

The Mainstreaming of Solar Energy – Opportunities and Issues for Texas Cities

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This Presentation

1. Overview -- Texas solar industry: Hemmeline.

- National trends.
- Texas solar market – foundations, status, outlook.

2. Use of solar by Texas municipalities: Zion.

- Solar deployment by municipally owned electric utilities.
- Solar for city facilities.
- Enabling solar in your city - local government regulation.

Resources on solar for city officials. Governmental and industry sources linked at the end of this presentation. Key resources:

Texas Solar Power Association

North Central Texas Council of Governments

State Energy Conservation Office (SECO)



Texas Solar Market Overview

Charlie Hemmeline



- The Texas Solar Power Association (TSPA) is a statewide industry trade association that promotes the development of solar electric generation in Texas.
- Member companies are investing in Texas, cost-competitively serving customers in both wholesale and retail markets.
- Our membership includes manufacturers, large-scale power plant developers, residential and commercial rooftop integrators, and other companies in Texas participating across the full solar photovoltaic supply chain.
- TSPA aims to be a resource for information on the Texas solar industry





Outline

- National trends
- Texas market: foundations
- Texas market: current status and new developments
- Texas market: looking ahead



Solar Portfolio Options

- Solar power has multiple distinct applications:

- Residential
- Commercial & Industrial
- Large scale power plants
- Community Solar



- The solar portion of a portfolio can itself be a portfolio
- The solar industry is active in each of these areas so municipal utilities and local governments will find eager partners and support for all of the paths chosen

Residential rooftop – San Antonio, TX



Mueller neighborhood – Austin, TX



***Commercial rooftop – San Antonio,
TX***



Commercial Rooftop – Austin, TX



Courtesy of Legal Zoom

Commercial Rooftop – Austin, TX



Carport – Austin, TX



Source: NATiVE

Carport – Austin, TX



Alamo Solar 3 – San Antonio, TX



Blue Wing – San Antonio, TX



Centennial - San Antonio, TX



Alamo Solar 2 – San Antonio, TX



Alamo Solar 5 – Uvalde, TX



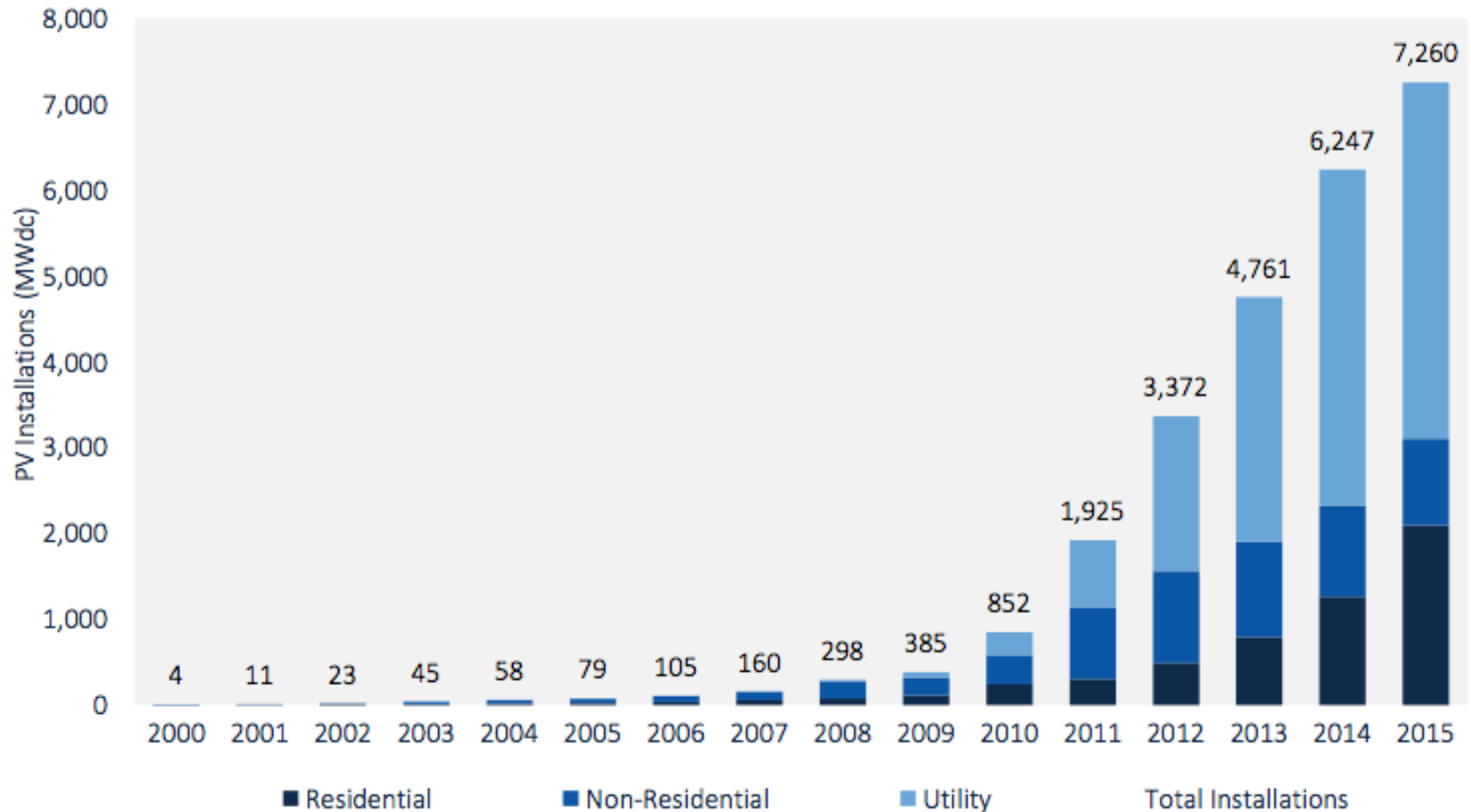


National Trends

- Through Q1 2016, the total U.S. operating solar capacity is 27.5 GW-dc with the cumulative number of solar installations surpassing one million
- The U.S. installed 7,260 MW in 2015, the largest year ever and up 16% over 2014
- 14.5 GW-dc total additions projected in 2016, 94% growth over 2015
- The U.S. solar industry employs nearly 209,000 workers as of November 2015, 20% growth in past year and up 123% in the past 6 years



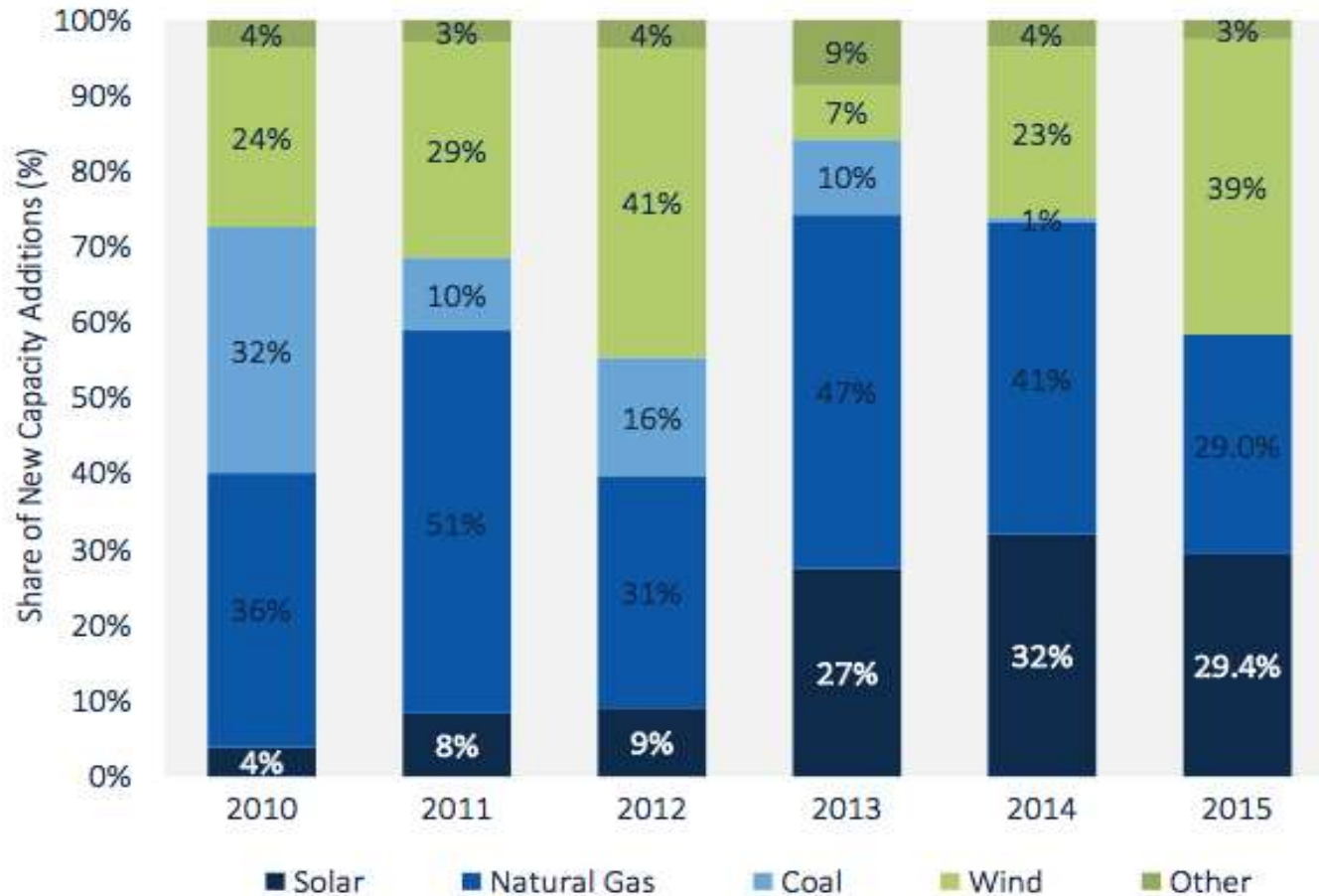
Annual U.S. PV Installations 2000 - 2016



Source: GTM Research/SEIA: U.S. Solar Market Insight®



New U.S. Electric Capacity Additions 2010 - 2015

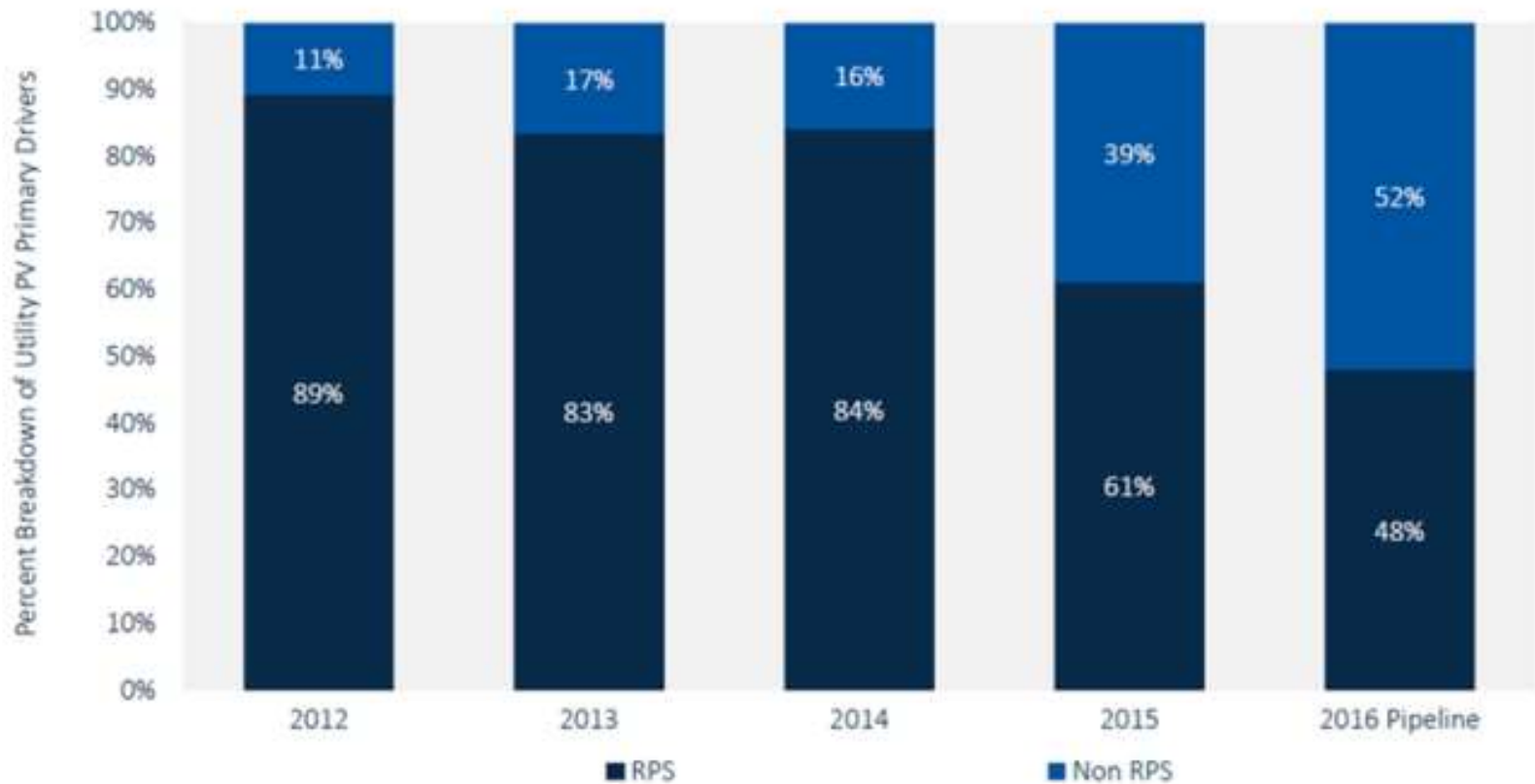


Source: GTM Research/SEIA: U.S. Solar Market Insight®, FERC



Mandates no longer the key driver

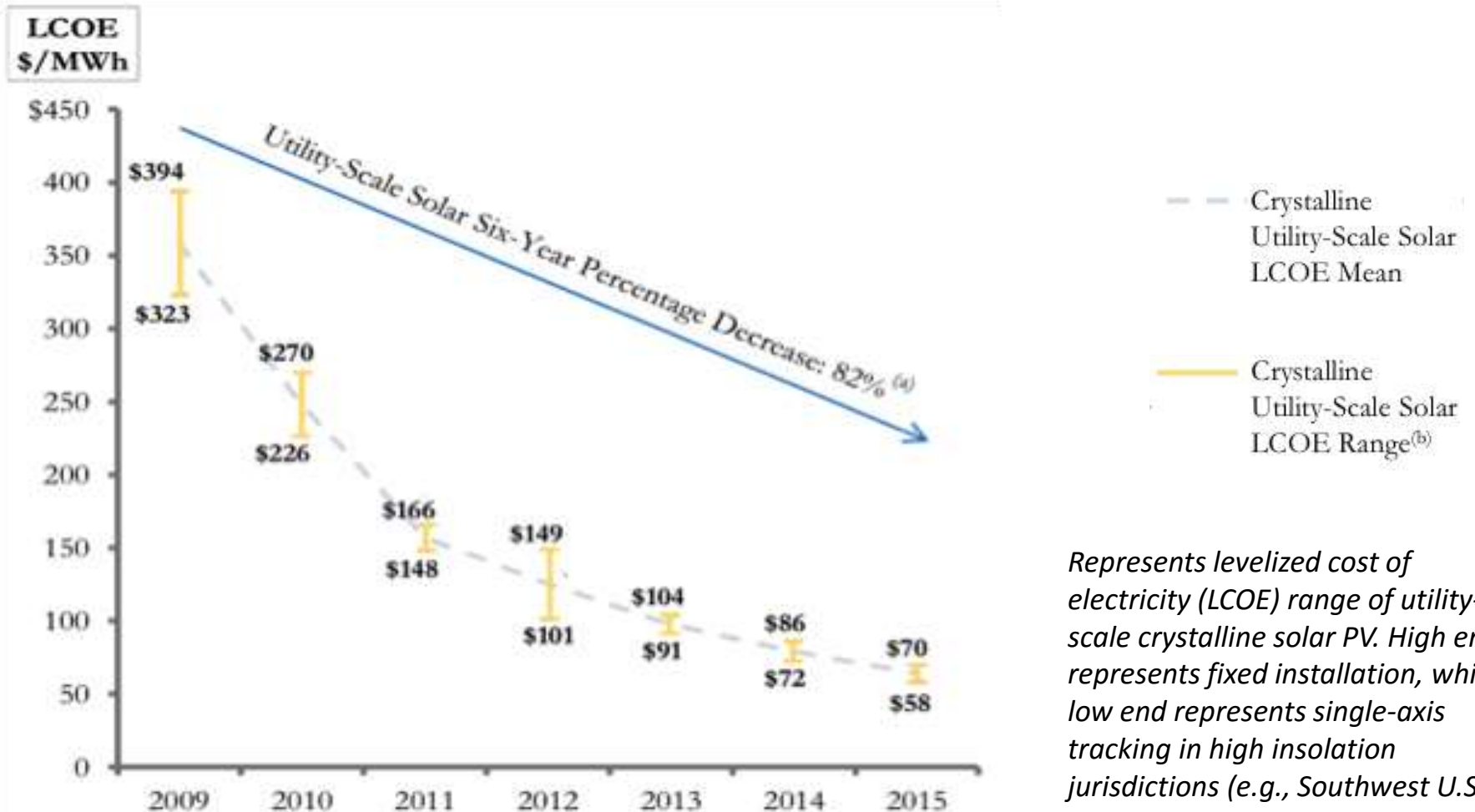
Percent Breakdown of Utility PV Driven by RPS and Non-RPS Mechanisms



Source: GTM The Next Wave of U.S. Utility Solar



Solar costs fell 82% from 2009-2015



Represents levelized cost of electricity (LCOE) range of utility-scale crystalline solar PV. High end represents fixed installation, while low end represents single-axis tracking in high insolation jurisdictions (e.g., Southwest U.S.).



Top Corporate Users: Solar Becoming Mainstream

- Walmart – 142 MW
- Prologis – 98 MW
- Target – 72 MW
- Apple – 61 MW + 130 MW offsite
- Costco – 51 MW
- Kohl's – 50 MW
- IKEA – 41 MW
- Macy's – 21 MW
- Johnson & Johnson – 18 MW
- FedEx – 15 MW



Courtesy of Freedom Solar

Over 500 MW of “offsite”
commercial & industrial solar
projects projected to come online
by end of 2016



The Case for Solar in Texas is Strong

Texas has:

- Growing energy demand
- Peak energy needs
- Sustained drought
- Air quality constraints
- Largest solar resource in US
- Largest energy market in US
- Public support in polling

Solar offers:

- High value electric supply
- Zero fuel costs
- Minimal to no water use
- Rapid deployment
- Economic development & jobs
- Environmental benefits
- Trillion dollar global industry
- Unprecedented affordability





Market-specific Benefits for Texans

Retail: *Residential & Comm.*

- Solar offers customers the choice to self-generate
- Provides an opportunity to reduce electricity bills, control future costs and earn attractive financial returns
- Provides generation where it's needed, reducing grid line losses and congestion

Wholesale: *Power plants*

- Cost-competitive peak power
- Rapidly deployable, delivering better cost certainty and alignment with load needs
- Minimal viewshed impact – typically no taller than 10 feet off the ground



Solar in Texas Today: State of the State

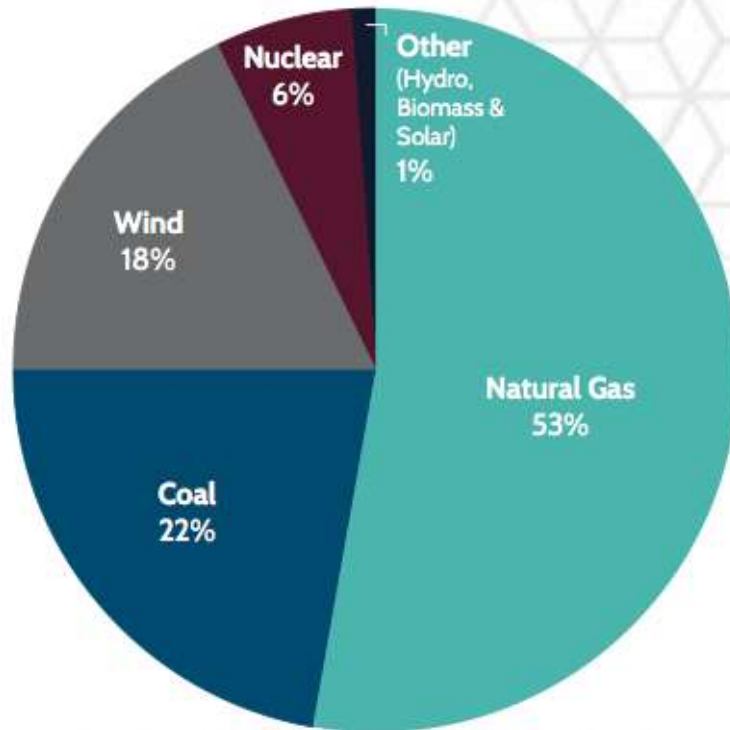
- 560 MW installed through Q1 2016
- Ranked 10th in cumulative capacity and 9th in new capacity added in 2015 (207 MW)
- Texas is a unique and complex market
- We have started slower than states with intentional solar policy but are beginning to develop our enormous potential based on market drivers

State	Rank		
	2014	2015	Q1 2016
California	1	1	1
North Carolina	2	2	2
Massachusetts	4	3	3
Nevada	3	4	4
New York	7	7	5
Maryland	11	11	6
New Jersey	6	10	7
Arizona	5	5	8
Georgia	16	6	9
Colorado	13	12	10
Hawaii	9	13	11
Texas	8	9	12

Source: GTM Research/SEIA: U.S. Solar Market Insight®

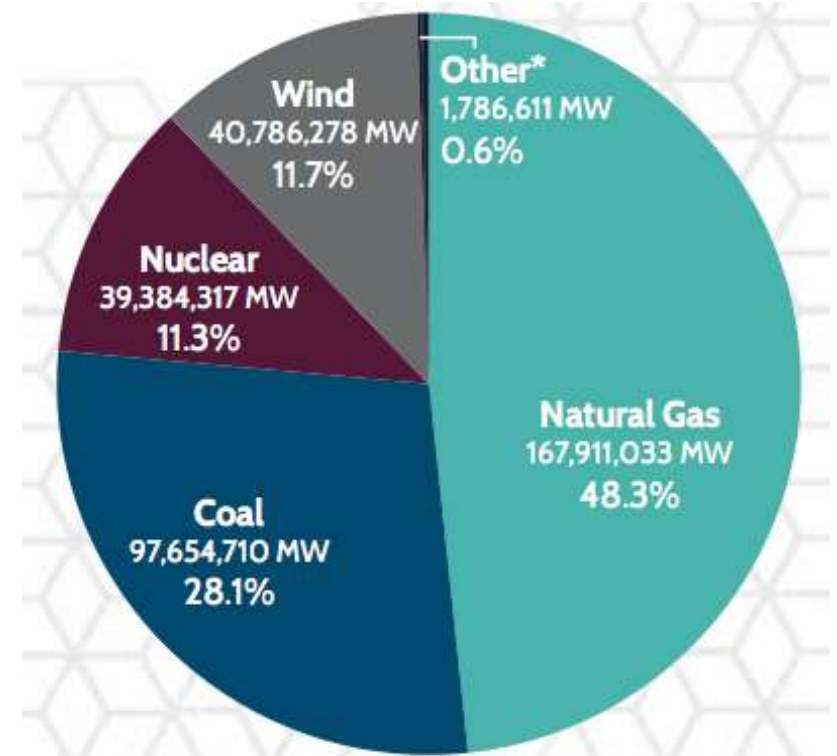


Solar in Texas: ERCOT Capacity and Energy Use



2015 Generation Capacity

(Total Installed Summer Capacity as of December 31, 2015)



Energy Use 2015

77,000+ MW capacity for peak demand
1 MW powers ~ 200 homes at peak demand

347 billion kWh used in 2015
Source: ERCOT Quick Facts, 2/2016



Texas Solar Jobs

- The solar industry is making an economic impact with 7,030 jobs through 2015
- An additional 3,900 workers are spending up to half-time on solar: traditional industries such as construction and electrical product manufacturing are now adding new solar revenue streams to existing business lines
- 12.7% growth expected in 2016 *Source: The Solar Foundation: Texas Solar Jobs Census 2015*

THE WALL STREET JOURNAL.

BUSINESS

As Oil Jobs Dry Up, Workers Turn to Solar Sector

Burgeoning solar projects offer opportunities for out-of-work rig hands, roustabouts and pipe fitters

By LYNN COOK

April 21, 2016 7:16 p.m. ET



Workers install massive racks that will hold solar panels at the Alamo 6 solar farm under construction in McCamey, Texas, about 300 miles northwest of San Antonio. *PHOTO: JENNIFER BOOMER FOR THE WALL STREET JOURNAL*



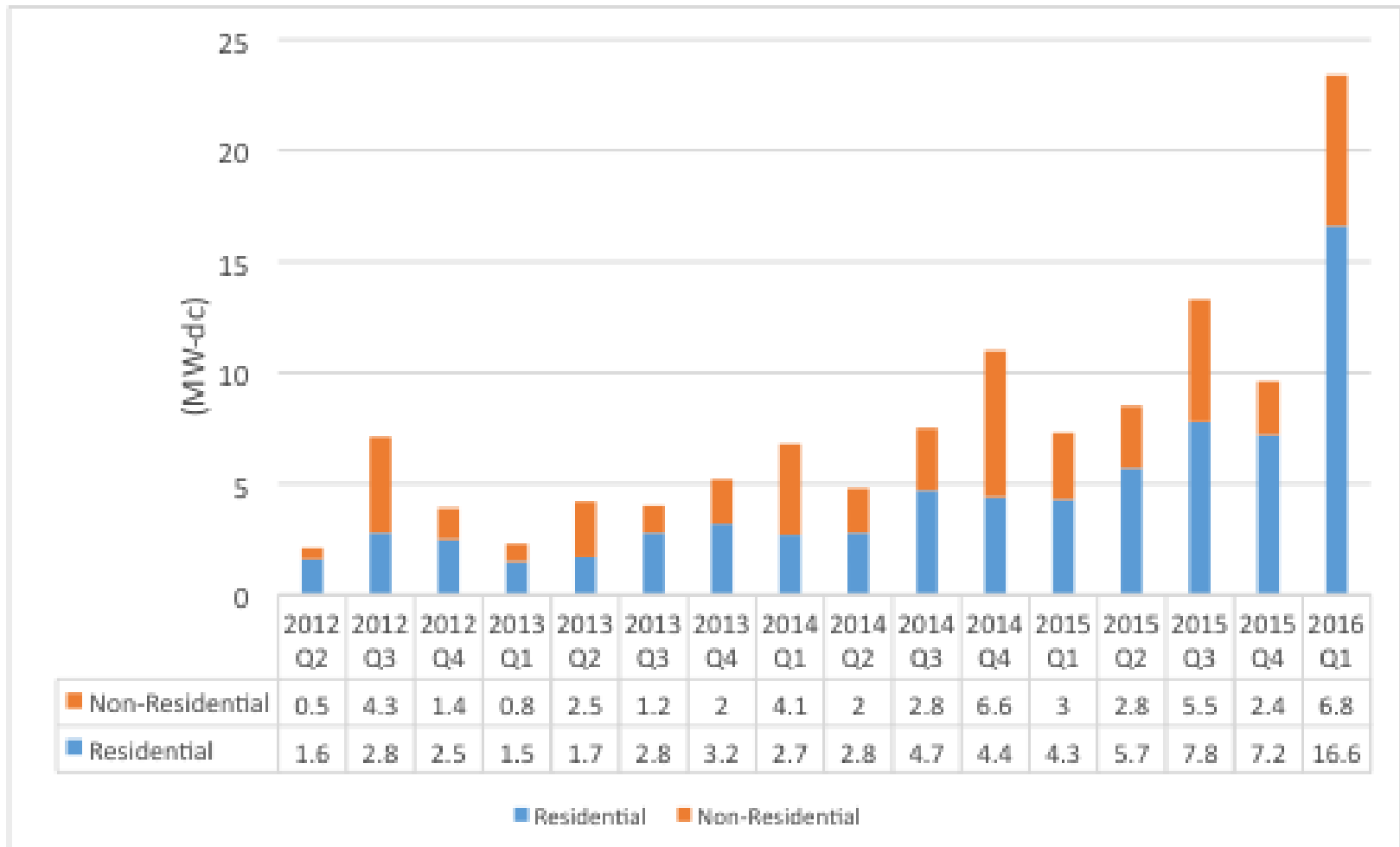
Texas Market Activity: Retail



- Capacity through Q1 2016:
 - 86 MW Residential
 - 65 MW Non-Residential C&I
- Managed programs
 - CPS Energy
 - Austin Energy
 - T&D utilities, e.g. Oncor
 - Various other municipal and co-op utilities
- Competitive markets
- Off-grid / special applications



Texas Residential & Commercial PV Installations



Source: GTM Research/SEIA: U.S. Solar Market Insight®



Competitive Retail Market Innovation

- In the deregulated Texas market, Retail Electricity Providers are not required to buy excess solar generation from customers
- However, leading REPs are now competing for solar customers by voluntarily offering rate plans that credit customer solar generation

Company	Plan Name	Rate / kWh	Rate Type	Term
Reliant	Reliant Solar Sell Back Plan	\$0.113	Variable	Month-to-Month
TXU	Clean Energy Credit Program	\$0.075	Variable	Month-to-Month
Green Mountain	Renewable Rewards®	\$0.122	Variable	Month-to-Month
	Renewable Rewards® 12	\$0.116	Fixed	12 Months
	Renewable Rewards® 24	\$0.116	Fixed	24 Months
MP2 Energy	MP2 Solar Buyback Program	\$0.106-0.114	Fixed	12 Months
	MP2 Net Energy Metering Program	\$0.106-0.114	Fixed	24 Months
		\$0.081-0.102	Variable	24 Months
		\$0.117-0.125	Fixed	60 Months
		\$0.096-0.106	Variable	60 Months



Texas Market Activity: Wholesale

- **409 MW of power plants online through Q1 2016, including:**
 - Centennial Solar (19.8 MW)
 - Blue Wing (14.9 MW)
 - Acacia Solar (10.0 MW)
 - Webberville (26.7 MW)
 - Alamo Solar 1 + 4 + 5 (39.2 + 38 MW + 95 MW)
 - Barilla Solar I (30 MW)
- **Under contract / construction**
 - OCI Solar Power / CPS Energy (100+ MW)
 - Recurrent Energy / Austin Energy (157 MW)
 - First Solar / Austin Energy (120 MW)
 - Hanwha Q Cells / Austin Energy (170 MW)
 - ConEdison Development / Austin Energy (150 MW)

Total = over 1,300 MW



Courtesy of CPS Energy



A Record-breaking Deal: Austin Energy 150 MW Contract

**RECURRENT
ENERGY**

“The city said its best offers were about **5 cents per kilowatt hour**, possibly the cheapest solar-power deal in the United States to date, according to media reports.” ¹

“Solar power has reached a **price that is competitive in the ERCOT market**, allowing us to further diversify our energy portfolio with renewable resources,” says Larry Weis, General Manager of Austin Energy. ²

The West Texas plant will be the state's biggest one-site solar facility. The original Request for Proposals sought 50 MW, says Austin Energy Spokesman Carlos Cordova, “**but the prices were so good that we decided to purchase 150.**” ³

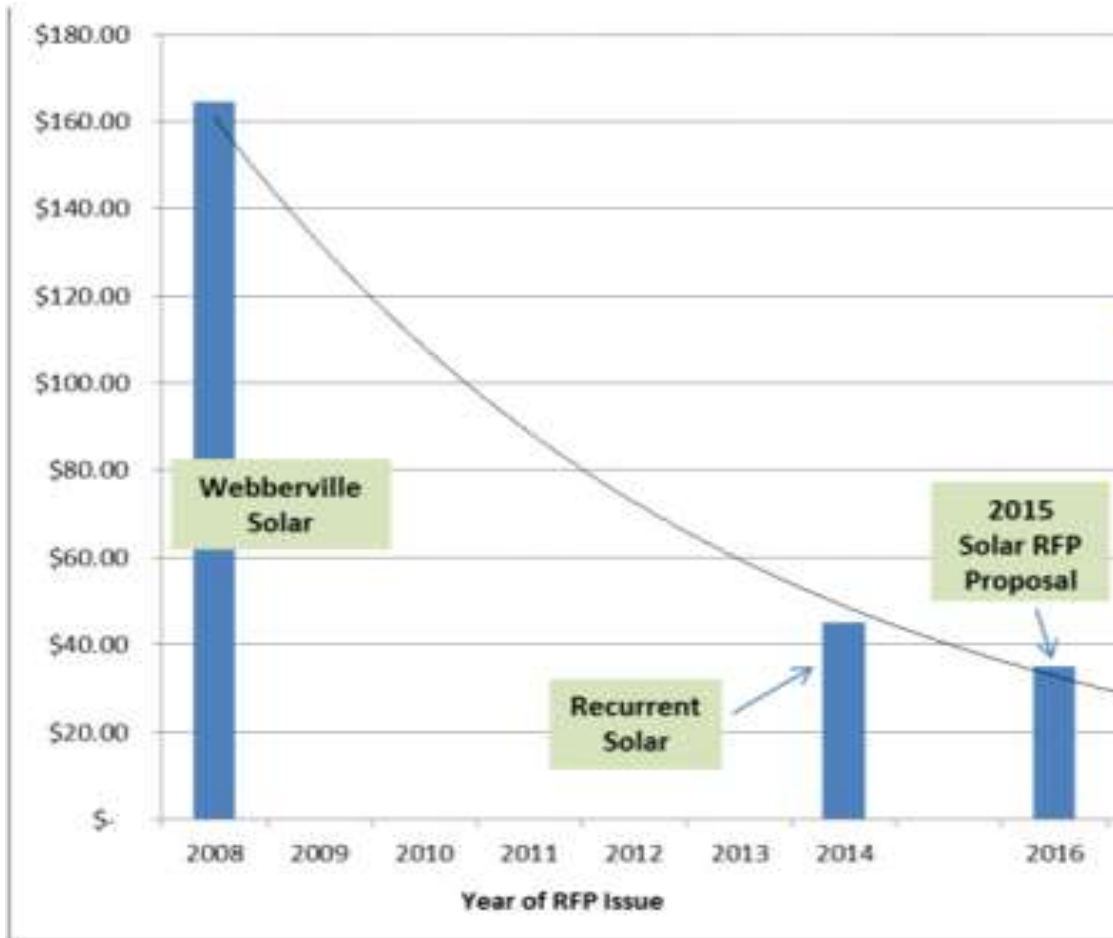
¹ <http://fuelfix.com/blog/2014/05/15/recurrent-energy-set-to-build-largest-texas-solar-plant/>

² <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/25770>

³ <http://www.austinchronicle.com/news/2014-07-04/aes-solar-deal-game-changer/>



Buyer's Market: "Cheapest Solar Ever"



- Austin Energy RFP in April 2015 nets record low bids
- Utility received offers for 1,295 MW of solar projects priced below recent Recurrent Energy deal
- Austin Energy approved to contract for up to 450 MW

Source: Greentech Media "Cheapest Solar Ever: Austin Energy Gets 1.2 Gigawatts of Solar Bids for Less Than 4 Cents" 6/30/15

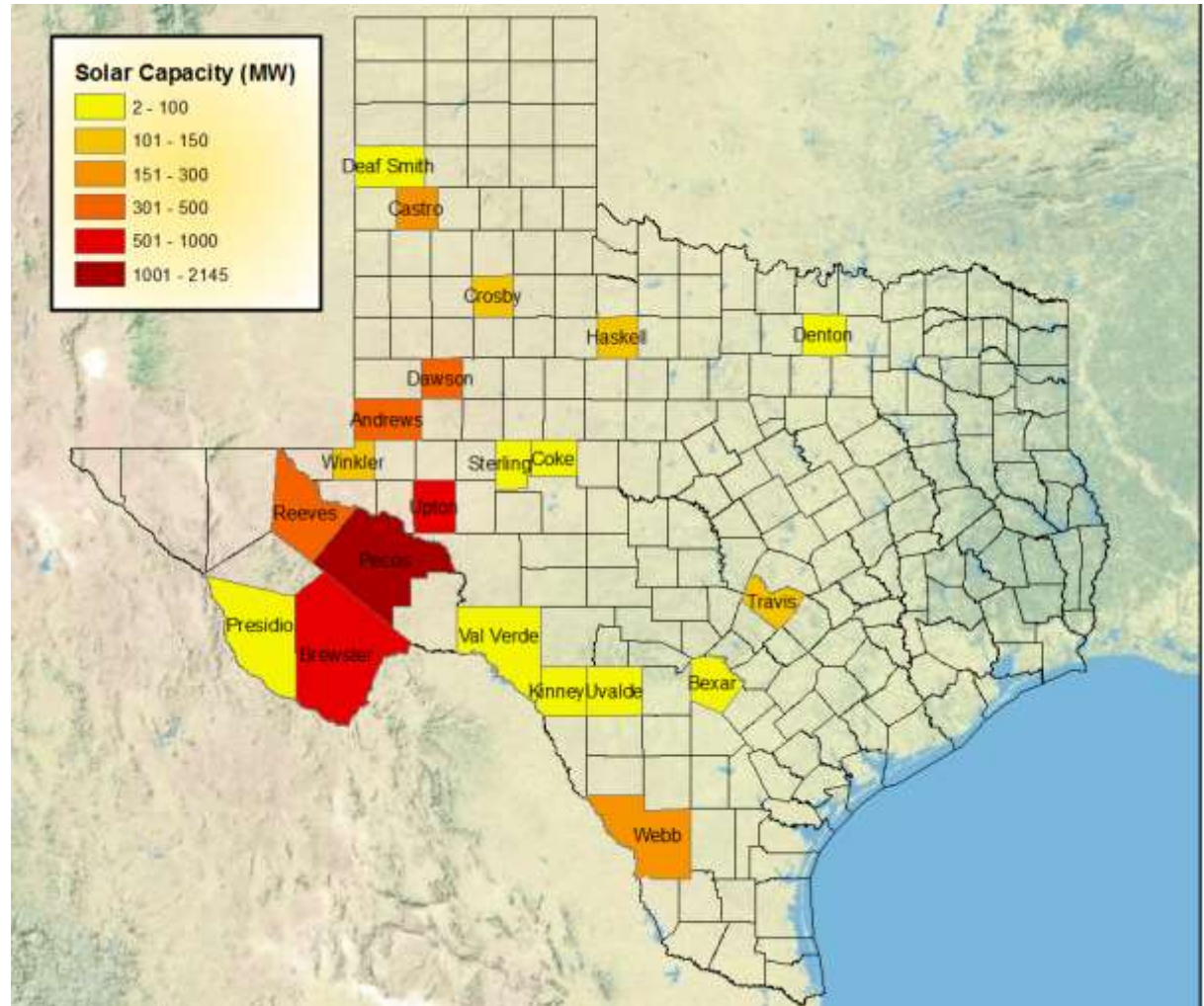


Looking Ahead: Power Plant Development Pipeline

- Through July 2016, there are 7,414 MW of solar projects in development in ERCOT
- 2,269 MW with signed interconnection agreements
- 20 counties have projects online or in development

Source: ERCOT

Note: map includes projects online and those with executed interconnection agreements or under full study



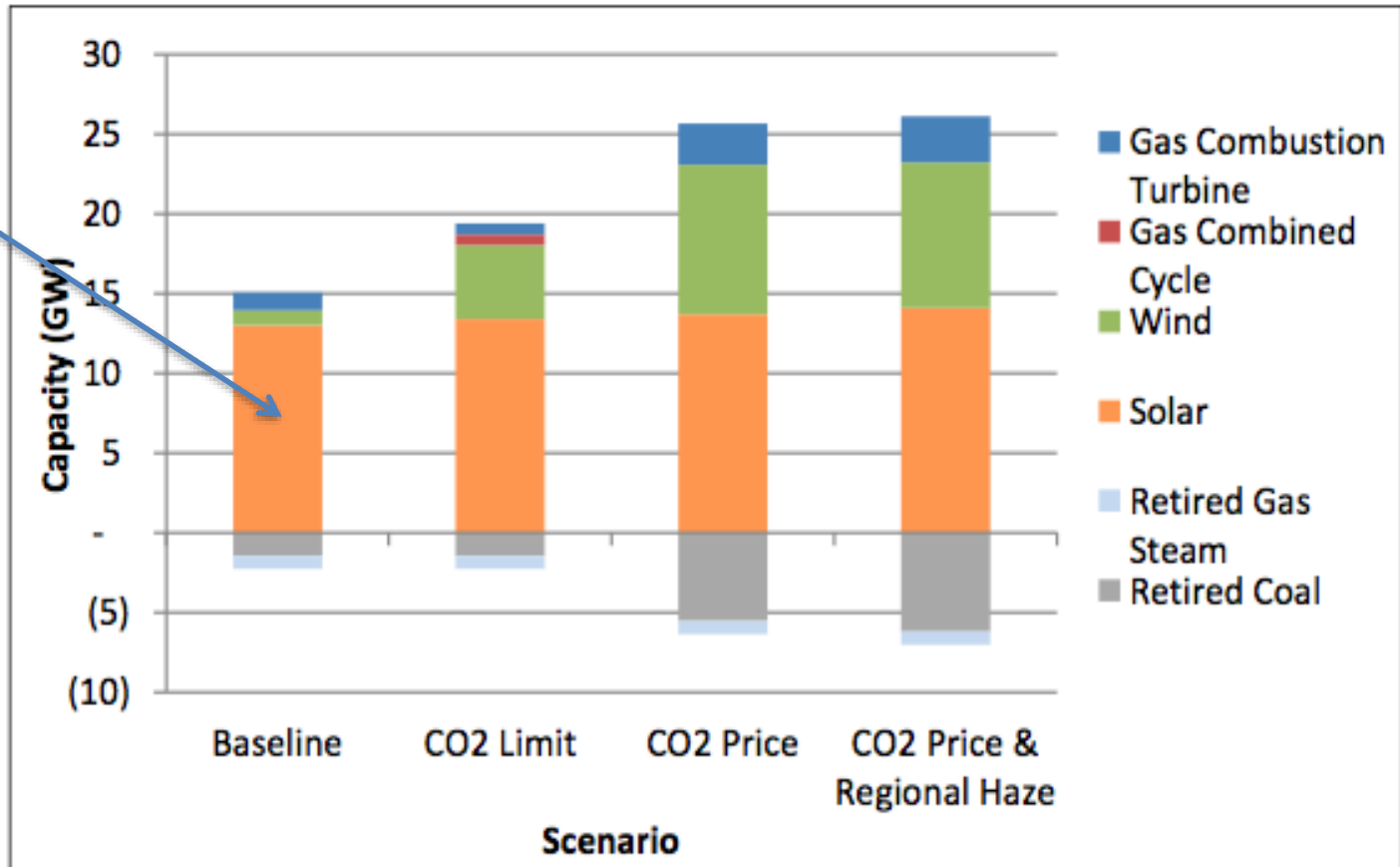


Looking Ahead: ERCOT Projections

Capacity Additions and Retirements by 2030

13,000 MW solar with “business as usual”

* Prior to ITC extension



Source: ERCOT Analysis of the Impacts of the Clean Power Plan



Contact:
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Use of Solar by Texas Municipalities

1. Solar deployment by municipally owned electric utilities.
2. Solar for city facilities.
3. Enabling solar in your city - local government regulation.

Mark Zion

MOU Solar Deployment.

Municipally Owned Electric Utilities (MOUs) in Texas are Leading the Way.

Public power DELIVERS an essential service. Public power PRODUCES community value.

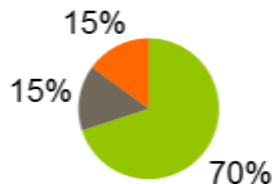
72 MOUs provide power to 4.1 million Texans. Many have been serving their communities for over 50 years.

MOUs are “full service” electric utilities that own poles and wires and often power plants.

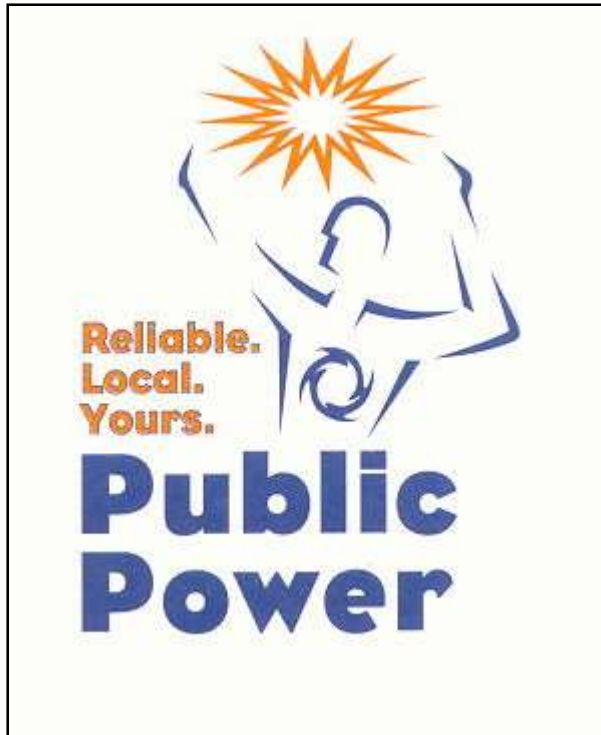
Local authorities set MOU rates and policies that are responsive to community priorities.

MOUs have a local option on retail deregulation – to date, none have taken the deregulation option.

MOUs - 15% of Texas market.
IOUs/Deregulated - 70%,
Coops - 15%



MOU Attributes that Drive Solar Leadership



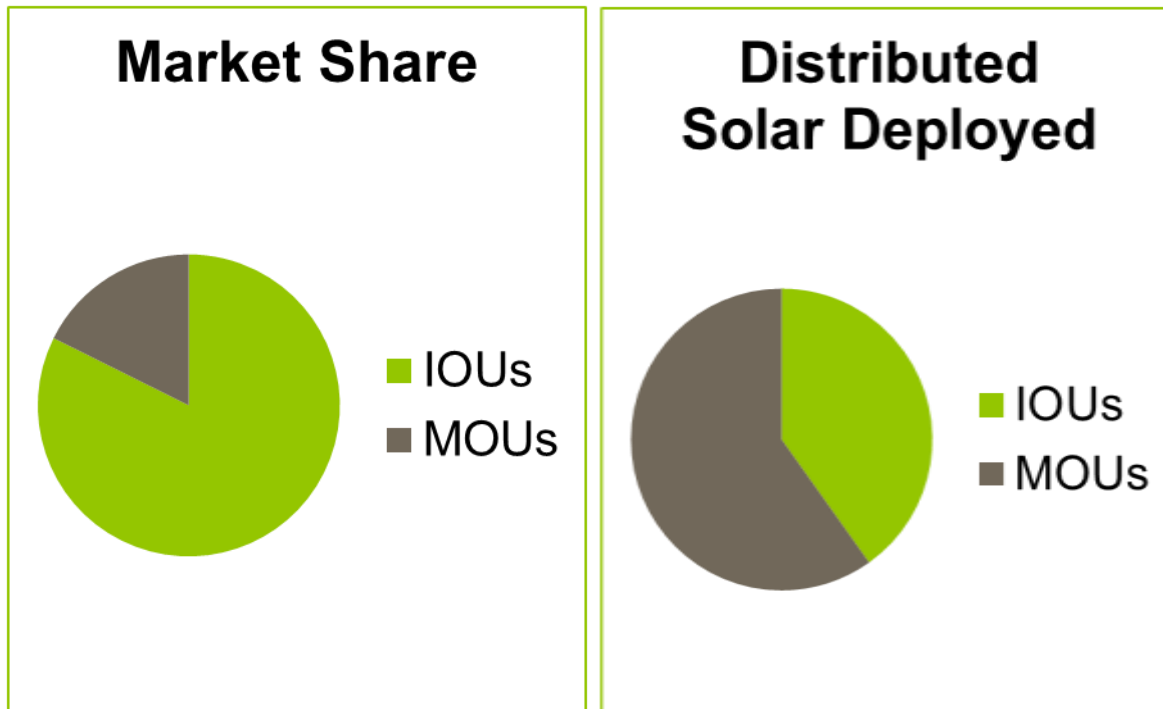
- **LOCAL CONTROL:** The ability to pursue policies and practices that reflect community priorities.
- **MOU LEADERSHIP – UTILITY SCALE:**
 - Stable customer base = long term planning horizon = fuel diversity = rate stability.
 - MOUs – most creditworthy participants in the industry.
- **MOU LEADERSHIP – DISTRIBUTED:**
 - Customer ownership = customer orientation.
 - MOUs are enablers, not just suppliers.
 - Focus on local economic development.

MOU Deployment Utility Scale Solar

- Municipally Owned Electric Utilities:
 - Six MOUs have utility scale solar in their portfolios or under development (San Antonio, Austin, Denton, Bryan, Garland, and Georgetown).
 - MOUs contract for about 2/3rds the 288 MW of the solar plants that were “operational” per the May, 2016 ERCOT CDR.
 - 600 MW+ to be added by MOUs in the next several years.
- MOUs procure solar via PPAs, normally 20 – 25 year term.
- Examples – MOU utility scale solar.
 - Austin Energy – 600+ MW installed or under development.
 - CPS Energy – 450 MW installed or under development.
 - Georgetown – 150 MW announced.
 - Bryan – BTU – 10 MW.
 - Denton – DME – 10 MW announced.
 - Garland – GP&L – 50 MW announced.



MOU Deployment Distributed Solar



MOUs account for more than half of the approximately 15,000 rooftop solar installations in Texas.

MOUs – municipally owned electric utilities (public). IOUs – investor owned electric utilities (private).

Local MOU Policies & Innovative Programs



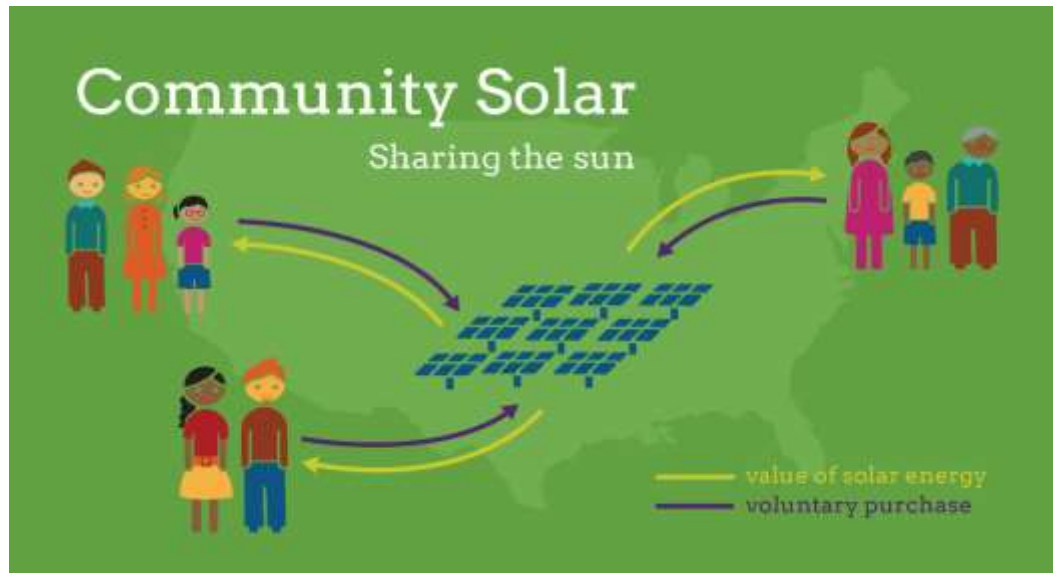
- Larger MOUs have local interconnection & surplus policies. Smaller MOUs have policies as needed. Diverse local policies:
 - Austin – “value of solar”.
 - San Antonio – “net metering”, etc.
 - Others – usually net meter at retail or avoided cost.



- Innovative MOU Programs
 - San Antonio – links economic development and education to solar development - “New Energy Economy”.
 - Austin Energy – solar integration (Pecan Street “microgrid”)

Trend – MOUs Deploy “Community Solar”

- Customers get the benefit of locally produced solar without having to install rooftop panels. They purchase a share of a larger (and usually local) solar installation, and receive credit for its solar electrical output. Benefits utility and consumer. (Local land acquisition for panels can be an issue.)
- MOU community solar projects in Texas, and 6 other states.
 - CPS Energy of San Antonio - “Roofless Solar” program. One panel = \$300 with a bill credit for power produced for 25 years.
 - Austin Energy – under development, 3.2 MW with storage.



Solar for City Facilities

Physical installation and market-based procurements.

Focus on non-MOU cities.

Energy Efficiency is Complimentary to Solar

- For city facilities, energy efficiency measures should be considered beforehand or in conjunction with solar for city facilities.
- **Key resource – State Energy Conservation Office** (SECO). Programs include:
 - Local Government Energy Program
 - Preliminary Energy Assessment Reports
 - Texas Building Energy Code
 - CHP Evaluation Guidelines
 - Energy Reporting Overview
 - Energy Savings Performance Contracting
 - LoanSTAR Revolving Loan Program



Key Considerations – Solar for City Facilities

- **COSTS:** Energy costs are a significant part of municipal budgets. Solar, particularly now that prices have fallen, can reduce or stabilize those costs, and provide future cost predictability.
- **FLEXIBLE APPLICATIONS:** Solar can be used in a variety of municipal applications – powering parking meters, service centers, large offices, etc.
- **MULTIPLE FINANCING OR PURCHASING MODELS:** On site solar projects can be financed and owned by a local government or can involve a third party solar developer. Retail market purchases can power city facilities with remotely-generated solar.



Three Basic Models

- **ON SITE – CITY OWNERSHIP.** *Most common.*
 - Municipality finances and owns solar installed on city property.
- **RETAIL PURCHASE.** *Emerging model in Texas.*
 - Usually in a deregulated area of the state, the city purchases electricity from a retail electric provider (REP) that includes solar generated at a remote utility scale facility.
- **ON SITE – PUBLIC/PRIVATE PARTNERSHIP - P3.**
Emerging model in Texas.
 - Various structures (solar lease, purchased power agreement – PPA) for what is essentially a partnership between the city and a solar developer.
 - Solar developer finances / installs / owns system on city property.
 - In return, city gets (1) the solar system output at a pre-set price over a number of years or (2) a lease payment.

Most Common Model - Texas Cities Own Solar on Their Facilities

- Examples:
 - Carrollton – city hall, fire station.
 - Cedar Hill – government center (shown).
 - Duncanville – city hall, library, recreation center (shown).
 - Grand Prairie – library, development ctr.
 - Pflugerville – water treatment plant (shown), recreation center.
 - Warren City – city hall.
 - Watauga – fire station.
 - Wylie – senior center.
- Installation costs may potentially be offset by grants, utility incentives, selling back surplus solar electricity.



Emerging Models in Texas: Retail Purchases and P3

RETAIL PURCHASES: Emerging business model. Customers to buy solar electricity without installing panels. Terms are often longer than standard retail offers. Examples in the competitive ERCOT retail market include:

- All/partial solar offers like TXU Energy's "Solar Advantage" and "Solar Club" plans. Customers buy electricity generated at a remote utility solar plant.
- "Community solar" offers like NEC Retail's "Roofless Solar" plan. Customers buy panels in a solar farm.
- Solar PPAs (purchased power agreements), currently for larger users, like the City of Houston's recent agreement to buy much of the output from a Hecate solar farm via its retailer, Reliant.

P3: Mature business model in other states, offers have started in Texas with the residential sector.



	Advantages	Challenges
<u>City Ownership</u> <i>Solar on city property.</i>	<ul style="list-style-type: none"> • Ability to use less expensive tax-exempt public debt. • Full control over project design, operations, and risks. • Control of any renewable energy credits. 	<ul style="list-style-type: none"> • As a public entity, city cannot realize the value of the federal investment tax credit. • Debt issuance. • City needs project mgmt. & operational expertise.
<u>Retail Purchase</u> <i>Solar not on city property.</i>	<ul style="list-style-type: none"> • No upfront capital outlay. • No installation on city property, no O&M for city. • Value of federal tax credit can be embedded in price to city. 	<ul style="list-style-type: none"> • Emerging business model. • Solar system is remote to the community it serves.
<u>P3</u> <i>Solar on city property.</i>	<ul style="list-style-type: none"> • No/low upfront outlay of capital. • Developer can realize tax credit and pass it through to the city. • Predictable electricity price for 15–25 years or lease payment. • No O&M for city. • Path to city ownership (option) at the end of contract. 	<ul style="list-style-type: none"> • Business model still developing in Texas. • City has limited control over project design, operations, etc. • Counterparty risk.

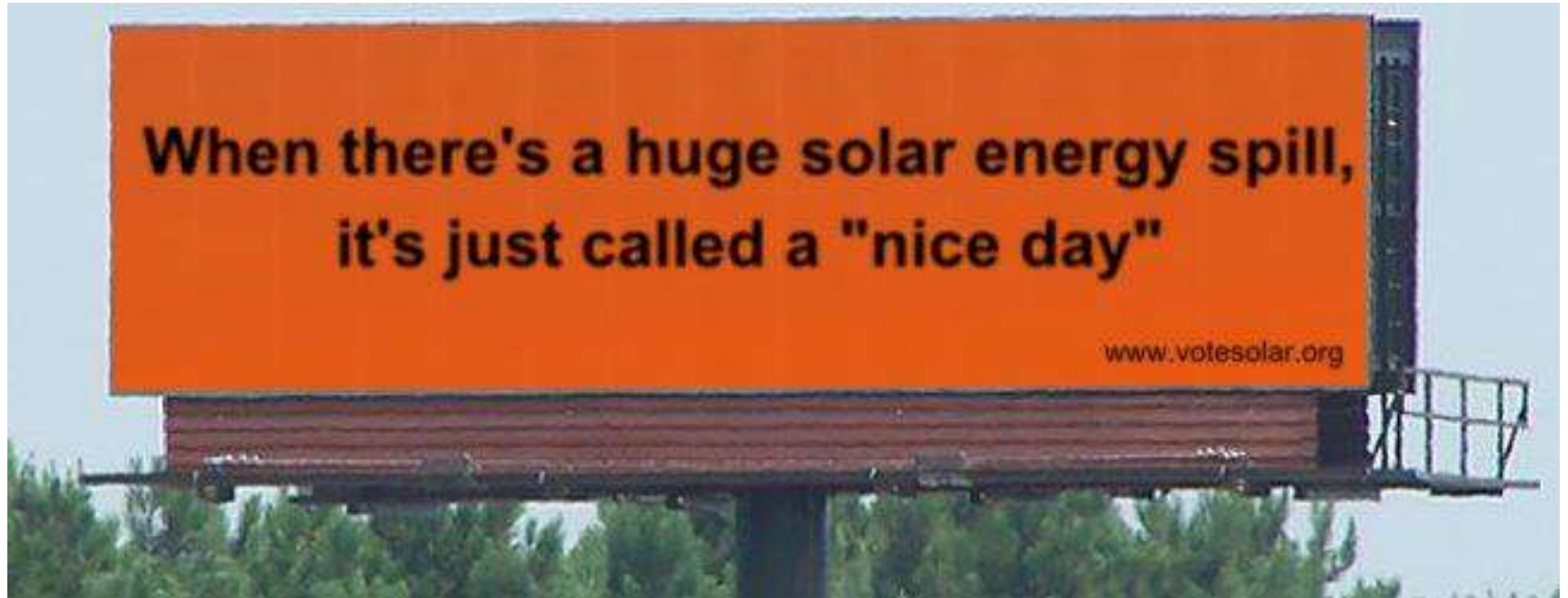
First Steps: Solar for Your City Facilities

- If considering solar on a city facility:
 - Assess suitability of facility? Orientation, structure, etc.
 - Initial inquiries to qualified solar companies.
 - Preliminary analysis: costs/benefits, financing, legal issues, etc.
 - Decisions – retain expertise, issue solicitation?
- If considering a retail purchase:
 - Contact your existing retail electric provider (REP) and ask if they have a product with a solar component.
 - Shop for a REP that offers an all/partial solar product.

And remember...

**When there's a huge solar energy spill,
it's just called a "nice day"**

www.votesolar.org



Enabling solar in your
community via local
government
regulation.

Key Local Government Regulation for Solar

- Codes
- Permitting
- Land Use and Zoning

✓ *None involve reinventing the wheel.*

✓ *All can be implemented in ways that enable the deployment of solar by local residents and businesses.*

Codes & Standards



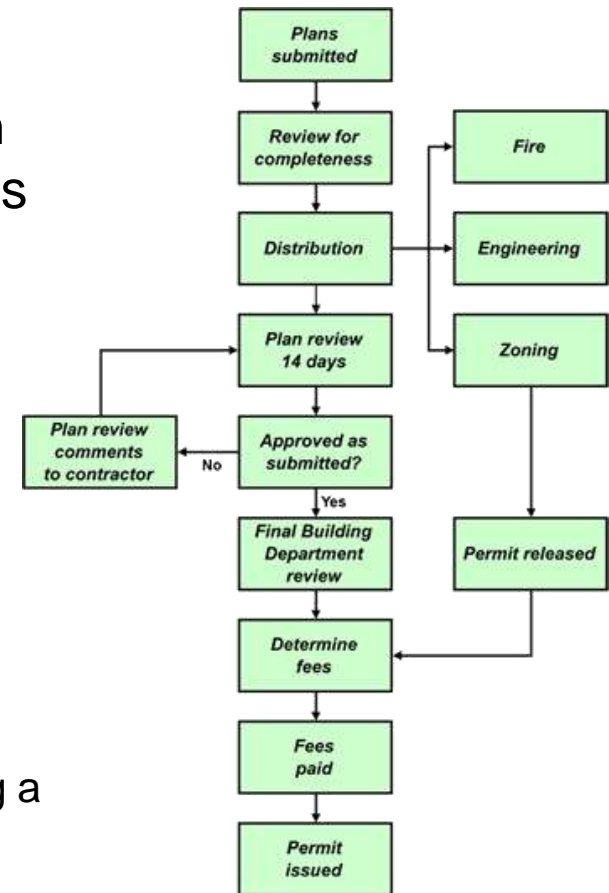
- Existing codes, routinely already adopted at the city level, have proven provisions to accommodate solar PV.
 - Electrical codes - NEC Article 690 - Solar Photovoltaic Systems – NFPA 70
 - Uniform Solar Energy Code – ICC
 - Building Codes – ICC, ASCE 7-05
 - Fire Code – IFC 605.11
- Solar PV panels and systems are manufactured per established standards.
 - UL Standard 1703, 1741 PV Modules, Panels, Inverters, Controllers, etc.
 - IEEE 1547, Standard for Interconnecting Distributed Electric Power Systems

Enabling Solar via Codes & Standards

- Make sure newer codes are adopted in your community. They fully address public and building safety for solar.
- Familiarize local code officials with solar provisions in existing codes. Examples of training opportunities:
 - On-line training from IREC – International Renewable Energy Council.
 - State Energy Conservation Office (SECO) general code training. and solar webinar series with North Central Texas Council of Governments.
- Seek expertise to familiarize city staff with solar technologies.
- Ensure interdepartmental communication – for example between building inspection and fire departments.

Permitting

- Residential or commercial solar installations typically require a building/electrical permit.
- The permitting process for a solar installation can involve multiple local government reviews (building, electrical, fire, structural, etc.), a permitting fee, and a site inspection.
- An efficient permitting process allows local governments to:
 - Ensure public safety,
 - Track solar installations in their communities.
 - Maximize the use of city staff time and resources.
- A cumbersome permitting process can:
 - Substantially increase the time and cost of installing a solar system.
 - Be an obstacle to solar adoption in a community.
 - Take an inordinate amount of city staff time and resources.



Enabling Solar via the Permitting Process

- Understand the entire permitting and inspection process for solar systems and the dynamics among the entities involved (installation contractors, consumers, various city departments, inspection officials, and the local utility).
- Create a permitting checklist for stakeholders that outlines the steps in the process and all of the information that the city will require to issue a permit (site/structural plans, equipment specifications, etc.).
- Develop an expedited process. Many solar installations are similar – pre-qualification can be granted to standard solar electrical plans, known installers, etc.

Zoning & Land Use

- Most cities regulate the installation of solar only through the permitting process. Zoning codes do not necessarily need to single out solar.
- HOAs/POAs cannot prevent solar deployment.
- Based on community priorities, cities have the option to address solar in their zoning codes, ordinances, and city plans.
 - The deployment of solar can be encouraged, and costs decreased by the adoption of a “solar ready” ordinance.

Enabling Solar via “Solar Ready” Ordinances / Codes



- Certain elements of buildings (structural, layout, solar orientation) can prevent a solar retrofit or make it less cost effective.
- A “solar ready” building is designed and built for solar installation up front, even if the solar installation does not happen at the time of construction.
 - The “solar ready” design features, if considered early in the process, are typically low or no cost.
 - Examples include: building orientation, available roof space, roof type, wiring and conduit location, etc.
- Cities wishing to move forward on “solar ready” have the option to:
 - Adopt “Appendix U, 2015 IRC (International Residential Code)”, or
 - Craft their own local ordinance.

Take-Aways

- Solar is a mainstream, cost-competitive energy resource that is increasingly being adopted by utilities and end-users.
- Cities have opportunities to use solar for their facilities, and to enable its adoption in their communities.

THANK YOU.

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Resources: Solar for City Officials

KEY RESOURCES:

- Texas Solar Power Association (TSPA) - <http://txsolarpower.org/> . Comprehensive information on the solar industry in Texas.
- North Central Texas Council of Governments - <http://www.gosolartexas.org/> . Comprehensive information local governments and solar.
- State Energy Conservation Office (SECO) - <http://www.seco.cpa.state.tx.us/> . Comprehensive information on energy efficiency, solar, renewables, Texas programs.

PRESENTATION RESOURCES – Ordered by sections in the PowerPoint presentation.

Overview of the Solar Industry:

- Texas Solar Power Association (TSPA) - <http://txsolarpower.org/> .
- Solar Energy Industries Association (SEIA) - <http://www.seia.org/> .
- Power To Choose - <http://www.powertochoose.org/> . PUC website – retail electric offers.

Use of Solar by Municipalities – General:

- North Central Texas Council of Governments “Governing Solar” - <http://www.gosolartexas.org/gov/index.html> .
- DOE Guide for Local Governments <http://www1.eere.energy.gov/solar/pdfs/47692.pdf> .
- DOE Solar Energy Resource Center
http://energy.gov/node/807181/resources/solar_powering_your_community_guide_local_governments .
- DOE Sunshot Initiative, Sustainable NJ, SEIA - http://solaroutreach.org/wp-content/uploads/2014/07/New-Jersey-Solar-Siting-Guidebook_Revised.pdf .

Resources on Solar for City Officials, continued...

Solar Deployment by Municipally Owned Electric Utilities (MOUS):

- Texas Public Power Association (TPPA) - <http://www.tppa.com/> .

Solar for City Facilities:

- SECO Local Government Programs - <http://www.seco.cpa.state.tx.us/government/> .
- National Renewable Energy Lab - <http://www.nrel.gov/docs/fy12osti/53622.pdf> . Solar financing issues, ownership, third-party, etc.

Codes, Standards, Permitting and Ordinances for Solar:

- North Central Texas Council of Governments - <http://www.gosolartexas.org/gov/bmps.html> . Best management practices for cities.
- Solar America Board for Codes and Standards - <http://www.solarabcs.org/> .
- SEIA - <https://www.seia.org/policy/health-safety/codes-standards> .
- International Code Council - <http://www.iccsafe.org/cs/SCAC/Documents/TaskGroup5/SolarInThe2012ICodesA.pdf>
- SEIA - <http://www.seia.org/policy/distributed-solar/local-solar-permitting>
- Solar America Board for Codes and Standards - http://www.solarabcs.org/about/publications/meeting_presentations_minutes/2011/09/pdfs/webinar-IFC-092011.pdf . Fire code review.
- State Energy Conservation Office (SECO) general code training - <http://seco.cpa.state.tx.us/tbec/edutrain.php> and solar webinar series with NTCOG <http://seco.cpa.state.tx.us/re/education.php> .
- On-line code training from IREC – International Renewable Energy Council - <http://www.irecusa.org/workforce-education/allied-solar-professions/pv-online-training/> .
- Solar Ready Provisions of the International Residential Code (IRC), Appendix U - http://codes.iccsafe.org/app/book/content/2015-I-Codes/2015%20IRC%20HTML/Appendix%20U.html_

Questions?

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