Putting Underutilized Land to Work for Solar

July 27, 2016
11:30 am – 12:30 pm

Sponsored by:

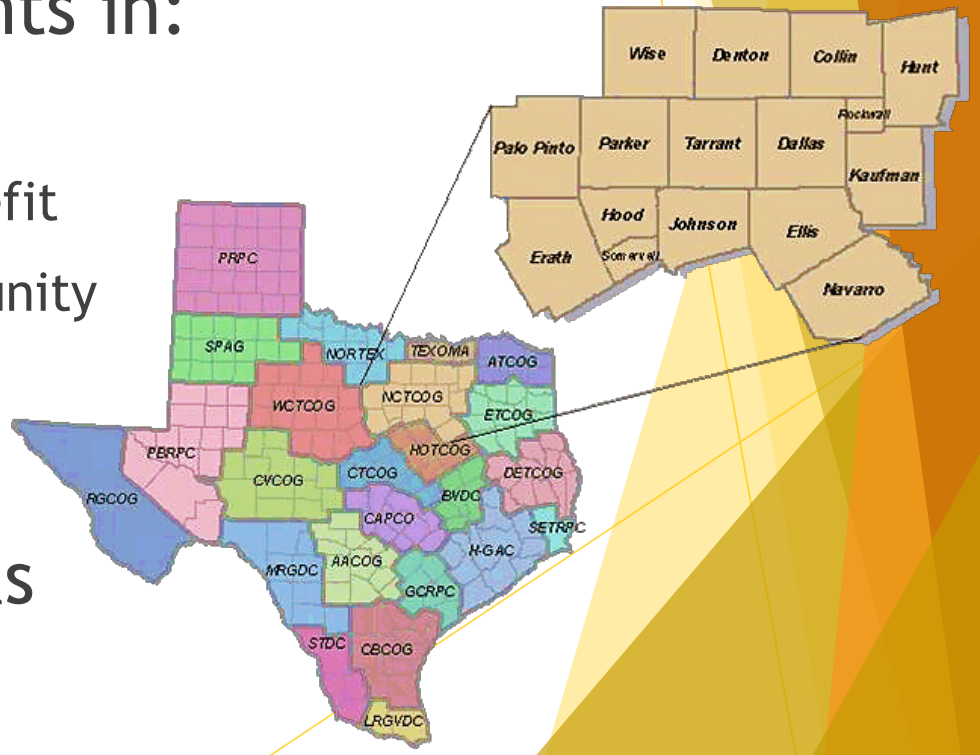
North Central Texas Council of Governments

SECO
State Energy Conservation Office

www.GoSolarTexas.org

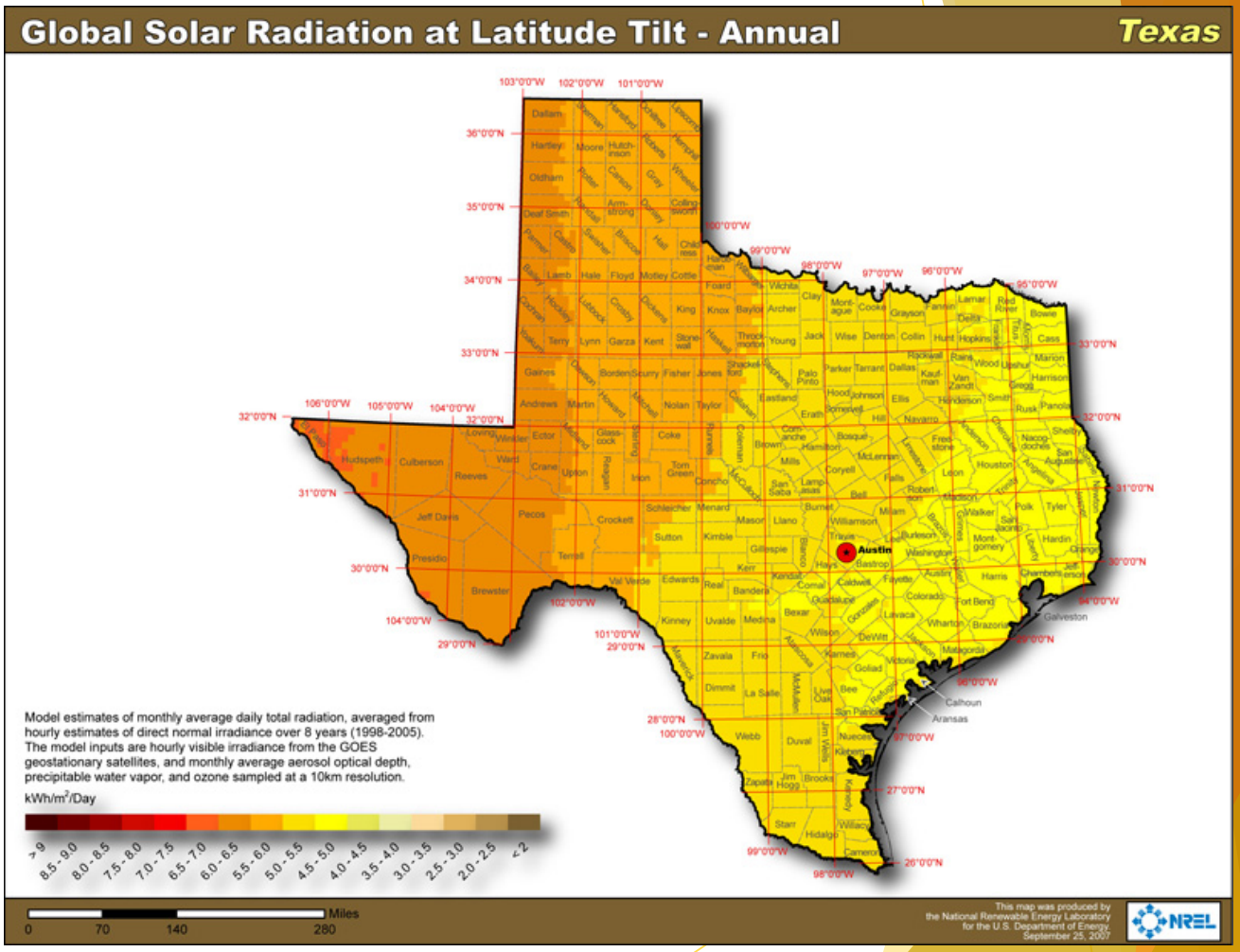
What is NCTCOG?

- Voluntary association of local governments
- Established in 1966
- Assists local governments in:
  - Planning for common needs
  - Cooperating for mutual benefit
  - Recognizing regional opportunity
  - Resolving regional programs
  - Making joint decisions
- One of 24 COGs in Texas
- www.nctcog.org



Why is NCTCOG focused on Solar?

- Improve Air Quality
- Increase Local Energy Reliability
- Facilitate Local Government Efforts
- Provide Consistency Among Region
- Reduce Costs (for everyone)



Statewide Solar Energy Initiative

- NCTCOG contractor to State Energy Conservation Office (SECO)
- Performing activities through August 2016

Major Tasks

- Outreach to Niche Markets (Municipal Owned Utilities/Electric Coops, ISDs)
- Solar Energy System Training (Statewide)
- Statewide Solar 101 Information Distribution (Local Government and Public Audiences)
- Solar Energy Expedited Permit and Model Ordinance
- Solar Applications Cost-Benefit Analysis

Steve Wiese

Sr. Consultant – Efficiency and Renewables

Frontier Associates

NCTCOG
North Central Texas
Council of Governments

50 YEARS 1966-2016

Benefits and Costs of Model Solar Applications for Local Governments

NCTCOG Webinar - July 27, 2016
"Putting Underutilized Land to Work for Solar"

Steve Wiese, Senior Consultant, Efficiency + Renewables
swiese@frontierassoc.com, 512-372-8778

FRONTIER ASSOCIATES

About Frontier Associates

- At Frontier Associates, we work on the demand side of energy markets
  - Energy efficiency and distributed renewable energy programs
  - Demand response programs
  - Innovative rates and pricing strategies
  - Research into new energy-efficiency technologies
- Based in Austin, and most of our work is in Texas and neighboring states
- Our staff of 35 has assisted nearly every major electric and natural gas utility in Texas, Oklahoma, Arkansas, Colorado, and New Mexico
- www.frontierassoc.com

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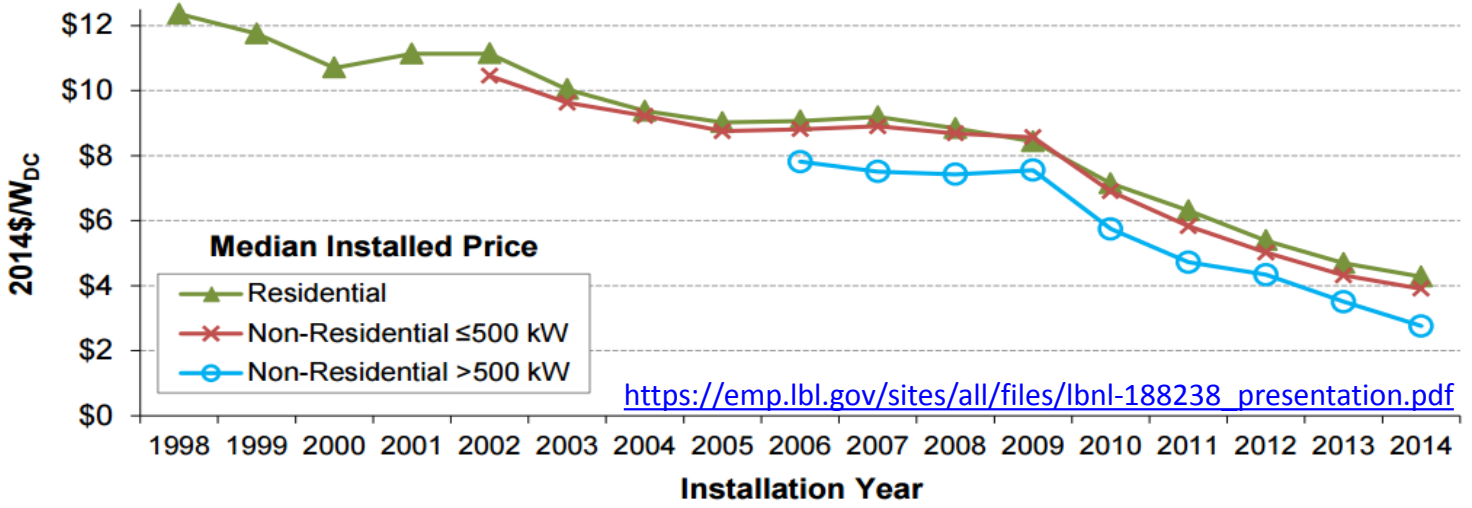
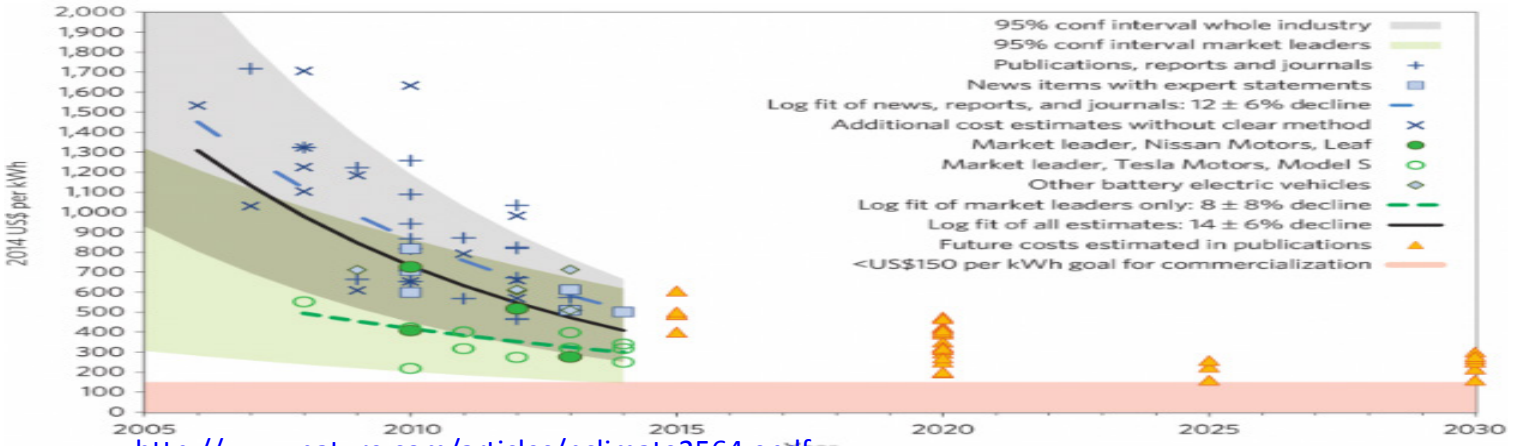
Rapidly Declining Costs

Solar, 1998-2014 (NREL)



https://emp.lbl.gov/sites/all/files/lbnl-188238_presentation.pdf

Storage, 2005-2014 (projected 2030) (Nature Climate Change)



http://www.nature.com/articles/nclimate2564.epdf

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NCTCOG Project Summary

Purpose

Provide guidance to local government officials in understanding the benefits and costs of potential investments in solar and storage on public facilities

Approach/Method

- Review potential applications, trends, key system components, common financial structures
- Define benefit-cost analysis inputs and outputs, design pro-forma tool
  - Direct financial benefits and costs
  - Additional community impacts
- Identify model solar applications, define input parameters for model systems/facilities
- Run the model, summarize results, provide overall conclusions and recommendations

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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

Benefits and Costs Examined

Direct Financial Benefits and Costs	
Direct Financial Benefits	**Direct Financial Costs**
Electric bill savings Avoided energy inflows Value of outflows Avoided demand charges Increases in property tax revenue Value of shade/shelter Time of use arbitrage Resiliency	Capital costs, net of Utility incentives Additional grants Tax credits Operating and maintenance costs Financing costs
Key Direct Financial Metrics	
Internal rate of return (IRR) Net present value of cash flows (NPV)	Simple payback years Benefit cost ratio
Additional Community Impacts	
Local jobs and economic development Shading/shelter Extend emergency services capabilities	Environmental and health benefits Productive land use/increased taxable value Increasing public awareness of clean energy

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Preliminary Conclusions

- **Solar, storage, and solar + storage combinations are becoming increasingly cost-effective in local government applications**
  - Grid-tied solar is currently cost-effective when costs are reduced with grants or utility incentives
  - Storage may be currently cost-effective where the value of backup power is very high, and where there is likely to be a need for backup over extended periods of time
- **Some potential value streams provided by solar and storage**
  - Are currently difficult or impossible to capture, but mechanisms should develop as market interest increases
  - Other potential value streams are currently difficult to quantify (e.g., “resiliency”)
- **Model applications and pro formas provide a base scenario which can be customized to a particular public facility**
- **Frontier can help local governments adapt the model to specific use cases**
- **Final report and tools should be available by fall 2016**

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For More Information

Steve Wiese
Senior Consultant, Efficiency + Renewables
swiese@frontierassoc.com, 512-372-8778

FRONTIER ASSOCIATES

Dan French

CEO

Brownfield Listings, LLC


WE CAN DO IT!
REBUILD, REFIT AND RENEW AMERICA
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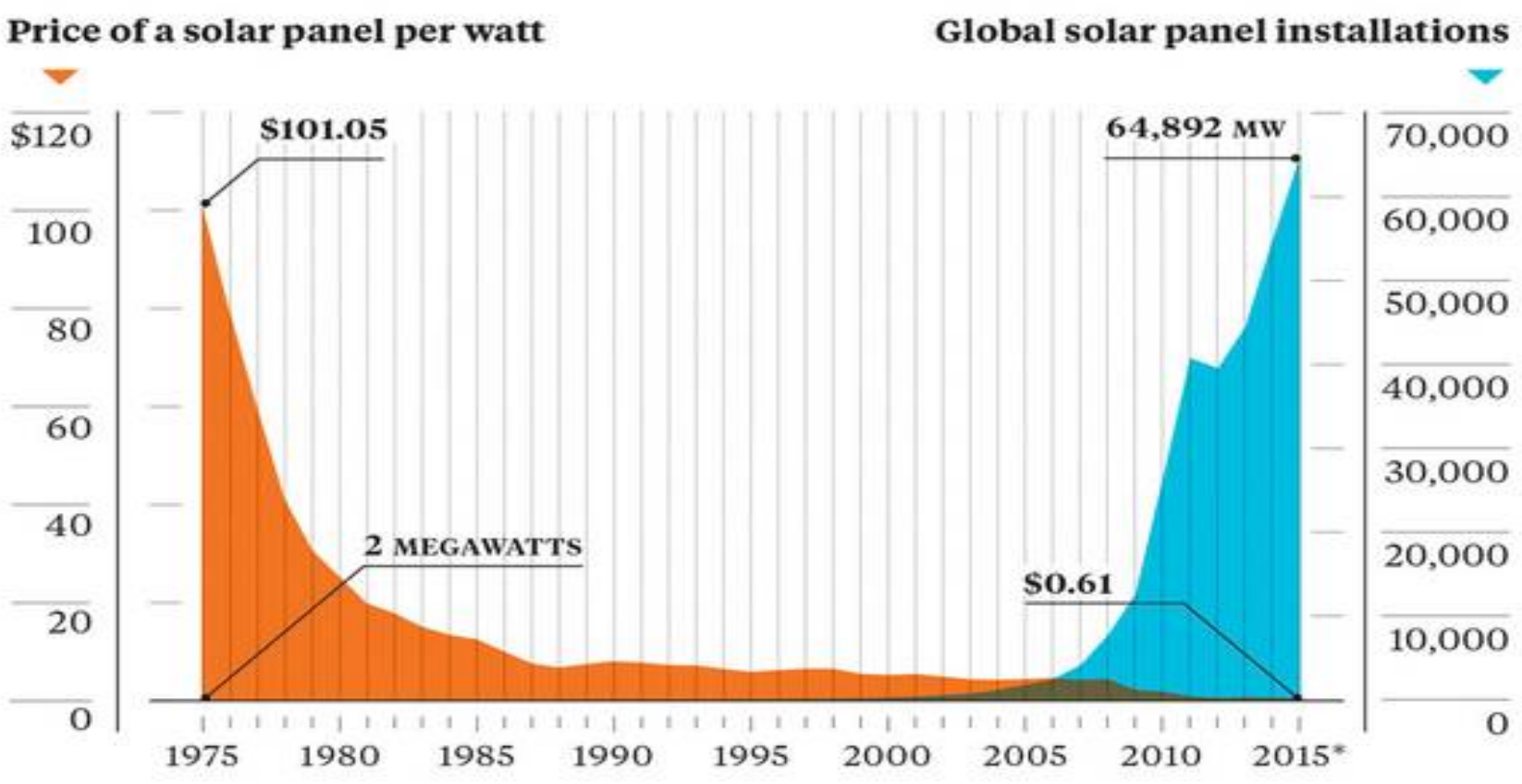
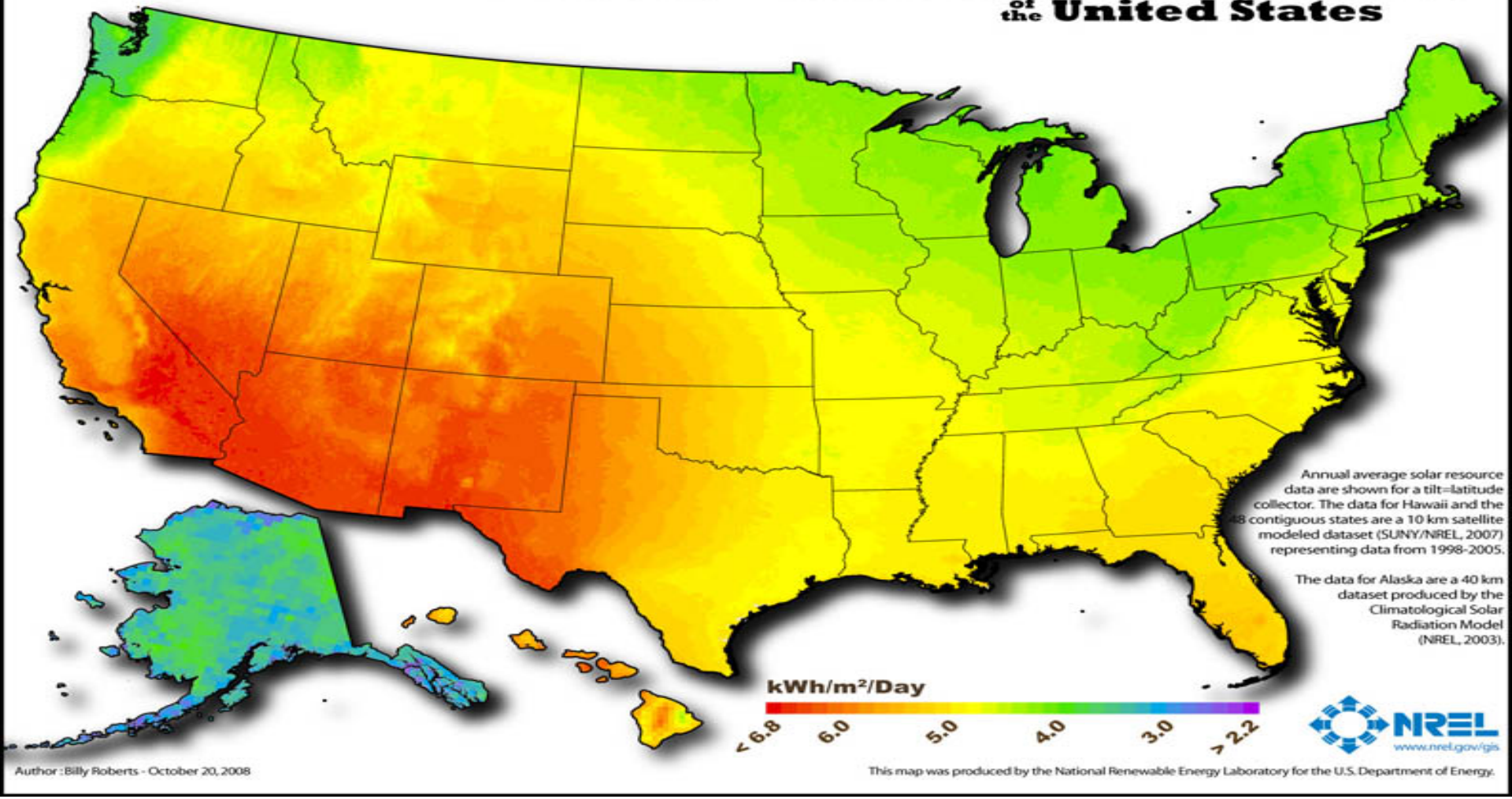

Price of a solar panel per watt
Global solar panel installations
$120
100
80
60
40
20
0
$101.05
2 MEGAWATTS
$0.61
64,892 MW
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1975
1980
1985
1990
1995
2000
2005
2010
2015*

Photovoltaic Solar Resource of the United States



Annual average solar resource data are shown for a tilt=latitude collector. The data for Hawaii and the 48 contiguous states are a 10 km satellite modeled dataset (SUNY/NREL, 2007) representing data from 1998-2005.

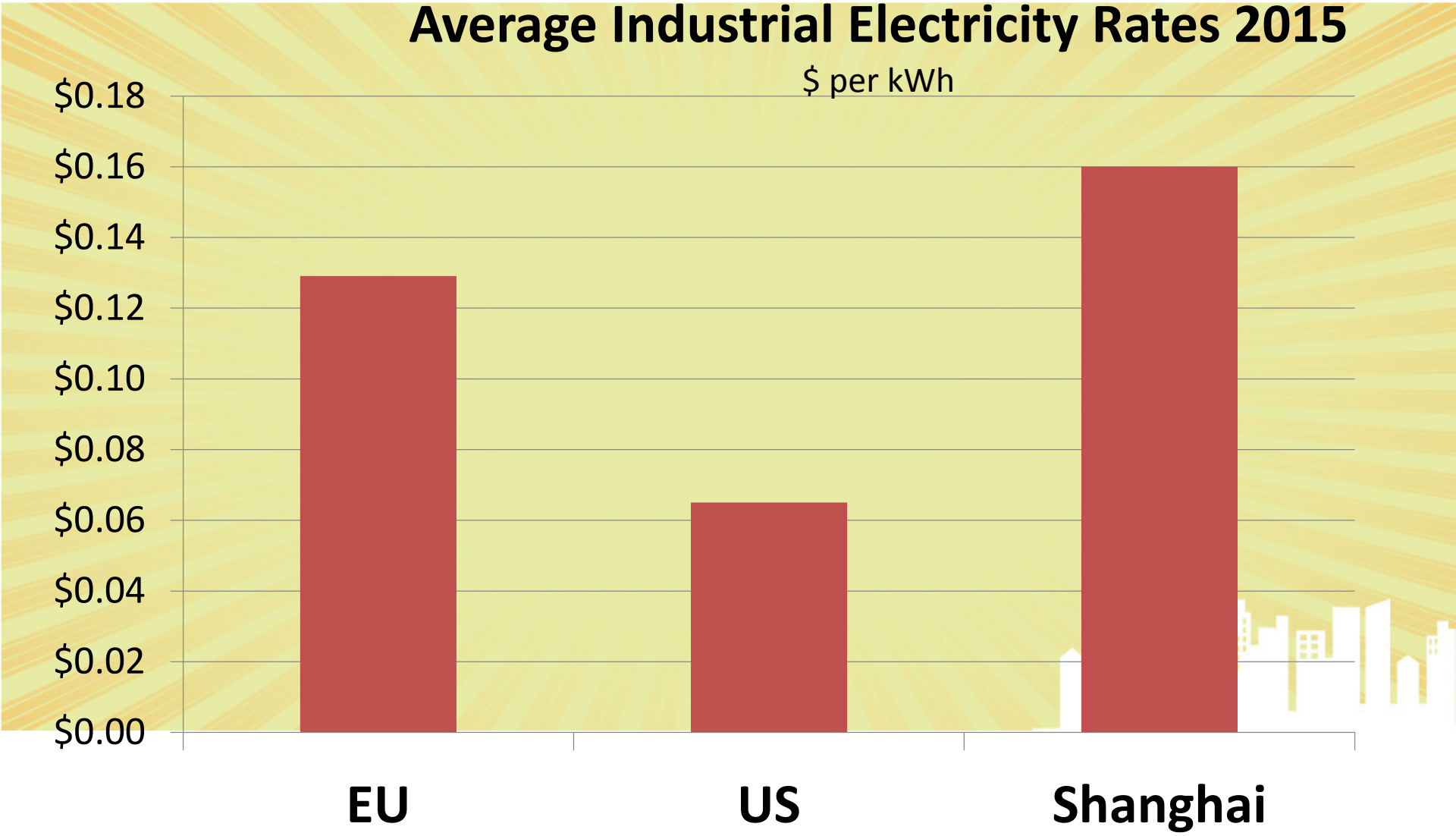
The data for Alaska are a 40 km dataset produced by the Climatological Solar Radiation Model (NREL, 2003).

NREL
www.nrel.gov/gis

Author : Billy Roberts - October 20, 2008

This map was produced by the National Renewable Energy Laboratory for the U.S. Department of Energy.

Average Industrial Electricity Rates 2015



- Greenfield vs. brownfield | Advantage brownfields
  - Zoning, permitting, public opinion
  - Cost savings: existing interconnection, legacy infrastructure
  - Location: proximity to substations, grid connection, existing end-users
- Green on brown benefits
  - Sustainability gains
  - Reusing land otherwise unusable for productive use
- Benefits as a land use option
  - Productive use where no land use could go before
  - Low intensity use: no noise, no effluents, no traffic
  - Long term "interim" use
  - Pathway to closure
- Developers searching for brownfields
- Site selection criteria

SolarTurf BRING LAND TO LIGHT
COMMUNITY GREEN ENERGY
PV NAVIGATOR

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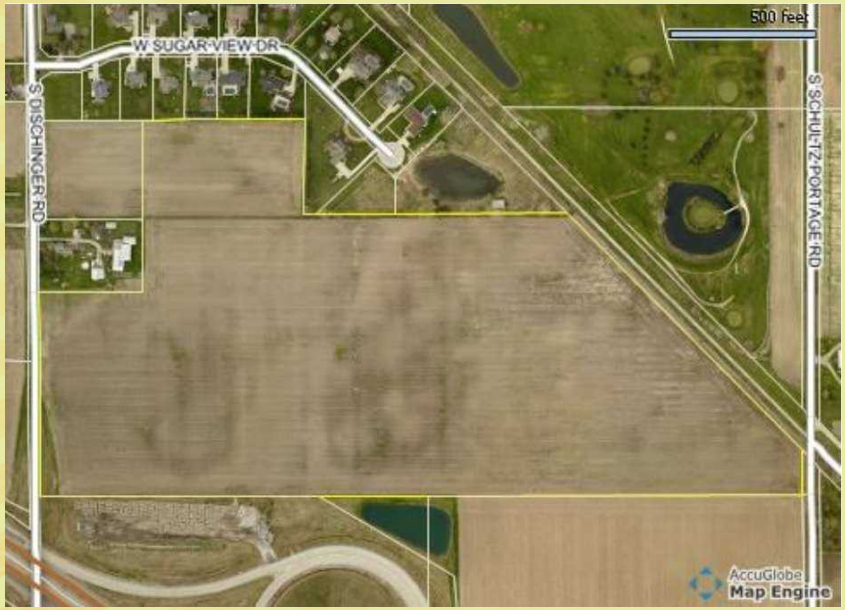
Design. Diligence. Development.

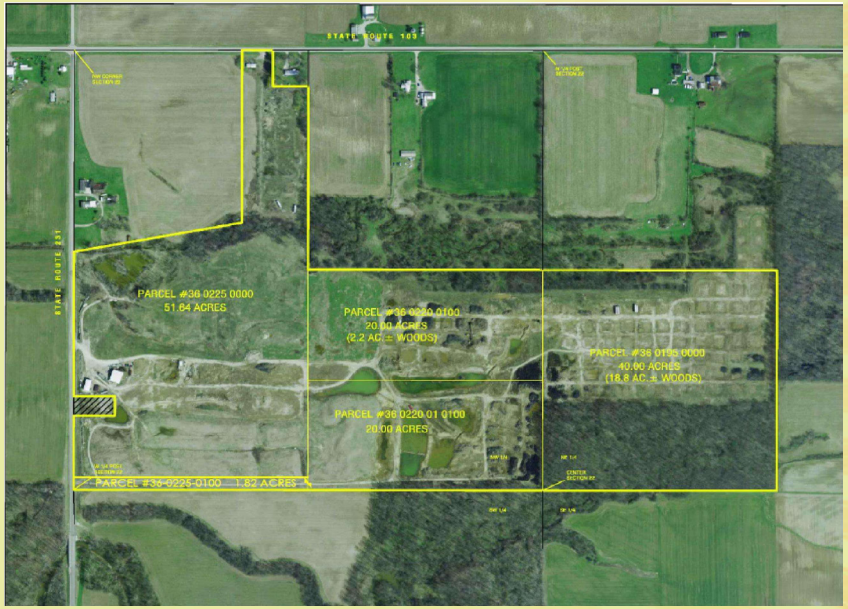
Elmore Greenfield

- 52 acre city-owned urban greenfield site | RFP for 1 MW
- City owns & operates electric utility serving ~950
- Preference shown for proposals w/option for city to purchase the facility at a later date



Kirby Tire Recycling

- 133 acre rural facility suffered major fire in 1999
- Remediated, covenant not to sue issued by EPA
- Multi-party MOU clears liens upon solar development



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3-in-1 RFP published by the Connecticut Materials Innovation and Recycling Authority (MIRA)

Waterbury Landfill

- 3 acre urban infill site
- Landfill closed in 2009
- Utility corridor adjacent to property

Shelton Landfill

- 60 acre urban infill site
- Landfill closed in 2001
- Showcase installation at Seaside Park

Ellington Landfill

- 38 acre rural site
- Landfill closed in 1998
- Surround by productive farmland

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- A national project marketplace for real estate revitalization, remediation, and redevelopment
- Free platform to list properties and post projects; also with premium pay-for features
- Internal project tools for redevelopment teams to collaborate and share
- External publishing tools for marketing and stakeholder engagement
- Reach a national audience of vendors and developers capable of taking on properties in ANY condition
- Search vendor and developer profiles to find pros and partners
- RFP/Q marketplace pings thousands of redevelopment professionals bidding projects to reimagine, reuse and renew underutilized brownfield and greyfield properties everywhere in the U.S.
- Portfolio feature markets sites collectively by condition, location or end use, e.g. the Brightfields Portfolio for potential solar sites

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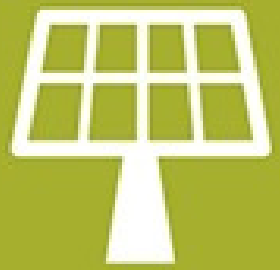
BRIGHTFIELDS PORTFOLIO



NOW LIVE!

An open feature for potential solar sites across the country

- **Free and clear path to market to solar developers**
- **Focused on 1+ acre sites**
- **Formal RFPs can be attached to listings**
- **Featuring developers specializing in brownfields, closed landfills, pre-closure landfills and other pre-remediation sites**
- **Featuring developers installing 'community-owned' projects—also known as solar gardens—whose electricity is shared by more than one household/user**
- **Free matchmaking pairs brightfield sites with solar developers**

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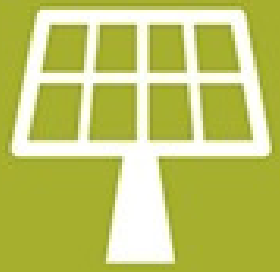

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An open feature for potential solar sites across the country

Go to http://BrownfieldListings.com

1. **Register free user account**
2. **Create free listing organization**
3. **Create free basic listing using the brightfield tag**

Email info@brownfieldlistings.com

EPA's RE-Powering Initiative

Mapping and Screening Tools

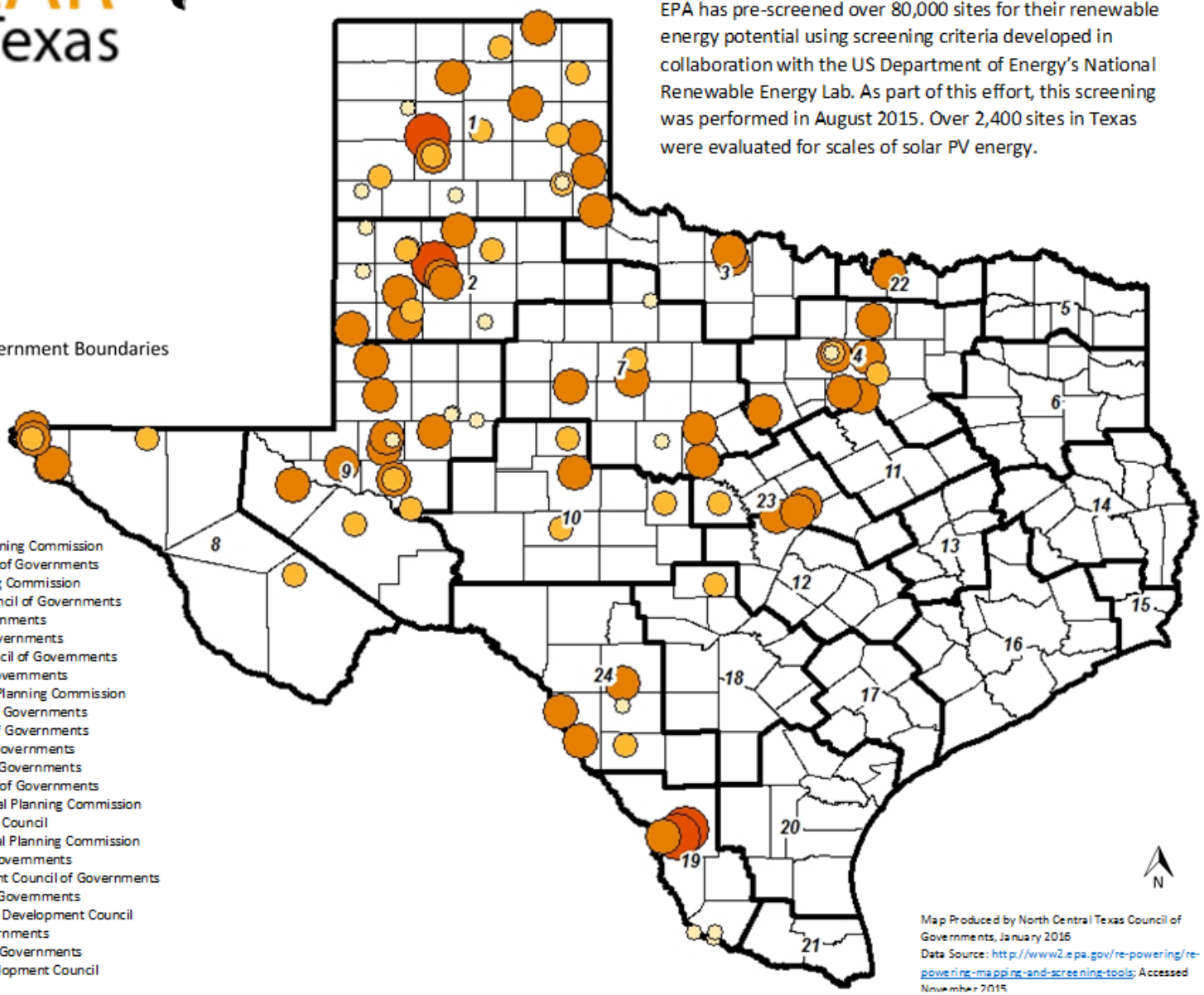
RE-Powering Initiative

- EPA encourages renewable energy on already developed or degraded land instead of green space. The tool addresses the following types of sites:
  - Potentially Contaminated Sites (Superfund, Brownfield, RCRA, mine site)
  - Landfill (Municipal Solid Waste, Construction and Demolition or similar unit)
  - Underutilized (Abandoned parcels, parking lots, buffer zones)
  - Rooftop (Solar PV only; Commercial / Industrial roofs)

RE-Powering's Electronic Decision Tree Tool

- The electronic decision tree is a downloadable computer application that:
  - Walks users through a series of Yes / No / Skip questions supplemented by tips and links to relevant tools and information resources
  - Screens for site characteristics, redevelopment considerations, criteria specific to landfills and contaminated sites, energy load, policies and financial considerations
  - Generates reports of the screening results and user annotations that can be printed and/or copied into another document

GO SOLAR North Texas



EPA has pre-screened over 80,000 sites for their renewable energy potential using screening criteria developed in collaboration with the US Department of Energy's National Renewable Energy Lab. As part of this effort, this screening was performed in August 2015. Over 2,400 sites in Texas were evaluated for scales of solar PV energy.

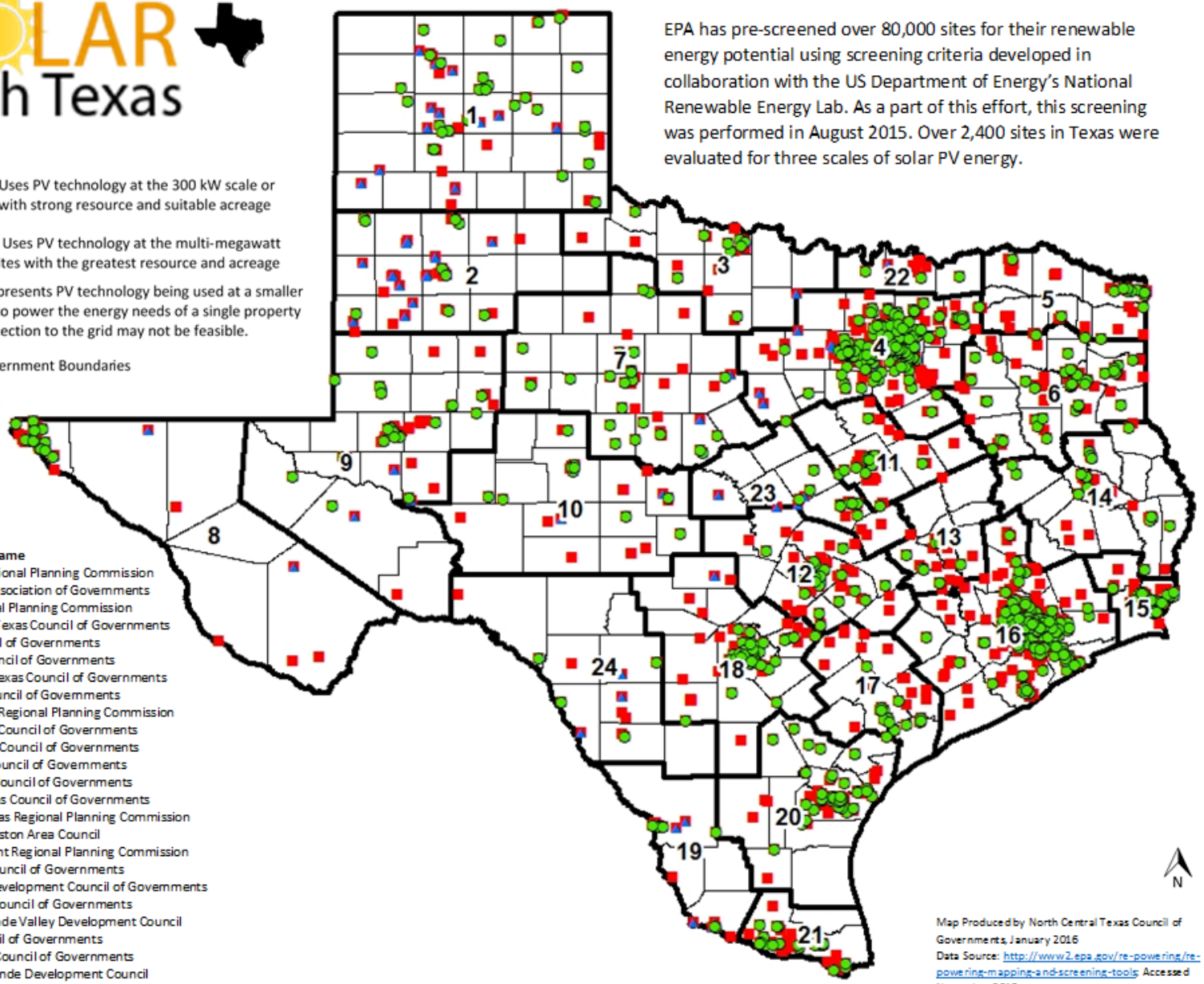
Map #	COG/RPC Name
1	Panhandle Regional Planning Commission
2	South Plains Association of Governments
3	Nortex Regional Planning Commission
4	North Central Texas Council of Governments
5	Ark-Tex Council of Governments
6	East Texas Council of Governments
7	West Central Texas Council of Governments
8	Rio Grande Council of Governments
9	Permian Basin Regional Planning Commission
10	Concho Valley Council of Governments
11	Heart of Texas Council of Governments
12	Capital Area Council of Governments
13	Brazos Valley Council of Governments
14	Deep East Texas Council of Governments
15	South East Texas Regional Planning Commission
16	Houston-Galveston Area Council
17	Golden Crescent Regional Planning Commission
18	Alamo Area Council of Governments
19	South Texas Development Council of Governments
20	Coastal Bend Council of Governments
21	Lower Rio Grande Valley Development Council
22	Texoma Council of Governments
23	Central Texas Council of Governments
24	Middle Rio Grande Development Council

Map Produced by North Central Texas Council of Governments, January 2016
Data Source: http://www2.epa.gov/re-powering/re-powering-mapping-and-screening-tools; Accessed November 2015

GO SOLAR North Texas

EPA has pre-screened over 80,000 sites for their renewable energy potential using screening criteria developed in collaboration with the US Department of Energy's National Renewable Energy Lab. As a part of this effort, this screening was performed in August 2015. Over 2,400 sites in Texas were evaluated for three scales of solar PV energy.

- Large Scale PV: Uses PV technology at the 300 kW scale or greater at sites with strong resource and suitable acreage
- Utility Scale PV: Uses PV technology at the multi-megawatt (MW) scale at sites with the greatest resource and acreage
- Off-Grid PV: Represents PV technology being used at a smaller scale, typically to power the energy needs of a single property when interconnection to the grid may not be feasible.
- Council of Government Boundaries



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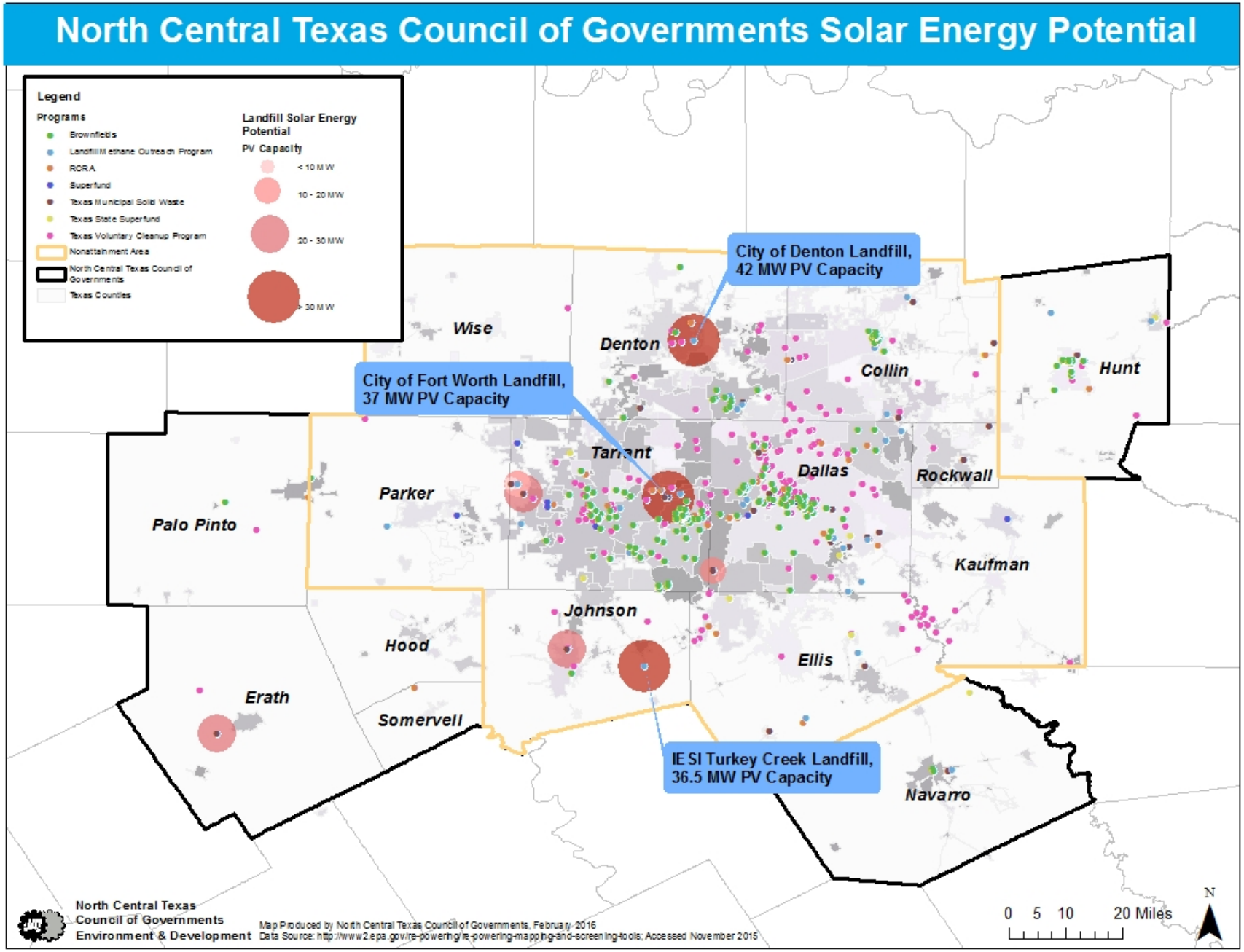
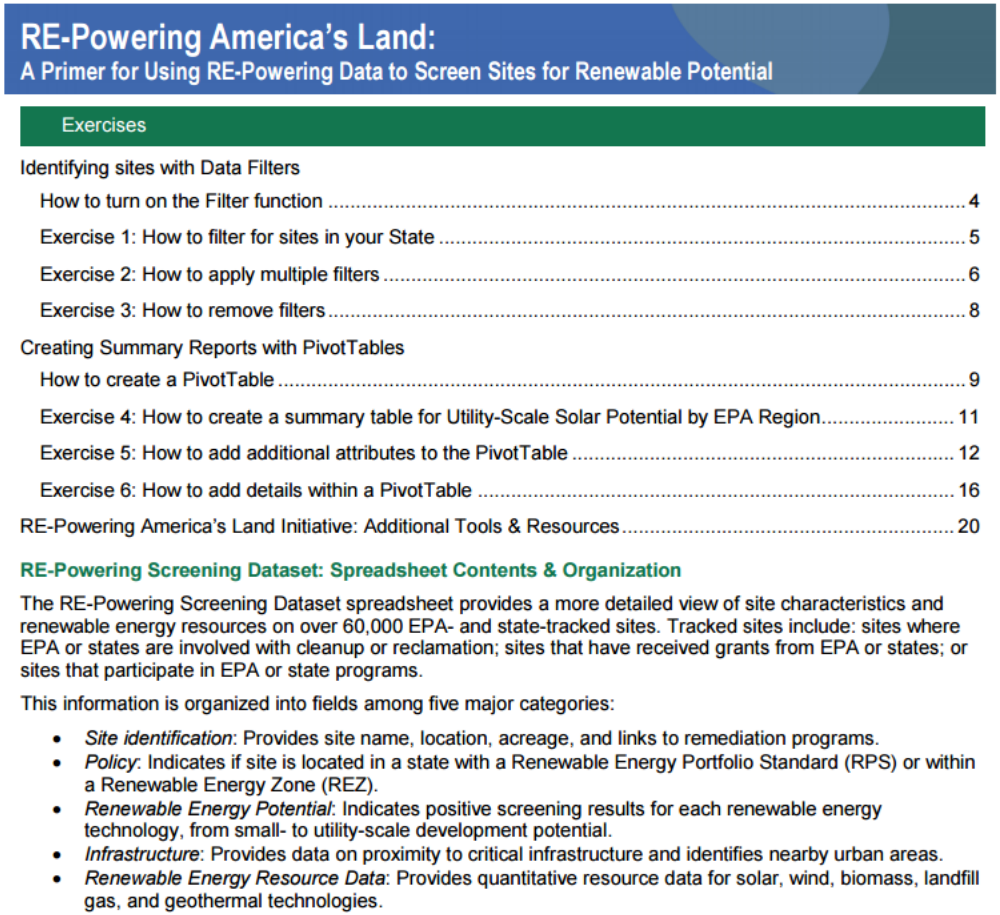
North Central Texas Council of Governments Solar Energy Potential



RE-Powering Mapper

- EPA RE-Powering Mapping and Screening Tools

  https://www.epa.gov/re-powering/re-powering-mapping-and-screening-tools



RE-Powering America's Land:
A Primer for Using RE-Powering Data to Screen Sites for Renewable Potential

Exercises

RE-Powering Screening Dataset: Spreadsheet Contents & Organization

The RE-Powering Screening Dataset spreadsheet provides a more detailed view of site characteristics and renewable energy resources on over 60,000 EPA- and state-tracked sites. Tracked sites include: sites where EPA or states are involved with cleanup or reclamation; sites that have received grants from EPA or states; or sites that participate in EPA or state programs.

This information is organized into fields among five major categories:

- *Site identification*: Provides site name, location, acreage, and links to remediation programs.
- *Policy*: Indicates if site is located in a state with a Renewable Energy Portfolio Standard (RPS) or within a Renewable Energy Zone (REZ).
- *Renewable Energy Potential*: Indicates positive screening results for each renewable energy technology, from small- to utility-scale development potential.
- *Infrastructure*: Provides data on proximity to critical infrastructure and identifies nearby urban areas.
- *Renewable Energy Resource Data*: Provides quantitative resource data for solar, wind, biomass, landfill gas, and geothermal technologies.

QUESTIONS

Steve Wiese
Sr. Consultant – Efficiency and Renewables
Frontier Associates
swiese@frontierassoc.com
512-372-8778

Dan French
CEO
Brownfield Listings, LLC
dan@brownfieldlistings.com
(312) 988-0256

Thank You!

Presentations, upcoming webinars and training opportunities posted at GoSolarTexas.org

Tamara Cook
Manager of Environment and Development
tcook@nctcog.org
817-695-9221

Rachel Evans
Environment and Development Planner
Revans@nctcog.org
817-695-9223

Soria Adibi
Environment and Development Planner
sadibi@nctcog.org
817-608-2363

Lori Clark
Principal Air Quality Planner
lclark@nctcog.org
817-695-9232

Rachel Linnewiel
Air Quality Planner
rlinnewiel@nctcog.org
817-608-2329

Kristina Ronneberg
Air Quality Planner
kronneberg@nctcog.org
817-695-9226