

SOLAR'S BRIGHT FUTURE

New Financing & Policies Position the Solar Industry
for Rapid Growth in Texas

September 2015



SOLAR IN TEXAS

With 129 megawatts (MW) of solar electric capacity installed in 2014, it is clear that Texans increasingly regard solar power as a cheap and clean form of energy, whether it is provided to them via their utility (utility-scale) or installed directly on their roofs (distributed generation). The surge of utility-scale and distributed generation (DG) solar in Texas reflects decreasing prices all along the solar value chain—from panels to installations. Continued growth in the sector, however, will also rely on socio-political and economic paradigms in the state to change.

The solar boom in Germany serves as a helpful guide for a discussion of solar in Texas. In this model, public policy ushered in a new approach to energy generation and consumption through: (1) subsidies at the grid and retail level, (2) taxes on externalities for other “dirtier” energy sources, (3) and education and training. In the early 1990s West Germany passed the Erneuerbare Energien Gesetz (renewable energy law), which catalyzed investment across renewable energy generating technologies with a special focus on solar energy. As technological innovation drove the price of solar PV panels down and increased the efficiency of installation, adoption rates skyrocketed. **The solar boom in Germany reflects a 20-year process where policy, market, and industry dynamics fed into one another to create an ecosystem that fomented growth in the sector.**¹

Whereas the German model was led by aggressive policy changes, market forces in Texas are likely to drive similar adoption rates now that the cost of the technology has dropped. Because of high price caps in the wholesale electricity market in Texas and the price volatility that is inherent in the deregulated ERCOT grid, solar energy can provide a hedge against high real time and day-ahead pricing (see HEB and Wal-Mart). In short, Texas is a buyers market for solar. For example, in the spring of 2015 Austin Energy procured approximately 150 megawatts at less than \$40 a megawatt.

Because the industry as a whole is now less reliant on technological innovation to drive cost savings, financial tools and novel billing structures will play an increasingly important role in promoting solar development at the utility, commercial, and residential scale. In order to illustrate the current state of the solar industry in Texas and its trajectory, this white paper will provide a brief overview of (1) the regulatory and policy framework for solar energy in Texas, (2) financial models designed to develop utility scale projects, as well as smaller commercial and residential installations, and (3) solar industry trends including mergers and acquisitions of major solar companies.

SOLAR POLICY & INCENTIVES IN TEXAS

A strong solar policy framework does not have to be synonymous with heavy regulation. Texas – a state that stands out because of its independent grid and deregulated market – should not have any trouble meeting new federal requirements for renewable energy deployment. Under the Clean Power Plan (CPP) introduced by the Obama administration, states will have significant leeway in deciding how they will meet the emissions reductions that the plan requires under the traditional “cooperative federalism” model. Policies at the state level will impact how much of the renewable mix will go to solar. The impact

of the CPP on the Texas solar industry will not be fully understood until the state delivers a proposal to the Federal Government (required by next year). The policies detailed below are highlighted because of their overall impact on the solar industry in Texas today. This is not a comprehensive overview: rather, a targeted look at policies currently impacting the state of play.

ITC – INVESTMENT TAX CREDIT

The Federal Government implemented the ITC under the Energy Policy Act of 2005. The ITC provides a dollar-for-dollar reduction in the income taxes that a person or company would otherwise pay the Federal Government. ITC credits are equal to 30% of the basis that is invested in eligible property used for solar energy production.² The ITC expires in December 2016 and is eligible for renewal, but its renewal is a contentious issue. Opponents claim that it provides unfair advantage to solar energy producers, while proponents argue that solar energy technologies have not passed the innovation phase and thus still require incentives from the government. **Whether or not the ITC remains intact, it is important to note that the credits provided to-date have played an essential role in promoting solar technologies in the U.S. and have helped to bring down prices of solar energy by 50% since 2010.**³

The expiration of the ITC (if it is not renewed) does not imply the end of the solar energy boom. **In fact, many large solar companies have stated that the solar industry at large will not suffer from its expiration.** SolarCity, a major U.S. solar firm headquartered in San Mateo, CA, recently released a report to its investors illustrating that the step-down of the ITC would not have a negative impact on its business model. If the company is able to reach its goal of \$2.50/watt by 2017, its leadership believes that the company will continue to be cost-competitive against other energy suppliers.⁴ As the ITC debate heats up and attracts more political fervor, more nuanced policies have quietly been adopted in the Lone Star state, such as the Property-Assessed Clean Energy (PACE).

PACE – PROPERTY ASSESSED CLEAN ENERGY

PACE originated in California, where a municipal politician recognized the financial constraints that his constituents faced when attempting to make mid to large scale efficiency upgrades to their homes and businesses. PACE allows property owners to avoid large upfront payments for energy improvements on their assets by allowing them to take out a 10 to 20 year loan on their property tax bills. The owner/company minimizes risk by using a PACE loan because it is attached to the property and not to the individual or company. **PACE creates significant market opportunity for the solar industry. By definition, solar panel installations are considered to be energy efficiency upgrades, enabling commercial and industrial energy users to fund up to 100% of their panel installations with PACE financing.**

Because the loan places a first lien on the property, this model instigated a disagreement between federal loan agencies and the municipalities that allowed PACE to operate in their cities. PACE statute SB385 was passed into Texas law as recently as Spring 2013, and in Spring 2015 Travis County was the first county to implement a PACE district, enabling the County to grant loans for efficiency upgrades on commercial and industrial properties.

To date, Texas PACE does not include single residential consumers (properties with 5 or more homes are accepted), in part because of the ongoing friction with the Federal Government over these loans. The FHFA's effort to oppose U.S. states from adopting laws that will allow for homeowners to acquire these loans and to prosecute public and private organizations that engage in this activity is primarily based on two assumptions: (1) A homeowner with a first-lien PACE loan cannot refinance their existing mortgage with a Fannie or Freddie Mac mortgage; and (2) Potential home buyers who already have a first-lien PACE loan cannot use a Fannie Mae or Freddie Mac loan for the purchase.

In *California vs. FHFA*, the FHFA argued that PACE loans are risky due to the additional cost that they create for homeowners, citing the lack of energy retrofit standards to assist homeowners as well as the above-mentioned inability for the homeowner to refinance a loan on the lien placed for the PACE loan. However, standardization in the solar industry renders this point moot. Additionally, solar panels increase the value of the home, not the other way around. Texans who want cheap and abundant solar energy but cannot afford the current upfront costs or do not want to lease their panels have a lot to gain from a PACE Texas that includes single residential loans.

CPP - CLEAN POWER PLAN

The CPP, introduced by the Obama administration in August 2015, is the first big step by the U.S. government to curb CO2 emissions on a national scale. The CPP requires that the U.S. achieve a 32% reduction in power sector emissions by 2030.⁵ In Texas, the implication is clear; dirty coal-fired plants will be decommissioned and cleaner power producers will take their place. Many would argue these old coal-fired plants were on their way out regardless of the plan. In a 2014 analysis of the CPP, ERCOT predicted a boom in solar power generation, with a baseline scenario of 10 gigawatts (GW) of added capacity by 2029. Because the plan will accelerate the decommissioning of coal-fired plants around the state, solar generation stands to fill in the gap, along with wind and natural gas.

SOLAR FINANCE

Solar has come a long way from when president Jimmy Carter placed solar panels on the White House in the 1970s. Understanding the policies, technological and business innovations, public awareness and education campaigns that have pushed solar technologies to the state of commercialization that we see today requires a nuanced understanding of the economics of innovation. **Technological innovation is no longer single handedly transforming the solar industry; business models and financial innovations have also accelerated solar's reach at faster rates than previously anticipated.** Specifically, in recent years the solar industry has benefited from new and innovative financial tools that allow companies to sell their product, whether panels or direct electricity, to more people.

SOLARCITY – FROM LEASE TO LOAN

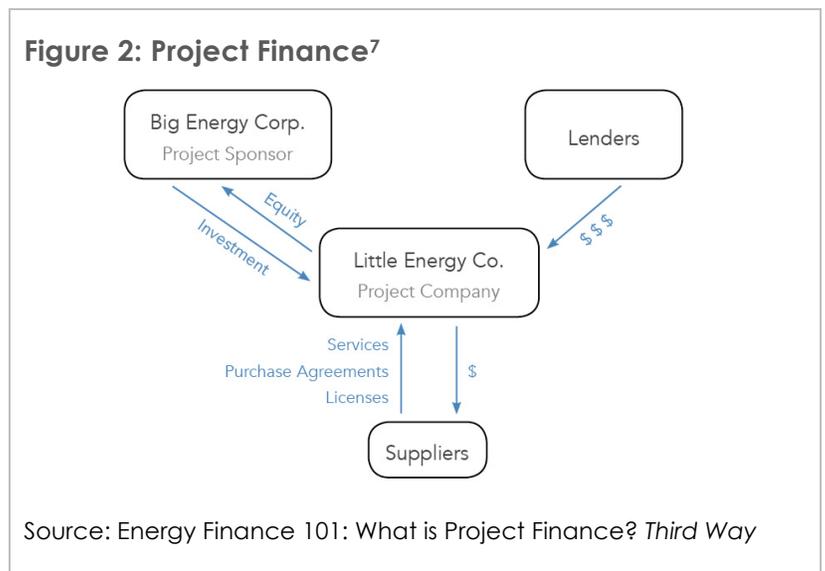
SolarCity pioneered the "third party ownership" model that revolutionized the solar industry. Instead of selling and installing systems to select consumers, SolarCity leases rooftop systems to homeowners to reduce the barrier to entry for residential rooftop solar. Leased residential rooftop solar arrays function as

a sort of power plant, allowing the consumer to enter a long-term PPA (power purchasing agreement) with SolarCity. This model has made solar accessible to more customers by allowing them to avoid large down payments and installation fees. It also put SolarCity on the map.

SolarCity continues to innovate on the financing side to attract and retain residential customers. In 2014, it announced that it would begin to offer long-term loans as an alternative to leasing, citing a growing consumer preference towards ownership.⁶ Programs like PACE created financing alternatives for consumers outside of the “third party ownership” model and led the way for SolarCity and other companies to imitate the model and provide a private loan to its customers. In the quarter SolarCity launched its loan program (Q2 2014), 218 megawatts were booked, adding 30,000 customers in that quarter alone. The company has set a \$1.90/watt installed goal for 2017.

PROJECT FINANCE

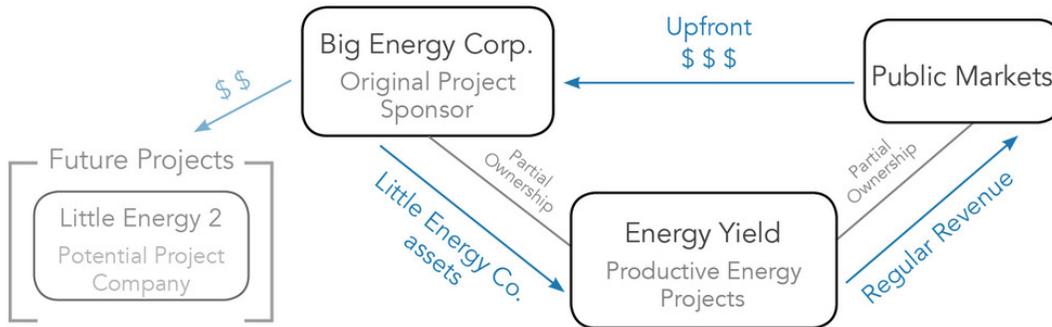
Project financing allows companies to protect their existing assets as they develop large-scale projects (in this case utility-scale solar power plants). In this scenario, large corporations mitigate risk by spinning off a second (project) company in which they maintain a majority state, thus protecting themselves from bankruptcy if the project fails. From a business and legal perspective, the project company is completely separate from the sponsor company. The project company can take out loans based on the potential cash flows that will be generated from the project upon completion, as well as all of the assets and property. These loans are considered project finance; they allow the independent company access to capital for the outlay of the project. Figure 2 (above) illustrates how project finance funnels money from the sponsor company and other lenders into the project company.



YIELDCO

A yieldco is a financial tool used to attract capital by creating a publicly traded company. In the project finance example above, a sponsor company and lenders create a project company to mitigate risk. A yieldco is the next step in this process. Once the project company has successfully developed the solar plant, the company begins to generate revenue by selling energy. **By grouping successful and low-risk project companies together into one company that can be traded on the stock market, a yieldco can attract capital for a sponsor company that would otherwise have to wait years to pay off its loans for the project companies.**

Figure 3: Yieldco Structure



Source: Energy Finance 101: An Intro to Yield Cos. *Third Way*

Figure 3 (above) illustrates how big energy companies can raise large sums of capital that can be subsequently invested into future projects (spinout companies). First, yieldcos attract capital from investors based on existing project cash flows. This capital then generates a return for the sponsor company, thus allowing for the development of more projects.⁸ Yieldcos are a powerful tool for the deployment of large-scale renewable projects and are attracting significant investment in the capital markets. SunEdison's "emerging markets" yieldco, TerraForm Global, raised \$675 million in its August 2015 initial public offering (IPO). Similarly, a yieldco formed by SunPower and First Solar, 8point3 Energy Partners, raised \$420 million in June 2015.

4. THE NEXT GENERATION OF SOLAR COMPANIES

Solar companies are becoming more vertically integrated as they grow. **With dozens of mergers and acquisitions in 2015 across the solar industry, the leading solar companies are becoming much larger.** Arguably, they are no longer "just" solar companies at this scale and scope. These energy companies possess the latest in storage technologies, energy efficiency software, and demand response capabilities.

SOLAR SUPERMAJORS?

SunEdison (a solar energy company) purchased Vivint Solar Inc. (a rooftop panel installer company) for \$2.2 billion dollars in July 2015. This purchase, along with many others, led some to declare the company to be the first renewable energy supermajor. From Bloomberg Business to Greentech Media, analysts have speculated that SunEdison's growth is designed to rival large oil and gas corporations (supermajors) in size and reach. Analysts note that SunEdison has a long way to go before it can influence policy to the same degree that entrenched players like Exxon Mobile or Duke Energy. In short, SunEdison has a \$9 billion dollar market cap, while Exxon Mobile and Duke Energy are at \$342 billion and \$50 billion dollars, respectively.⁹ **Nevertheless, SunEdison is reaching for something no other renewable**

energy company has ever achieved. As it acquires more companies and grows nationally and internationally, the company grows its market share as well as its ability to influence policy and interfere with “business as usual.”

In 2014 when the city of Denton banned oil and gas companies from fracking within city limits, the state of Texas refused to acknowledge the ban. The Texas Oil & Gas Association filed a lawsuit against the ban shortly after it was voted into law. Big oil and gas money funded the lawsuit, and eventually the ban voted in by Denton's citizens, was overturned. This example is just one of many that demonstrates the influence that oil & gas supermajors have on energy policy in Texas. The growth of SunEdison and others in the renewable energy space means that the industry will have a stronger influence on policy in the future.

SOLAR + STORAGE

Home storage and grid storage have the potential to revolutionize the energy industry, and 2015 has been a big year for both. Battery technologies have improved and become more economically accessible, opening the door for solar energy companies to add energy storage as a part of their playbook, up and down the value chain. Examples of solar energy companies purchasing energy storage technologies abound. Analogous to the drop in solar energy prices, storage technologies have become cheaper and more durable as the technologies have matured. **With the ability to store energy, issues of intermittency and peak load stress on the grid that have challenged solar companies and grid operators in the past are less acute.**

The rate at which solar companies are investing in energy storage is increasing. In the spring of 2015 SunEdison purchased Solar Grid Storage, a Philadelphia-based storage company, with the intention of providing co-located storage capabilities for their wind and solar plants. Elon Musk and SolarCity CEO Lyndon Rive recently announced that SolarCity would sell backup battery systems with every rooftop solar power system in the next 5-10 years. Finally, Sungevity recently partnered with Sonnenbatterie, one of Europe's top smart energy providers, to deliver lithium ion batteries with 10,000 charge capabilities to its customers.¹⁰

5. CONCLUSION

The solar revolution in Texas will be driven by market forces and accelerated by new financing and business model innovations. The technology is proven, reliable, and cost-competitive with other forms of energy generation. Texas is rich in solar radiation and the scale and scope of the market in Texas has attracted major players to the market. The industry is also an important employer: according to the Solar Energy Industries Association (SEIA), Texas' 417 solar companies already employ over 7,000 people in the state.¹¹ While the policy landscape at the federal, state, and local levels is still critical to reducing barriers to solar development and adoption, the voice of the solar industry is an increasingly powerful—and persuasive.

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ABOUT CLEANTX

CleanTX is the cluster development organization for cleantech in Central Texas, a \$2.5 Billion industry that employs 20,000 individuals in the Austin region. CleanTX accelerates cleantech innovation and adoption through the advancement of public-private partnerships, thought leadership and education, and networking among industry stakeholders.

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