



Go Solar Texas:

Building Capacity for Solar at the Local Level

CATEE Conference

San Antonio, Texas

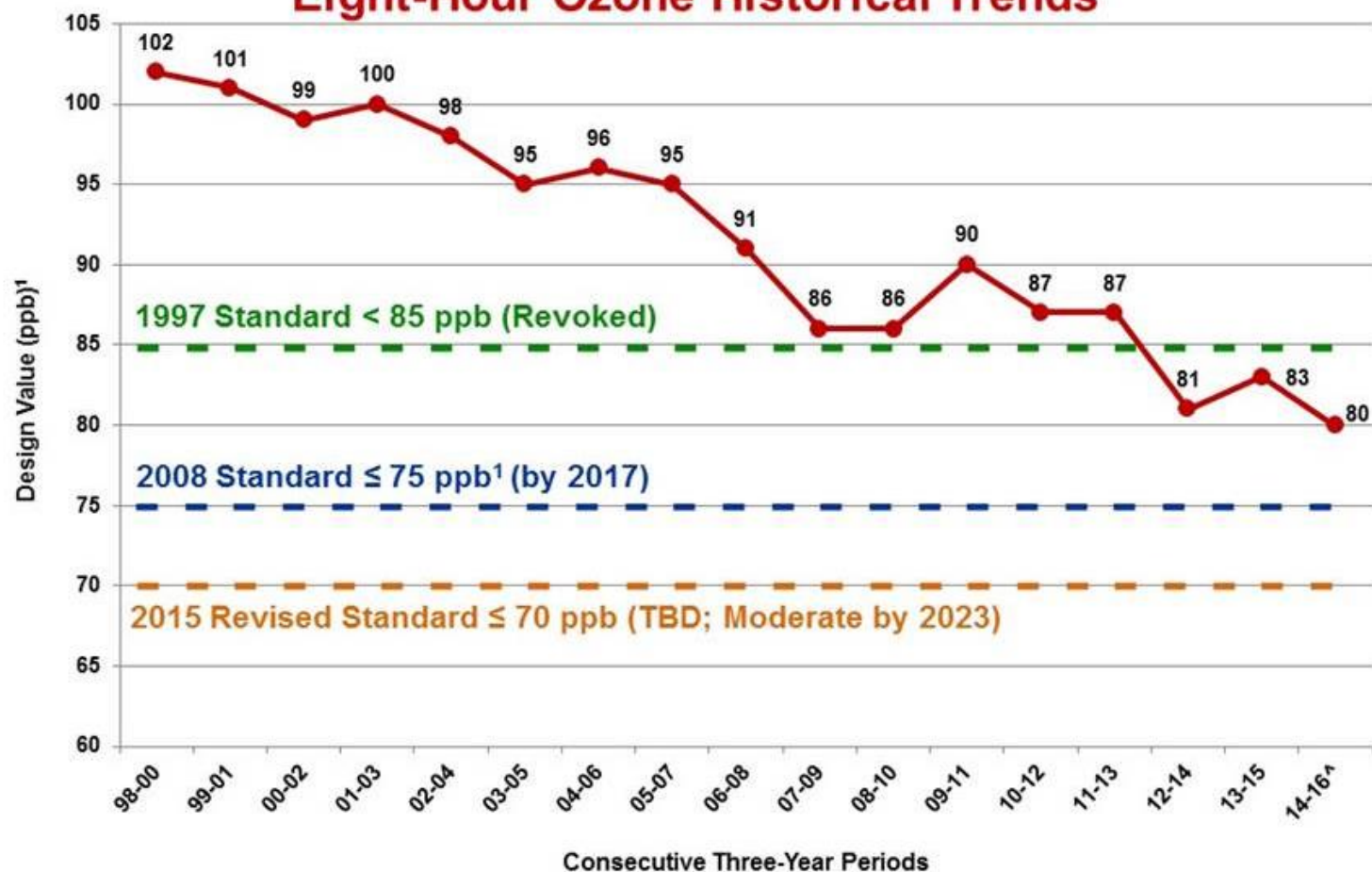


Lori Clark, North Central Texas Council of Governments

Tamara Cook, North Central Texas Council of Governments

Ozone Nonattainment & Air Quality

2016 OZONE SEASON Eight-Hour Ozone Historical Trends

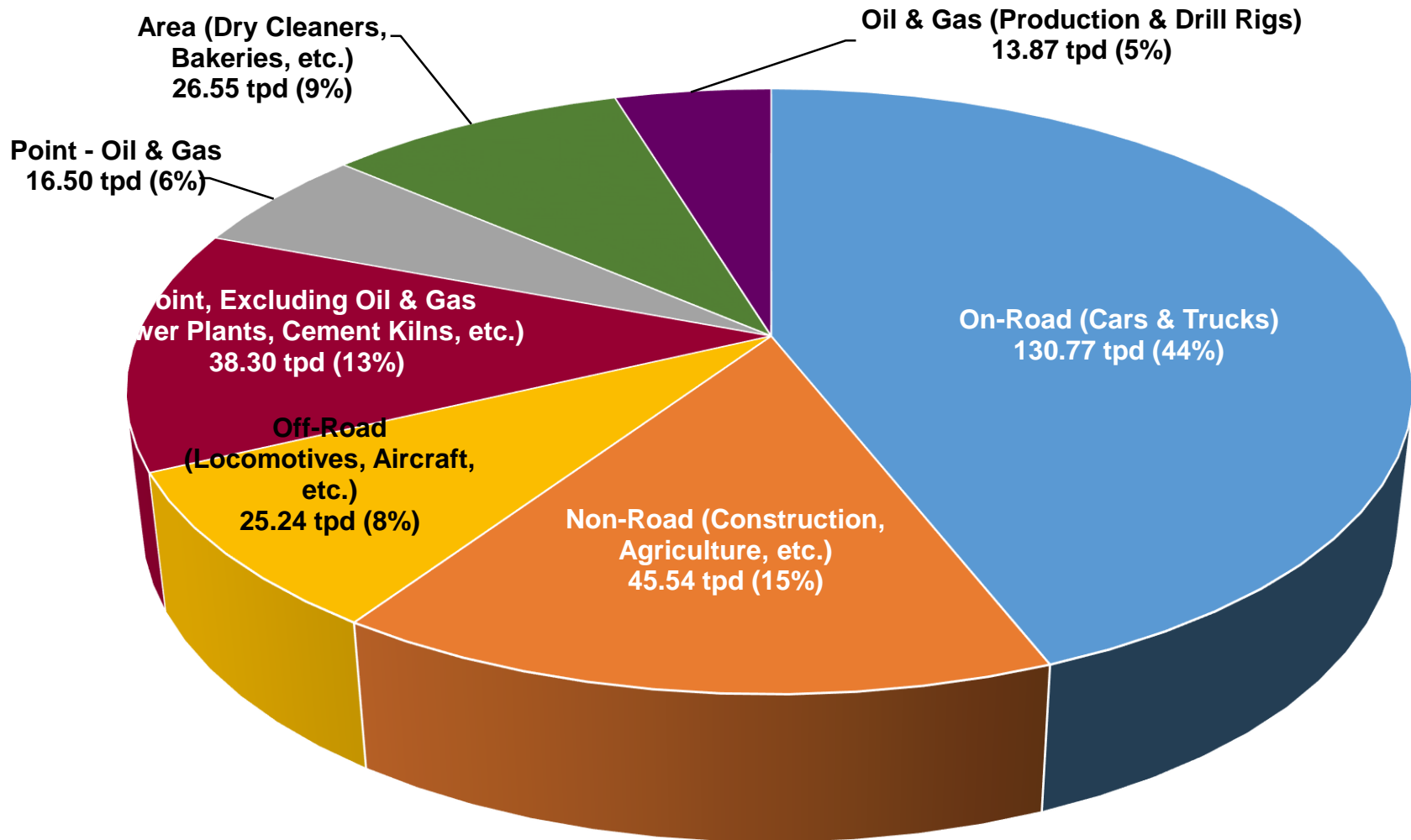


¹Attainment Goal - According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the *Design Value* (three-year average of the annual fourth-highest daily maximum eight-hour average ozone concentration) is equal to or less than 70 parts per billion (ppb).

[^]Not a full year of data, current as of 10/30/2016

STATE OF AIR QUALITY IN NORTH CENTRAL TEXAS

Estimated 2017 Nitrogen Oxides (NOX) Emissions Inventory
Source Category Estimates = 296.77 tons per day (tpd)

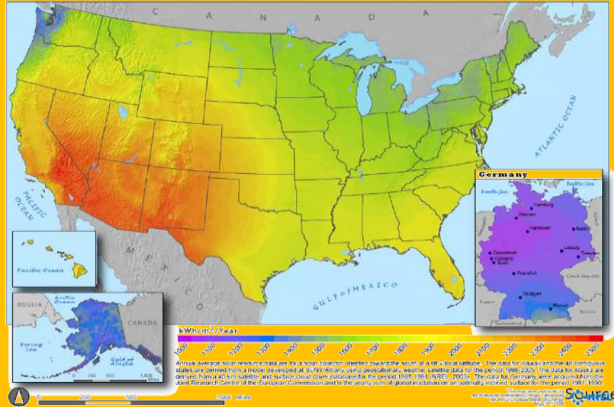


Air Quality Control Strategies & Local Programs

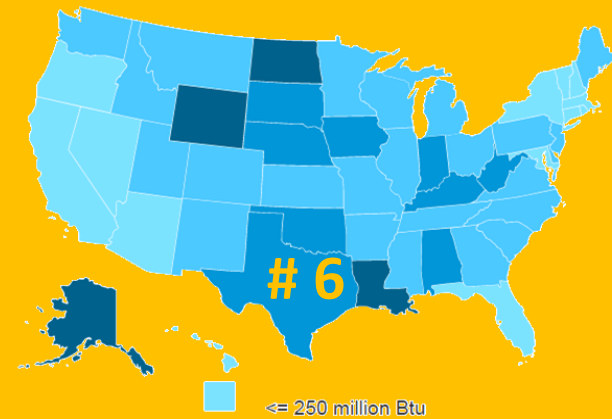


Texas' Benefits From Solar

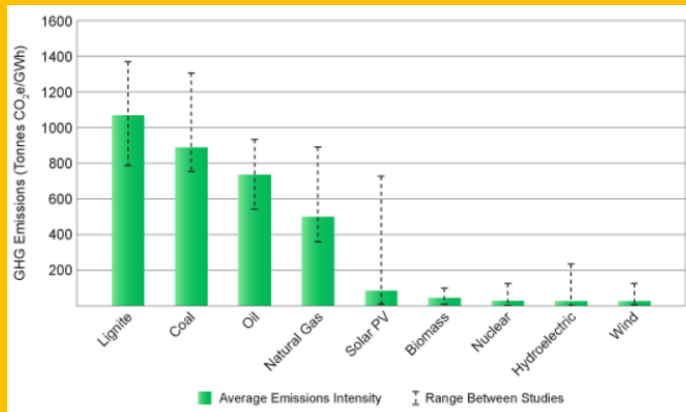
Abundant Resource



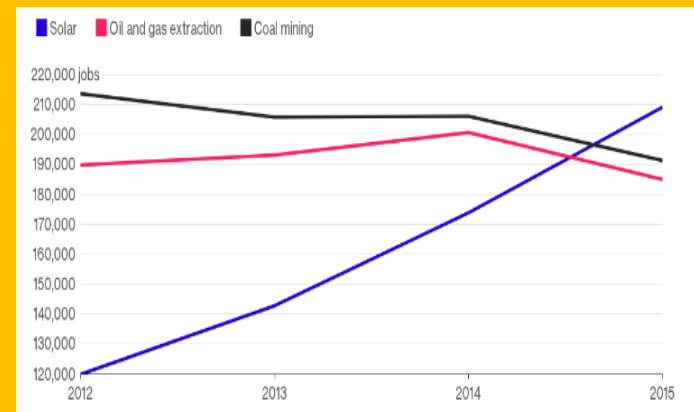
Meet Growing Energy Demand



Low-Emission Energy Source



Economics and Financial Stability



Local Government Benefits From Solar



Resilience

Job Growth

Tax Base

Attracts New Business

GoSolarTexas.org, Solar Information Clearinghouse



Resources For... ▾

About

FAQ

Case Studies

Events

Training

Search



Solar power is an emerging clean energy option that can positively impact North Texas' environment and save consumers money on their electric bills. Dallas-Fort Worth is a prime location for solar technology and its growth due to the region's climate and geography. Solar power can provide much of the needed electricity when electricity demand is highest - when it's hot and the sun is shining.

With proper implementation, solar energy will help to improve air quality by decreasing the amount of fossil fuel power generation needed. This corresponds to reduced emissions that contribute to Texas' air pollution and current nonattainment status for the pollutant ozone in several regions.

To learn more about solar resources and information available to you, select the level of solar that applies to you.



Visit GoSolarTexas.org



1. Best Management Practices



2. Training and Resources



3. Funding Incentives and Opportunities



4. Tools, Templates, and Tips

Local Government Regulation – Permitting



SOLAR PHOTOVOLTAIC (PV) SYSTEM PERMIT APPLICATION CHECKLIST

This Permit Application Checklist is intended to be used as a best management practice when establishing local government requirements for residential and commercial solar photovoltaic (PV) system permits. Local governments may modify this checklist to accommodate their local ordinances, code requirements, and permit procedures. The following application items may, at the community's discretion, be replaced by an expedited process such as those published by the Solar America Board for Codes and Standards or referenced as examples in the Solar Ready II materials posted at www.nctcog.org/solar.

1. REQUIRED INFORMATION

Type of Application

- ☐ Residential
- ☐ Commercial (Also see Part 2: Commercial)

Type of Solar PV System

- ☐ Roof Top
- ☐ Ground Mount
- ☐ Other: Click here to enter text.

- ☐ Size of System (kW): Click here to enter text.
- ☐ Completed permit application(s) and supplement (Building Department for standards)

- ☐ Roof Top: An electrical permit is required
- ☐ Ground Mount: Building and electrical permit
- ☐ Other: Building and/or electrical permits may be required

- ☐ Installed in accordance with the National Fire Protection Association (NFPA) 70, National Electrical Code (NEC), and applicable local codes, subject to plan approval.

NOTE: The National Electrical Code (NEC) is the State Code on September 1 of any year in which it is adopted.

NOTE: Potential impacts of solar PV projects to be evaluated by the local government as appropriate.

- ☐ Construction Documents: Two copies of construction documents

- ☐ Site specific, stamped engineering drawing by engineer, if determined to be necessary by installation plans, manufacturer's installation instructions
- ☐ Make, model, and quantity of module, inverter, and mounting system

NCTCOG, in partnership with the National Association of Regional Councils, is participating in the Solar Ready II program. Solar is striving to position the United States as a global leader in the solar industry.



SOLAR PV EXPEDITED PERMIT CHECKLIST

This Expedited Permit Checklist is intended to be used as a best management practice when establishing local government requirements for rooftop residential and commercial solar photovoltaic (PV) system permits. Local governments may modify this checklist to accommodate their local ordinances, code requirements, and permit procedures. This expedited permit checklist will facilitate the decision timeline for all solar PV systems meeting all pre-defined criteria in Section 4.

SECTION 1: SITE AND OWNER INFORMATION

Site Address: _____ Name: _____
Parcel ID: _____ Email: _____
Street: _____ Phone: _____
City: _____ Zip Code: _____

SECTION 2: TYPE OF SOLAR PV APPLICATION

- ☐ Residential
 - Year Home Built: _____ (Homes built prior to 1975 may, at the discretion of the building official or designated representative, require additional structural review and may not qualify for the expedited permit process)
 - Roof Covering Type:
 - ☐ Composite Shingles ☐ Tile ☐ Other: _____
- ☐ Commercial
 - Year Building Built: _____ (Additional structural review may be required based on the commercial building age and will be at the discretion of the building official or designated representative)
 - Roof Covering Type:
 - ☐ Composite Shingles ☐ Tile

SECTION 3: SOLAR PV SYSTEM INFORMATION

- ☐ Provide manufacturer specification sheets for all system components
 - Is the mounting system an engineered product designed to mount solar panels? ☐ YES ☐ NO
 - If no, provide structural attachment details in a letter certified by a design professional.

	MODULE	INVERTER	MOUNTING SYSTEM (IF PRE-ENGINEERED PRODUCT)
Manufacturer			
Quantity			
Model			

System Weight/Arrangement

- Total weight of module(s) and rails (lbs.): _____
- Number of attachment points: _____
- Weight per attachment point (lbs.): _____
- Maximum spacing between attachment points (inches): _____
- Total surface area of modules (sq. ft.): _____
- Total system weight per sq. ft. (lbs.): _____

This document was produced by the North Central Texas Council of Governments for use by local governments through partnerships with the Texas State Energy Conservation Office and the Solar Ready II program (National Association of Regional Councils, the Mid-America Regional Council, Meister Consultants Group, Inc., and the Council of State Governments).

Page 1

• Permit Checklist

- Clear Communication Regarding Requirements Between Permitting Staff and Applicant
- Streamlines Workflow for Staff
- Streamlines Process Across Region

• Expedited Permit Checklist

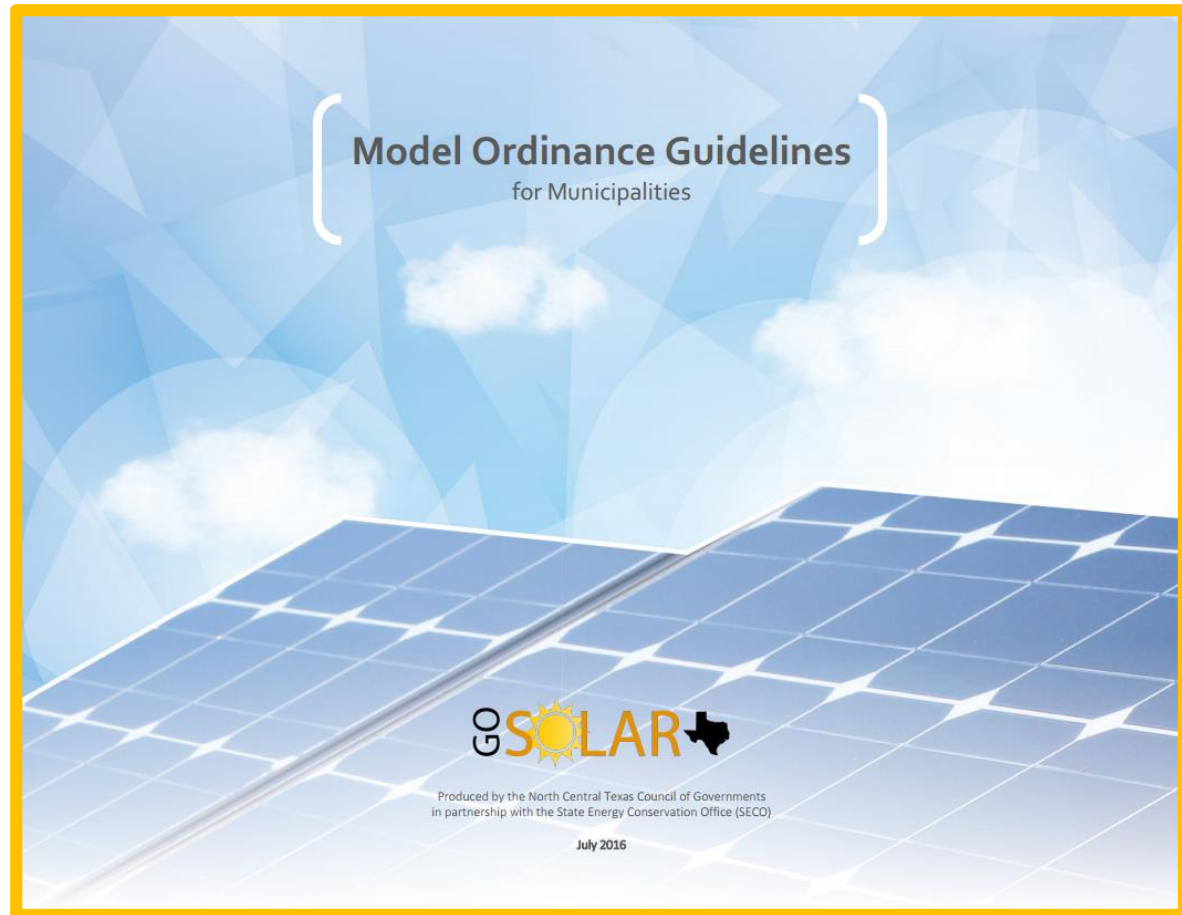
- Identify Standard vs Non-Standard Installations
- Reduce Time, Effort and Cost

• Templates Available on www.gosolartexas.org

Local Government Regulation - Ordinances

“Zoning codes, solar ordinances and comprehensive plans can establish the vision and goals for solar development within a community.”

-- Solar Ready II: Best Management Practices for Solar Installation policy



Trainings and webinars

Putting Underutilized Land to Work for Solar



Jul 27, 2016

This webinar provides information to local governments, special districts, and businesses interested in going solar by siting PV arrays on brownfields, landfills, and other previously unusable lands.

[View Training Materials](#)

PACE Financing



Jul 12, 2016

Property Assessed Clean Energy (PACE) is a financing method available to businesses that allows them to finance 100% of a solar energy system.

[View Training Materials](#)

Community Solar in Texas



Jul 8, 2016

This webinar provides information to electric utility cooperatives and municipal owned utilities who may be interested in exploring opportunities for community solar programs.

[View Training Materials](#)

Solar for Local Governments



Jun 8, 2016

Local government officials will learn about the basics of solar energy, ways to ease the permitting process, and discover the economic benefits of solar energy.

[View Training Materials](#)

Solar PV for Fire and Code Officials Workshop



Jun 8, 2016

Fire Inspectors will learn about applicable fire codes and methods for implementing code requirements in residential and commercial photovoltaic (PV) systems.

[View Training Materials](#)

Financing Solar Energy Systems



Jun 7, 2016

This class covers available rebates and tax credits for purchasing solar energy systems for commercial and multi-family property owners and lenders.

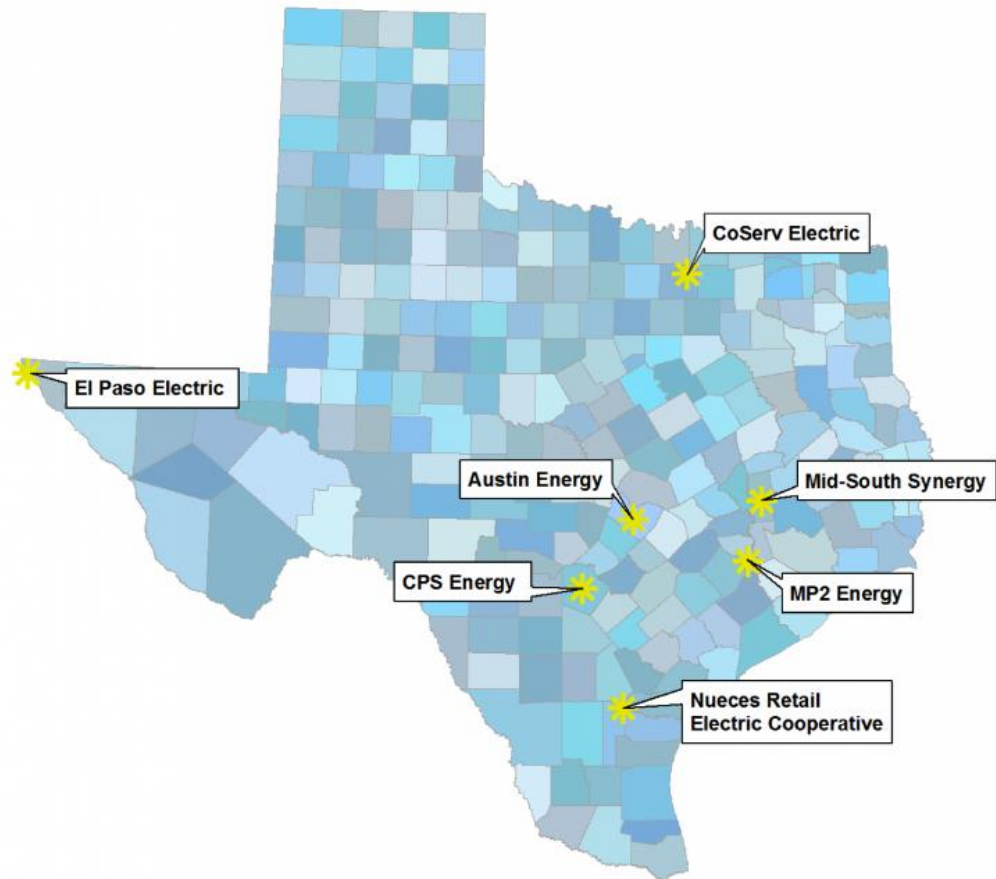
[View Training Materials](#)

Community Solar

Texas Community Solar Guidelines

for Electric Cooperatives and Municipally Owned Utilities

Find out if your area has a Community Solar program!



Produced by the North Central Texas Council of Governments
in partnership with the State Energy Conservation Office (SECO)

August 2016

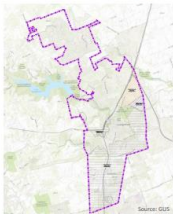
Case Studies

Case Study:

Municipally Owned Utilities in Texas



Georgetown Utility Services



Georgetown Utility Services
Electric Service Area Boundary

Quick Facts

Georgetown Utility Services has contracted with SunEdison to build and maintain a **150 MW** solar array near Fort Stockton, in West Texas. The array will be operational by 2017.

Georgetown Utility Systems will be producing **294 MW** of energy in total once they go **100%** renewable. Currently, the utility has a peak load of **145 MW**.

Georgetown Utility Services is expecting to increase from **10%** renewable energy to **100%** by the end of 2017.

Summary

Georgetown Utility Services (GUS) serves an overall population of 24,000 in TX. In 2012 the utility entered into a contract to pursue solar to secure the most risk and reward to their customers based on the buying customers with a goal of 100% renewable energy. In 2014, only 4.2% of the energy they underwent evaluation the choice to go 100% renewable to reduce pollution and save money at competitive prices. The long-term, flat renewable energy the right terms reaches 100% renewable in the country and the future.



A Growing City

In 2015, the City of Georgetown purchased 150 MW of the energy to provide electricity to GUS in Texas where a panel can be used because of the state use the high capacity transmission (CREZ) lines, installed by

Case Study:

Municipally Owned Utilities in Texas



CPS Energy



Summary

CPS Energy is the nation's 755,000 electric customers in Antonio, TX. CPS Energy is a public utility and distribution. With a focus on making solar energy available through programs that shading/angle, roof ownership, and energy efficiency technologies to help customers more wisely and lower new jobs and education opportunities for the community. With Energy has committed resources to be completed by 2020. CPS Energy has already surpassed its goal of generating 1,000 new jobs committed to San Antonio by their NRECA Sunda project. A positive financial impact on the economic community is very important as they continue to grow renewable energy to the

Quick Facts

CPS Energy's service area ranks #1 in Texas and #7 nationally for solar energy generation.

CPS Energy has 9 solar farms, which together are generating over 230 MW of solar power. That is enough energy to power over 37,000 homes.

The largest of their solar installations will be a 1,200-acre solar farm expected to generate 110.2 MW.

CPS Energy offers 3 different ways to engage their customers with solar energy — community solar, private ownership, and solar hosting.

CPS Energy successfully links clean energy investment to local job creation by relying on local companies for solar equipment and installation.

CPS Energy has already surpassed its goal of generating 1,000 new jobs committed to San Antonio by their NRECA Sunda project.

Case Study:

Electric Cooperatives in Texas



CoServ Electric

Quick Facts

There are 275 subscribers to the CoServ Solar Station program.

The CoServ Solar Station is located on 16 acres of land.

The Solar Station is a 2 MW array.

There are 8,448 fixed-tilt 315 watt solar panels in the array.

Each panel is expected to produce 473.4 kW-hours per year for a total of 3.9 million kWh.

CoServ Solar Station is a Rate-Based Structure, selling blocks of energy produced to their customers.

A member's minimum usage over the past 12 months is the maximum energy block that can be purchased.

The solar project to help lower the cost of utility-scale power and cooperative members.

The most challenging step for CoServ was finding land suitable for solar and restrictive zoning and permitting regulations, less than 100 acres. CoServ worked with a land broker who was able to help the co-op secure the solar array. CoServ chose to build a 2 megawatt (MW) co-op determined that it would be more time and cost effective.

Summary

CoServ Electric (CoServ), a cooperative (co-op) in the Collin, Denton, Cooke, Wise, and Tarrant counties, is diversifying their energy receive options and a value diversification applied in the program was guided by participation's (NRECA) Solar Utility



Community solar is a concept where the NRECA Sunda project large scale solar project to help members, such as renters or homeowners. When NRECA was granted the opportunity to participate in the Sunda project during the project development phase, CoServ was able to range from resources for co-op members.

Case Study:

Independent School Districts in Texas



Presidio Independent School District



Summary

Presidio Independent School District (ISD) is a public school district in Presidio, TX. The ISD has 3 campuses that serve Presidio, Candelaria, Chinati, and Ruidosa, TX. Presidio ISD has become a leader in solar energy production in West Texas. The district saw the value in investing in renewable energy and is reaping the educational, environmental, and economic benefits. While undergoing budget cuts from the state, Presidio ISD turned to the abundance of West Texas sunshine as a way to enhance the district's value and provide a long term return on investment. Presidio ISD applied for several grants to retrofit district buildings with solar and in 2011 the first solar modules were installed. "Solar PV is our goal," says Dennis McEntire, the Superintendent for Presidio ISD. Presidio ISD aims to continue adding solar to help minimize infrastructure costs while maintaining a higher percentage of school dollars applied to direct student services.

Quick Facts

Location
Presidio, TX

Facilities Participating
Presidio High School
Presidio Elementary
District Offices
District Technology Center

PV Capacity
150 kWh

Average Annual Production
307,440 kWh

PV Location
Ground mount
Rooftop

Project Installation
First modules — 2011
Fully installed — 2014

Cost
\$500,000

PV Funding
Partial ISD budget and
partial grants (40/60)



Photos courtesy of Dennis McEntire, Superintendent, Presidio ISD

Funding

In 2010, Presidio ISD received a grant of \$250,000 from the State Energy Conservation Office (SECO) to install 72 kW rooftop array at the elementary school. The grant required that the district match 20% of the project costs. Presidio ISD also received \$500,000 from the U.S. Department of Energy National Environmental Policy Act (NEPA), secured by Ciro D. Rodriguez, the U.S. Congressman for the 23rd Congressional District, who is an active voice for solar power in the region.

Cost Benefit Analysis

Model Applications

**Simple
Grid-Tied
Solar**



**Solar with
Ancillary
Benefits**

Solar on Landfills/Contaminated Sites



Solar on Shading Structures



**Solar with
Storage**

Grid-Tied Solar with Storage



Mobile Solar with Storage



Cost Benefit Analysis

Project Deliverables

Report



Benefits and Costs of Model Solar Applications for Local Governments

Frontier Associates, August 2016
www.frontierassoc.com



North Central Texas
Council of Governments

Fact Sheets

1 SIMPLE GRID-TIED SOLAR

Simple grid-tied solar installations can offset purchased electricity on public properties such as wastewater treatment facilities, city halls or libraries, etc. These systems are by far the most common solar application deployed by public and private entities.

MODEL SOLAR APPLICATIONS

1. SIMPLE GRID-TIED SOLAR
2. SOLAR ON LANDFILLS OR OTHER UNDERUTILIZED SITES
3. SOLAR ON SHADING STRUCTURES
4. GRID-TIED SOLAR WITH ENERGY STORAGE
5. MOBILE SOLAR WITH ENERGY STORAGE

Solar and energy storage applications can provide energy, capacity, shade, mobility, resilience and other benefits to local communities. The North Central Texas Council of Governments (NCTCOG), with support from the Texas State Energy Conservation Office (SECO), identified a need for efficient approaches to evaluating solar and storage costs and benefits. This fact sheet, developed by Frontier Associates, presents information and analysis about one of five model solar applications likely to be of interest to local government officials. Frontier also produced a detailed report and Microsoft Excel-based financial pro forma templates that can be customized and applied to specific projects under consideration. All of this information may be obtained at www.gridtiedtexas.org.

3SOLAR

CLOSE UP

FIRE STATION #6 IN MCKINNEY

An example simple grid-tied solar energy system is the 52 kWdc solar array at Fire Station #6 in McKinney. The system produces an estimated 137,000 kWh of electricity annually, about 50 percent of the Fire Station's annual energy needs.

This project was funded in part by a grant through the Texas State Energy Conservation Office. It consists of 222 polycrystalline solar modules, rated at

235 watts each, installed on 3 different roof surfaces. The panels are attached to the roof seam utilizing clamps that allow the modules to be attached to the roof without making penetrations. It utilizes multiple string inverters due to limited space for a large centralized inverter, and includes a web based monitoring system that provides real time energy production data through a standard web browser.

Excel Tool

Solar/Energy Storage Financial Pro Forma and Benefit/Cost Analysis Tool									
Model Application 1. Simple Grid-Tied Solar									
A. Model Inputs					B. Model Outputs				
Category	Item	Value	Unit		Category	Item	Value	Unit	
System	PV System Size	200	kWdc		Direct Financial Benefits and Costs				
	Storage System Size	0	kWh		(from financial pro-forma model at right)				
	Storage System Size	0	kWh		Direct	IRS	6.5%	%	
	Storage System Size	0	kWh		Financial	Simple Payback Yrs	12	years	
Costs	PV System Cost	\$100,000	\$		Net Present Value	NPV	\$29,091	\$	
	Storage System Cost	\$0	\$		Benefit/Cost Ratio		1.1		
	Utility Incentives	\$100,000	\$		Annual and Cumulative Cash Flows				
	Tax Credits	\$0	\$						
Financing	Additional Grants	\$0	\$		Jobs and economic development impacts				
	Federal ITC Value %	20%	%		(see notes on Instructions worksheet)				
	Does ITC apply?	No	"Yes" or "No"		Dining	Jobs	3.7		
	Financing %	100%	%		construction	Employment	\$250,292	\$	2000-2016
PV Specs	Term	20	years		Operating	Employment	\$251,055	\$	2000-2016
	Rate	4.00%	%		Dining	Jobs	0.1		
	Loan origination costs	5%	%		Operating	Employment	\$2,441	\$	2000-2016
	Long-term maintenance fee?	No	"Yes" or "No"		Operating	Employment	\$2,700	\$	2000-2016
Rural Billing	Annual PV Production (or I)	235,593	kWh (from PV Watts)		Annual avoided emissions impacts				
	Annual PV Degradation Rate	0.50%	%		(see notes on Instructions worksheet)				
	PV Output/Federal Production R	92%	%		Annual avoided monthly kWh		24,355	kWh/month	
	PV Demand Factor	92%	%		Annual	Nitrogen Oxides	195	pounds/yr	
Retail Billing	Credit value for reduced imports	\$1,000	\$/kWh		Avoided	Sulfur Dioxide	648	pounds/yr	
	Credit value for exports	\$1,000	\$/kWh		Emissions	Carbon Dioxide	361,003	pounds/yr	
	Demand charge?	Yes	"Yes" or "No"		Annual avoided emissions equivalents				
	Demand charge savings rate	\$5.00	\$/kWh		(from EPA Guidelines for Emissions Calculations)				
Add'l Storage	Time of use savings rate	\$1,000	\$/kWh		Avoided	CO2 emissions	589,971	average passenger vehicle miles	
	Energy/demand rate escalator	15%	%		emissions	CO2 emissions	24.6	average home's annual electricity	
	Storage roundtrip efficiency	90%	%		equivalents	Carbon sequestered	4,714	tree seedlings grown for 10 years	
	Storage useful life	10	years						
Shading Value	Shaded parking spaces	0	#						
	Increased daily rental fee/pays	2	\$						
	Utilization rate	50%	%						
	Increases in tax revenues	\$0	\$/yr, or 15						
Tax Value	Resilience value	\$0	\$/yr, or 15						
	REC value	\$0	\$/yr, or 15						
	REC value	\$0	\$/yr, or 15						
	REC value	\$0	\$/yr, or 15						
Operating	PV O&M costs	\$13.33	\$/kW (from JED)						
	Other costs	0	\$/yr						
	O&M cost escalator	15%	%/yr						
	Inverter or 2 of inverter cost	0%	1.6-3% per NREL						
Depreciation	Inverter life	10	years						
	Inverter cost reduction	-2.0%	%/yr						
	Base "line", "MACRS"								
	Depreciation method	\$100,000	\$						
Tax Rate	Depreciation basis	\$100,000	\$						
	Marginal tax rate	0%	%						
	Is flat income taxable?	No	"Yes" or "No"						
	Discount rate for NPV calc.	4%	%						
PV Watts	AC Energy								
	Monthly	15,551	kWh						
	January	20,506	kWh						
	February	26,905	kWh						
Output	March	26,000	kWh						
	April	23,843	kWh						
	May	23,757	kWh						
	June	23,716	kWh						
Annual	July	23,716	kWh						
	August	23,716	kWh						
	September	23,716	kWh						
	October	23,716	kWh						
	November	23,716	kWh						
	December	23,716	kWh						
	Annual	235,593	kWh						

Key Resources To Assist in Evaluating Solar Energy Options or to Learn More

HELPFUL TOOLS

- [The Solar Roadmap](#)
- [Google Project Sunroof \(not in Texas yet\)](#)
- [Energy Sage](#)
- [Mapdwell \(not in Texas\)](#)
- [Geostellar](#)
- [DOE PV Watts](#)
- [Solar Energy.com Solar Power Calculator](#)
- [Solar Estimate Calculator](#)
- [Worksheet courtesy of Solar Plano Advocates](#)
- [Smart Meter Texas](#)
- [Database of State Incentives for Renewables and Efficiency \(DSIRE\)](#)
- [Power to Choose Available Purchase Offers \(electric companies who purchase excess renewable energy\)](#)
- [Property Tax Exemption](#)
- [Fannie Mae Green Initiative Loan Program](#)
- [Business Energy Investment Tax Credit](#)
- [Property Assessed Clean Energy \(PACE\)](#)
- [Go Solar Texas Solar Glossary](#)

INDUSTRY ASSOCIATIONS AND GROUPS

- [Solar Energy Industries Association \(SEIA\)](#)
- [Solar Electric Power Association \(SEPA\)](#)
- [Texas Solar Energy Society](#)
- [Texas Renewable Energy Industry Alliance \(TREIA\)](#)
- [North Texas Renewable Energy Group](#)
- [Plano Solar Advocates](#)
- [Solarize Texas](#)
- [Solar Instructor Training Network \(SITN\)](#)
- [Solar Energy International Solar Professionals Certificate Program](#)
- [North American Board of Certified Energy Practitioners \(NABCEP\)](#)
- [Oncor Take a Load Off, Texas Service Provider website](#)

GOVERNMENT AND OTHERS

- [North Central Texas Council of Governments - Gosolartexas.org](#)
- [Texas State Energy Conservation Office](#)
- [Open PV Project](#)
- [Department of Energy Solar Energy Resource Center](#)
- [Department of Energy Sunshot Initiative](#)
- [Solar Outreach Partnership \(SolarOPs\)](#)
- [Environmental Protection Agency Re-Powering America's Land Initiative](#)
- [National Association of Regional Councils Solar Energy](#)
- [Texas Solar Facts](#)



www.gosolartexas.org

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