



MEMORANDUM

TO: Larry Weis, General Manager

FROM: Michael Osborne, Special Assistant to the General Manager

DATE: November 1, 2011 (Last paragraph on p. 4 revised on Nov. 7, 2011)

SUBJECT: Final Report on strategy to reach 200 MW of solar generation, per Resolution No. 20110804-027

On August 4, 2011, City Council approved a resolution directing staff to provide a report within 90 days on the current strategy to reach the adopted goal of 200 MW of solar generation by 2020.

The Resolution directed that the Report address possible solar generation projects including:

- Current and potential utility-scale projects, including the potential for local manufacturing facilities,
- Rooftop solar for large commercial developments and residential homes,
- The potential for the utility's leasing of private rooftop space for solar installations,
- The potential for community solar projects, including any legal restrictions,
- Possible changes to the land development code that could promote solar installations, and
- The new state legislation and whether it could allow new options in Austin's service area.

The following pages fulfill the direction of the resolution.

Final Report on Austin Energy's Strategy for 200 MW of solar generation per Resolution No. 20110804-027

Overarching Principles

- Austin Energy will provide solar energy for its customers in a fair and consistent way.
- Austin Energy should craft strategies that provide solar energy efficiently and at the lowest cost.
- Austin Energy strategy should consider all the costs and benefits of the various scenarios and approaches.
- Austin Energy strategy should include and encourage third party development. (EUC recommendation)

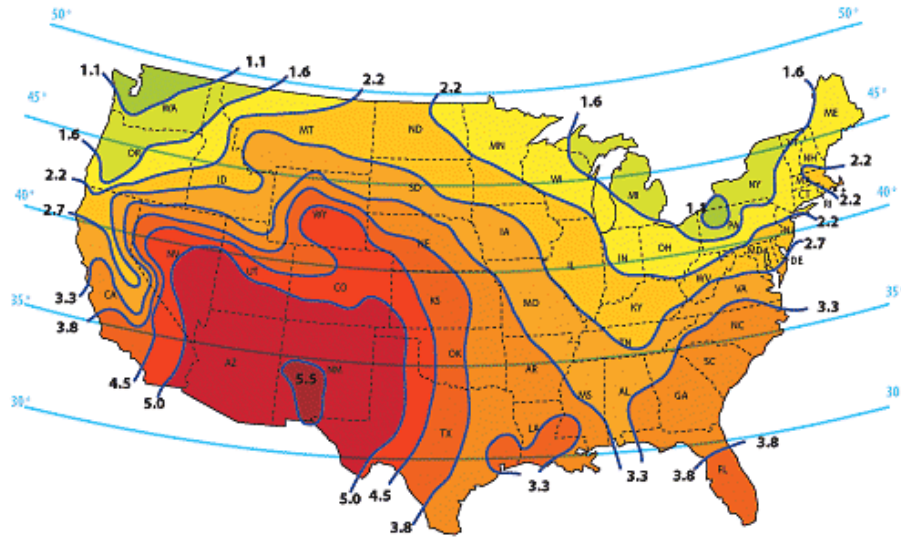
Current and Potential Utility Scale Projects and Local Manufacturing

Austin Energy is within a few weeks of taking power from a 30 MW photovoltaic (PV) plant located on City land just east of Webberville, Texas. It is the largest solar installation in Texas and one of the largest in the United States at this time. Energy from this plant will flow into the homes and businesses of all Austin Energy customers. The cost of the energy when the power purchase agreement was negotiated was approximately 16 cents/kWh.

Austin Energy also has leases or purchased land approximately 400 miles west of Austin suitable for solar production.

- The General Land office tract is located on a 69 KV line that, according to preliminary insertion studies, is capable of carrying 30 MW. The site is currently monitored for both total insolation and for direct beam energy.
- On the Toyah tract, we have enough land for a 200 MW plant. However, the existing line is only capable of approximately 30 MW. The site is also monitored for both total insolation and for direct beam energy. Should the line be upgraded and combined with the Competitive Renewable Energy Zone infrastructure in the region, the Toyah site could reach its full potential. These CREZ lines will move renewable energy from the windy hot deserts in the west to the load zones to the east. Most of these lines will be completed by 2014.
- Austin Energy also has the ability to blend large scale PVs with our current wind acquisitions. The Round Mountain project could be the site of a 40 to 50 MW plant, thus achieving maximum efficiency out of the substation and road infrastructure.

Austin Energy could site from 100 to 280 MW of solar with these three properties. Westerly plants enjoy approximately 30% more sun than Austin, and they will meet late afternoon peak demand more effectively due to their longitude. (See insolation map on next page.) Energy from solar plants in the west will therefore be less expensive than Austin sites provided the planned CREZ lines reduce congestion costs in the region.



Overall Deployment Strategy

Austin Energy’s clean energy strategy is to deploy the least cost resources and most developed technologies first. In general, that means that energy efficiency should be deployed first, followed by low cost wind, then biomass or geothermal, then large scale centralized solar, then large scale distributed solar.

Today, distributed solar is the most expensive, difficult to service, and problematic in financial terms for the utility. Distributed solar is generally recognized to be the ultimate solution as solar modules give way to solar glazings, solar roofs, and other building integrated products.

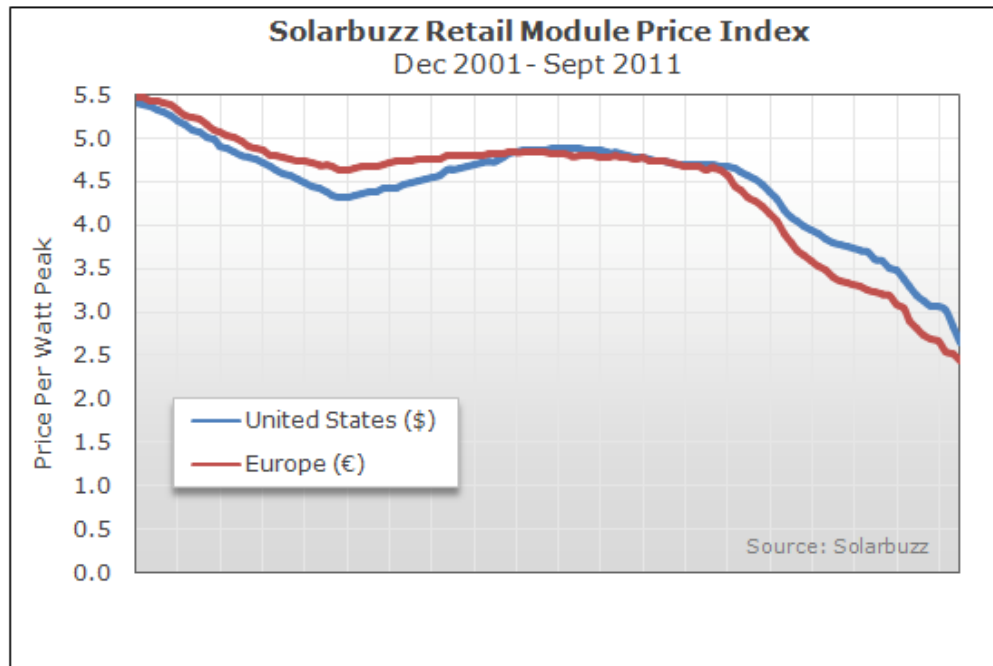
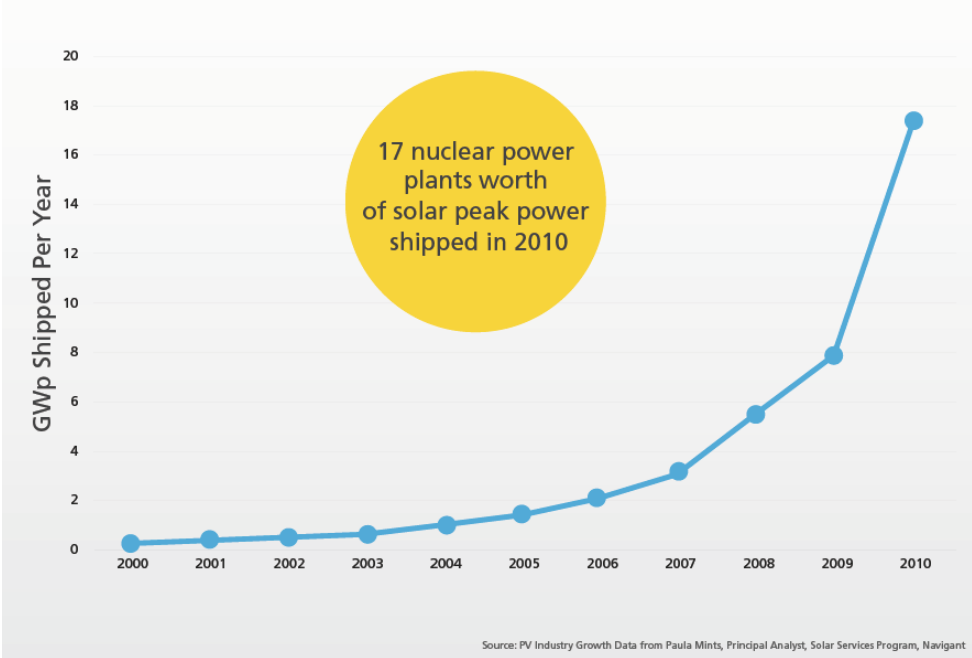
The challenge for the City is to provide enough incentives for the distributed solar generation industry to develop and mature and become self sustaining, while at the same time moving aggressively towards our overall renewable and energy efficiency goals.

Solar Pricing

The solar industry is growing at remarkable rates. In 2011, over 22 GW of solar panels will ship globally. Ten years ago, only 400 MW were produced. Prices have come down. Over the last 20 years, PV has shown impressive price reductions, with the price of modules decreasing by over 20% every time the cumulative volume of modules sold has doubled. Since 2001, retail module prices have declined by more than 50%.

A few factory module prices are now under a dollar/watt for the first time ever. Wholesale prices are less than \$2/watt. Raw silicon, the raw material for most solar cells, is trading at less than \$40/kilogram from highs in the \$300 range just three years ago.

Solar Growing Rapidly, Averaging 65% Compound Annual Growth Rate for the Past 5 Years



These combined reductions have brought the cost of distributed solar down in the Austin area to \$4.50/watt for certain installations. The cost is further reduced by \$2.50/watt with Austin Energy's current rebate. Federal tax credits can reduce this cost by another \$0.60/watt, for a net first cost of \$1.40/watt or \$1,400 per kW. In 20 years, a kilowatt of solar will produce 24,000 kWh under Austin sun, approximately a \$2,500 value assuming no monetization for carbon or other values.

Prices for large scale solar projects in the deserts of West Texas are now well under 10 cents/kWh. Prices approaching 7 cents/kWh by 2015 are likely.

Potential for Local Manufacturing

Any time a community makes an investment, it is ideal to try to keep as much of that investment within the community. No matter what kind of fuel or energy we use, if it's not locally produced, the community is exporting dollars to import fuel.

The same is true for solar. If panels are not made locally or installed by locally owned companies, then we are not making the best use of our spending power. It is true however that distributed solar flows income to its owners and back to the community once the capital cost is recovered. This is a clear value to the community as a whole. The more installers, the more inverter manufacturers, the more fabricators, the more manufacturers that call Austin their home, the more wealth we create for the community.

A 2006 study commissioned by Austin Energy concluded that construction of a 100 MW solar manufacturing plant in the Austin area could create nearly 300 new jobs and add about \$1 billion to the regional economy by 2020. Unlike most cities, Austin already has one solar manufacturer, and another large solar operations center that are moving here.

In 2009, the city offered property tax breaks for Yingli Green Energy Associates, which was considering Austin for a solar panel manufacturing plant and some 300 jobs. Austin also would have become Yingli's U.S. headquarters. Yingli, the U.S. subsidiary of a large Chinese solar-energy company, would get 80% property tax breaks for 10 years under an incentives offer from the City. Earlier in the year, Yingli announced the opening of coastal U.S. headquarters in New York City and San Francisco. Yingli did not build a plant in Austin, or in Phoenix, our competitor. They enlarged an existing plant in China.

After being granted an incentives package by the Council, which pays \$233 for every job the company creates and retains from 2011 to 2020, Sunpower *did* move to Austin. The San Jose, California-based company plans to employ 450 highly paid professionals over the next four years in marketing, finance, sales, and other areas. The average salary will be \$70,000, and the company expects to fill 80 % of the jobs locally.

HelioVolt remains in Austin with their unique printing technology. In September, HelioVolt reported collecting \$85 million from 25 investors just four days after they announced a partnership deal with a division of SK Group, a Korean energy, chemicals and telecommunications giant. HelioVolt disclosed that SK Group was investing \$50 million in the company.

We feel that companies that choose our community thus providing positive economic impacts should be scored favorably in evaluating solar development offers. We also feel that making special offers to companies on their promise to move seems inappropriate and unfair to those who are here already.

Rooftop Solar for Large Commercial and Residential Solar

The idea that every home or office would have its own power derived from energy from the sun is compelling. In fact, the zero energy capable home or building is an important part of Austin Energy's resource plan. However, based on a 2009 Department of Energy/Austin Energy study,

the total amount of available rooftop PV in Austin is about 2.4 GW, which would produce about 3,000 GWh of energy a year. Currently, our customers use over 14,000 GWh annually.

In pursuit of a rooftop solar policy, Council approved a strategic plan for Austin Energy in 2003 that included a commitment to solar energy as a key component of the utility’s resource plan. Austin Energy established its Solar Rebate program in 2004 with the following goals in mind:

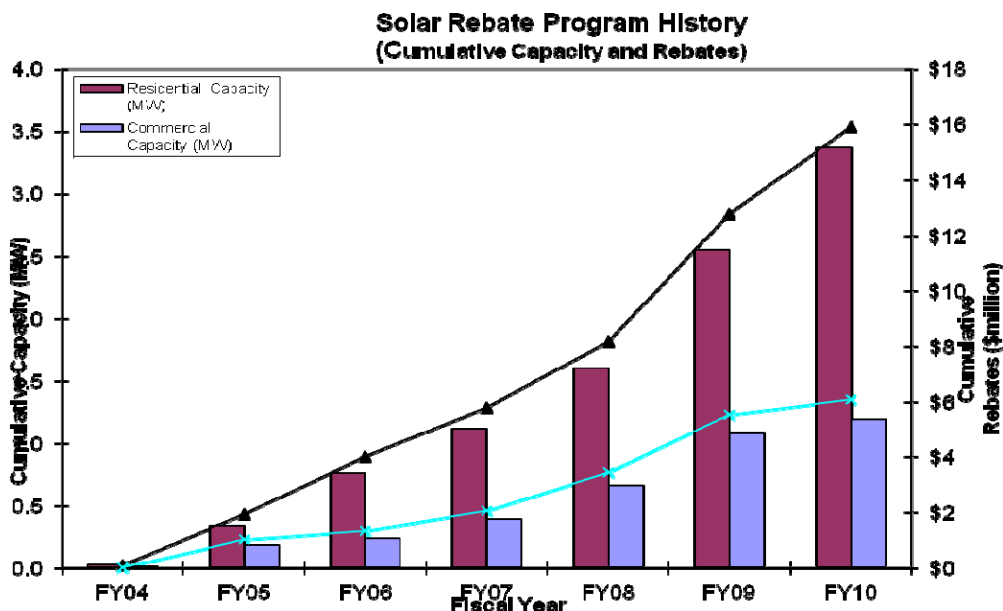
- The Program and incentives should ultimately lead to a self-sustaining rooftop/small scale solar energy market in Austin.
- The Program should provide financial incentives that are economically efficient, i.e., incentives that prompt customers to make solar energy investments they would not otherwise make, without being excessive.

During the first six years, while the solar market was emerging in Austin, the Solar Rebate Program offered capacity rebates (rebates denominated in dollars per installed watt of generating capacity) to all residential and commercial solar customers. Capacity rebates are appropriate when the greatest hurdle to private investment is initial investment costs. Capacity rebates remain the optimal rebate design for the residential sector.

The history of the program and its achievements are below:

Solar Rebate Historical Statistics								6-Sep-11
Fiscal Year	Nominal Rebate Rate (\$/kW-Rebate)	Average Installed Cost (\$/kW-DC)	Average Rebate Amount (\$/kW-Rebate)	Rebate vs. Total Installed Cost (%)	Annual Budget (\$)	Annual Goal (kW-Rebate)	Annual Expenditure (\$)	Number of Registered Contractors
FY04	\$5,000	\$ 6,526	\$ 4,962	72%	\$ 923,000	185	\$ 426,180	4
FY05	\$4,500	\$ 6,467	\$ 4,961	72%	\$ 3,500,000	770	\$ 3,395,216	9
FY06	\$4,000 - \$4,500	\$ 6,597	\$ 4,296	61%	\$ 3,200,000	700	\$ 2,796,354	14
FY07	\$4,500	\$ 7,096	\$ 4,493	60%	\$ 3,180,000	620	\$ 2,561,892	19
FY08	\$4500	\$ 7,322	\$ 4,286	56%	\$ 4,000,000	900	\$ 4,198,494	23
FY09	\$4,500 - \$3,750	\$ 6,868	\$ 4,273	59%	\$ 4,500,000	900	\$ 6,710,009	28
FY10	\$2,500	\$ 5,617	\$ 3,284	56%	\$ 4,350,000	1,530	\$ 3,910,771	33
FY11 - YTD	\$2,500 - \$3,000	\$ 4,739	\$ 2,762	56%	\$ 4,000,000	1,315	\$ 1,078,930	33

Note: Average Installed Cost and Average Rebate are for Residential Systems Only



After seven years, the program has resulted in approximately 5 MW of installed capacity. Perhaps even more consequential, because of shading, upkeep issues, and inverter issues, the average customer is receiving less than 1200 kWh/kW/year from their system. In comparison, the Webberville project, which uses a tracking system, will produce more than 2000 kWh/kW/year. Such systems in the west will produce more than 2600 kWh/kW/year.

Potential for Leasing

In order to increase the amount of distributed solar on our system and increase the amount of production from those facilities, Austin Energy is considering leasing rooftop areas from the owners of large flat roof warehouses and retail outlets. Here, issues of tree shading, and other quality control issues can be minimized. Austin Energy's first lease agreement has just been completed.

Equipment and system leases for solar systems offer an opportunity to increase solar penetration by addressing first costs and payback periods for customer investments.

There are issues raised by leases. For example, a third party lease of electric generation equipment to customers for the purpose of providing electric service for compensation (e.g. service denominated in energy or capacity) raises issues of franchise integrity under the Public Utilities Regulatory Authority Act of 2001 (PURA). Additionally, lease transactions reduce electricity sales revenue and may, under high penetration scenarios, create operational and financial challenges for Austin Energy.

Austin Energy is investigating a service to offer solar equipment leases to customers. Austin Energy could leverage Austin Energy billing and collection capabilities, third-party (tax credit supported) financing, competitive module procurement, and local installers to enhance local economic development opportunities while maintaining a strong connection with Austin Energy electric services customers.

Similarly, Austin Energy could offer a lease product to customers for capacity-denominated shares of a community solar installation built either by third parties or Austin Energy.

In investigating these opportunities, Austin Energy will be guided by several principles:

- Avoid PURA "electric service" problems
- Utilize third party, tax-benefitted financial support where possible
- Utilize private sector businesses for installation and services
- Utilize bulk purchase pricing benefits where possible
- Establish products and prices that enable wide participation by customers including renters and mid- and low income customers
- Generate cost recovery and margins for Austin Energy

The Value of Solar

Austin Energy contracted with Clean Power Research (CPR) in 2005 to perform a "Value of Solar" study. The objectives of the study were to quantify the comprehensive value of distributed PV to Austin Energy in 2006 and to document evaluation methodologies to assist Austin Energy

in performing the analysis as conditions change. The study was completed in 2006. Austin Energy has subsequently used the methodologies to periodically update the value of solar.

The study was one of the most detailed of its kind. It determined the value of the following distributed PV benefits: energy production, generation capacity, T&D capacity deferrals, reduced transformer and line losses, reactive power control, environment, and natural gas price hedge. The analysis was performed for six fixed and tracking PV system configurations. Under current market conditions, the levelized (i.e., constant) value over the 30-year PV system life is around 12.5 cents/kWh. The calculated value of solar energy is highly sensitive to the price of natural gas. Consequently, in 2008, the value was closer to 16 cents.

Austin Energy has again contracted with CPR to assess whether the methodologies should be revised given changes to Texas' electricity market structure.

Potential for Community Solar and Legal Restrictions

Another strategy to increase energy production and reduce costs is the Community Solar concept. In this strategy, many homeowners and businesses band together to build larger installations within the community or even in the rural west and thus bring down the cost of their individual installations through the economies of scale that comes with larger installations. Each home or business owner would in effect buy a share of the project and would treat that share as if it existed on their roof. The proponents of this concept would issue deeds to their condo owners and provide proprietary software that would allow for the home or office to net its energy consumption against the energy production of the field in real time.

Although this strategy is appealing, there are legal and operational issues that cause concern. There is no certainty from a legal perspective that a condominium structure does not constitute third-party electric service within Austin Energy's certificated service area, which is prohibited by the Texas Utilities Code.

The structure is designed to take advantage of the fact that Texas law does not assign an ownership interest by a condominium owners' association to the facility's common facilities (this has not always been the case). However, given the proposed scale of the solar facility and the number of owners involved, the facility will in fact be marketed, maintained, and operated by a third party, including the provision of services related to billing and tracking customers.

While a third party does not own the facility, case law suggests that courts will look at the practical effect of the arrangement, rather than only at its formal legal structure. It is possible to structure this transaction as a purchase power agreement between the utility and the owners, rather than a retail service structure.

Possible Changes to the Land Development Code

Pursuant to City Council Resolution No. 20060810-060, the Zero Energy Capable Homes (ZECH) Task Force recommended in their September 2007 final report to the Council that the City consider the following:

- “Review the Land Development Code to determine the feasibility of revisions that would encourage energy efficiency from changes in the land development process, such as passive solar lot orientation, incentives for subdivisions designed to meet energy efficiency or renewable energy goals.

- Conduct a Comprehensive review of the entire land development, permitting and construction process (including Austin Energy subsidies for renewable energy) to encourage original development of homes that are not only Zero Energy Capable, but constructed with on-site or near-site renewable energy source so that the homes truly are Zero Energy. “
- Council also added a review of the land development code to the last code adoption ordinance for barriers to high level energy efficiency.

These reviews have not been conducted. However, Austin Energy has taken a major step toward integration of our renewables policy with efficiency in the last round of solar rebate changes when we required at least a 3-Star rating from Austin Energy Green Building or participation in Home Performance with Energy Star® as a prerequisite for receiving the rebate.

Austin Energy is also playing a major role in supporting the development of a new low-income housing project that will be one of the first ZECH communities (Guadalupe-Saldana), to gain real world experience with the challenges a developer faces.

We are also active in a Pecan Street Project demonstration project where we are seeking to develop rates and services that will encourage optimization of solar and efficiency resources operating as a system.

These efforts will aid in developing a matrix for revision of the Land Development Code that embraces Imagine Austin principles to grow as a compact, connected City.

New Legislative Action

Some of the more important pieces of legislation that passed the 81st legislature regarding solar energy came from Senator Corona. SB 981 clarifies how solar panel owners and third party leasing companies are treated in the competitive retail electric market. It also requires the PUC to study and compare different methods of compensating a DG owner for excess energy and to report to the Legislature by Sept. 1, 2012. The law specifically does not apply to municipal utilities like Austin Energy

SB 943 by Corona clarifies that energy storage facilities can hook up to the electric grid by being classified as a generation asset.

HB 362 by Representative Solomons encourages solar deployment on rooftops by preventing property owners associations from prohibiting solar panels.

HB 2077 by Representative Eddie Rodriguez will initiate a pilot project to extend low-interest “LoanSTAR” funding for renewable energy deployment and energy efficiency at houses of worship and non-profits.

Senator Watson’s SB 768 creates a new municipal utility district in the area that will have specific authority to develop renewable energy projects.

Finally, public private partnerships for new renewable projects could be greatly encouraged by the passage of SB 1048 which sets guidelines and a local process for public-private infrastructure projects such as power generation facilities. The guidelines for this process must be developed by the local government before it can be implemented. There is already some interest in this bill by local developers, so Council action will be required to use this public private initiative.

A full list of solar related bills may be found in the Appendix.

The Current Strategy

Austin Energy will continue to develop its solar portfolio on many fronts. We will bring the 30 MW Webberville plant online late this year and will then begin to evaluate its performance over the next year, particularly next summer. Webberville will be the first real solar plant the Utility operates. We will continue to offer solar rebates, rates, and incentives for distributed solar to our residential and commercial customers. We will continue to innovate and experiment with new structures and options if legal hurdles and opt-in issues can be solved or dispelled.

We believe a reasonable scenario that reaches our 200 MW goal by 2020, with an aggressive distributed solar component, would include the following assets and programs:

Webberville Solar plant	30 MW
Saragosa Solar Plant	30 MW
Toyah Solar Plant	75 MW
Round Mountain Hybrid Plant	40 MW
Rooftop & Community Programs	25 MW

Austin Energy currently has the real estate and program assets to reach our 200 MW goal. Due to expected reductions in solar prices throughout the decade, we believe that the 200 MW goal as described in the Resource, Generation and Climate Protection Plan is the most affordable path to achieving that goal. However, if Congress does *not* renew the solar tax credits in 2016, and given that CREZ lines are completed in 2014, a buying opportunity similar to the one we just experienced in the wind purchases may arise in the 2014-2015 time frame.

Appendix

Key Solar Bills passed by Texas Legislature 2011

HB 362 by Solomons will prevent Property Owners Associations from prohibiting solar panels. The panels must be on a roof or in a fenced yard.

SB 981 by Corona clarifies the regulation of solar power and other distributed generation in the competitive retail electric market. The bill does not affect Austin Energy or other municipal utilities but will simplify third party leases for solar panels in the competitive areas of the state. SB 981 stipulates that DRG owners, including third party leasing companies, are not required to register with the PUC as power generation companies like conventional power plants, provided the estimated annual amount of electricity to be produced is less than or equal to the customer's estimated annual consumption. Distributed Generation is defined as no more than 2MW capacity installed on the retail customer's side of the meter. SB 981 requires the PUC to study and compare different methods of compensating a DG owner for excess energy and to report to the Legislature by Sept. 1, 2012. The law takes effect 9/1/2011.

SB 943 by Carona clarifies that energy storage facilities may connect to the electric grid. Storage facilities will have to register as a generator of power and be subject to the same rules as traditional generation.

SB 768 by Watson creates the Rio de Vida MUD and specifically allows them to develop solar or other renewable energy projects.

HB 2077 by Eddie Rodriguez extends low interest funding for renewable and energy efficiency projects to churches and certain non-profit entities.

SB 1048 by Jackson sets up an advisory board for comprehensive public-private agreements and sets parameters and approval process for such agreements between government entities and private contractors. Such agreements could be used for power generation facility as well as buildings.