

DOE OFFICE OF INDIAN ENERGY

2017 Tribal Energy Webinar Series

Techno-Economic Renewable Energy Potential on Tribal Lands and Tribal Energy Atlas

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Webinar Overview

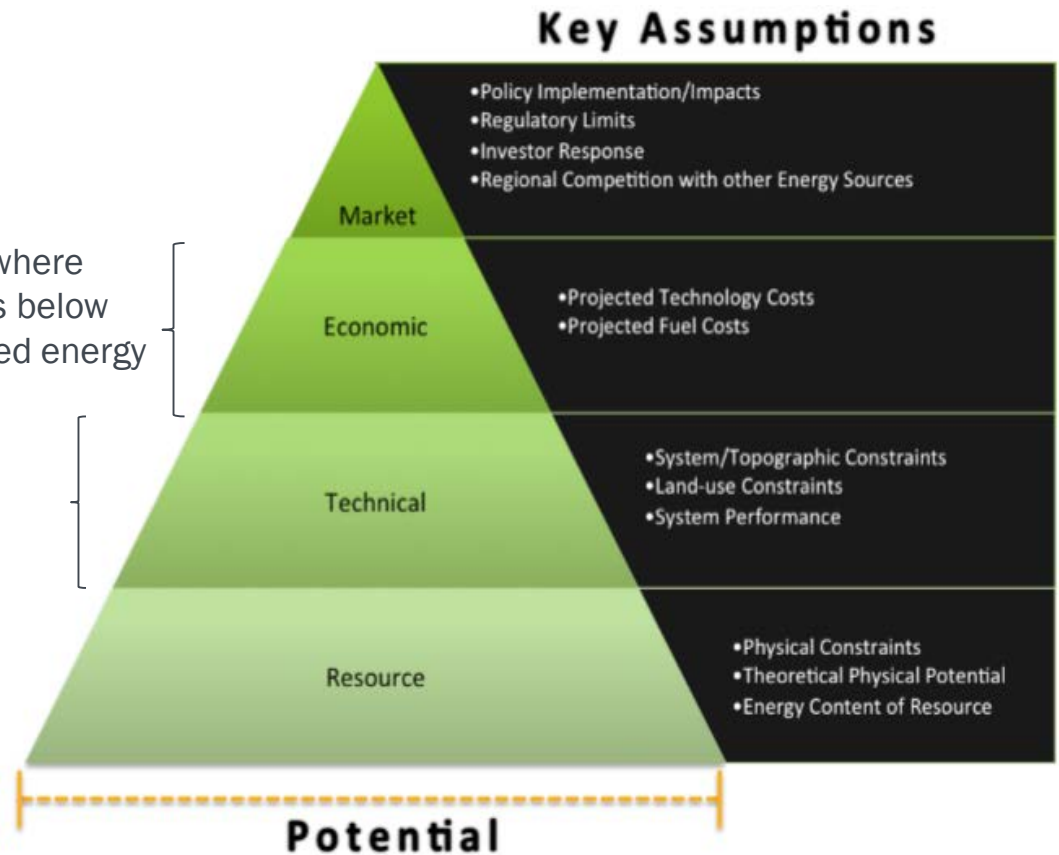
- Results of NREL's study of techno-economic renewable energy (RE) potential on tribal lands
- Results of NREL's survey of currently installed tribal RE capacity
- Demo of the Tribal Energy Atlas tool

Techno-Economic RE Potential on Tribal Lands

Levels of Potential

A subset of resource technical potential where the cost required to generate electricity is below the revenue available in terms of displaced energy and displaced capacity.

Establishes an upper-boundary estimate of development potential.



Source: Lopez et al. 2012

Technical RE Potential on Tribal Lands

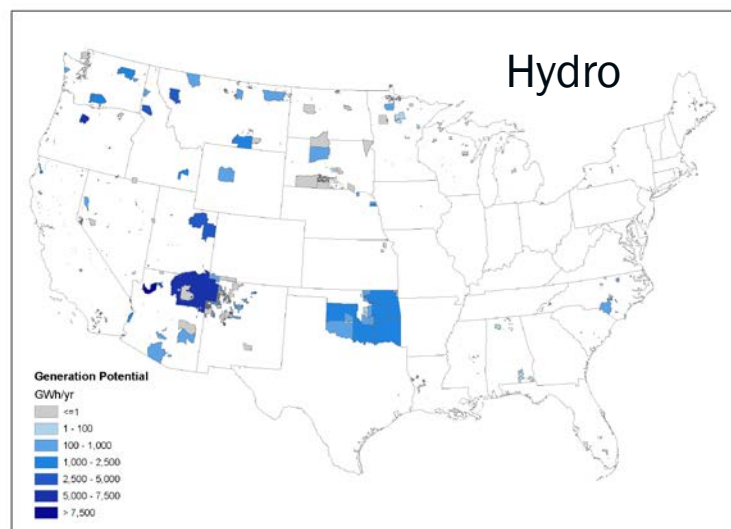
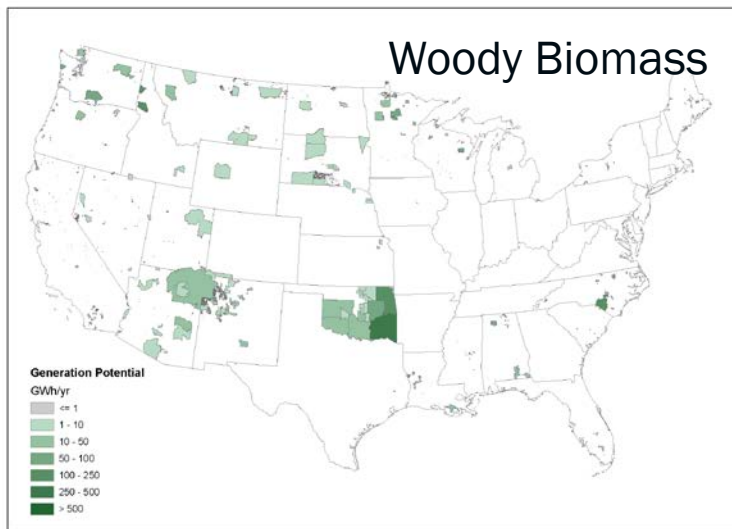
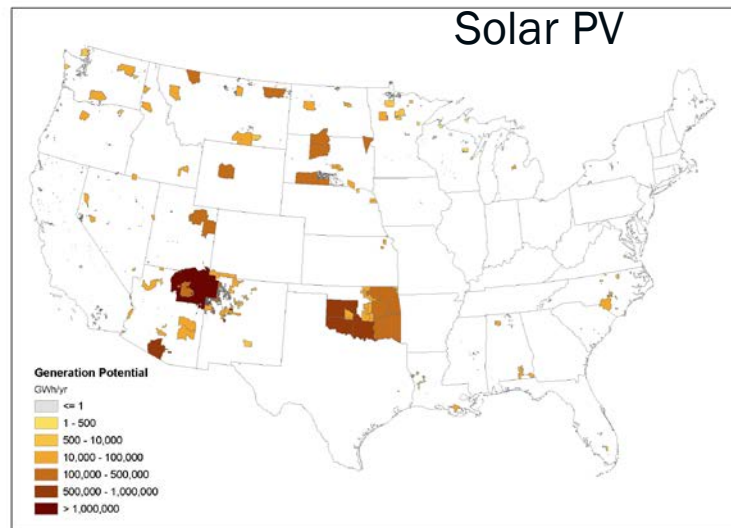
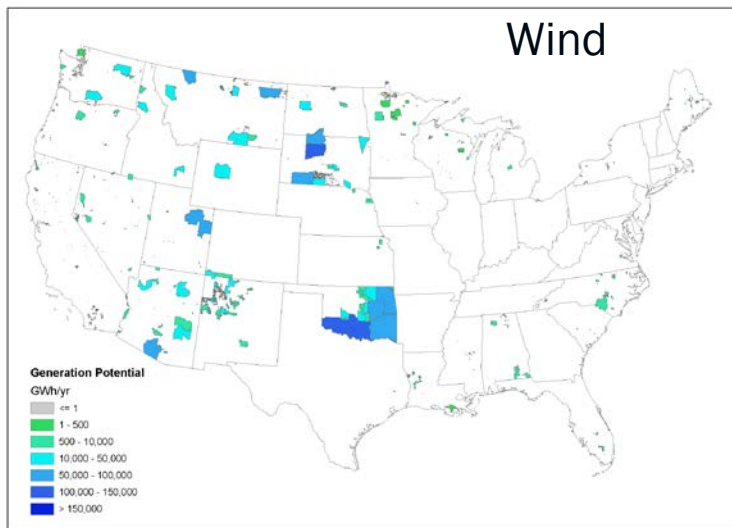
Utility-scale technical potential on tribal lands (in the lower 48 states) is 6.5% of the total national technical potential.

Technology	Tribal Capacity Potential (GW)	National Capacity Potential (GW)	Tribal Generation Potential (TWh)	National Generation Potential (TWh)	% of National Capacity	% of National Generation
Solar UPV	6,035	118,918	10,689	197,087	5%	5.4%
Solar CSP	2,114	26,318	7,701	92,994	8%	8.3%
Wind	891	10,119	2,394	30,781	8.8%	7.8%
Geothermal (Hydrothermal)	0.033	5.7	0.228	39	0.6%	0.6%
Biomass (Wood)	0.542	34	2	156	1.6%	1.6%
Hydropower	21	62	124	342	34.4%	36.4%
Total ¹	9,063	155,457	20,912	321,401	5.8%	6.5%

¹ Each technology is evaluated separately; the same land area may be available for many technologies.

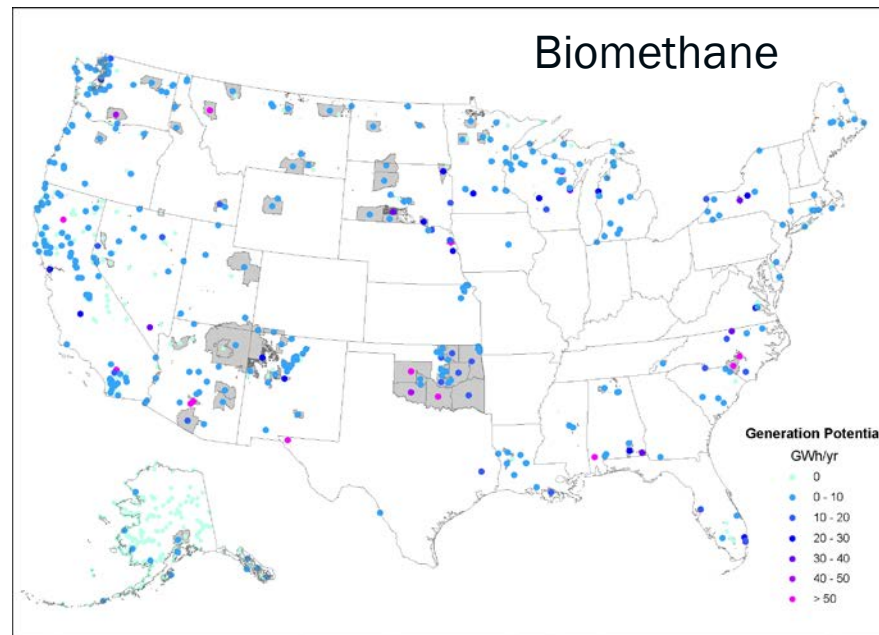
Milbrandt, A., Heimiller, D., Schwabe, P. “Techno-Economic Renewable Energy Potential on Tribal Lands.” Pending NREL Technical Report.

Utility-Scale Technical RE Potential on Tribal Lands



Distributed-Scale Technical RE Potential on Tribal Lands

- Estimates are for biogas/biomethane only (biogas is the gaseous product of anaerobic digestion, a biological process in which organic material is broken down in the absence of oxygen).
- Biomethane potential is estimated for animal manure, wastewater, and landfills.
- Discussion is provided for biogas potential from food waste at casinos.



Utility-Scale Economic RE Potential on Tribal Lands

- Analysis inputs include:
 - Renewable energy cost
 - Market electricity prices
 - Availability and level of energy-support policies
 - Transmission cost
 - Tribal-specific considerations
- The economic potential estimates vary based on the input assumptions, thus the results of this analysis are case specific and likely to change over time.

Estimated Lower 48 Tribal Economic Potential at Utility Scale

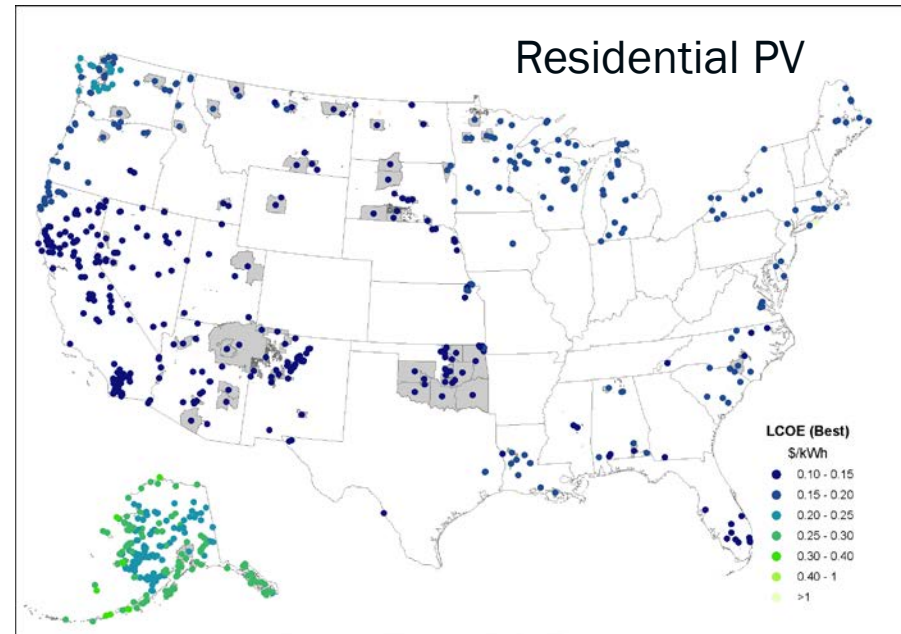
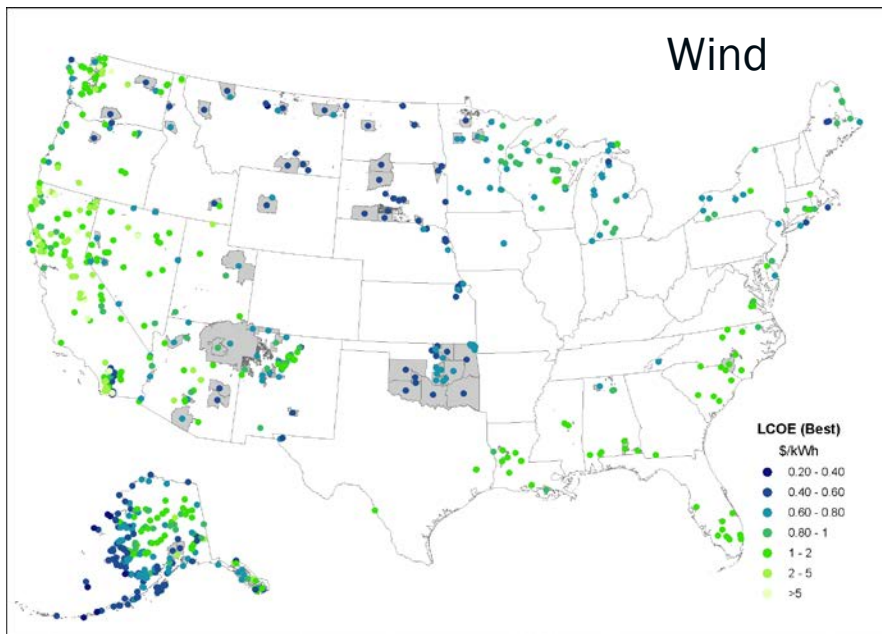
<u>Biopower</u>		Geothermal		Hydropower		Land-Based Wind		Utility PV	
GW	<u>TWh</u>	GW	<u>TWh</u>	GW	<u>TWh</u>	GW	<u>TWh</u>	GW	<u>TWh</u>
0	0	0	0	0	0	1	3	61	116

Distributed-Scale Economic Indicators

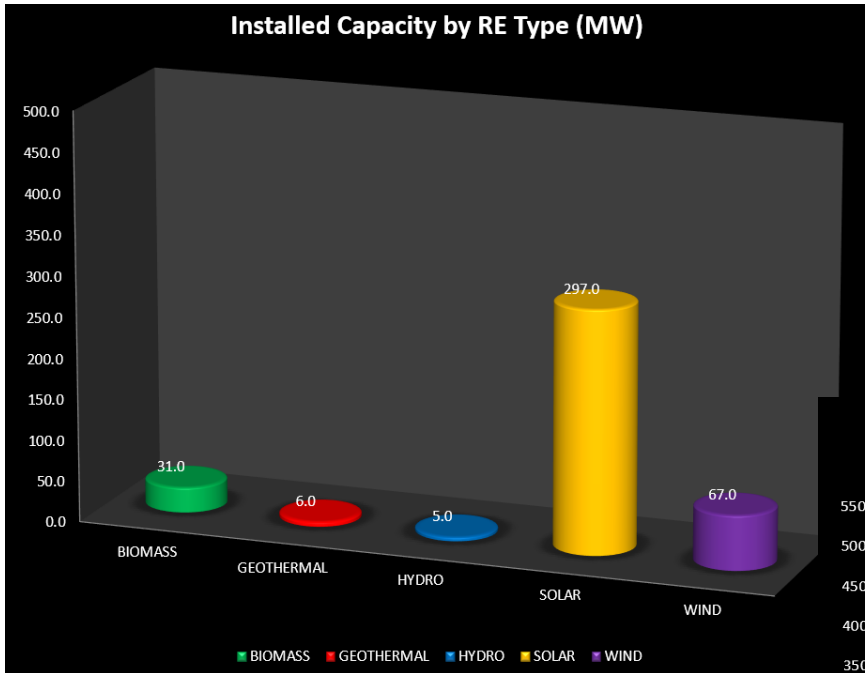
- This analysis does not extend to full economic potential.
- It evaluates the levelized cost of electricity (LCOE) for the following technologies:
 - Distributed wind
 - Residential solar PV
 - Biogas
 - Small-scale hydropower
- Estimates are provided for the lowest LCOE that could occur in the tribal area as a guidepost for further investigation.

Distributed-Scale Economic Indicators (cont.)

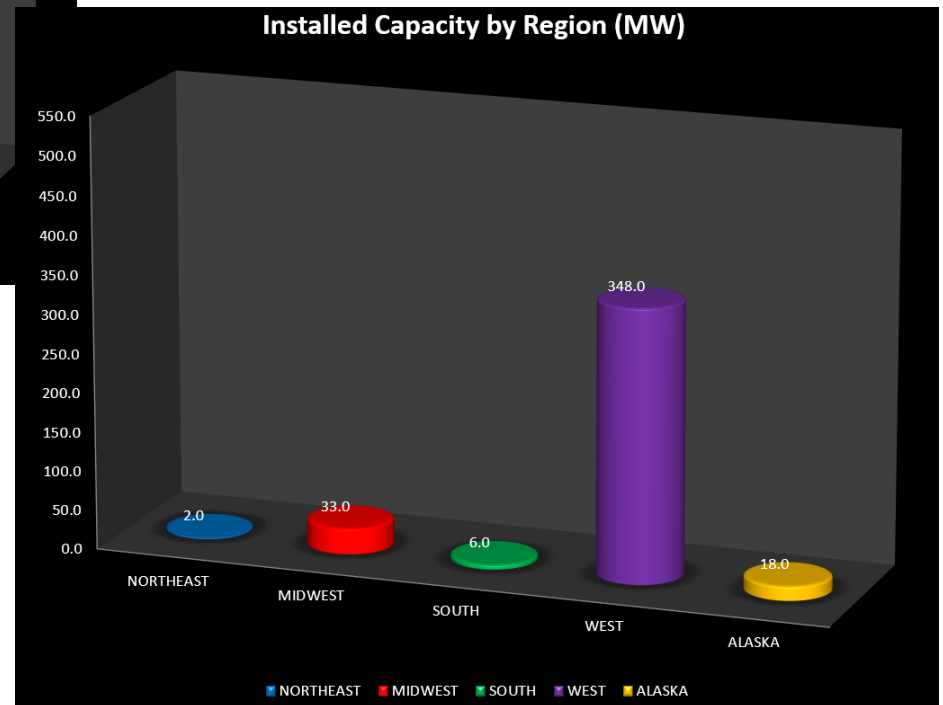
Distributed wind and PV potential exists for every tribal area, but in low resource areas the resulting LCOE is high and may not be competitive with grid electricity prices.



Currently Installed RE Capacity on Tribal Lands



- Data as of November 28, 2017
- Survey response rate: 67%



Tribal Energy Atlas Overview

- Interactive, geospatial application
- Allows users to view resources, infrastructure, and other relevant data
- Allows users to query the data and conduct simple analyses
- Provides demographic, installed capacity, and utility-scale RE technical potential summaries by tribe
- Data download and feedback options
- Expected release date: January 2018

Tribal Energy Atlas Demo



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