



E.ON North America



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OCI Solar Power



From Adams Utilities & Energy Services, Texas A&M University

# Clean Economy Rising

Texas winds generate economic growth

11.17.2014



# Agenda

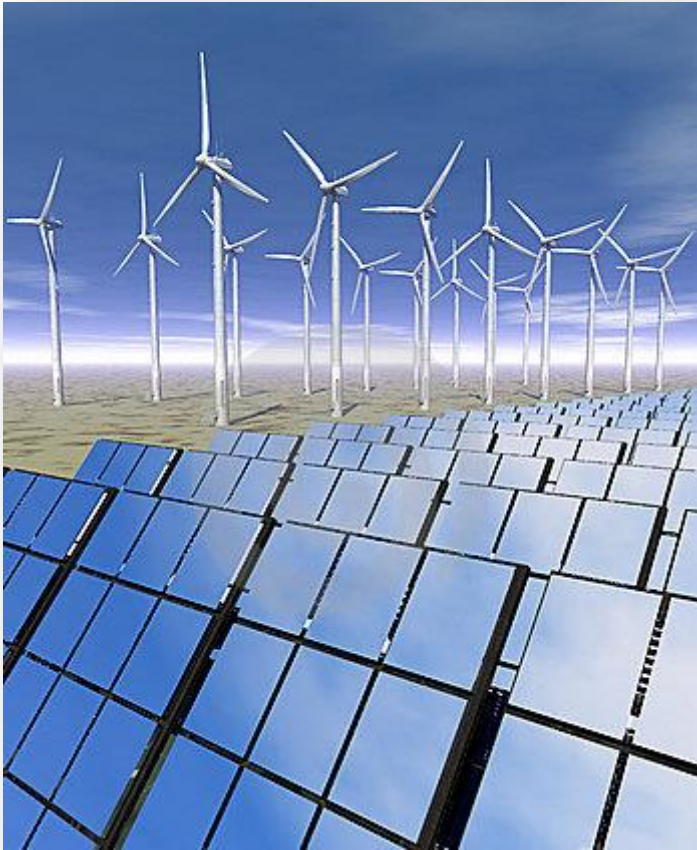
- **Pew's Research: *Clean Economy Rising***
  - Tom Swanson, *manager, clean energy*, The Pew Charitable Trusts
- **Wind Power in Texas**
  - Jeff Clark, *executive director*, The Wind Coalition
- **Solar Power in Texas**
  - Kim R. Stoker, *director, environmental planning, compliance & sustainability*, CPS Energy
- **Industrial Energy Efficiency in Texas**
  - Gavin Dillingham, *Ph.D., research scientist*, Houston Advanced Research Center



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# The Pew Clean Energy Initiative



*The goal is to accelerate the clean energy economy for its national security, economic and environmental benefits.*

The program promotes the adoption of key changes to U.S. energy policy in four sectors:

- Industry
- Utilities
- Transportation
- Research and Development



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# Clean Economy Rising

## Project Overview

State	SECTORS	EMERGING OPPORTUNITIES
GA	Solar, Biomass	Offshore Wind, EVs
ME	Wind, Biomass	Marine Hydrokinetic
MI	Wind, Biofuels	Cleantech Incubator
NC	Solar, Smart Grids	EVs, Biofuels
ND	Wind, Industrial Energy Efficiency	Solar, Biomass
OH	Wind, Solar, Industrial Energy Efficiency	Storage, Advanced Vehicles
PA	Industrial Energy Efficiency, Solar	Advanced Hydro
TX	Wind, Solar, Industrial Energy Efficiency	Clean Energy Manufacturing



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# Highlights of Texas' Clean Energy Economy

## National Rankings

Rank	
<b>2nd</b>	in energy- and environment-related jobs, 2011 (177,155)
<b>7th</b>	in new renewable capacity installations, 2013 (236 MW)
<b>9th</b>	in private investment, 2013 (\$553 million)

- Leads the nation in wind power and industrial energy efficiency
- Rising star in solar power

Sources: Navigant Research, Bureau of Labor Statistics

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# Drivers of Texas' Clean Energy Economy

- Highest wind and solar resource potential in nation
- Renewable portfolio and energy efficiency resource standards
- Deregulated electricity market
- Federal and state financing assistance

## Key State Policies

<input checked="" type="checkbox"/>	Renewable portfolio standard	<input checked="" type="checkbox"/>	Tax incentives	<input type="checkbox"/>	Green power purchasing
<input checked="" type="checkbox"/>	Interconnection standards	<input checked="" type="checkbox"/>	Bonds/loans/rebates/other financing	<input checked="" type="checkbox"/>	Nonutility sales of renewable electricity allowed

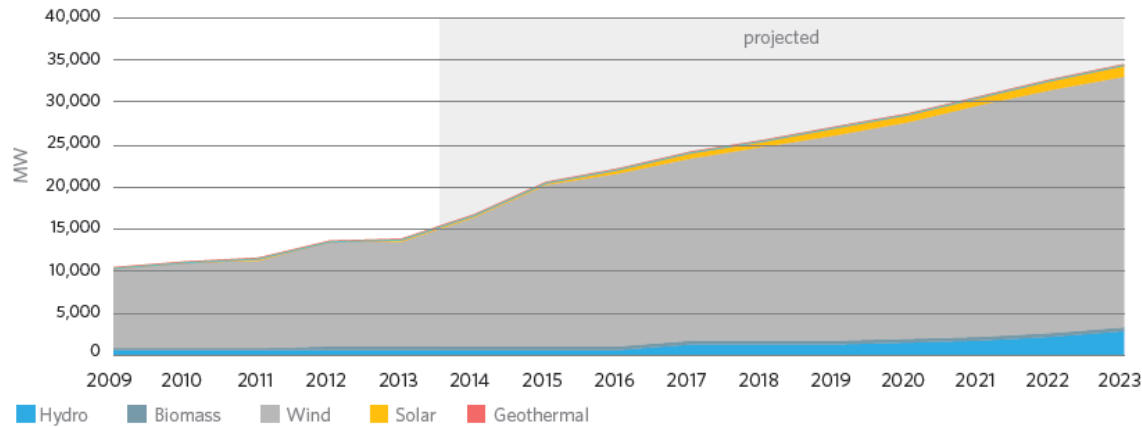
Source: North Carolina State University, Database of State Incentives for Renewables and Efficiency

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## Clean Energy Capacity, by Sector and Year

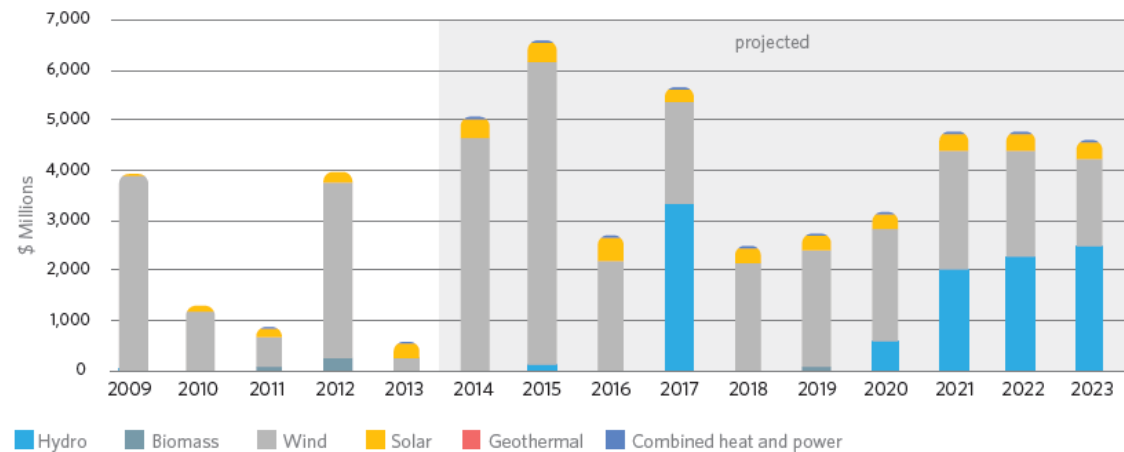
Actual (2009-13) and projected (2014-23) growth in cumulative capacity



# Clean Energy Installations & Investment

## Clean Energy Investment, by Sector and Year

Actual (2009-13) and projected (2014-23) annual investment



- 5.6 GW, \$10.6B over past 5 y
- 20.8 GW, \$42B over next 10 y

Sources: Navigant Research, Energy Information Administration

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# Wind

## Texas Wind

National rankings and statistics, 2013

Rank	
<b>1st</b>	in total capacity (12.8 GW)
<b>4th</b>	in new capacity (141 MW)
<b>4th</b>	in private investment (\$254 million)
<b>3.3 million</b>	homes powered by wind
<b>7.8 billion</b>	gallons of water saved by wind power

Sources: American Wind Energy Association, Navigant Research

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- Generates 23% of nation's wind electricity.
- Encouraged by Competitive Renewable Energy Zones (CREZ) & transmission projects.



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# Solar

## Texas Solar

National rankings, 2013

Rank	
<b>6th</b>	in jobs (4,100)
<b>8th</b>	in new capacity (75 MW)
<b>8th</b>	in private investment (\$269 million)
<b>13th</b>	in total capacity (213 MW)
<b>13th</b>	In homes powered by solar (12,636)

- San Antonio and Austin—cities with strong RPS—have 85% of installed solar capacity in Texas.

Sources: Navigant Research, Solar Energy Industries Association, and Solar Foundation

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# Industrial Energy Efficiency

## Texas Industrial Energy Efficiency National rankings and statistics, 2013

Rank	
<b>1st</b>	total capacity (17 GW)
<b>4th</b>	new capacity (20 MW)
<b>4th</b>	private investment (\$30 million)
<b>126</b>	projects statewide

- After hurricanes Ike and Rita, Texas adopted laws encouraging use of combined heat and power at critical facilities

Sources: Navigant Research, U.S. Department of Energy

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# Summary

- One of largest and fastest-growing clean energy economies in nation
- But policy matters:
  - CREZ/transmission and PTC encouraged wind
  - Cities with strong RPS have more solar



The 782-MW Roscoe wind farm in West Texas



CHP at Texas A&M University



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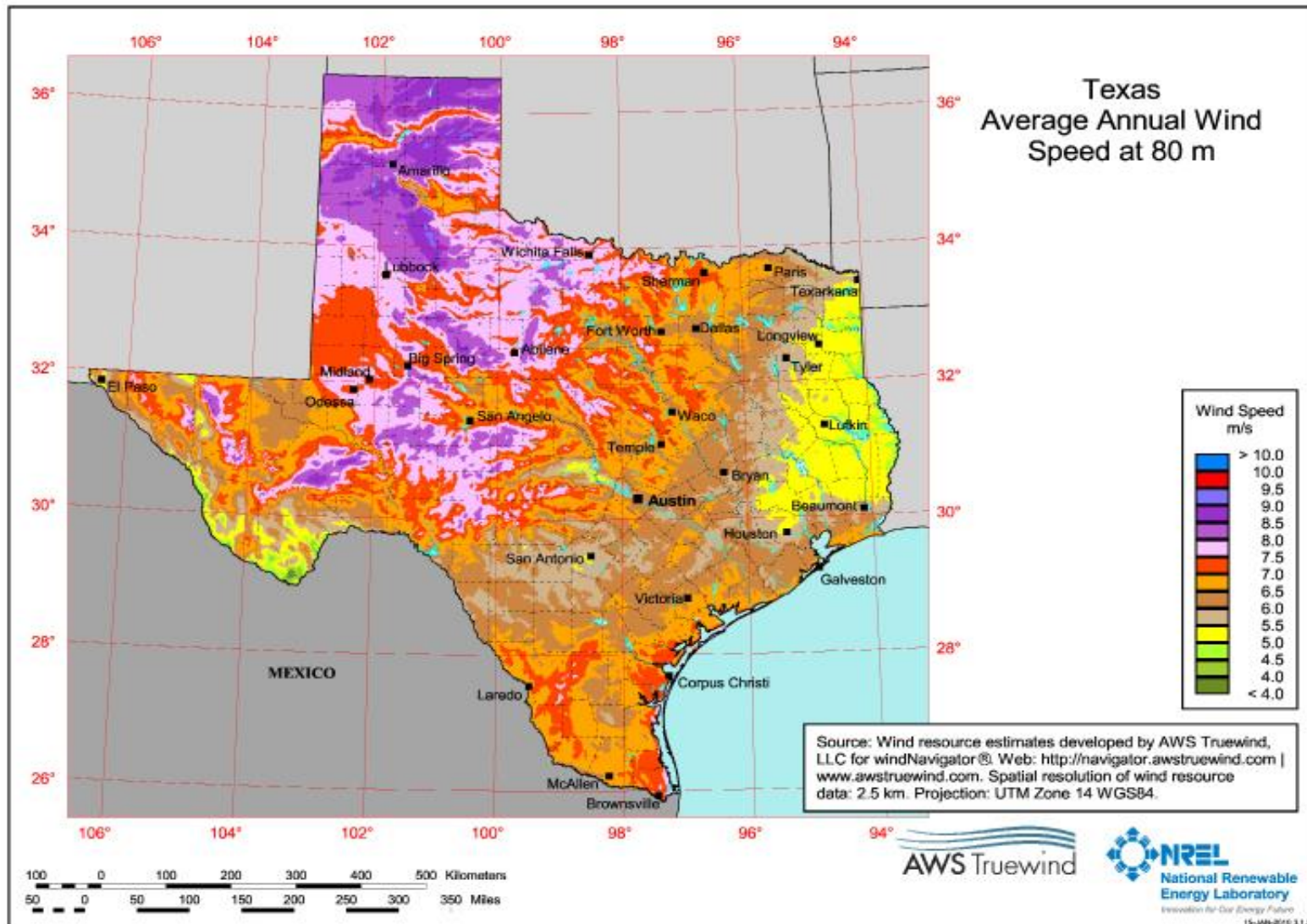




**The Wind Coalition**



# Texas: Incredible Wind Resource





# Quick Facts About Texas Wind

- **Installed Wind Capacity:** 12,755 megawatts (MW). State Rank: Texas ranks 1st for total MW installed
- On ERCOT, the main Texas grid, wind energy provided 9.9% of 2013 electricity.
- Texas wind farms now have capacity to power over 3.3 million average American homes.
- On November 2, 2014 wind generation hit a record 10,301 MW, or 33.4% of ERCOT's load.
- Currently saving consumers more than \$972 million in electricity costs every year.
- 7.8 billion gallons of water saved annually
- Rural Economic Development - \$60M annually in landowner payments, property tax and sales tax payments in communities.



# UTILITY-SCALE RENEWABLES



## Projects in Commercial Operation

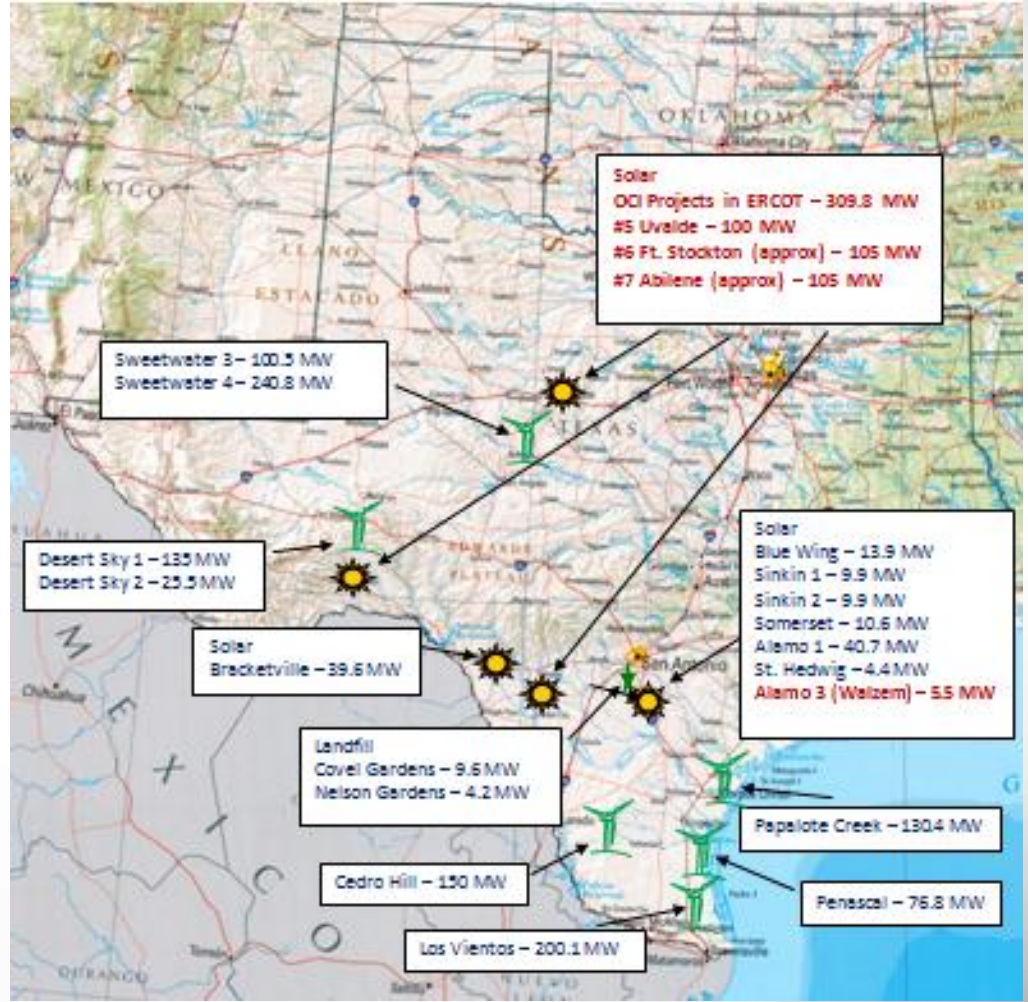
Wind	1,059.1 MW
Landfill Gas	13.8 MW
Solar	129.0 MW
<b>Total</b>	<b>1,201.9 MW</b>

## Projects in Development

Solar	315.3 MW
<b>Total</b>	<b>315.3 MW</b>

## Renewable Projects Under Contract

Wind	1,059.1 MW
Landfill Gas	13.8 MW
Solar	444.3 MW
<b>Total</b>	<b>1,517.2 MW</b>



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# NEE PARTNERS



- 400 MW Solar
- 200 MW cell & panel manufacturing plant
- North American HQ for OCISP, Mission Solar Energy and KACO
- Permanent jobs
- Capital investment
- Educational investments



- 25K LEDs (light-emitting diodes)
- GreenStar HQ with manufacturing in SA
- Educational investments

MISSION SOLAR ENERGY



- “Grid Optimization Program”
- Partner Solutions Testing & Certification facility in SA
- Permanent, high-tech jobs
- Capital investment
- Educational investments
- Internships



Texas Clean Energy Project

- 200 MW Low Carbon Off take agreement
- Clean coal technology
- Local SA office
- Carbon Mgt Advisory Board



- 30 MW Solar
- Educational investments

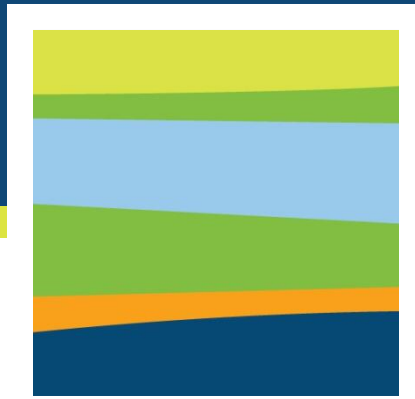


- 700k electric smart meters
- Local Office
- Permanent Jobs
- Educational Investment



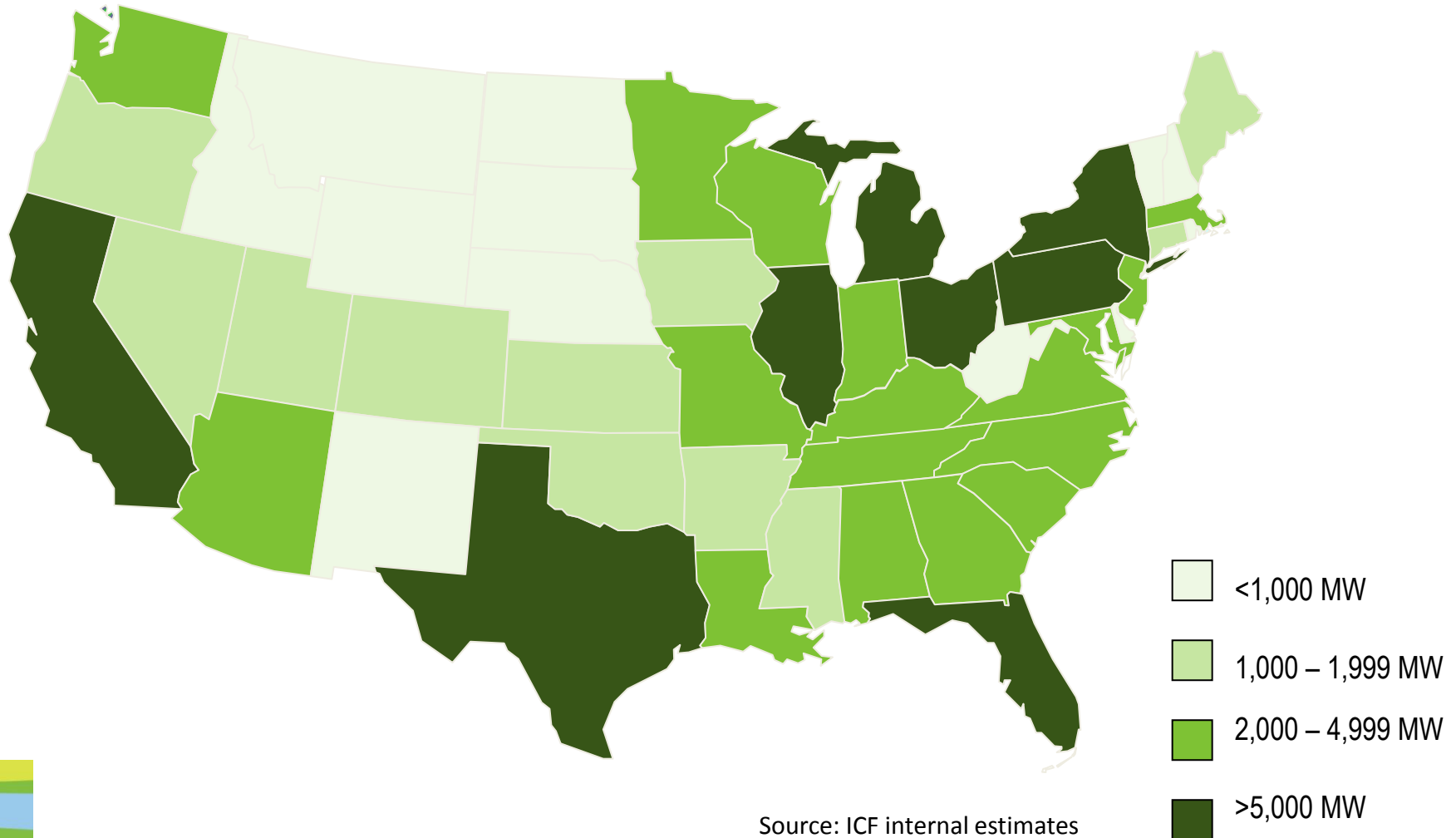
- 140K Home Area Networks (HAN)
- Consert HQ
- Permanent jobs

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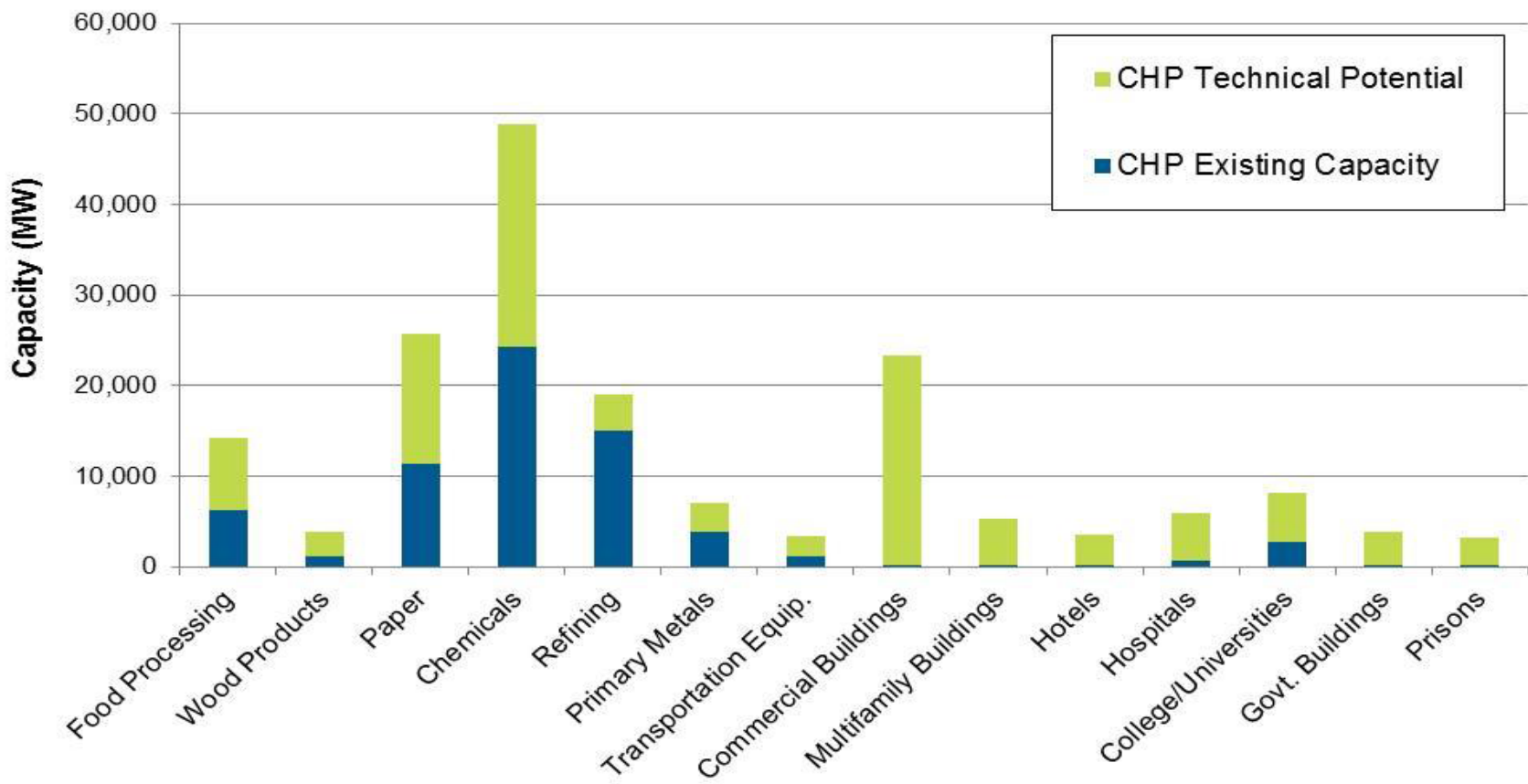
# CHP Drivers and Opportunities

# CHP Onsite Technical Potential Market





# Installed vs. Technical Potential



# Regulatory and Policy Activities

## Incentives:

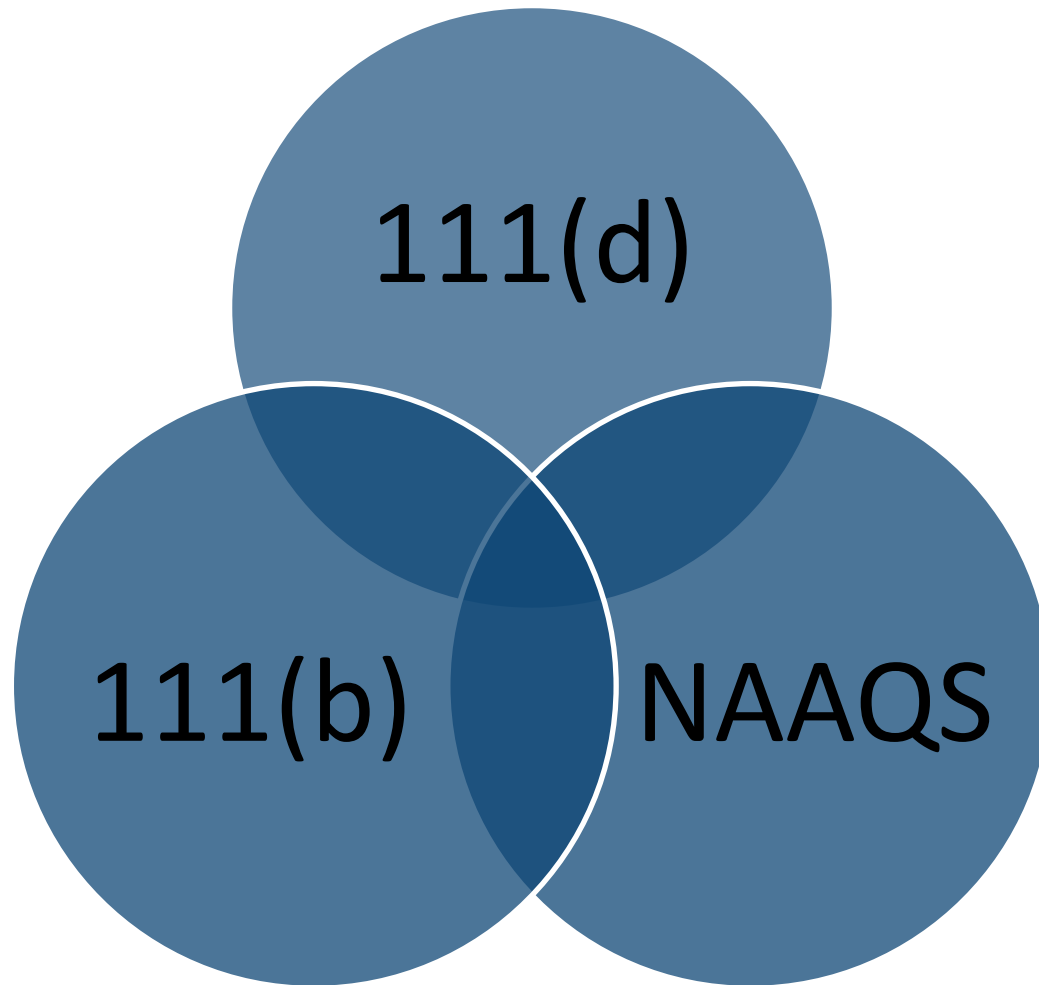
- PUC Administered Energy Efficiency Incentive Program
  - Utility Programs – systems up to 10 MW
- RPS – biomass systems

## Legislation:

- Permit by Rule – HB 3268
- Critical Infrastructure – HB 1831, HB 4409, HB 1864
- Power Export – HB 2049
- PACE – SB 385



# Federal Activity





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an independent research  
hub helping people thrive  
and nature flourish.

# For More Information

*Download the research:*

[pewtrusts.org/cleanenergy](https://pewtrusts.org/cleanenergy)

*Media inquiries:*

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