greenhouse gas emissions constitute a public nuisance. Other plaintiffs might try to assert that more environmentally sound product designs would have mitigated the harm suffered as a result of greenhouse gas emissions (Choo 2006).

In a recent landmark case, *Connecticut v. American Electric Power,* eight states, the City of New York, and several environmental groups sued five of the nation's largest electric power companies based on public nuisance claims. While the federal district court declined to review the merits of the case on jurisdictional grounds, this case is currently being appealed.

Although the power companies prevailed initially in *Connecticut v. American Electric Power,* this case will encourage other states, environmental groups, and citizens to bring similar actions in other courts. Indeed, another lawsuit in federal court in Mississippi names several oil, chemical, and refining companies as defendants and claims that their greenhouse gas emissions contributed to global warming, thereby resulting in more intense and destructive natural disasters like Hurricane Katrina (Choo 2006). California recently sued the world's six largest automakers under public nuisance, demanding that they pay the state for environmental damage caused by their vehicles' emissions (Bunckley 2006). A California victory in that case would boost state government hopes of winning compensation from the nation's largest power companies for the environmental damage caused by their contributions to global warming. And the U.S. Supreme Court recently heard its first climate change case, *Massachusetts v. EPA*, in which it must decide whether the Environmental Protection Agency must regulate carbon dioxide emissions from new motor vehicles under the Clean Air Act (Choo 2006). This decision could have significant impacts on the cost of coal-fired power plants across the nation if it results in EPA creating additional regulatory requirements for carbon dioxide emissions.

Even if the public nuisance and other lawsuits are ultimately unsuccessful, such litigation involves substantial costs to the defendants, harms the defendants' reputations, and makes

investment a risky proposition. John Dernbach, a co-chair of the Environment, Energy, and Natural Resources section of the American Bar Association, observes that:

> *The prospect of liability is a serious matter for people who understand climate change and take it seriously. Even if the risk appears to be small in terms of the likelihood of being found liable, the consequences of being held liable are substantial – potentially in the trillions of dollars. (Choo 2006)*

Analysis of TXU's Proposal

Because of the high emissions that will result from TXU''s new coal-fired projects, the company will be a tempting target for plaintiffs bringing nuisance or product liability actions. The defendants in *Connecticut v. American Electric Power* included the nation's five largest electric power companies, many of which operate coal-fired power plants that contribute to global warming. If TXU builds all of its new plants and thereby becomes the third largest emitter of carbon dioxide emissions among electric utilities (behind AEP at almost 164 million tons and Southern at roughly 148 million tons), it would be a likely defendant in future tort suits by states, localities, environmental groups, public health organizations, and individual citizens. As noted above, potential liability could be substantial.

The prospect of litigation is real. As the law in this area develops and the science becomes even more sophisticated, investors in any coal-fired power plant project face greater uncertainty, costs, and overall risk. The risks and costs of carbon litigation may also drive away customers in Texas's deregulated market, reduce stock value, and make debt more expensive.

Risk 6: Reputational Harm Could Create Obstacles

This project will mark TXU as an environmentally irresponsible firm because of the high amounts of air and climate pollution that will be produced. The perception of environmental irresponsibility could result in regulatory backlash, litigation, and unfavorable public opinion, which could increase project costs and negatively impact customer attraction and retention in Texas's deregulated electric power market, thereby reducing profits and shareholder returns.

Key Points

- TXU's facilities will emit sufficient amounts of nitrogen oxides to raise smog levels in the Dallas–Fort Worth area, which is already in violation of federal air quality standards. Waco and Austin would also experience degraded air quality.
- TXU's new facilities will together emit almost 1.5 tons of mercury, a potent neurotoxin, and its existing facilities already emit 2.5 tons of mercury annually. Much of this mercury will be deposited locally. Mercury levels are already so high in several northeast Texas lakes that fish consumption advisories have been issued. TXU must reduce its mercury emissions under EPA's Clean Air Mercury Rule (CAMR). However, CAMR is being challenged in the courts, contributing to uncertainty about whether TXU might have to comply with stricter mercury standards. Even after TXU lowers its emissions under CAMR, it will be among the top five electric utility mercury emitters in the country.
- Several lawsuits have already been filed against TXU regarding the project's environmental impacts, more are promised, and a Texas judge recently ruled against the governor's plan to fast-track TXU's permit process, all of which clearly could delay TXU's proposed schedule and increase project costs.
- Two-thirds of Texans oppose new coal-fired power plants in the state, and three of four would rather rely first on conservation. In Texas's deregulated electricity market, these potential customers of TXU may choose to purchase electricity from companies with better reputations.

Context and Trends

The air pollutants emitted by coal-fired power plants, and their detrimental impacts on human health and the environment, are well known by the public. Nitrogen oxides have long been regulated at the national and state levels for their myriad adverse effects on human health and the environment. Oxides of nitrogen contribute to the formation of smog, or ground-level ozone. The Houston and Dallas/Fort Worth areas violate Clean Air Act ozone standards and have been designated as ozone non-attainment areas. Northeast Texas has experienced ozone levels exceeding the federal standard, but that region is officially an ozone attainment area. A new cap for nitrogen oxides emissions will come into effect under EPA's Clean Air Interstate Rule (CAIR) program in 2009 and 2015.

Mercury is a powerful neurotoxin and was one of the first pollutants officially recognized in the 1970s as "hazardous" (or especially toxic) under the Clean Air Act. EPA research concerning mercury deposition from coal-fired power plants shows that much airborne mercury is deposited locally, with the potential to contribute to "hotspots" of high mercury concentration (Keeler et al. 2006). Mercury emissions from power plants are subject to control under the cap-and-trade Clean Air Mercury Rule (CAMR) in 2010 and 2018. The CAMR is being challenged in court by fifteen states and several environmental groups, who claim that the rule should be more stringent and should not allow for emissions trading (because of mercury's highly toxic nature and because local deposition is strongly affected by nearby emissions). The status of CAMR therefore remains unclear.

Greenhouse gas emissions from coal-fired power plants, as discussed above in Risk 2, are also increasingly well understood in the public mind. Recently, a range of high-profile companies, including some electric utilities, have taken well-publicized stands in favor of mandatory climate regulation and the urgent need for action. For instance, the U.S. Climate Action Partnership, which in January 2007 issued its call for the federal government to quickly enact strong national legislation to require significant reductions of greenhouse gas emissions, includes in its membership Duke Energy, FPL Group, PG&E Corp., and PNM Resources (USCAP 2007).

Analysis of TXU's Proposal

By 2015, nitrogen oxide emissions from Texas power plants must be reduced by 25 percent relative to 2003 levels under the cap-and-trade Clean Air Interstate Rule (EPA 2006b). TXU claims that it will cut air pollution at its existing facilities so that overall emissions will drop by twenty percent relative to existing emissions, but the company has not yet indicated how it will accomplish this goal. A recent air quality modeling analysis shows that TXU's facilities will emit sufficient nitrogen oxides emissions to raise smog levels in the Dallas-Forth Worth area, which violates federal air quality standards. While TXU has promised – again without providing technical specifics – to offset its new emissions by reducing emissions at existing sources, emission increases and corresponding offsets would occur in different regions of the state. On hot summer days when the winds blow from the south, smog levels in Dallas-Fort Worth are predicted to increase, even after accounting for the offset emissions reductions. Waco and Austin would also experience degraded air quality (Environmental Defense 2006).

The permit applications for TXU's new facilities indicate that they will also emit approximately 1.5 tons of mercury annually (Public Citizen 2006), and TXU's existing facilities emit approximately 2.5 tons of mercury. After the new facilities are built and before the CAMR goes fully into effect in 2018, TXU will be the highest emitter of mercury among all U.S. electric power companies (Natural Resources Defense Council 2006). Even assuming that TXU complies with CAMR exactly as the company currently projects, its mercury emissions (2.0 tons/year) will put the company among the top five mercury-emitting utilities in the country. Mercury levels are already so high in several northeast Texas lakes that fish consumption advisories have been issued (Texas Parks and Wildlife 2006).

Concerns about smog, mercury, and greenhouse gases have resulted in the perception of TXU as an environmentally irresponsible company in the eyes of some of the public (Gunther 2007), resulting in regulatory backlash, litigation, and unfavorable public opinion.

For instance, bills are expected in the Texas legislature to seek a slowdown of any new permits to build coal plants and to call for a tax on coal to put it on par with natural gas. Twenty-five legislators have also formally asked the Texas Commission on Environmental Quality to delay approving permits to build coal plants until the cumulative impact on air quality can be determined (Allen 2006).

TXU's plans have also faced significant litigation. Texas public interest groups have sued the corporation on the grounds that it must tighten proposed nitrogen oxides and mercury air pollution controls on its proposed Oak Grove units (Our Land Our Lives 2006). While draft permits have been issued for six of TXU's eleven planned facilities (Anonymous 2006b), an administrative law judge panel has recommended that the Texas Commission on Environmental Quality reject TXU's Oak Grove permit proposal on the grounds that it does not sufficiently restrict nitrogen oxides and mercury emissions (Loftis 2006). In December 2006, two environmental groups, one funded by a wealthy Texas oilman and developer, sued TXU in federal district court over emissions of sulfur dioxide, nitrogen oxides, particulate matter, and mercury from its planned Oak Grove expansion; the parties to this suit promise to seek

injunctions against all of TXU's new units on similar grounds (Loftis 2006a, Associated Press 2006).

Public opposition is also substantial. Texas Cities for Clean Air Coalition (led by Houston Mayor Bill White) has vowed to obstruct TXU's proposal to build more coal-fired facilities, favoring instead power generation from cleaner fuels or renewable sources (Stiles 2006). According to a November 2006 survey, two-thirds of Texans oppose new coal-fired power plants in the state and three of four would rather rely first on conservation (Environmental Integrity Project 2006).

This opposition could increase project costs and negatively impact customer attraction and retention in Texas's deregulated electric power market, thereby reducing profits and shareholder returns.

IV. A RISKY SCENARIO AND THE BOTTOM LINE

As described above, TXU's proposal involves several market, competitive, regulatory, litigation, and reputational risks that could involve substantial adverse consequences for investors, whether public or private. If some or all of these risks are realized, TXU's shareholders and financial backers could find their investments significantly devalued.

For instance, consider the implications if the following scenario unfolds:

- TXU encounters construction cost overruns and delays because of tight labor and materials supply markets;
- TXU encounters regulatory and permitting delays because of public opposition and legal challenges;
- TXU builds only some plants, cancels the rest of the construction contracts, and loses revenue because of increased energy conservation, increased competition from renewable sources, and lower electricity demand;
- The Texas legislature enacts more aggressive demand reduction programs, reducing the market for TXU's power expansion even further;
- National greenhouse gas regulations are passed in 2008 and come into effect in 2010, requiring 25% of emission allowances to be purchased for existing plants and 100% for plants built after 2006 with a carbon price of $20/ton, resulting in TXU spending hundreds of millions of dollars to buy allowances and meet the requirements;
- TXU, as one of the nation's leading greenhouse gas emitters, is sued under public nuisance by a group of state attorneys general; and,
- TXU's reputation as an environmentally irresponsible company leads to customer flight.

This scenario, packaging together a range of likely risks, presents a troubling picture for TXU's investors. In Texas's partially deregulated electricity market the substantial costs of these burdens will likely be borne by shareholders and bondholders, not by ratepayers. In other words, it's the investors who are at risk.

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