

# *Cool Texas:*



## *A 12-Step Plan for Meeting Our Electricity Needs that is Good for Texas ...and the Climate*

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*Texas Center for Policy  
Studies*

*Lone Star Chapter,  
Sierra Club*

*Cool Texas*

## **Cool Texas:**

Texas is at a crossroads in deciding how we will meet our energy demands and take action on the climate crisis. In 2007, the scientific community made its strongest statements to date that Earth was warming at an alarming rate, and that the warming was largely in response to human activity which has caused the concentration of carbon in the atmosphere to increase exponentially over the last 50 years. For many non-scientists in Texas, climate change – hotter temperatures, longer droughts, more intense rains, and more dangerous hurricanes – is already apparent. At the same time, Texas is reportedly in an energy supply crisis, with ERCOT projecting that Texas' electricity demand will continue to increase by some 2 percent per year, and the PUC estimating that Texas will need to build 50 to 60 medium-sized power plants to keep up with population increase, energy demand and retirement of plants.

Fortunately, the recommendations in this preliminary report provide state leaders with 12 steps that would benefit our economy, help meet Texas' electricity needs and reduce carbon dioxide emissions.

We look forward to refining and implementing these recommendations over the coming year and request the participation of the public and our state's leaders in spearheading this long-over-due campaign to respond to the climate crisis and our energy needs.

### ***A 12-Step Plan for Meeting Our Electricity Needs that is Good for Texas and the Climate***

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## Introduction

In the last few years, scientists, policy makers, and major energy companies have come to the conclusion that:

- The climate is changing rapidly; and
- Part of that change is inextricably linked to the human-induced presence of carbon dioxide in the atmosphere.

From the scientific perspective, the most definitive conclusions come out of the United Nation's Intergovernmental Panel on Climate Change (IPCC). In their fourth major review of the science, the IPCC concluded that:

- the evidence of global warming – that the earth's average temperatures are increasing – is “unequivocal;”
- that regional impacts are already occurring; and
- that increased temperatures are “very likely” – more than 90 percent likely – directly due to human activity – principally carbon dioxide and methane emissions from fossil fuel combustion – but also forestry and agriculture activities.<sup>1</sup>

**Table 1. Carbon Dioxide in the Earth's Atmosphere**

Date	Carbon Dioxide in Earth's Atmosphere (PPM)
Feb, 1968	323.25
Feb, 1983	342.28
Feb, 1998	365.82
Feb, 2003	375.62
Feb, 2007	383.86
Feb, 2008	385.76

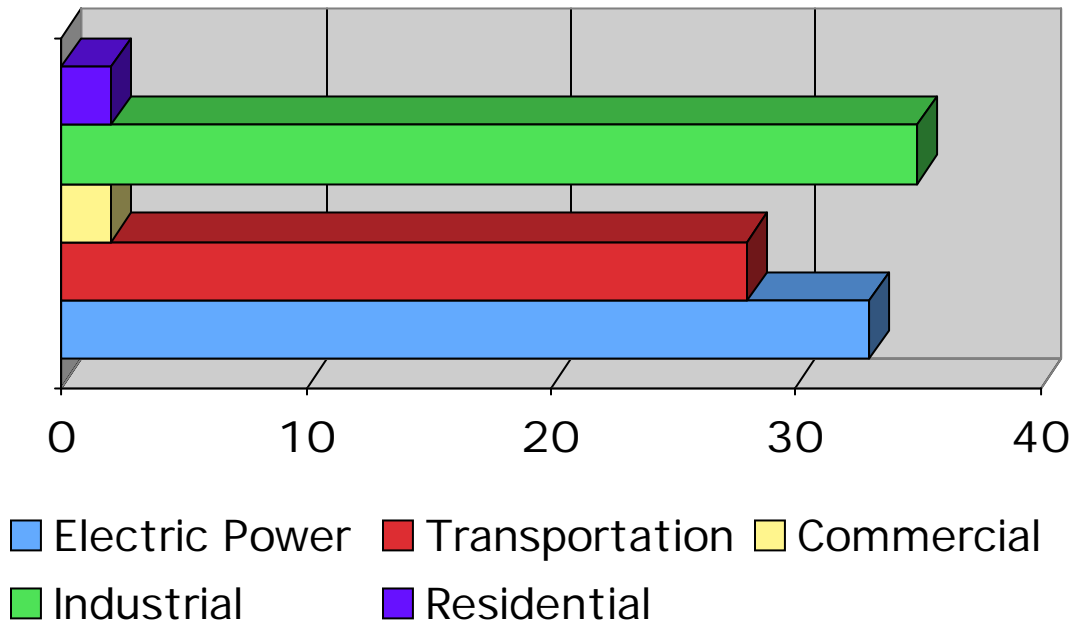
Note: As measured by the Mauna Loa Observatory, Hawaii.

In February of 2007, a large chunk of the Wilkins ice shelf in Antarctica that was three times the size of Manhattan broke away, and scientists worried that the Wilkins Ice Shelf itself might break off sooner rather than later from Antarctica.<sup>2</sup> While the recent break-up of major ice shelves in Antarctica does not have a direct impact on sea level rises – because they are already in the water – they are indicative of the rapid change that has been occurring in the northern and southern zones of the planet because of rising temperature.

<sup>1</sup> Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, November 2007, pages 2-4.

<sup>2</sup> CNN.com, “Massive Ice Shelf on Verge of Breakup,” Accessed March 26, 2008.

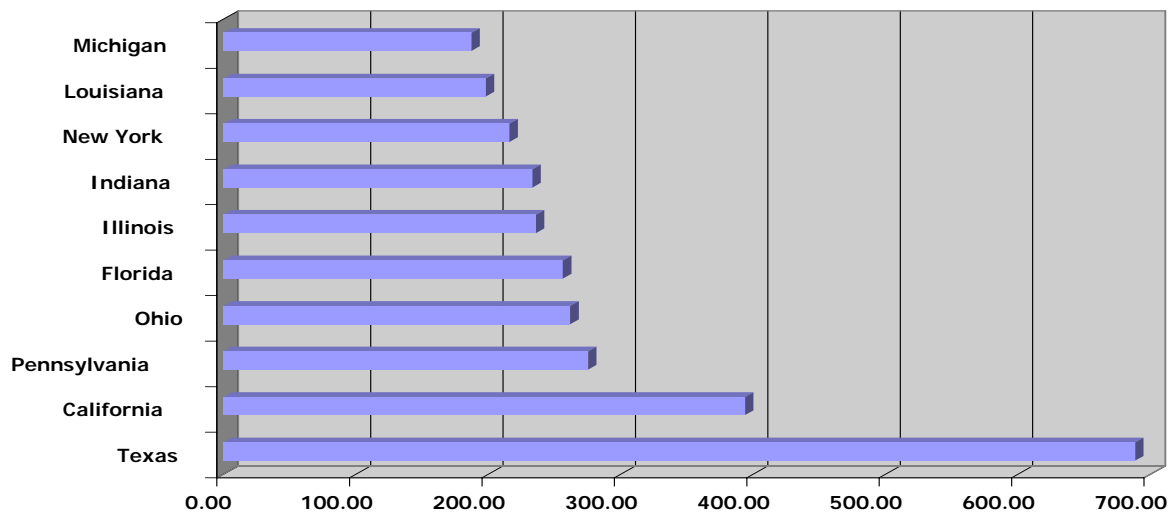
**Figure 1. Estimated Carbon Dioxide Emissions from Fossil Fuel Consumption by Source in Texas, 2004**



Source: U.S. Environmental Protection Agency, State CO<sub>2</sub> Emissions from fossil fuel combustion, 1990-2004, 2006.

Texas itself has been witness to several unusual weather patterns in recent years which, while not “unequivocally” related to human-induced climate change, point to the types of shifting patterns experts have predicted: more intense rainfall and hurricanes in some cases, but also more extensive droughts and hotter days in others.

**Figure 2. Millions of Tons of Carbon Dioxide Emissions from Fossil Fuel Combustion from Top 10 States, 2004**



Source: U.S. Environmental Protection Agency, State CO<sub>2</sub> Emissions from fossil fuel combustion, 1990-2004, 2006.

In addition, with ice melting happening faster than anticipated, the potential that global warming could impact Texas homes in Galveston, South Padre Island and much of the coast because of sea level rise, means the need for action worldwide is of paramount importance.<sup>3</sup>

Common predictions in Texas, for example, include:

- Temperatures will be warmer and precipitation patterns will change, with longer heat waves;
- The sea level will rise, threatening low-lying communities along the Gulf Coast;
- Hotter weather, more severe droughts and the expanding population will put severe strains on Texas' water supplies; and
- The severity of hurricanes will increase because of warmer ocean waters.<sup>4</sup>

The 2007 legislative session – in which more than 30 bills specifically mentioned global warming or climate change – demonstrated a growing recognition that climate change is an issue that must be addressed.<sup>5</sup>

In fact, one bill – HB 2713 by Dennis Bonnen, Chairman of the Environmental Regulation Committee -- called for formation of a special joint committee on energy and its environmental impacts and the creation of an energy plan which specifically directed the committee to assess the impacts on climate change. While the bill was not signed into law, Speaker of the Texas House Tom Craddick named a *Select Committee on Electric Capacity Generation and Environmental Effects* chaired by

<sup>3</sup> Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, November 2007, page 8.

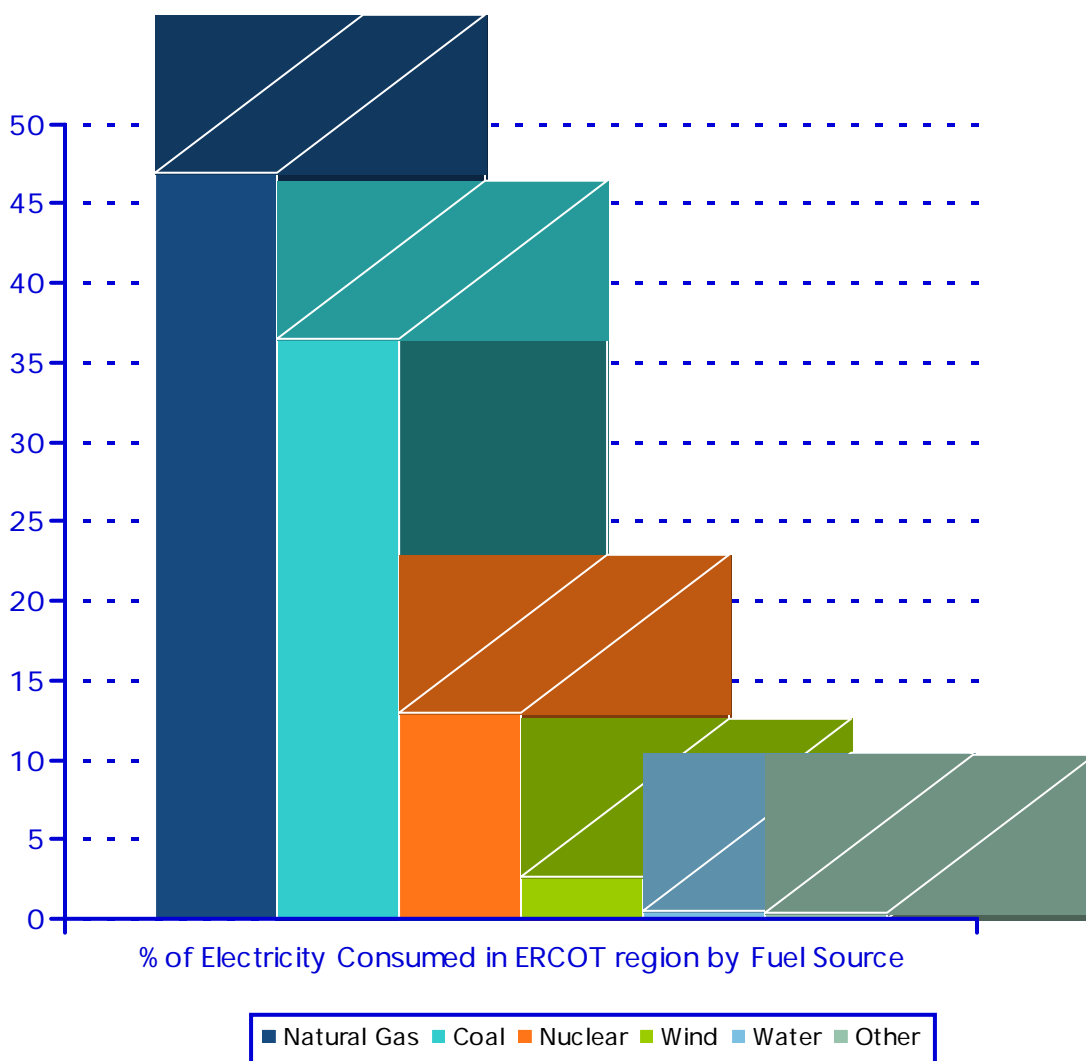
<sup>4</sup> Environmental Protection Agency. *Climate Change and Texas*. Publication No 230-F-97-008qq. September 1997.

<sup>5</sup> Dina Cappiello, "Lawmakers place global warming on the agenda," *Houston Chronicle*, March 25, 2007.

Rep. Bonnen to address the same issue – how should Texas meet its energy needs, taking into account the potential climate and other environmental impacts of many of our energy choices?

This question is, of course, a key one in Texas because it is the state’s existing energy choices – the large reliance on coal-burning power plants and natural gas plants for its electricity generation – its place as a leader in oil and gas production, oil refining and the petrochemical industry as well as its huge transportation and industrial needs – that have created both so much wealth but also so many environmental challenges, including being the carbon dioxide emissions leader. The Select Committee is scheduled to release its report early next year.

**Figure 3. Electricity Consumption by Fuel Source, 2007**



In fact, as is often cited, if Texas were a country it would rank some where between sixth and eighth in the world in the production of carbon dioxide emissions. While quantifying carbon dioxide

emissions without any required reporting is difficult, recent estimates say roughly a third of emissions are from transportation, a third from power plant emissions, and a third from industrial production. (see Figures 1 and 2).

Most of these obviously involve the use and combustion of fossil fuels. At the same time, both ERCOT and the PUC are predicting that energy demand for electricity will continue to rise in Texas.

Thus, ERCOT predicts annual growth in peak electricity demand of approximately 1.8 % between 2008 and 2018. If temperature events are higher than normal – which could well be the case – its prediction is that peak energy demand would increase by an additional 5.35 percent.<sup>6</sup> It is important to note, however, that it is difficult to forecast energy demand. Thus, in December of 2007, ERCOT noted that actual peak demand in 2007 – at about 62,000 MW -- was 2.5 percent **less** than their previous forecast.

Similarly, as of early 2007, ERCOT was predicting that assuming that peak demand for electricity would outstrip available capacity by 2013, and that even as early as 2009 the state would not be able to meet the 12.5 percent reserve margin that is required by ERCOT. By May, 2008, however, again ERCOT revised their figures based on reductions in peak demand, energy efficiency and new power plants coming on-line. ERCOT now says that Texas will have a reserve margin of 17.3 percent in 2010, and will not face any shortage below the reserve margin until 2013, when they estimate peak demand will total approximately 71,500 MWs. Therefore, predictions about when demand might outstrip available capacity are continuously changing depending upon temperature, energy conservation and efficiency and economic growth.<sup>7</sup>

While the recent ERCOT report suggests that Texas currently has enough capacity to meet peak demand and maintain the required reserve capacity of 12.5% for at least five years, PUC Commissioner Barry Smitherman believes that because of both growing energy demand and the need to replace aging coal, natural gas and nuclear plants, that some 50 to 60 medium-sized energy plants would be needed over the next 30+ years.<sup>8</sup>

In 2007, this electricity was provided primarily by natural gas, coal, nuclear, wind, hydropower and other resources (see Figure 3). It is important to note that the use of natural gas has declined recently with coal and wind taking over part of that generation, though natural gas continues to provide the highest percentage. It is also important to note that the source varies significantly from one year to the next, depending upon fuel costs, availability of wind and temperature.

This brief policy report does not focus on global warming and its impacts but on statewide policies that would help us meet our energy needs while also reducing carbon dioxide emissions. At the same time, the report recognizes that with federal level policy on energy and climate change already being implemented, and with much greater regulations likely under the new Obama administration, it is an opportunity for Texas to be prepared and to gain recognition – and credits – for policies that lead to less production of CO<sup>2</sup> and give us “a leg up” on future regulations. It is better to lead than follow,

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<sup>6</sup> ERCOT, *2007 ERCOT Planning Hourly Peak Demand and Energy Forecast*, May 8, 2007.

<sup>7</sup> ERCOT, ERCOT News Bulletin, December 5, 2007.

<sup>8</sup>Chairman Barry Smitherman, Public Utility Commission, Presentation to Select Committee on Electricity Capacity and Environmental Effects, February 6, 2008.

and find strategies that work for Texas before the federal government tells us what to do.

In making these recommendations, the authors are trying to promote energy sources which we believe have better long-term benefits for the state of Texas and will be reliable, affordable and create jobs, economic development and wealth. We believe the future of energy is wedded to a combination of solar, wind, certain kinds of biomass, vehicle-to-grid, on-site renewables, energy storage, energy efficiency, and the use of natural gas as a kind of “bridge” fuel for those times when the sun doesn’t shine or the wind doesn’t blow.

**Table 2. ERCOT Planning Long-Term Hourly Peak Demand and Energy Forecast, 2008**

	2008	2009	2010	2011	2012	2013
Summer Peak Forecast (MW)	63,725	65,028	66,422	67,745	68,833	70,235
Total Resources (MW)	72,503	75,749	77,894	77,918	78,843	78,843
Reserve Margin (12.5% minimum required)	13.8%	16.5%	17.3%	15.0%	14.5%	12.3%
Improvement in reserve margin since Dec 2007 predictions	Up 0.7%	Up 4.4%	Up 3.3%	Up 3.8%	Up 4.0%	Up 4.1%

Thus, these recommendations are centered on how to meet energy needs from renewable sources, energy efficiency and demand response programs, while tightening up regulations on the emissions of existing fuel sources.

While the report does not deal directly with the transportation sector – which is a large consumer of energy and accounts for more than a third of the carbon dioxide emissions – one recommendation cuts across the transportation and electricity sectors: the promotion of plug-in-hybrids as Texas begins to develop the infrastructure for a vehicle-to-grid future.

We believe that carefully crafted, these policies should reap an economic benefit for Texas in the medium-term. Recent reports suggest that renewables and energy efficiency programs are creating

100,000s of jobs nationwide and have the potentially to create millions of job equivalents in the future.<sup>9</sup>

As an example, the U.S. Department of Energy released a new report that provides a road map for how the US can produce 20 percent of its electricity from wind by 2030.

The report documents how we can reduce carbon dioxide emissions from electricity generation 25 percent by 2030 by investing in wind energy, and create almost 500,000 jobs in the U.S. A similar report found that if the U.S. were to get 20 percent of its energy from renewable resources, Texas would see some 60,000 jobs, mainly in the solar and wind industries (see section on RPS).

Both solar utility-scale and solar photovoltaics are being promoted throughout the U.S., in part because on a kilowatt basis, they produce more jobs than other sources of electricity. Thus, a recent study shows how both solar PV and wind produce the equivalent of 5.5 jobs per \$1 million of investment, while traditional coal plants only provide about 4 person-year jobs.

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<sup>9</sup> Sterzinger, George (2007) "The Economic Promise of Renewable Energy," *New Labor Forum*, 16:3, 80 – 91; and George Sterzinger, (March 2008). *Energizing Prosperity: Renewable Energy and Re-Industrialization*, Economic Policy Institute Discussion Paper, Briefing Paper #205.

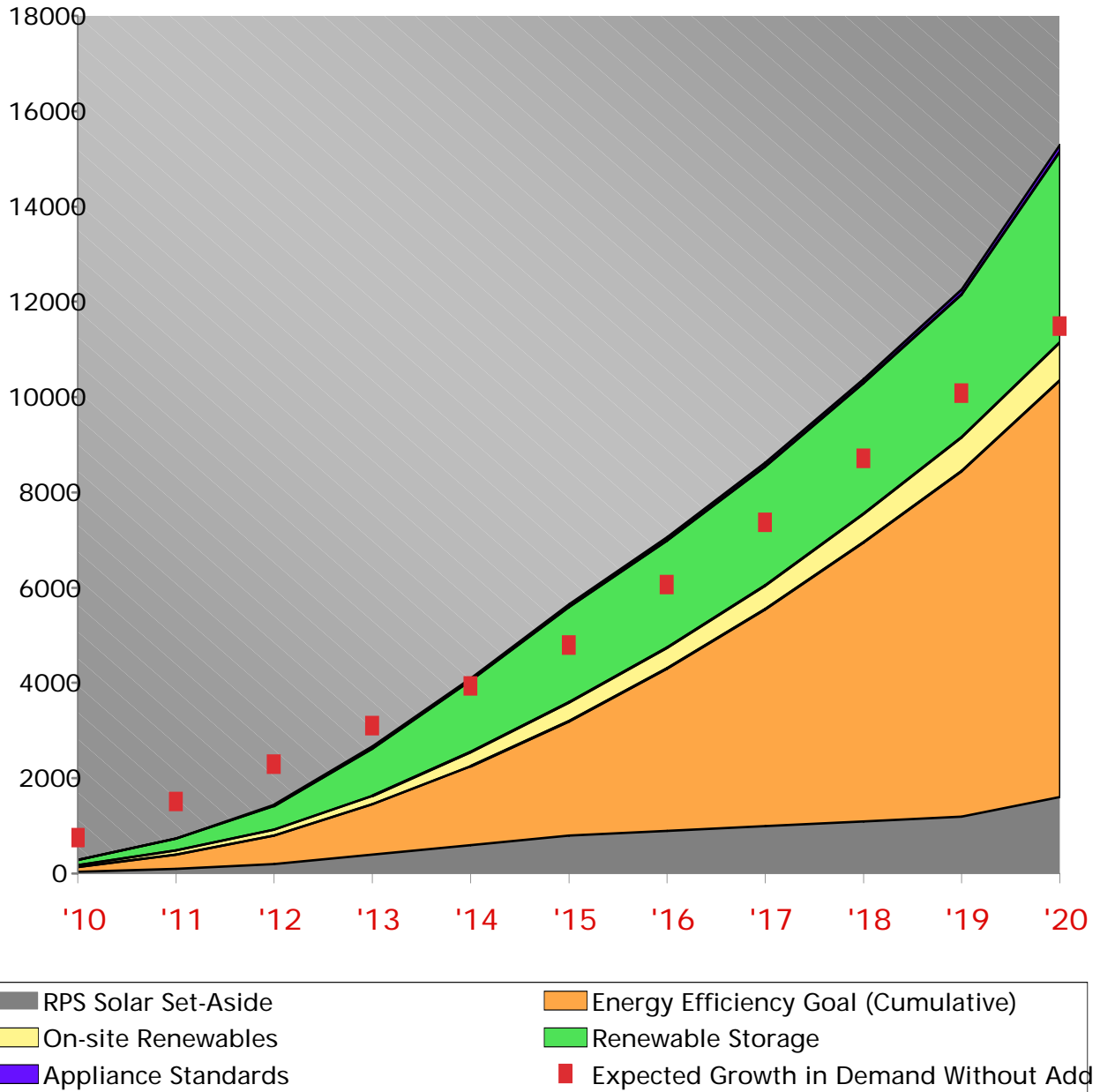
The **12 Recommendations** include:

1. Establish a carbon emissions inventory, reporting system and action plan to reduce carbon emissions from point sources for Texas;
2. Update our air permitting standards so that newly proposed plants must look at best available control technology and maximum achievable control technology, and begin to address carbon dioxide emissions as part of the permitting process;
3. Increase utility funded efficiency programs to 50 percent of load growth or 0.7 percent of total peak growth by 2015; and two percent of peak (1500 MW) and two percent of sales by 2020;
4. Create a parallel on-site renewable energy program at transmission and distribution utilities of 2,000 MWs by 2020;
5. Create a Solar Renewable Portfolio Standard of five percent of sales – around 4,000 MWs -- by 2020 which could be met by utility-scale solar or contracting with or purchasing on-site solar installations;
6. Create a new Renewable Energy Storage Portfolio Standard of 4,000 MWs by 2020;
7. Create and fund low-income energy efficiency programs for existing and new homes;
8. Create state appliance standards for six appliances;
9. Adopt more efficient building code standards, including an Advanced Energy Building Program for Public Buildings;
10. Expand the Texas Loan Star Program to \$300 million and allow access to non-profits like churches, electric cooperatives and municipalities for energy efficiency loans;
11. Create a Clean Energy Fund to develop new technologies like energy storage.
12. Adopt Green Fleet requirements for public entities which include plug-in hybrids so that Texas can begin to develop a vehicle-to-grid electric market.

Taken together, these measures would help Texas meet its future energy demand. More specifically, the new proposed requirements on Retail Electric Providers, Transmission and Distribution Utilities and Electric Cooperatives and Municipalities would help Texas close the gap of approximately 12,000 MWs between current energy supply and the growth in peak demand in 2020.

The combination of on-site renewables, energy efficiency programs, a solar Renewable Portfolio Standard, appliance standards and an Energy Storage Portfolio Standard would be the key means to get there, while the increased funding for the LoanStar, weatherization program and Clean Energy Fund would also help boost new energy sources while cutting energy demand (See Figure 4).

**Figure 4. How will Texas Meet Its Energy Demand in 2020? Programs to Help Meet Energy Demand in 12-Step Plan**



Note: RPS Solar and On-Site Renewable Energy Goals are assumed to provide a 40 percent capacity factor at peak demand.

## 1. Establish a carbon emissions inventory, reporting system and action plan to reduce carbon emissions from point sources for Texas

The first step in any 12-step plan or program is to admit you have a problem. Unfortunately, Texas does not currently have a state system to report, estimate or inventory carbon dioxide emissions or other global warming emissions from any source. The Texas Commission on Environmental Quality did create a global warming inventory in 2000. That inventory, however, was incomplete, was based on limited data, and is now outdated and is not even currently available on the internet.

In order to begin to address human-made emissions of carbon dioxide, or other global warming gases, a verifiable accurate inventory is needed. It would give policy makers a much better sense of the opportunities for companies whether through voluntary measures or future regulation to make reductions. Moreover, if specific emission-level permitting standards are adopted statewide or federally for certain kinds of industries, having accurate reporting and an inventory would allow industries to assess their options for meeting such standards. In addition, a reporting and inventory system would allow for the creation of state-level flexible action plans to actually reduce emissions with specific targets. It is important to note, however, that the two efforts are neither mutually exclusive nor necessarily joined: one can have an action plan without an inventory, and certainly have an inventory without an action plan.

In December of 2007, Congress approved HR 2764, the “Consolidated Appropriation Act, 2008,” which under the Environmental Protection Agency budget includes a requirement that monies be spent to develop a rule that requires mandatory greenhouse gas emissions reporting and EPA publication of a Final Rule by mid-2009. Thus, it is in Texas’ interest to develop an inventory system now that is accurate and easy to integrate with existing reporting requirements as Federal reporting requirements are being developed.<sup>10</sup> It is important to note that even with a Congressional mandate, the U.S. EPA is notorious for not meeting deadlines, and given a new President, regulations are sure to change.

Fortunately, Texas is not starting from scratch but has the benefit of looking at what some other states have done in this regard. There are at least two reporting models to choose from. On May 8, 2007, more than 30 states signed on as charter members to The Climate Registry, to develop a common system for entities to report greenhouse gas emissions, and today there are now 39 U.S. states, as well as several provinces and states in Canada and Mexico (Figure 4). Recently, draft protocols were developed, although they are still being implemented. The states that join are agreeing to a voluntary entity-wide greenhouse gas emissions reporting and verification system. Each member state will encourage entities in their state to voluntarily report their emissions to *The Climate Registry*. In other words, it is a voluntary approach to report global warming gases.

A quick review of the program makes it apparent that few companies have been willing to voluntarily report their emissions under either the Climate Registry or other voluntary systems. California, which began a voluntary system which predates the Climate Registry and was in fact its model, had decidedly mixed results in getting companies to report in the first years. Recently, however, as reporting requirements began to be implemented, a reported 214 companies have joined.<sup>11</sup> Some companies located in states which have not joined the Climate Registry are nonetheless reporting, including Shell Oil in Houston, Element Markets in Houston, Austin Energy and the City of Austin and Alliant Environmental LLC in Magnolia.<sup>12</sup> This makes it apparent that companies that are in states that have not joined see the benefit of being prepared for future regulation, be it at the national or international level.

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<sup>11</sup> The California Climate Registry, 2007 Achievements, available at <http://www.climateregistry.org/about/2007-achievements.html>.

<sup>12</sup> The Climate Registry, (<http://www.theclimateresistry.org/reporters.html>), accessed March, 2008.



time.<sup>14</sup> The Reduction Registry is a separate mechanism in Wisconsin that is voluntary for companies to report their reductions apart from the required reporting inventory.

Texas should consider these options. While a first step might be updating the 2000 Inventory of Global Warming Gases to create a base, Texas should explore required reporting. For example, Texas could utilize reporting already required of major industrial sources through the Texas Emissions Inventory with the TCEQ having the authority to design the system and collect the data. Thus, all major industrial sources in Texas already collect annually data on NO<sub>x</sub>, SO<sub>x</sub>, Carbon Monoxide, volatile organic compounds and particulate matter so that Texas can design plans to meet clean air standards and industries can get credits for reductions they have made. Obviously, in designing such a system, Texas should make sure it can be easily integrated with the Climate Registry. *The most important step in reducing carbon dioxide emissions is to have verifiable, accurate data so that industries know the extent of their problem – and the opportunities to fix it.*

A second simple step would be for Texas to do what many other states have done: come up with an “action plan” on climate change. Some states have pursued a climate action plan on their own, such as the recent decision by Florida Governor Charlie Crist through Executive Order to create a blue ribbon panel to suggest ways to reduce carbon dioxide emissions.<sup>15</sup> Others, such as most of the western states that form the Western Governor’s Alliance have formed regional alliances like the Western Climate Initiative (WCI), which are – albeit slowly – working toward a regional action plan. The extent and types of action plans differ. Some follow the recommendations from a blue ribbon committee while others establish specific targets for emission reductions through legislation, such as California’s AB 32. Some have been established through executive order, others through an advisory group approach while other have been done through legislation. In all, 36 states now have climate action plans completed or in development while seventeen have actually set state-wide emission targets.

The action plan does not replace actual policies that can be taken now to reduce global warming gases, but does complement those policies and help identify other cost-effective opportunities to reduce greenhouse gas emissions that are relevant to the state. *In fact, in Texas, the efforts of the Select Committee on Electricity Generation Capacity and Environmental Effects could be considered the first attempt to develop a kind of action plan – at least for the electricity sector -- but obviously a longer term plan and structure is needed to assure that good ideas get translated into tangible results. We would suggest that any action plan have targets and provide incentives and timelines for different sectors to reach those targets. One approach might be a kind of “no-regrets” plan that sets out policies that would be implemented if they made economic and environmental sense. Thus, such a plan would require the various state agencies to assess strategies that cut emissions and cost nothing over a certain time period, and then implement those strategies with stakeholder input. The plan should include an advisory council composed of industry, the public, governmental representatives and experts.*

**Recommendation: Texas should create a global gas emissions inventory and reporting system and adopt a flexible action plan that assesses strategies that will cut emissions and generate income or cost nothing, with specific goals and targets for the electricity-generating sector.**

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<sup>14</sup> Wisconsin Department of Natural Resources, Air Emissions Inventory Information, <http://dnr.wi.gov/air/emission/m> accessed March 2, 2008.

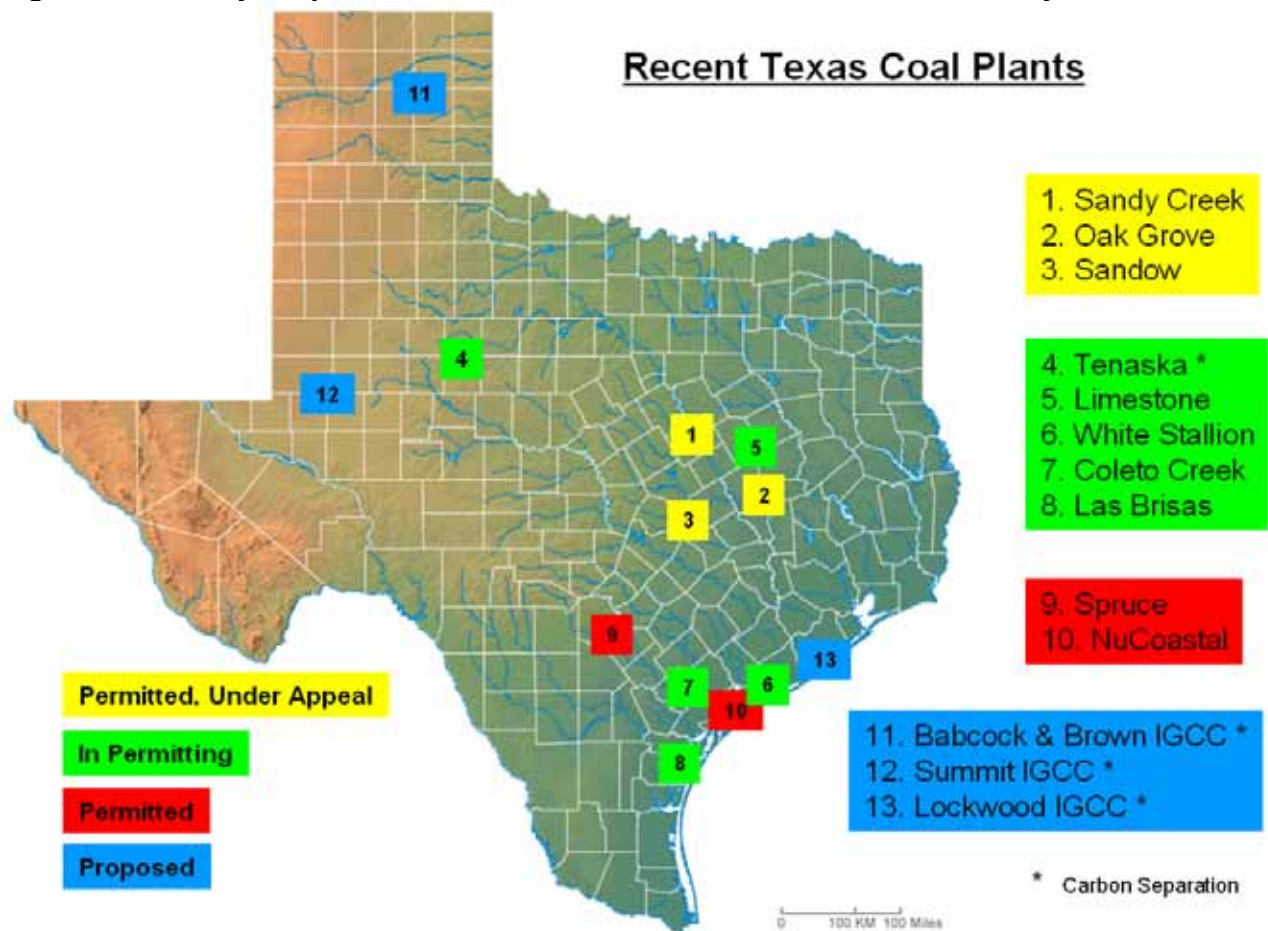
<sup>15</sup> Pew Center on Global Climate Change, Learning from State Action on Climate Change (December 2007 Update), 13.

## 2. Update our air permitting process to require true best available maximum available control technology, cumulative impact and ozone analysis and begin to address carbon dioxide emissions as part of the permitting process

The years 2006 and 2007 were marked by costly and bitter political and legal fights over whether or not to permit a number of new power plants fueled by coal burned in traditional boilers. At the height of activity, some 19 new power plant units were seeking air quality permits from the Texas Commission on Environmental Quality (TCEQ).

A wide range of individuals and groups, including major state environmental groups like Sierra Club, Environmental Defense and Public Citizen opposed most or all of these units. In many cases, however, the opposition also included local citizens, a coalition of business leaders and dozens of mayors concerned with the cost and air and water quality impacts of the plants. They were also openly questioning whether all of these plants were actually needed to meet Texas' growing electricity demands or whether that demand could be met through energy efficiency measures. The utility with the largest number of applications – TXU – was planning to build 11 units, which would have doubled emissions of carbon dioxide in Texas from the electricity sector. Eventually, TXU was bought out by private equity interests, and they made the decision – spurred in part by continued opposition – to cancel plans on eight of the 11 units.<sup>16</sup>

**Figure 6. Recently Proposed New Coal and Petroleum Coke-Fired Electricity Plants**



<sup>16</sup> Elizabeth Souder, "TXU Bidders Would Cut 8 of 11 Proposed Plants," *The Dallas Morning News*, February 25, 2007.

Still, there remain a number of proposed coal and petroleum coke plants that are either permitted, awaiting construction, on appeal, or planned but not yet permitted (see Table 2).

Taken together, these plants would provide substantial electricity to the ERCOT grid. At the same time, they would also increase global warming gases as well as criteria air pollutants significantly, including the building blocks of ozone pollution which create problems for Texas' major metropolitan areas.

Most of these plants are undergoing legal challenges, as is a plant in nearby Arkansas that would also potentially serve part of the electrical grid in Texas. Opponents like the Sierra Club argue that many of these permits have not been assessed to see if there might be impacts on ozone formation in metropolitan areas like Waco, Corpus Christi, Austin and Dallas, nor have the cumulative impact of these plants been assessed.

At the heart of the debate for the Texas plants is whether the air permitting regulations on the book are sufficient, and whether the TCEQ is correctly interpreting those laws in issuing new air quality permits.

In January, Environmental Defense Fund and the Lone Star Chapter of the Sierra Club filed a petition with EPA citing deficiencies in TCEQ's air permitting program. The petitioners charged that TCEQ was not following the law in terms of the requirements for Best Available Control Technology (BACT) – in other words requiring the cleanest, most effective pollution control equipment for major air pollution sources.<sup>17</sup> Furthermore the petition argues that there is a lack of basic monitoring and modeling to assure that emissions from proposed major air sources won't impact areas that are failing or struggling to meet air quality standards such as the Dallas-Fort Worth, Austin, Waco and San Antonio areas.

While the petition argues that Texas is neither following federal law nor its own statutes, the legislature had and will have the opportunity to clarify requirements for BACT, Maximum Available Control Technology for mercury or other toxics, and modeling, monitoring and evaluation of cumulative impacts of large electricity generating and chemical plants.

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<sup>17</sup> Lone Star Chapter, Sierra Club, Press Release: Environmentalists Challenge State's Weak Adherence to Clean Air Act's Permitting Program, January 17, 2008.

**Table 3. Proposed Coal Plants, 2008**

Name	City, County	MW	NOx Emissions (Tons per Year)	Carbon Dioxide Emissions (Tons per year)	Mercury (Lbs. per year)	Status
Oak Grove (2 Units)	Bremond, Robertson	1,600	6,386	16.6	2,180	Under Construction; appeal
CPS Spruce	San Antonio, Bexar	750	1,752	7.4	140	Under Construction
Sandy Creek	Riesel, McLennan	900	1,793	7.5	150	Under Construction; appeal
Formosa Plastic (2 Units)	Point Comfort, Calhoun	300	920	3.0	78	Permit Granted
TXU Sandow 5	Rockdale, Milam	581	2,593	5.4	192	Under Construction, Appeal
Calhoun Co. Navigation District	Point Comfort, Calhoun	303	813	2.6 (agreement to offset)	14	Permit Granted, settlement reached
NRG Limestone	Jewett, Limestone	745	1,752	7.4	140	Application Filed, Hearing Granted
Tenaska	Sweetwater, Nolan	900	1,819	0.75 (promise sequester 90%)	400	Application Filed
Coletto Creek	Goliad	650	1,461	6.0	140	Application Filed, Hearing Requested
Las Brisas Energy Center	Corpus Christi, Nueces	1,200	3,776	10.4 (estimate)	320	Application Filed, still undergoing technical review
White Stallion	Bay City, Matagorda	1,200	4,047	10 (estimate)	100	Application Files, Still Undergoing Technical Review
<b>Total Permitted Plants</b>		<b>4,334</b>	<b>14,157</b>	<b>43</b>	<b>2,754</b>	
<b>Total In Permitting Stage</b>		<b>4,695</b>	<b>12,855</b>	<b>27</b>	<b>1,100</b>	
<b>All proposed plants</b>		<b>9, 129</b>	<b>27,112</b>	<b>70</b>	<b>3,854</b>	

Source: Texas Commission on Environmental Quality and Environmental Integrity Project

An even larger issue to take up is whether new permits in Texas must begin to address global warming gases themselves. In fact, back in 1999, the Legislature added new authority to the TCEQ to regulate gases that lead to climate change, although neither the legislature nor the TCEQ has followed up with more specific laws or rules.<sup>18</sup> Still, with the recent Supreme Court ruling that carbon dioxide is a pollutant that the EPA must regulate, and the permissive authority under Texas law, it is only logical to consider the potential to begin adding not only reporting requirements (see previous recommendation) but also actual emission limits.

Most recently the EPA's Environmental Appeals Board ruled that EPA must require BACT on a new coal plant which could signal the beginning of national carbon dioxide regulation. Another option would be to issue permits only for coal-fired electrical generating units that either sequestered any carbon dioxide emissions or off-set any increase by decreasing carbon emissions at other plants in Texas, on a better than one-to-one basis.

A less rigorous option would be to at least direct TCEQ to develop rules for global warming gas emission limits so that a framework could be established. Recently, a proposed petroleum coke electric generator reached agreement with the SEED Coalition to offset all carbon dioxide emissions, while both Summit Power and Tenaska have announced their intent to seek air quality permits for coal plants that would sequester a portion of the carbon dioxide emissions. Yet neither Tenaska, Summit Power nor Nueces has actually put these promises to sequester or offset their carbon dioxide emissions as part of their permit conditions apparently because the TCEQ feels it lacks specific authority. The Legislature must clarify this authority so that efforts to sequester, offset or eliminate carbon dioxide emissions are part of the permit process.

A final issue is that current and proposed coal plants do not have adequate standards for hazardous air pollutants like mercury. A recent federal regulation known as CAMR to address mercury emissions was recently thrown out by a federal court. Yet Texas has adopted the federal CAMR rules to address mercury emissions. Instead, Texas must apply Maximum Achievable Control Technology for new and existing coal plants for mercury and other hazardous air pollutants. As the number one emitter of mercury, with 17 water bodies with fish poisoned by mercury that are considered dangerous to eat – and many more lakes and rivers where fish remain untested – Texas should do the right thing and clean up its act.

Improved BACT and MACT permitting standards, better modeling and monitoring of ozone formation, consideration of cumulative impacts, creation of a carbon permitting system and establishment of offset requirements resulting in actual carbon emissions reductions would severely curtail the types, size and locations of proposed coal-fired power plants and force industries to consider major cuts in emissions from existing plants.

**Recommendation: Implement new permitting requirements to assure BACT, MACT, pre-permitting modeling and cumulative impact analysis on metropolitan airsheds, and begin to permit carbon dioxide levels for new plants.**

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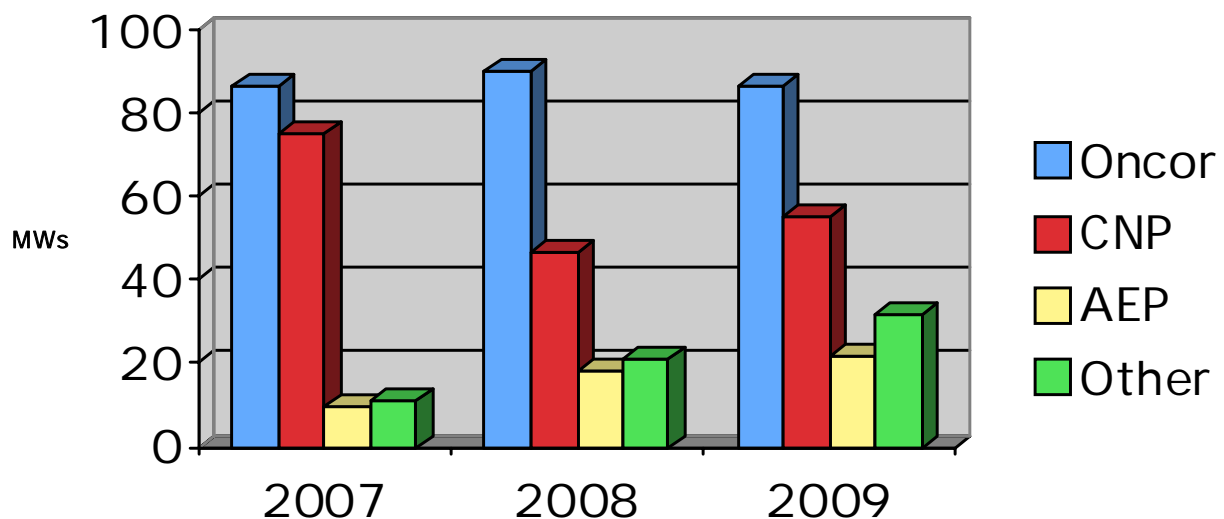
<sup>18</sup> Health and Safety Code, Sec. 382.0205. SPECIAL PROBLEMS RELATED TO AIR CONTAMINANT EMISSIONS. Consistent with applicable federal law, the commission by rule may control air contaminants as necessary to protect against adverse effects related to:

- (1) acid deposition;
- (2) stratospheric changes, including depletion of ozone; and
- (3) climatic changes, including global warming

**3. Require utility funded efficiency incentive programs to meet 0.7 percent of peak demand by 2015 (equivalent of 50 percent of load growth) and to 2.0 percent of peak demand and 1.25 percent of total sales by 2020 and require the largest municipalities and cooperatives to meet the same goals.**

It doesn't get as much attention as the Renewable Portfolio Standard, but Texas established a unique market-based energy efficiency program in 1999 as part of electric deregulation. All customers served in the investor-owned utility market pay extra charges on "the wires" – transmission and distribution utility charges – that pay for the program. These monies are then collected and the utilities contract out programs to meet part of their demand through energy efficiency. These can include such programs as programmable thermostats, energy audits, lighting efficiencies and air conditioning tune-ups to name a few examples or even rebates to developers that build Energy Star homes. While initially utilities were expected to meet 10 percent of growth in demand through market-based and standard-offer programs, in 2007, the Legislature unanimously passed HB 3693 by Rep. Joe Straus, which among other provisions increased the requirement to 20 percent of load growth by 2009. The legislation also requires a Public Utility Program study to look at the potential to increase the energy efficiency programs to 30 percent of growth by 2010 and 50 percent by 2015. That just-released review – Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018 -- supports the potential to move to 50 percent of load growth by 2015, and further recommends that percentage of peak demand is a better metric than load growth to drive energy efficiency.<sup>19</sup> Thus, the report suggests that by 2015, investor-owned utilities should be able to reduce peak demand by 0.7 percent, or about 450 MWs, which is the equivalent of 50 percent of load growth. Furthermore, the report recommends suggests that by including industrial customers in the programs, an additional seven to 15 percent of peak energy could be saved, making the goals easier to meet and the program more cost-effective.

Figure 7. Historical and Planned Demand Savings from Energy-Efficiency Programs at Investor-Owned Utilities in ERCOT



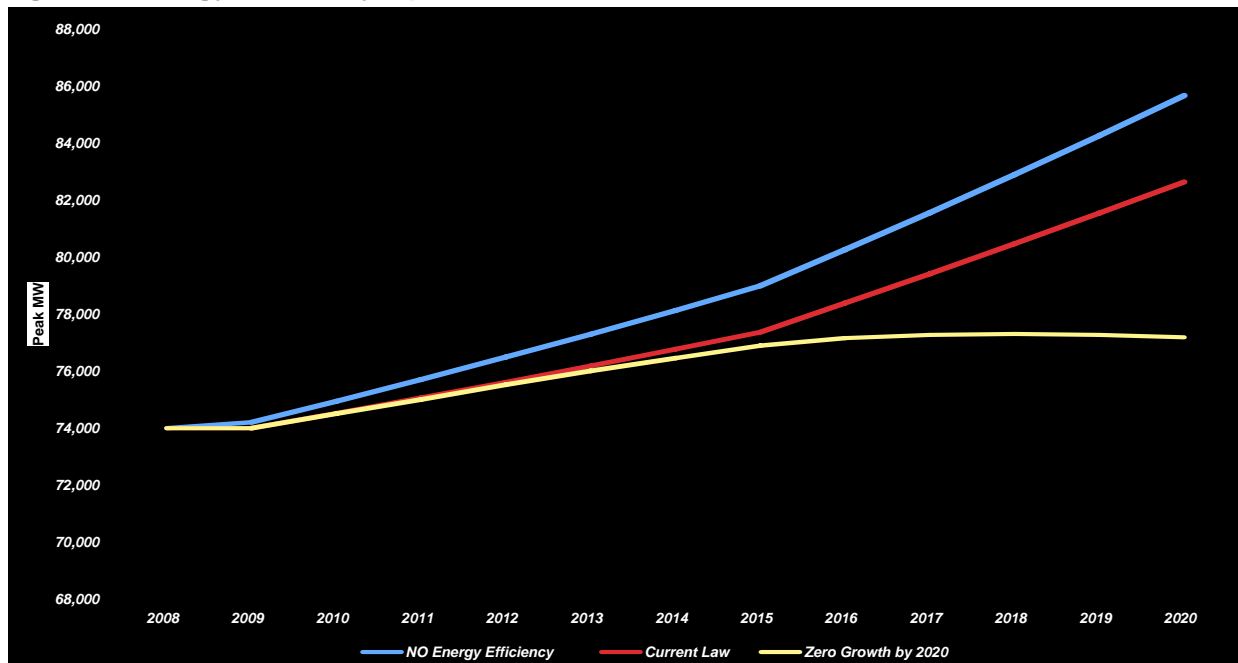
<sup>19</sup> Itron, *Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018*, December 10, 2008.

There is little doubt that the cheapest, quickest and most environmentally clean way for Texas to meet its power needs is through energy efficiency – the use of energy in a more efficient manner – and demand response, controlling and lowering the demand of customers. Thus, in 2004, the utilities spent only \$80 million dollars, or 0.4 percent of their revenue, to lower peak demand by 181 MWs, surpassing the 10 percent goal. In 2007, utilities saved some 190 MWs of energy demand through these programs, with similar savings planned for 2008 and 2009. At approximately 3.5 cents per kilowatt hour, the programs are also much cheaper than any other option on the market.

A series of studies of the Texas electricity market has in fact concluded that Texas, San Antonio, Houston and Dallas could meet virtually all of their projected increase in energy demand through energy efficiency, demand response and on-site renewables. The states of Massachusetts, Connecticut and Rhode Island spend more than 3 percent of electric utility revenues on efficiency, while the State of Vermont will increase spending to almost 5% of total revenues on energy efficiency – some \$700 million per year -- and is expected to lower total use by 2 percent each year – meaning that total demand actually decreases each year. Recently, the state of Pennsylvania approved legislation to force utilities to lower electricity sales by three percent by 2013, while Ohio has adopted similar goals of getting to two percent sales reduction.

Texas must set a long-term goal of significantly LOWERING peak demand – the moment in late August on a sunny afternoon when Texas power needs skyrocket – as well as total energy sales through a significant investment in such energy efficiency programs. Texas has a roadmap on how to proceed. The programs work, the rules are now in place to give utilities incentive payments to meet and exceed these goals, and Texas must continue to increase the goals to meet our energy needs. As a first step the goal should be raised to 0.7 percent of peak demand by 2015 (equivalent to 50 percent load growth by 2015), and then the requirement be raised to 2.0 percent of peak demand by 2020, which would be equivalent to 100 percent of growth, as well as 1.25 percent of sales. The figure below shows that such a goal would help flatten peak demand.

**Figure 8. Energy Efficiency Options for Texas**



At the same time, while municipalities and cooperatives are required to report their efforts at energy efficiency, we believe that the same requirements imposed on investor-owned utilities should apply to those municipalities and electric cooperatives with more than 500,000 megawatt hours. Later in this report, the

possibility of expanding the Texas Loan Star Program and creating an energy efficiency and renewable bond program to help fund energy efficiency efforts and renewables in areas served by cooperatives and municipalities is discussed as one possible mechanism to increase energy efficiency in the areas served by cooperatives. Our recommendation is that large and high-growth municipalities and cooperatives meet the same goals as transmission and distribution utilities.

**Table 4. Recent Studies on Potential of Energy Efficiency, Demand Response and On-Site Renewables**

Study Author and Date	Area Covered	% of Load Growth and/or Peak Demand Achievable by Energy Efficiency, Demand Response, On-site Renewables	% by Investor Owned Utility Program Alone
ACEEE, September 2007	Houston Metropolitan Area	76 percent of load growth by 2024	41 percent would be provided by 50 percent goal
ACEEE, September 2007	Dallas/Fort Worth	101 percent of load growth by 2024	31 percent would be provided by a 50 percent goal
Optimal Energy, January 2007	Texas	80 percent of load growth by 2021	50 percent load growth goal by 2020; 75 percent also possible by then
ACEEE, March 2007	Texas	8 percent consumption by 2013 and more than 107 percent of growth in peak summer demand	65 percent of peak demand and 50 percent of load growth by 2013
KEMA Energy, 2004	San Antonio	100 percent of growth in peak demand by 2014	73 percent of peak demand by 2014
ITRON, 2008	Statewide	23 percent of overall peak demand by 2018	50 percent of load growth or 0.7% of peak demand by 2015

SOURCES: Elliot, R. Neal, Maggie Eldridge, *Role of Energy Efficiency and Onsite Renewables in Meeting Energy and Environmental Needs in the Dallas/Fort Worth and Houston/Galveston Metro Areas*, American Council for an Energy-Efficient Economy, September 2007; ACEEE 2007; Optimal Energy 2007; KEMA Energy 2004; Itron, *Assessment of the Feasible and Achievable Levels of Electricity Savings from Investor Owned Utilities in Texas: 2009-2018*, December 10, 2008.

**Recommendation:** Raise the TDU Efficiency Program levels to 0.7 percent of peak demand (50 percent of load growth) by 2015, and a minimum of 1,500 MWs, or two percent of peak demand, and 1.25 percent of total sales reduced by 2020.

#### **4. Create a Parallel Program to the Energy Efficiency Standard to Create 2,000 MWs of On-Site Renewable Energy by 2020 and Adopt other Incentives to Encourage the Development of On-Site Renewables**

While HB 3693 certainly encourages the development of demand response programs such as programmable thermostats that can be set to time the use of air conditioning at certain times of day, there is no “carve-out” or separate standards for demand response or energy saved through on-site energy generation. We think there should be separate incentives and rules for demand response programs, including on-site solar and other renewable generation. We believe that because such power sources have the potential to eliminate the need for expensive transmission and distribution lines, then their cost-effectiveness must be judged differently than a traditional energy efficiency program. Thus, the avoided cost of transmission, distribution and generation must be calculated so they will have an easier time qualifying for incentives.

Many other states have created statewide on-site renewable rebate programs. These include most notably California – with its promise of solar on one million roofs by 2016. In January 2006, the California Public Utilities Commission (CPUC) adopted a program -- the California Solar Initiative (CSI) -- to provide more than \$3 billion in incentives for solar-energy projects with the objective of providing 3,000 megawatts (MW) of solar capacity by 2016. The CPUC manages the solar program for non-residential projects and projects on existing homes (\$2+ billion), while the CEC oversees the New Solar Homes Partnership, targeting the residential new construction market (~\$1.2 billion). Together, these two programs comprise the effort to expand the presence of photovoltaics (PV) throughout the state.

Other states have set up on-site renewable portfolio standards that include requirements for on-site renewable generation. Thus, New Jersey, has recently set a goal of approximately 1,500 MWs of solar by 2021 and now upped the total to 1,800 MWs, while Pennsylvania is requiring that its utilities meet 0.5 percent of total sales through on-site solar. New Mexico has a goal of 0.6 percent of sales from distributed generation by 2020. In Texas, it would make sense to use the model already developed through the energy efficiency program to create a requirement for on-site renewables on IOUs.

Thus, as an example, a requirement that Texas develop a capacity of 2,000 MWs of on-site renewable generation by 2020 would translate into about two to three percent of peak demand and would be equivalent to half a million homes with photovoltaic systems. Finally, because the requirement to install on-site renewable systems would be developed by transmission and distribution utilities through rebate and other incentive programs, either the TDUs or individual owners of the on-site generation could arrange to sell their renewable energy credits to Retail Electric Providers as a way for them to meet the requirements imposed by the Renewable Portfolio Standard.

In addition to the new parallel program to require that TDUs create on-site renewable incentive programs, Texas could explore other tax incentives for on and off-site renewable power. Thus, while the federal government currently offers a tax incentive to cover part of the costs of solar systems (up to \$2,000), these incentives are scheduled to run out soon. Texas could consider a state solar tax credit for PV solar power or other renewables that would be long-term, giving a needed boost to investment in solar technologies.

Many states, including both New Mexico and Pennsylvania, have established specific buy-back provisions from utilities for on-site solar to pay for Renewable Energy Credits, whether or not the power is fed back to the grid or used by the company. In addition, many countries and now some states – including Washington, Wisconsin, Minnesota, California, and most recently Illinois -- have established “feed-in” tariffs for solar and other alternative energy sources that establish an agreed-upon price that is paid for electricity generated by these sources.

Feed-in tariffs are designed to provide price certainty to generators but policies are designed to be revenue-

neutral for the utilities, with costs spread over all customers. Table 5 provides some examples of recently approved feed-in tariffs.

In addition, Texas could explore state sales and franchise tax to entice more renewable electric generation through the Solar Devices Business Franchise Tax Exemption, a sales tax exemption on some equipment and machinery used to generate renewable electricity, and property tax exemptions for buildings that incorporate PV and other components that reduce energy use.

**Table 5. Selected Feed-in Tariffs/Production-based Incentives for Renewable Energy in US\$/kWh**

All Conversions from the Euro.			
	Wind	PV	Biogas
Austria	0.1081	0.6589	0.2428
Brazil	0.0791		0.0698
California		0.5000	
Czech Republic	0.1235	0.6635	
France	0.1175	0.7878	0.1289
Germany 2008	0.1149	0.6385	0.1551
Italy		0.7878	
Minnesota C-BED	0.0480		
Ontario	0.1103	0.4195	0.1103
Portugal	0.1132	0.0000	
South Korea		0.8114	
Spain (2007 RD)	0.1049	0.6308	0.1872
Turkey	0.0716		
Washington State		0.5400	
New Mexico		0.130	

Source: Paul Gipe, “Electricity Feed Laws, Feed-in Tariffs and Advanced Renewable Tariffs,” Wind-Works.org.

Finally, while HB 3693 established some basic net-metering provisions – the idea that customers could be paid for the surplus energy they create -- for customers installing on-site renewable generation, it lets the actual price and mechanism be negotiated between the REP – retail electric provider – and customer. The language of HB 3693 has led to different interpretations of whether payment is required for the generation of electricity, making it difficult to predict whether solar will be promoted. Texas may want to revisit its net-metering policy, particularly if REPs do not offer significant “products” to entice customers to make investments. We would recommend clarification to the existing statute to require payment by the Retail Electric Provider at the market price at the time of generation, a generator bill of rights, allowing third-party ownership of distributive renewable generation and full disclosure of pricing paid by the REP for any excess energy.

**Recommendation: Create a 2,000 MW on-site renewable energy program by 2020 and clarify net-metering rules in Texas’s competitive market.**

## 5. Create a separate Solar Renewable Portfolio Standard of 4,000 MWs by 2020.

In 1999, the Texas Legislature took a bold forward step by creating a Renewable Portfolio Standard, which mandated that certain utilities – those known as retail electric providers -- invest in or purchase energy sources that were powered by renewable resources such as the sun, the wind, geothermal energy and biomass. While representing a tiny fraction of overall generation capacity at the time, the combination of the mandate and the creation of market-driven tradable Renewable Energy Credits spurred a nascent market in wind development.

The original statutory goal of the program was to install 2,000 megawatts (MW) of additional, new renewable resource generation in Texas by the year 2009, adding to the 880 MW already existing. Texas has rapidly moved beyond the original goals. Indeed, the legislature acted again in 2005, raising the goal to 5,880 MWs by 2015, and also setting up a process to create new transmission lines so that the wind from West Texas could meet the energy demand in East Texas. Perhaps surprising even wind's most ardent supporters, the pace of wind development has already outpaced the mandate.

More than 4,000 MW of wind power has been added since 2001. The installed wind capacity in ERCOT is currently 5,311 MW, soon to surpass the 2015 renewable portfolio standard goal of 5,880 MWs. Texas will have met the Renewable Portfolio Standard, almost entirely through wind generation. For example, of 19 interconnection requests by private electricity providers to the PUC, 17 of them are from wind interests, totaling 3,064 MWs.<sup>20</sup> Most recently, ERCOT reported that when all 233 active generation interconnection requests are considered in all phases – they total over 100,000 MW, about half of which is from requests from wind (Figure 9). While many of these will never be built, it is a clear indication of the viability of wind in Texas.

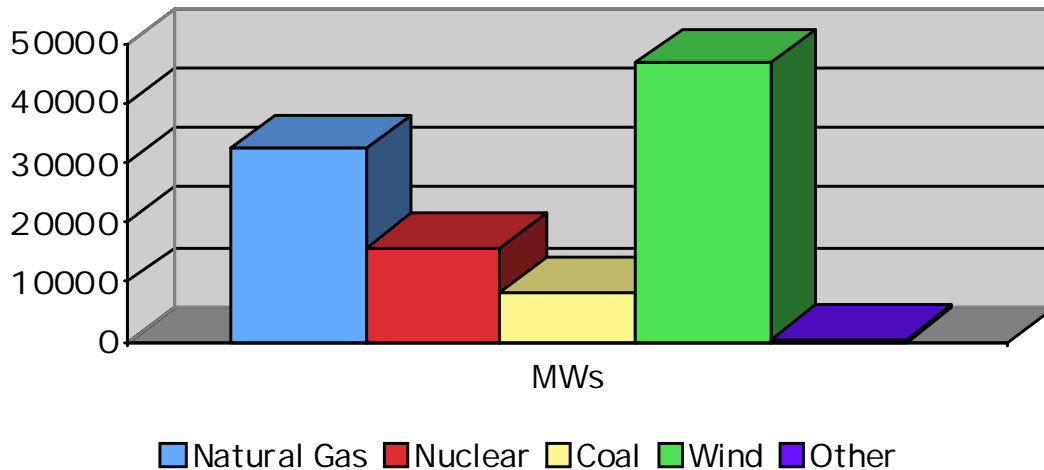
Wind has become an economic engine and player in Texas' electricity market in large part because Texas has abundant wind resources, because the price of natural gas has made wind cost-effective, and because of the promise of new transmission lines. Still, although Texas wind production dwarfs other states, that wind energy is not without challenges. Wind is intermittent, meaning it tends to blow at night and in the morning when energy demand is lower. In addition, until the Competitive Renewable Energy Zones are established, and the exact mechanism for paying for and laying down the new transmission lines actually implemented, there is and will be a bottleneck in taking advantage of West Texas wind. There are times when wind companies are actually paid not to produce electricity because of these bottlenecks. Still, information from the PUC's potential scenarios indicate that between 12,000 and 24,000 MWs of wind could potentially come from these "CREZ" zones given the right market conditions. This will be costly – with estimates ranging from roughly \$3 billion to \$7 billion depending upon the scenario.<sup>21</sup> Earlier this year, the Public Utility Commission chose a Scenario for the transmission zones that should guarantee that a total of approximately 18,000 MWs between existing and planned wind will be operating in Texas in approximately five to seven years.

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<sup>20</sup> Mike Sloan, Presentation to Texas Public Policy Foundation Forum On Wind, March 2008.

<sup>21</sup> ERCOT, CREZ Optimization Study, 2008.

**Figure 9. Generation Interconnection Requests Currently Being Processed, February 2008**

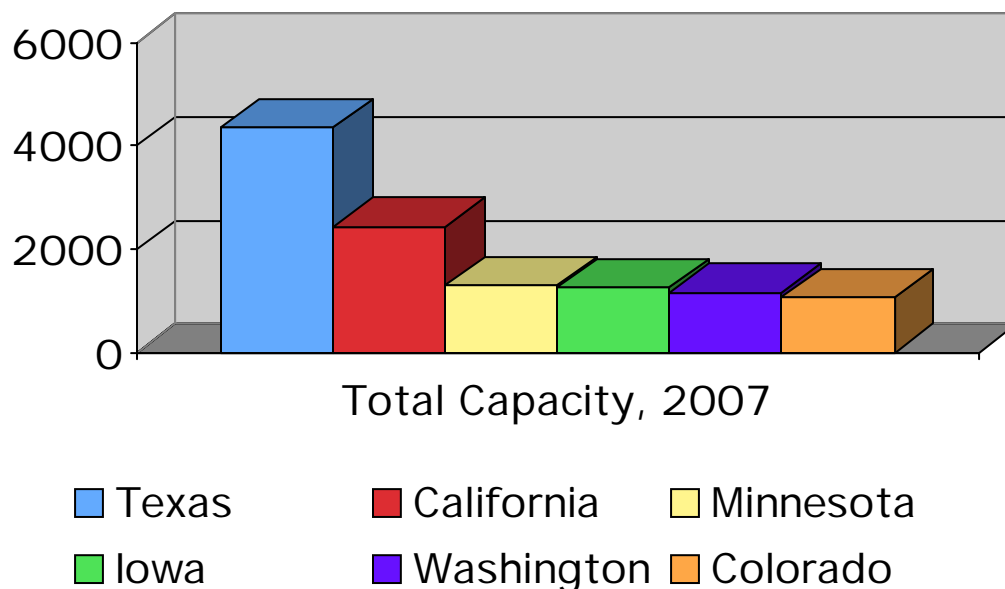


Source: ERCOT, Systems Planning Division, Monthly Status Report to Reliability and Operations Subcommittee, February 2008.

But with continued high oil and gas prices, and the likelihood of carbon regulation increasing the cost of traditional energy sources, even the high cost of transmission is potentially less than those “traditional” sources in both the short and long-term because the cost of fuels like natural gas, coal and uranium is likely to increase.

Another challenge for wind is siting. Wind energy does have a physical footprint on the land. While there have been relatively few concerns in sparsely populated, arid West Texas, along the coast concerns over site selection and their impact on property values, aesthetics, but especially habitat and migratory birds has led to lawsuits, enraged citizens and also an attempt to arrive at “voluntary” siting guidelines for the wind industry. It is clear that either through reasonable regulation, voluntary or mandatory guidelines, Texas will need to address this issue if it wants to take advantage of coastal and West Texas wind resources, while respecting the unique habitats and species along the coast and in the hill country.

**Figure 10. Wind Capacity Installed in Leading States, 2007**



Source: American Wind Energy Association, Wind Power Outlook 2008.

**Table 6. Capacity of New CREZ Wind Production Chosen by PUC**

Zone	Scenario 2
Panhandle A	3,191
Panhandle B	2,393
McCamey	1,859
Central	3,047
Central West	1,063
Total CREZ Zone Wind Capacity	11,553
Existing Capacity of Non-CREZ Zones Estimated by 2010	6,903
Total	18,456
Cost	\$4.93

Source: ERCOT, Competitive Renewable Energy Zone Transmission Optimization Study Update, February 19, 2008.

If plans for wind development are outstripping even the goals set by the RPS, is there a need to mandate an increase in wind production and purchase? On one level, the Renewable Portfolio Standard creates a more secure market mechanism through the Renewable Energy Credits, while also allowing investors some certainty. In addition, other states have expanded their RPS goals beyond Texas', thus meaning investors might choose to bring economic development and jobs to those states instead. With Congress recently debating a national RPS standard of 20 percent, our recommendation would be to increase the RPS to 20% of total capacity by 2020 or its equivalent. Assuming for example, as ERCOT now projects, a demand of some 80,000 MWs by 2020, an RPS of 20% would be approximately 16,000 MWs.<sup>22</sup> In some cases,

<sup>22</sup> ERCOT, "ERCOT Generation Capacity and Demand Projections," in *Report on the Capacity, Demand and Reserves in the ERCOT Region*, System Planning, May 2008.

particularly in the upper panhandle, Texas may be in the business of providing wind electricity to states such as Oklahoma or Kansas.



**Picture: Aerial View of Solar One Nevada, outside of Las Vegas**

Still, because Texas is likely to reach such levels within 10 years, there may not be a need to mandate purchase of wind power through an increased RPS. While wind is presently the cheapest renewable to develop, and its production has been progressing, other renewable sources have not. And yet study after study has determined that the potential in Texas for solar power is even greater than wind, especially if one assumes the technology will continue to improve. The sun shines continually in Texas, and is most powerful at precisely those times of day when needed – the early and late afternoon.

While California invested in a series of parabolic trough off-site concentrated solar plants in the 1980s with mixed results, in the last three years, the states of Nevada, California, Arizona and New Mexico have either announced, begun or completed giant solar power plants in the desert (see Table 7). All of these are being built to meet specific RPS mandates in those states, but as it turns out, the prices are increasingly competitive with other power sources, and are expected to come down over time. Texas has the potential for major off-site solar. The City of Austin has indicated it will make an announcement soon on a much more modest 30 MW solar plant, but has also been exploring a much larger proposed plant in West Texas of 100 or 200 MWs that would be dependent upon other investors and better transmission infrastructure.

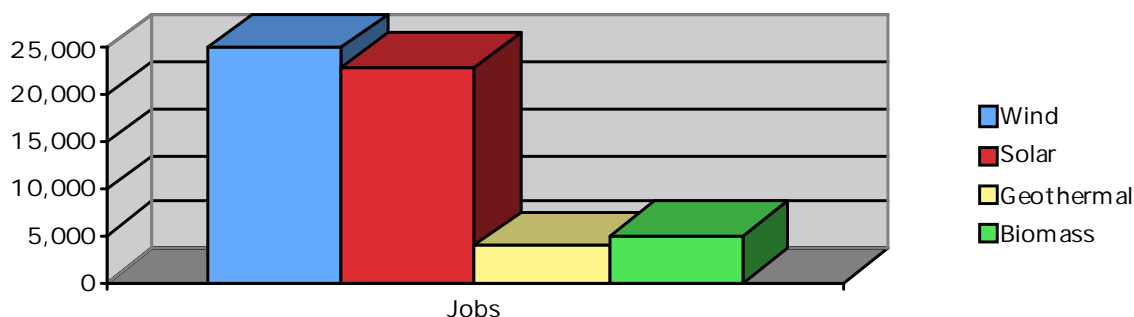
**Table 7. Recent announcement of major off-site solar plants, Southwestern U.S.**

Company	Location	MWs	Status
Abengoa Solar/Arizona Public Service Co.	Gila Bend, Arizona 1,900 acres	280	Announcement and purchase agreement – to be operating by 2011
Nevada Solar One (Solargenix Energy/ Accionista)	Boulder City, Nevada 64 acres	65	Constructed and operating
Solel/Pacific Gas and Electric Company	Mojave Desert. CA 6,000 acres	535	Announcement and purchase agreement to operate by 2011
Total		880	

Source: Various news reports, 2008.

The creation of a carve-out for solar power would help create a market for solar Renewable Energy Credits and give investors more regulatory certainty. The increased cost of traditional power plants coupled with the increased cost of natural gas has made solar look much more attractive than could have been imagined five years ago. The solar requirement would also be a boon for manufacturing jobs, as well as construction and installation jobs at a time when the economy is suffering from high food and gas prices. For example, a recent study on the impacts on jobs of a 20 percent RPS nationwide found that more than 60,000 full-time equivalent jobs would be created in Texas, second only to California, including some 23,000 in the solar industry.<sup>23</sup> Currently, however, Texas only has a 500 MW “target” for non-wind which has not been interpreted as a legally binding requirement for utilities.

**Figure 11. Estimates of Full-Time Equivalent Manufacturing Jobs Created in Texas by 20 percent Renewable Portfolio Standard**



Source: Renewable Energy Policy Project, State Manufacturing Reports, available at [www.REPP.org](http://www.REPP.org).

On-site renewable generation – solar PV panels on rooftops – is another potential source of electricity, although it can also be created through incentives within the energy efficiency programs (see Recommendation on Energy Efficiency). Thus one recent report predicted that with the right incentives in place, jobs in the Solar PV industry nationwide would jump from 20,000 in 2005 to 62,000 in 2015, with Texas

<sup>23</sup> George Sterzinger, (March 2008). Energizing Prosperity: Renewable Energy and Re-Industrialization, Economic Policy Institute Discussion Paper, Briefing Paper #205.

benefiting with 5,567 jobs in manufacturing, installation and construction, and nearly \$4.5 billion in investments by 2015.

There are other potential renewable energy sources such as biomass, landfill gas (from methane collection), and geothermal which also offer benefits. While some environmental groups – including Sierra Club – are concerned that some wood products that have a better and higher use could end up as fuel, carefully crafted, there is the potential in East Texas for positive biomass production.

Still, because of solar's great potential to produce electricity and jobs with little resource use, we recommend mandating purchase of solar power and that REPs be allowed to pick the technologies – from thermal solar plants to photovoltaic to building integrated solar that would get them there. Thus, as an example, a REP could actually purchase renewable energy credits from generators putting solar on their roofs or integrating thin film in their buildings or decide to contract with or invest in a large-scale utility plant.

**Recommendation: Create a required Solar Renewable Portfolio Standard of 4,000 MWs by 2020.**

## **6. Create A Renewable Energy Storage Portfolio Standard of 4,000 MWs by 2020**

One of the criticisms of renewable energy is that you can't use it all the time. Thus, solar energy works well in certain areas when the sun shines, but doesn't produce electricity at night, and its capacity is curtailed during cloudy or rainy periods. Wind, as is well known, does not blow all the time, and in fact, at least in West Texas, blows best at night, precisely when there is less need for electricity.

One way to solve the intermittent nature of renewable energy is to develop technologies to store energy, either at the site of generation or somewhere within the transmission system. Texas could consider adopting a requirement that all utilities meet part of their energy demand by storing energy. By creating such a requirement, costs of developing this technology would be shared, jobs and new technology would be created, wasted spinning reserves – the natural gas and other plants which must be left on in case the wind doesn't blow – would be reduced or eliminated, and another source of low-carbon power would be created.

Currently, there are a number of energy storage technologies that have been developed, many of which are already in commercial use. Thus, as an example, the latest thermal solar power plants are being developed with thermal storage through the use of superheated liquids which are then used to create steam – even after the sun goes down. In Northwest Texas, Shell Energy and Luminant are developing a 3,000 MW windfarm which includes approximately 1,000 MWs of compressed air energy storage, where part of the energy created will be used to store compressed air underground, which can be released later to spin turbines and create additional energy using a modified combined-cycle natural gas plant. Other technologies in the development state include all types of batteries to store energy, hairy capacitors and flywheels. Most recently, engineers and scientists at the University of Texas at Austin achieved a breakthrough in the use of ultracapacitor devices to store energy that could be created by renewable sources.

Studies of energy storage show that despite the high cost of storing energy, the cost is less than natural gas or coal plants that in the future would be required to sequester their carbon dioxide emissions. An achievable goal – such as five percent of peak demand – or 4,000 MWs by 2020 would help make Texas a national leader in the development and implementation of renewable energy storage technology.

Legislators should explore to what degree transmission companies could actually own storage technology as a way to make their transmission networks more efficient and cheaper. TDUs could then contract the use of this technology to the Retail Electric Providers as a way to meet the new Renewable Energy Storage Portfolio Standard.

**Recommendation: Create a Renewable Energy Storage Portfolio Standard of 4,000 MWs by 2020**

## 7. Create and fund low-income energy efficiency program for existing and new homes

Many low-income Texans live in homes that use energy inefficiently, creating a situation in which the homes they can afford in terms of rents or mortgages are the types of homes that generate huge utility bills, which are unaffordable.

Texas has energy-efficiency programs for low-income Texans. For example, investor-owned utilities fund low-income weatherization to meet their energy-efficiency goals. Also, under the System Benefit Fund (SBF), the Legislature can allocate money to the Texas Department of Housing and Community Affairs (TDHCA) to pay to weatherize homes of Texans living at or below 125% of the federal poverty level. In 2002 and 2003, \$17.9 million of SBF funds were used for these programs. In addition to the approximately 5,000 homes weatherized, 4,773 refrigerators were replaced and 12,826 homes received energy efficient lighting using these funds.<sup>24</sup> **However, since 2003, the Legislature has not appropriated any funds from the SBF for energy efficiency and has instead relied on federal funds or utility efficiency programs.** Despite this other funding, the total number of families that have benefited is a fraction of those in need of assistance.

**Table 8. State and Federal Funding for Weatherization in Texas in Millions**

Year	Weatherization Assistance Program (Federal Program)	State Weatherization Program through Systems Benefit Fund	Number of Texas Households Benefiting from WAP and SBF Funding
2000	3.6	0	5,845
2001	10.5	0	5,424
2002	15.5	6.1	8,220
2003	17.7	8.9	7,637
2004	7.9	0	5,452
2005	6.9	0	5,416
2006	11.2	0	3,904
2007	7.6	0	5,404
2008	7.4	0	Not available

Source: Texas Department of Housing and Community Affairs, information provided to Sierra Club.

If Texas had funded weatherization at \$10 million per year between 2004 and 2008, an additional 15,000 households could have received assistance. Assuming that \$10.2 million were spent between 2004 and 2011 out of the SBF funds, then some \$85 million could help some 25,000 households receive weatherization assistance. The Legislature should fund these programs – which when combined with federal funding and utility programs would make more existing homes affordable through lower utility bills – as hundreds of millions of dollars are available in the SBF for allocation by the Legislature, and could be used for a quick energy efficiency program. Thus, a targeted \$85 million two-year efficiency program using leftover SBF funds could make significant reductions in energy use and peak demand.

In addition to a focus on existing homes, the TDHCA is charged with overseeing several programs designed to provide low-income Texans with access to affordable housing. Yet again, there is little attention to whether these new or existing homes are energy efficient. Texas could explore the creation of a small fund or incentives to promote energy efficient homes, which might cost slightly more but would actually be more affordable. HB 3693 does require that TDHCA consider how to make their housing programs encourage

<sup>24</sup> TDHCA, PY 2003, Low-Income Energy Efficiency Plan Funded by the System Benefit Fund, 2004.

energy efficiency and the Legislature should investigate if other steps are needed. Recently, the TDHCA adopted important changes in their rules to offer incentives to encourage developers to build more efficient low-income housing.

**Recommendation: Fully Fund the SBF Weatherization Program with an \$85 Million appropriation for 2010-2011.**

## 8. Adopt state energy efficient appliance standards and Expand the Sales Tax Holiday for Energy Efficient Appliances

The State of Texas can adopt efficiency standards for appliances that lack federal standards. Minimum standards of energy efficiency for many major appliances were established by the U.S. Congress in the Energy Policy and Conservation Act (EPCA) of 1975, and have been subsequently amended by succeeding energy legislation, including the Energy Policy Act of 2005. Laws require the U.S. Department of Energy (DOE) to set appliance efficiency standards. The DOE website lists updates and final rulings for 17 residential products and 11 pieces of commercial equipment.

Indeed, in 2006, a study by the American Council for an Energy-Efficient Economy contracted by the Texas State Energy Conservation Office, found that if Texas were to adopt state standards for 10 commercial and residential appliances, including pool pumps, portable electric spas, DVD players and walk-in refrigerators and freezers, it would save nearly 2.5 billion kilowatt-hours while reducing consumer electric bills by about \$230 million by the year 2020. Other specific studies of Texas' energy needs have found that such state standards would help reduce peak demand by some three percent net of growth in the Dallas –Fort Worth Area.<sup>25</sup>

Fortunately, as some 14 other states have already adopted some of these appliance efficiency standards, there is an established agreed upon standard to adopt and enforce in Texas. In fact, because these states include both California and New York, such standards would in effect become national standards and help drive further federal action. In addition, the Energy Independence and Security Act of 2007 established new standards for a few equipment types not already subjected to a standard, and updated some existing standards. Perhaps the most significant new standard is for general service lighting which will be deployed in two phases. Still, there are still six major appliances which lack federal standards even after passage of the 2007 Energy Act. The table below shows the remaining appliances without efficiency standards that Texas could adopt and the expected savings in energy that would occur.

**Table 9. States Where Appliance Standards Have Been Adopted, and Projected Electricity and Peak Demand Reductions in Texas**

Type of Appliance	States where a Standard has Already Been Adopted	Expected Electricity Savings in 2020 (GWh)	Summer Peak Capacity Reduction (MW)
Bottle-type Water Dispensers	CA, CT, DC, MD, NH, NJ*, OR, RI	20	3
Commercial Hot Food Holding Cabinets	CA, CT, DC, MD, NH, NJ*, OR, RI	28	9
Compact Audio Products	CA, NH*, NJ*, NY, OR	120	17
DVD Players and Recorders	CA, NJ*, NY, OR	17	2
Spas (Hot Tubs)	CA, CT, NJ*, OR	20	5
Swimming Pool Pumps	CA, CT, NJ*	472	108
Total		677 GWh	144 MWs

\*Proposed for adoption, not yet implemented.

Source: Information from Appliance Standards Awareness Project and State Energy Conservation Office, *Opportunities for Appliance and Equipment Efficiency Standards in Texas*, September 2006.

Finally, Texas should consider providing an incentive to low-income Texans – such as any family with a valid

<sup>25</sup> Elliot, R. Neal, Maggie Eldridge, *Role of Energy Efficiency and Onsite Renewables in Meeting Energy and Environmental Needs in the Dallas/Fort Worth and Houston/Galveston Metro Areas*, American Council for an Energy-Efficient Economy, September 2007.

Lone Star card – the opportunity to purchase energy star efficient appliances free of state sales tax up to a certain amount. Thus, for example, HB 3693 presently creates a tax-free holiday for energy efficient appliances on Memorial Day week-end for all Texans for purchases up to \$2,500. Such a tax-free holiday could be expanded year-round for card-carrying Lone Star members up to a certain amount, such as \$1,200 or \$2,500 per year for everything from washing machines to light bulbs. Thus, there are 800,000 Lone Star holders (2.4 million people, including all family members), meaning that if every single eligible Texan took full advantage of a \$100 in sales tax breaks each year, it would cost the state \$80 million dollars, but also help the state meet energy needs. It is of course very unlikely that each year every Lone Star Holder would take advantage of the program, but coupled with other incentives through the SBF fund it could lead to massive reductions in energy use, while lowering electricity bills.

Finally, legislators should consider adding other energy efficient appliances – televisions and audio equipment – that have been given the Energy Star logo to the list of appliances eligible for the sales tax holiday. In this way, Texas could encourage consumers to buy the most efficient appliances.

**Table 10. Energy Star Efficient Appliances Currently Covered by the Sales Tax Holiday and Additional Products**

<b>Energy Star Appliances Currently Covered by Memorial Day Weekend Sales Tax Holiday</b>	<b>Other Energy Star Appliances that Could Be Added to Sales Tax Holiday</b>
Air Conditioner (up to \$6,000)	Television, TV/VCR, VCR, DVD/VCR or TV/DVD device
Clothes Washer	Windows
Ceiling Fan	Cordless phone, answering machines
Dehumidifier	Room air cleaners
Dishwasher	Desktop and laptop portable computers
Incandescent or Fluorescent Lightbulb	Computer monitors
Programmable Thermostat	Printers, scanners and all-in-one devices
Refrigerator (up to \$2,000)	CD Players, receivers and speakers

**Recommendation:** Adopt state appliance efficiency standards for a suite of six commercial and residential products and expand the sales tax holiday to other energy efficient products.

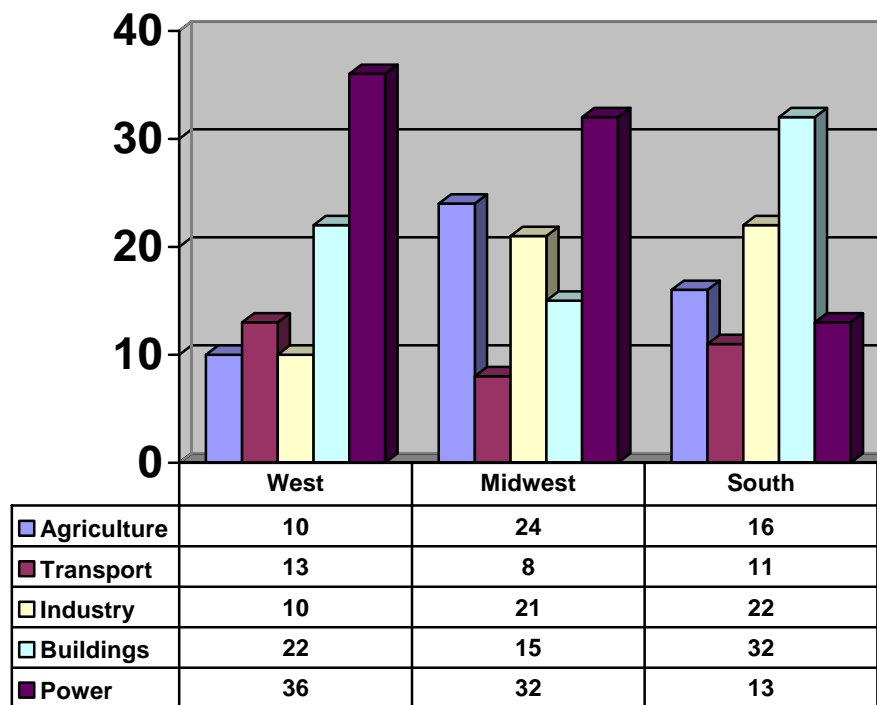
## 9. Adopt more efficient building standards, including an Advanced Energy Building Program for Public Buildings

According to the U.S. Department of Energy, residential (22 percent), commercial (18%) and industrial (3 percent) buildings use 43 percent of U.S. total energy.<sup>26</sup> Not surprisingly, this energy use leads to a substantial amount of million metric tons of carbon dioxide (and other emissions) due to energy use – about 34% in overall carbon dioxide emissions. When one considers that approximately half of the energy generated is lost in generation and transmission, the potential for improvement is vast. Thus, a combination of better building codes, better enforcement and the higher use of on-site electricity generation could all lead to lower utility bills and less global warming emissions.

In fact, a recent report by the McKinsey Group looking at cost-effective opportunities to abate global warming gases found the greatest potential in the Southern U.S. was in buildings (see Figure 7).<sup>27</sup>

Other recent analyses of the potential for energy efficiency in Texas have also found that building codes and building code enforcement could play a large role in meeting future energy needs. Thus, the recent ACEEE reports found that 10 percent of electricity savings over the next 15 years could come from improved building codes, with 11 percent from the same source in the Dallas-Fort Worth area.<sup>28</sup>

**Figure 11. Geographic Differences in Carbon Dioxide Abatement Potential by Sector and Percent by 2030**



Source: McKinsey Analysis, 2007. Note: Texas was grouped with Southern States.

<sup>26</sup> US Department of Energy, *2007 Buildings Energy Data Book*, 2007.

<sup>27</sup> McKinsey & Company. 2007. *Reducing U.S. Greenhouse Gas Emissions: How Much at What Cost?*

<sup>28</sup> Elliot, R. Neal, Maggie Eldridge, September 2007.

Texas has already reaped the benefits of requiring a minimum standard for new commercial and residential buildings based upon the 2001 International Energy Conservation Code, which has led to more than 15 percent energy savings in new buildings in Texas.<sup>29</sup> In 2007, the legislature approved HB 3693, which included a requirement that the State Energy Conservation Office create new building codes based upon more recent international energy efficient building code standards. Thus, under HB 3693, SECO has published notice to the interested public to comment on the most recent editions – from 2003 and 2006 -- of the International Residential Code and the International Energy Conservation Code, and these comments will be forwarded to the Energy Systems Laboratory at Texas A & M, who will make the ultimate recommendations about which codes to adopt. Unfortunately, the process has been slow, and the ESL has recommended only updating to a 2003 standard.

In fact, more could be done. Recently, the International Energy Conservation Code was updated and a 2009 code was adopted. The 2009 Code is said to produce buildings that would be 18% more efficient than those built to meet the 2006 Codes. Cities like Austin, Dallas, Houston and San Antonio have all recently passed or are in the process of passing new building standards that exceed the state-adopted standards by significant degrees. The single easiest step would be for Texas to simply adopt the 2009 codes statewide.

The Western Governor's Association recently released a series of recommendations for energy efficient buildings that Texas leaders should examine for important ideas on how to provide incentives – and mandates – for more efficient public and residential buildings. Surprisingly, their first recommendation involved educating builders, city councils and school children about the benefits of energy efficient buildings.<sup>30</sup>

Among the options for Texas to improve energy efficiency include:

1. Require all new public buildings of a certain size to meet Leadership in Energy and Environmental Design (LEED) Standards, with a specific energy performance standard, or other advanced building standards and utilize performance based contracts to accomplish these advanced energy standards.<sup>31</sup>
2. Create a Texas-specific Home Energy Rating System state program to label all new and existing homes so that buyers would be aware of energy costs.
3. Require that commercial and residential buildings meet codes that are 15 percent better than existing statewide codes by 2012, and review and update codes every three years;
4. Alternatively, adopt the 2009 IECC as a base and then begin to update the standard.
5. Offer state incentives for near-zero energy homes or those meeting advanced LEED or equivalent standards by time-certain dates;
6. Explore requirements for integrated solar, cool roof technology and Combined Heat and Power systems for certain buildings.

**Recommendation: Create and require an Advanced Energy Building Program for Public Buildings, create a Home Energy Rating System, and adopt the 2009 International Energy Conservation Code.**

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<sup>29</sup> Optimal Energy, Inc. Power to Save: An Alternative Path to Meet Electric Needs in Texas. January 2007, 14.

<sup>30</sup> Western Governor's Association, Building an Energy-Efficient Future, January 2008, 9.

<sup>31</sup> LEED has been criticized for not necessarily having the highest energy performance on electricity; Massachusetts has recently adopted a LEED +20 percent performance for public buildings.

## 10. Expand the funding and purpose of the Texas LoanSTAR Program

The State of Texas has created a unique loan program to help state buildings save money as well as offering free energy audits to local governments and school districts. At the same time, while many municipal utilities such as the City of Austin have very advanced energy efficiency programs, most municipal utilities and electric cooperatives do very little in terms of providing incentives or programs to promote energy efficiency and on-site renewables. They are not covered, for example, by the mandates imposed upon areas of the state served by investor-owned utilities. Texas should explore expanding its energy audit and loan program for its public entities and create a new bond loan program for large-scale energy efficiency and renewable projects that serve electricity needs of cooperatives and municipal utilities.

The LoanSTAR<sup>32</sup> program is designed to "Save Taxes And Resources (STAR)" by monitoring energy use and recommending energy-saving retrofits in public buildings. In 1988, the Texas Governor's Energy Office (now known as the State Energy Conservation Office) received approval to establish a statewide retrofit demonstration program using oil overcharge funds. The LoanSTAR program is designed to demonstrate commercially available, energy efficient, retrofit technologies and techniques. State agencies, such as schools and public buildings, may apply for loans to make recommended retrofits. SECO also offers these entities free preliminary energy audits. Originally, participants had to repay the loans in four years or less based on estimated energy savings. In 2001 the payback period was extended to 10 years and water conservation was added as another category that could be funded. In most cases repayment is made from savings generated by the cost-effective retrofit measures. State agencies are also authorized to repay these loans from general revenue funds budgeted for utilities. Once the loans are repaid, the savings are available for the agencies.

As of November 2007, LoanSTAR has funded 191 loans totaling over \$240 million dollars. Beneficiaries of LoanSTAR retrofits have included buildings at UT-Austin, Texas A & M, the University of Texas at Arlington, the Fort Worth and Victoria Independent School Districts, the Ward Memorial Hospital in Monahans, the University of Texas-Pan American and the Texas State Technical College in Harlingen. State-owned buildings at the Texas Capitol Complex, in Houston, Midland, and Nacogdoches have also been retrofitted.

As a result of these loans, the LoanSTAR Program has achieved total cumulative energy savings of over \$212 million dollars, which results in direct savings to Texas Taxpayers.

The program is so successful that there is currently a waiting list. In addition, the fact that the program now accepts performance contracting with a third party means there is a growing pool of interested contractors. The total pool of money available is only \$98.6 million dollars. The pool should be tripled to approximately \$300 million to allow more loans to retrofit state and other public buildings to lower energy use. In addition, all publicly-owned buildings of a certain size should have a required SECO energy audit to determine if it would be cost-effective for them to apply for a Texas LoanSTAR loan.

HB 3693 requires that an electric cooperative and municipally-owned utility of a certain size consider adopting and implementing energy efficiency programs that reduce the cooperative's annual growth in demand in a manner consistent with the standards established for other utilities within the state, even though there is obviously no equivalent funding source. The new law also requires that those same electric cooperatives and municipalities report to the State Energy Conservation Office (SECO) not later than September 1, 2009 the combined effects of its energy efficiency activities.

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<sup>32</sup> Information provided by State Energy Conservation Office (<http://www.seco.cpa.state.tx.us/lr.htm>) and Energy Systems Laboratory, A & M, [http://www-esl.tamu.edu/loanstar/about\\_LoanSTAR.html](http://www-esl.tamu.edu/loanstar/about_LoanSTAR.html).

Additionally, certain nonprofit cooperative corporations are permitted to use certain monies to provide energy efficiency assistance, if the funds are delivered to an energy efficiency assistance fund that is designed to assist members in reducing their energy consumption and electricity bills. However, the total amount of this fund can not exceed \$2 million.

HB 3693 made clear the legislature's desire for municipalities and electric cooperatives – which serve over 3 million members in Texas – to do more on energy efficiency. It is unlikely, however, that without further direction most electric cooperatives and municipalities will match IOU requirements to meet 20 percent of their growth in demand by 2009 through energy efficiency.

Texas should begin a program similar to the LoanSTAR program for major energy efficiency and demand response – including on-site renewable projects – in areas served by electric cooperatives and municipalities. The projects could be tied to municipal and other energy reduction projects required to be reported under HB 3693. Texas should consider allowing Electric Cooperatives and City-owned utilities to gain access to part of the Texas LoanSTAR program to then provide rebates and loans to their clients for energy efficiency and on-site renewables. Texas could also consider adding non-profit entities like churches to those organizations able to seek loans from the LoanSTAR.

Some cities – such as San Francisco – have enacted city-wide energy efficiency and renewable projects through city-wide bonds and there is no reason for Texas not to explore a similar effort aimed in particular at investing in efficiency and renewables at electric cooperatives. San Francisco issued \$100 million in bonds, and the State of Texas could certainly do as much or more, either through Texas LoanSTAR or separate bonds.

**Recommendation: Increase the Texas LOANStar program from \$100 to \$300 million, require energy audits of all large publicly-owned buildings and initiate a state-funded loan program for electric cooperatives and municipality-owned utilities to meet energy efficiency, renewable energy and demand management goals, either as part of the LOANStar program or as a separate program.**

## 11. Create a Clean Energy Fund

Recently, the United Steelworkers, the Sierra Club, the Natural Resources Defense Council and the Blue Green Alliance, a partnership of the USW and Sierra Club, launched the national Green Jobs for America campaign. The commitment is to promote renewable energy and energy efficiency to create over 820,000 new jobs nationally while reducing the dependence on fossil fuels and lower emissions.<sup>33</sup>

In fact, the renewable energy industries already have created thousands of jobs throughout the U.S. at a time when manufacturing and other jobs have been hard to come by (see Table).

**Table 11. Renewable Energy Job in the U.S., 2006**

Industry	Revenue (billions)	Direct Jobs	Total Jobs Created
Wind	\$3.0	16,000	36,800
Photovoltaic	1.0	6,000	15,700
Solar Thermal	0.1	800	1,900
Hydroelectric Power	4.0	8,000	19,000
Geothermal	2.0	9,000	21,000
Ethanol	6.3	67,000	154,000
Biodiesel	0.3	2,750	6,300
Biomass	17.0	66,000	152,000
Fuel Cells	0.9	4,800	11,100
Hydrogen	0.8	4,000	9,200
Total Private	35.4	185,150	427,000
Total Government	3.2	6,900	15,870
Trade and Professional Associations	0.6	1,500	3,450
Total	\$39.2	193,550	446,320

Source: American Solar Energy Society, 2007.

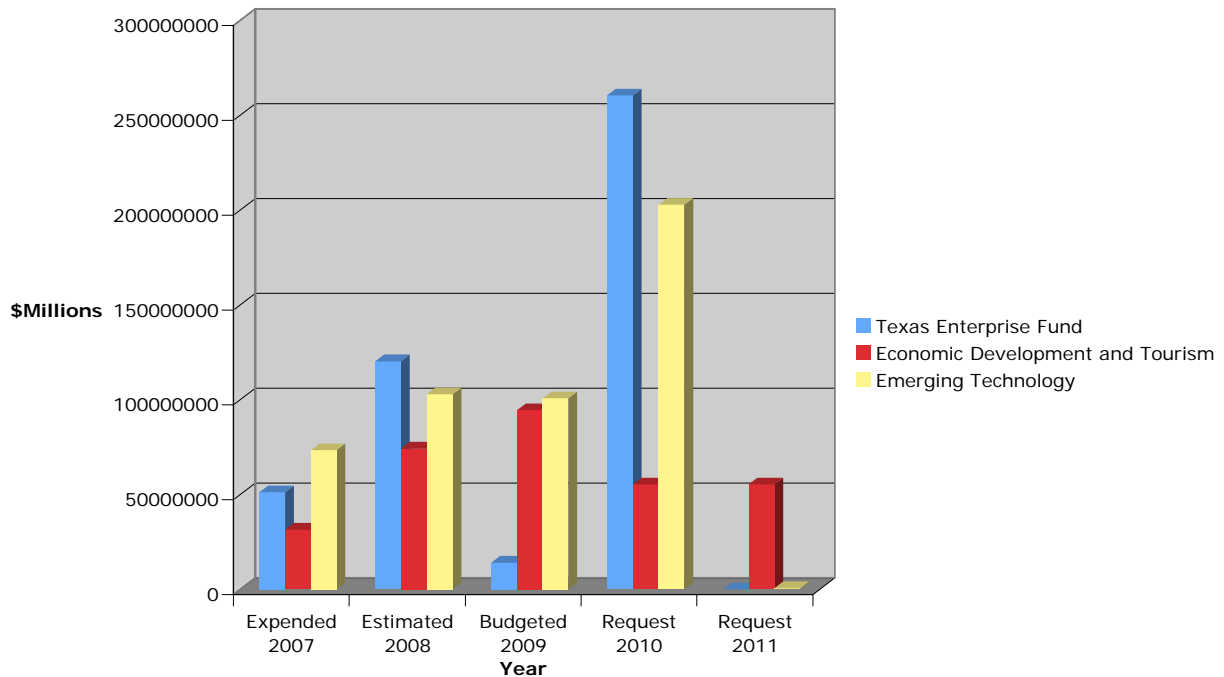
In Texas, clean energy could mean jobs both within the urban sector as solar panels or energy efficiency devices are installed or in West Texas as larger utility-sized Concentrated Solar Plants, wind or even plants using agricultural waste are constructed. As already mentioned, an additional Solar Renewable Portfolio Standard as well as more energy efficiency commitments, including one for demand response and on-site renewables, and the availability of loans for renewables and energy efficiency projects could help jumpstart this economic engine. Nevertheless, Texas could also consider other economic development tools and incentives to take advantage of the “green” job movement.

Texas is home to two existing economic development funds created by the Legislature: the Emerging Technology Fund and the Texas Enterprise Fund. While both can currently be used to retain, expand or attract businesses in the energy and energy efficiency sectors, there is no specific mandate to do so, and not even specific language in the statutes to encourage its use to attract clean energy projects to Texas. Recently, a large Spanish wind company – Gamesa Corporation -- chose to locate in Pennsylvania and not in Texas after receiving significant incentives from the State of Pennsylvania, despite Texas’ clear advantage in wind resources. Texas should explore a more robust use of these existing funds, as well as revenue bond financing to help manufacturers of solar, wind and other alternative equipment locate or expand in Texas. For example, in Pennsylvania, the state offered a financial package totaling approximately \$10 million in grants, loans and tax credits for the three manufacturing centers as well as additional \$9.31 million in state incentives for its

<sup>33</sup> Sierra Club, Press Release (“Labor, Environmentalists Joine Forces to Launch Green Jobs for America Campaign”), April 8, 2008.

Cambria County facility, and tax free status until 2018 for one of its manufacturing facilities located in a brownfield area. The state has set up mechanisms for clean energy to be able to provide nearly \$1 billion in tax-free bond financing for clean energy projects.<sup>34</sup>

**Figure 12. State of Texas’s Existing and Proposed Economic Development Funding, 2007-2011**



Source: Governor’s Office, Legislative Appropriations Request, 2010-2011.

The Governor in Texas is requesting an additional \$200 million for the Emerging Technology Fund and some \$260 for the Enterprise Fund for the upcoming budget.

There is no reason not to earmark or set aside part of this money to attract and commercialize the development of companies from the renewable energy, energy efficiency and energy storage technologies.

We would suggest that Texas create a \$100 million Clean Energy Incentive Fund as part of the Emerging Technology Fund.

**Recommendation: Expand and focus the Texas Enterprise and Emerging Technology Fund on alternative energy, energy efficiency and renewable energy storage.**

<sup>34</sup> Pennsylvania Department of Environmental Protection, Press Release: Governro Rendell Inaugurates GAMESA’s Cambria County Manufacturing Facility, **June 12, 2006**.

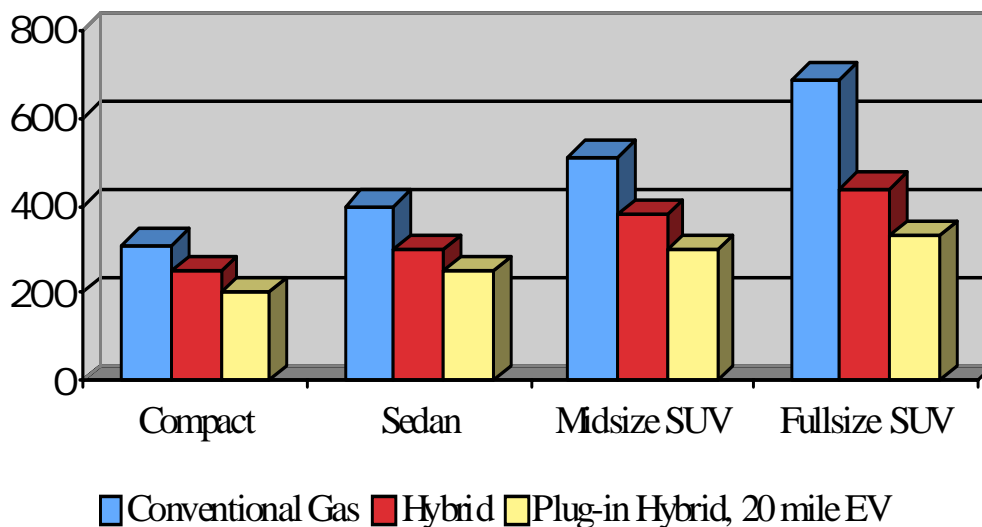
## 12. Adopt Green Fleet requirements for public entities including plug-in hybrids so that Texas can begin to develop a vehicle-to-grid electric market.

Many energy scholars believe that in the not-too-distant future most cars will gain their energy not from fuels, but from electricity from advanced batteries<sup>35</sup>. Furthermore, those same batteries could become the “vehicle” to then store electricity generated on-site and send it back to the electrical grid. While the different potential technologies are limited only by the imagination, these “vehicle-to-grid” systems would attempt to take advantage of the fact that cars are only needed part of the day – the part when we drive – while electricity is always needed in our homes, offices and industries. Imagine for example shaded parking lots that had solar panels on top to both power vehicles while parked, but also to allow cars to power the grid once their batteries were “full.”

The future is actually already here. While hybrid vehicles already get part of their power from a separate battery and are growing in sales, several localities and states have begun to promote the use of plug-in-hybrids (PHEVs) that would replace either the complete use of gasoline or other fuels with electricity or at least the first 20 to 40 miles driven. Electricity use is inherently more efficient than gasoline use, and when comparing from well to wheel produces less emissions of carbon dioxide as well as other air pollutants, even if the source of the electricity generated is traditional coal. When that power also includes renewables like solar and wind, the emissions reductions are nearly total. Thus, hybrids produce fewer emissions than normal cars, and PHEVs even less than hybrids (See Figure)

And PHEVs are already here. Thus, starting in 2004, individuals, corporations and public utilities have begun converting some hybrids – mainly the Toyota Prius -- into PHEVs at a relatively low cost. In 2007, General Motors announced its intention to mass-produce two PHEVs -- a Saturn VUE SUV, and the Chevy Volt, a series hybrid (where only the electric motor powers the wheels and the gasoline engine recharges the batteries). In 2008, Volvo officially announced a Swedish plug-in hybrid development program. Other companies have announced similar intentions.

**Figure 13. Carbon Dioxide Equivalent Emissions from Different Types of Cars**



Source: Electric Power Research Institute

<sup>35</sup>Arjun Makhijani, Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy (IEER Press and RDR Press).

PHEV technology also has the potential to provide peak load power during high demand periods, if a utility's electric distribution system provides vehicle-to-grid (V2G) capability through smart grid technologies. A number of states and localities have begun the effort to provide incentives to boost the sale and use of PHEVs and begin to create a vehicle-to-grid system.

These efforts include:

- A state law in Minnesota that encourages the state to buy plug-in hybrids for its public fleets;<sup>36</sup>
- A demonstration project in Michigan to analyze whether its utility system could handle a switch from traditional vehicles to PHEVs and whether a vehicle-to-grid program could be created;
- Demonstration projects in New York<sup>37</sup> and California to analyze the feasibility and environmental benefits of introducing plug-in hybrids and to convert some public hybrid vehicles to plug-in-hybrid;
- A \$300 sales-tax rebate in South Carolina for the private purchase of plug-in hybrids and a \$500 sales tax rebate for the purchase of equipment to convert a standard hybrid to a plug-in hybrid;
- The "Plug-in Partners" initiative by the municipal electric utility in Austin, Texas, to seek commitments from U.S. cities and utilities to help create a market for plug-in hybrids.

Thus far, the State of Texas has not specifically created a program to create mandates or incentives for plug-in hybrids or create a vehicle-to-grid system.

Texas does however have the beginning of a state Green Fleet program. In 2007, then State Representative Rick Noriega sponsored legislation that mandated that certain state agencies purchase hybrids or other low-emitting vehicles when buying new cars. In sponsoring HB 2293, Noriega noted that 37 state agencies spend upwards of \$120 million annually on maintaining and purchasing their fleets, with about a third going simply to pay for gasoline.<sup>38</sup> The legislation required that at least 10 percent of all new vehicles purchased by certain state agencies meet certain emission and fuel economy standards to save money, reduce emissions and promote cleaner vehicles.

Other states have gone even further to promote green fleets that will help reduce emissions, save gasoline and promote hybrid technologies. There are in essence three approaches:

1. Establish a fleetwide fuel economy standard for the entire fleet to encourage purchases of most economical, fuel-efficient car for the job needed.
2. Mandate the purchase of specific vehicles, including hybrids and/or plug-in hybrids; and/or
3. Set an oil-saving target, which could include both provisions for alternative vehicles and fuel-efficient standards.

In addition to these approaches, states should pursue the possibility of energy-efficient vehicle group purchases to utilize the purchasing leverage of state and local agencies.

Whatever the approach, the first step is to conduct an inventory of the existing fleet, including its emissions, mileage, oil consumption and fuel efficiency so there is a base to make real reductions in emissions and increases in fuel efficiencies.

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<sup>36</sup> Minnesota Governor Tim Pawlenty signed a law on May 31<sup>st</sup>, 2007 that requires the state to buy plug-in hybrids on a preferred basis when they become available. The law, House File 3718, also encourages Minnesota State University - Mankato to develop flex-fuel plug-in hybrid vehicles, and creates a task force consisting of business, government, and utility representatives to develop a strategy for using and producing such vehicles in Minnesota.

<sup>37</sup> Under the \$10 million New York State plug-in hybrids program, the 600 hybrid vehicles in the State fleet will be retrofitted to be plug-in hybrids

<sup>38</sup> House Research Organization, Bill Analysis: CSHB 2293, 80<sup>th</sup> Legislative Session, 2007.

In addition to state purchases of PHEVs, Texas could promote individual purchase of PHEVs and conversions to PHEVs either through a motor vehicles sales tax rebate or through the existing Drive A Clean Machine Program. In 2007, the Texas Legislature expanded the LIRAP, or Drive A Clean Machine Program to allow up to \$3,500 in incentives for Texans replacing an old vehicle with a new hybrid if they met certain income guidelines. Some \$100 million was earmarked for certain qualifying Texas counties in FY 2008 and FY 2009.<sup>39</sup> As more cities begin to require I & M programs on vehicle emissions, and as PHEVs become available, the program could be expanded to offer higher incentives for PHEVs.

Finally, Texas must begin to plan for the day when advanced, smart meters allow vehicle to grid transfers of electricity. Texas would be smart to plan for how to make this happen today.

**Recommendation: Texas should pursue a green fleet state program that would specifically promote PHEVs, and should first conduct an inventory of all vehicles and vehicle needs. In addition, Texas should create an incentive for individual purchases of PHEVs or conversions of existing hybrids to PHEVs through either a sales tax exemption or an expansion of the Drive a Clean Machine (LIRAP) program. Finally, the PUC should conduct a study of how to integrate PHEVs into the electric grid, and what technical, legal and economic changes in regulation are needed to make it happen.**

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<sup>39</sup> 80<sup>th</sup> Legislative Session, SB 12, 2007.



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