

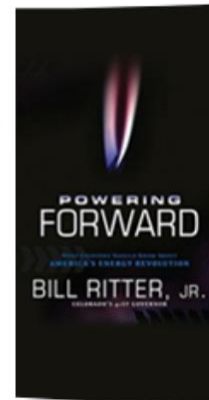
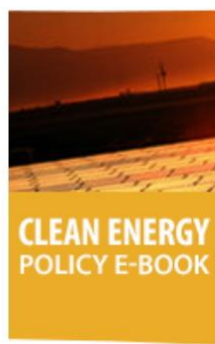
# Colorado State University

## Clean Energy Policy Opportunities For New Mexico

November 28, 2018



# Center for the New Energy Economy



<http://cnee.colostate.edu/>

# Why Clean Energy?

- **Rural Economic Opportunity** – Especially in rural areas, clean energy offers jobs, property tax payments, land lease payments and other economic benefits as well as boosting economic competitiveness by using homegrown energy.
- **Lower energy costs** – Replacing aging conventional power plants with less expensive cleaner forms of energy will lower costs for New Mexico electric customers.
- **Air and Water Quality** – As stewards of our natural surroundings, clean energy helps supply our nation's electricity while reducing air and water pollution.
- **Diversifying New Mexico's Economy** – spanning power technology (wind, solar, geothermal) to plant operators, engineers, manufacturing, and the state's supply chain.
- **Technology and Innovation** – New Mexico is part of the clean energy technology and workforce innovation boom and can be a leader in grid modernization, electric vehicles, storage and clean energy generation.

# Overview

- Economic impacts and jobs from the clean energy economy
- Air quality and energy emissions trends
  - National
  - State
- National energy policy
- State energy policy
- What decision-makers and utilities need to know
- Discussion

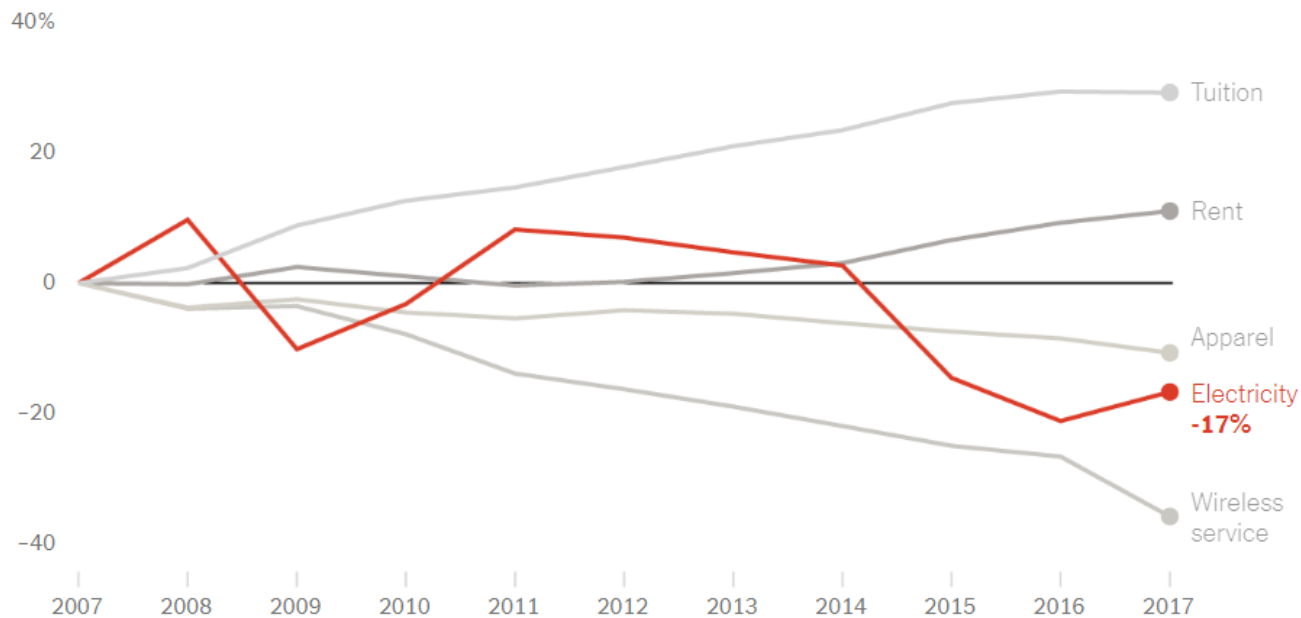
# Economic Development from the New Energy Economy



A wind turbine in eastern New Mexico. (Roberto E. Rosales/Journal)

# United States Electricity Prices

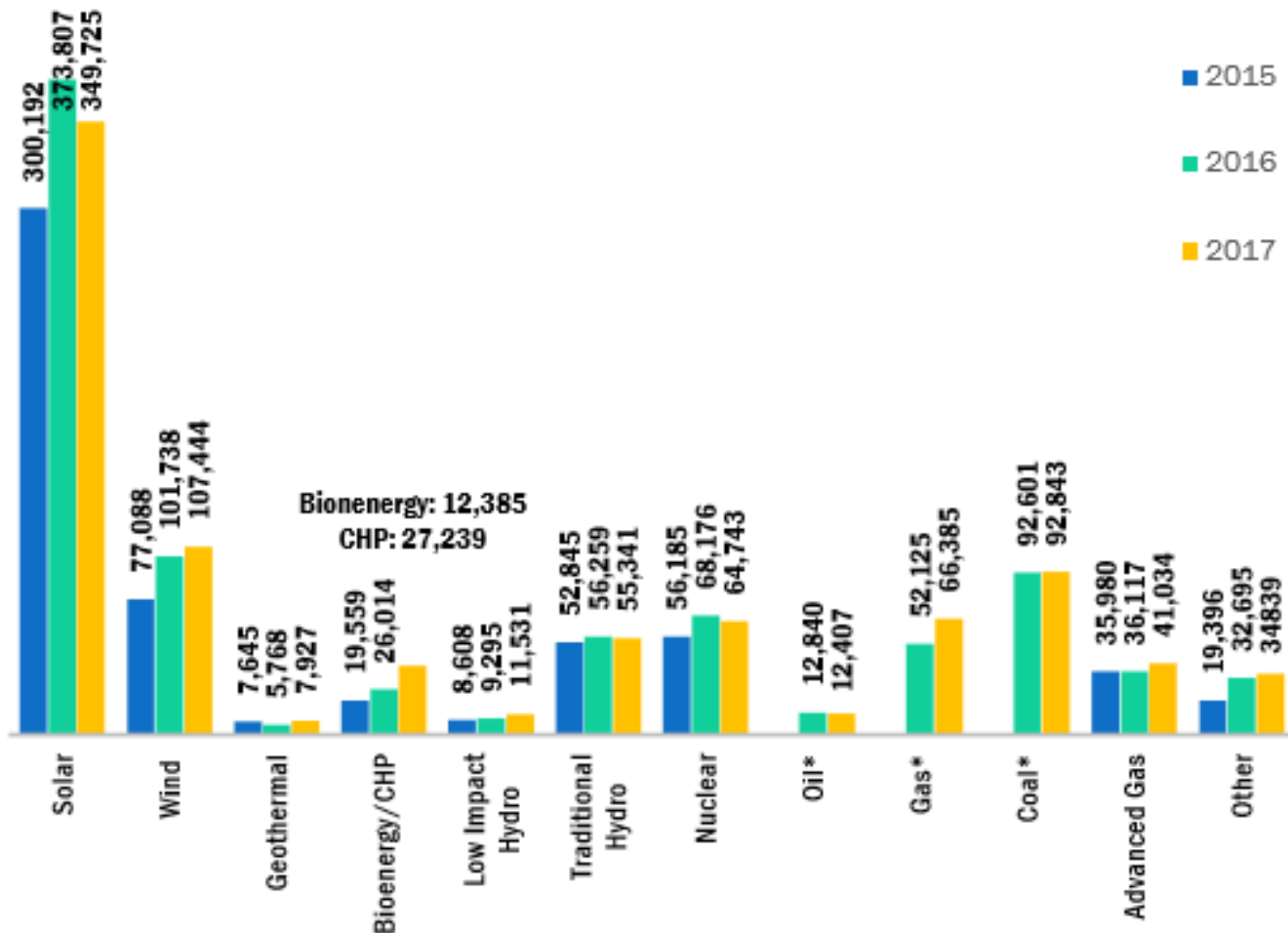
CHANGE IN PRICES SINCE 2007, ADJUSTED FOR INFLATION



Source: Bureau of Labor Statistics

# U.S. Jobs in Power Generation

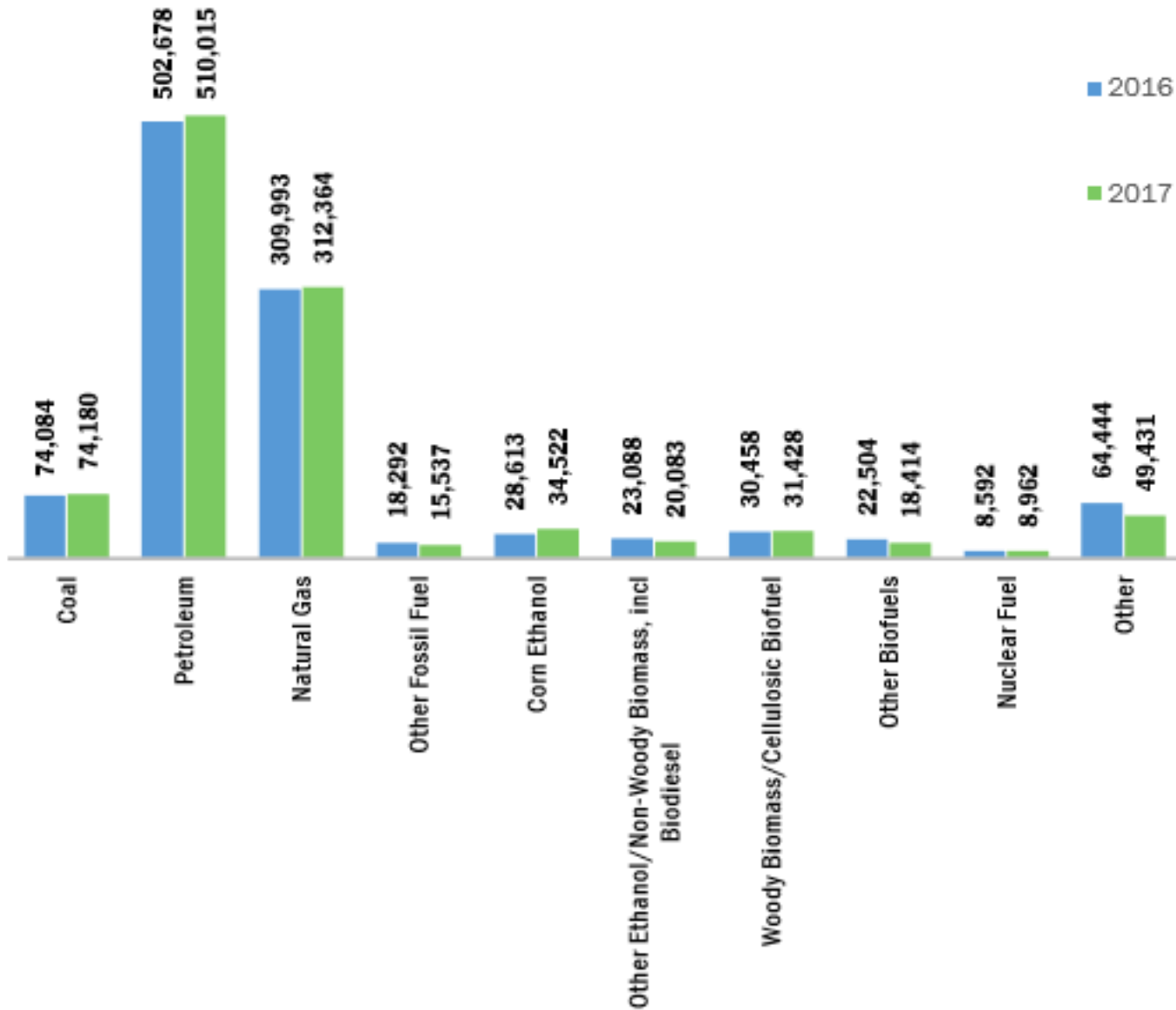
Electric Power Generation Employment by Detailed Technology Application, Q2 2015 - Q2 2017<sup>39</sup>



\* Fossil-fuel electric generation was not disaggregated into oil, gas, and coal in data for 2015. In 2015, it accounted for 135,898 total employees, compared to 157,566 total employees for these categories in 2016 and 171,635 total employees in 2017.

# U.S. Jobs in Fuels

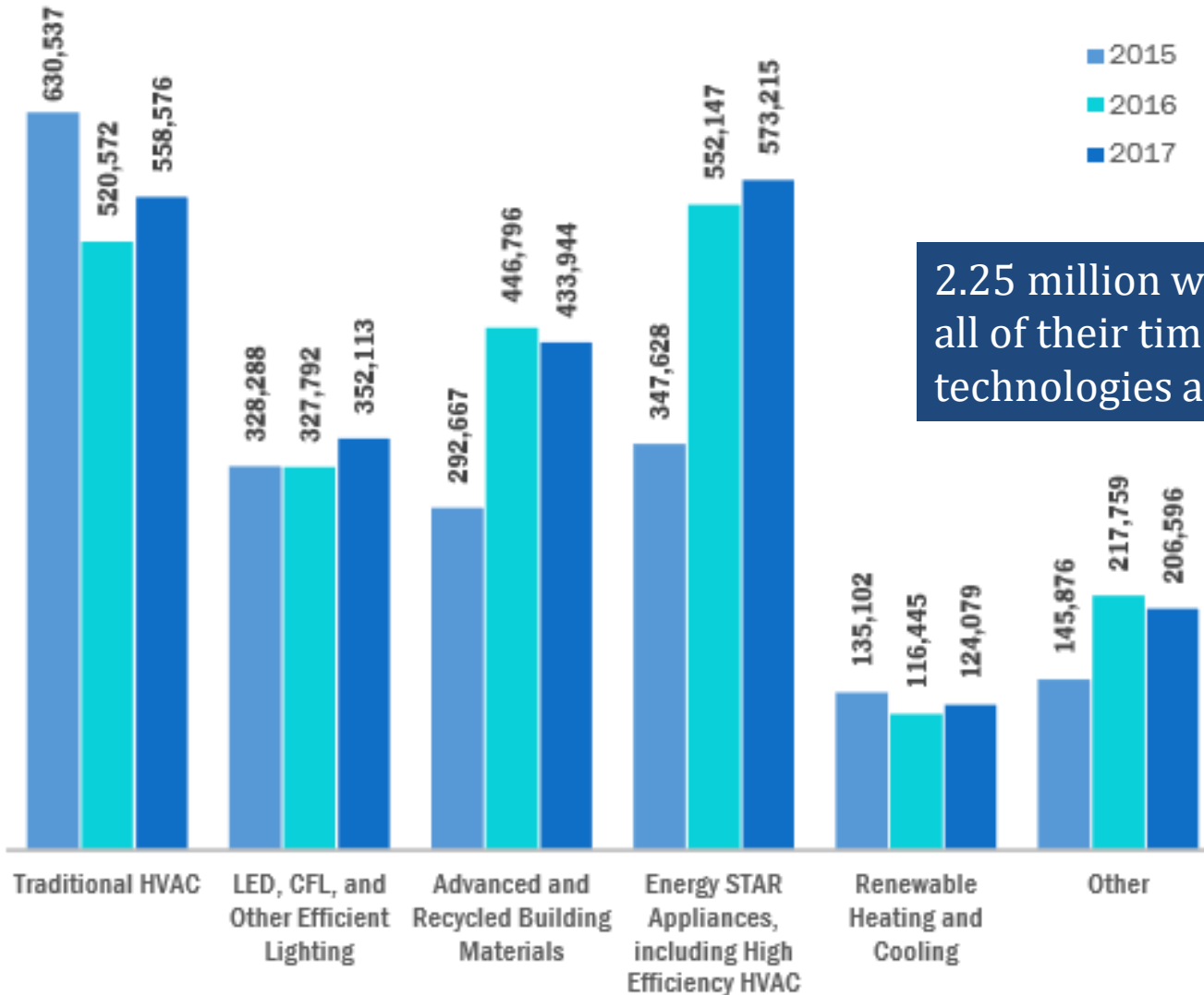
Fuels Employment by Detailed Technology Application, Q2 2016 – Q2 2017 <sup>41</sup>





# U. S. Jobs in Energy Efficiency

Energy Efficiency Employment by Detailed Technology Application (Q2 2015 - Q2 2017)<sup>52</sup>



2.25 million workers spent some or all of their time working with EE technologies and services in 2017.

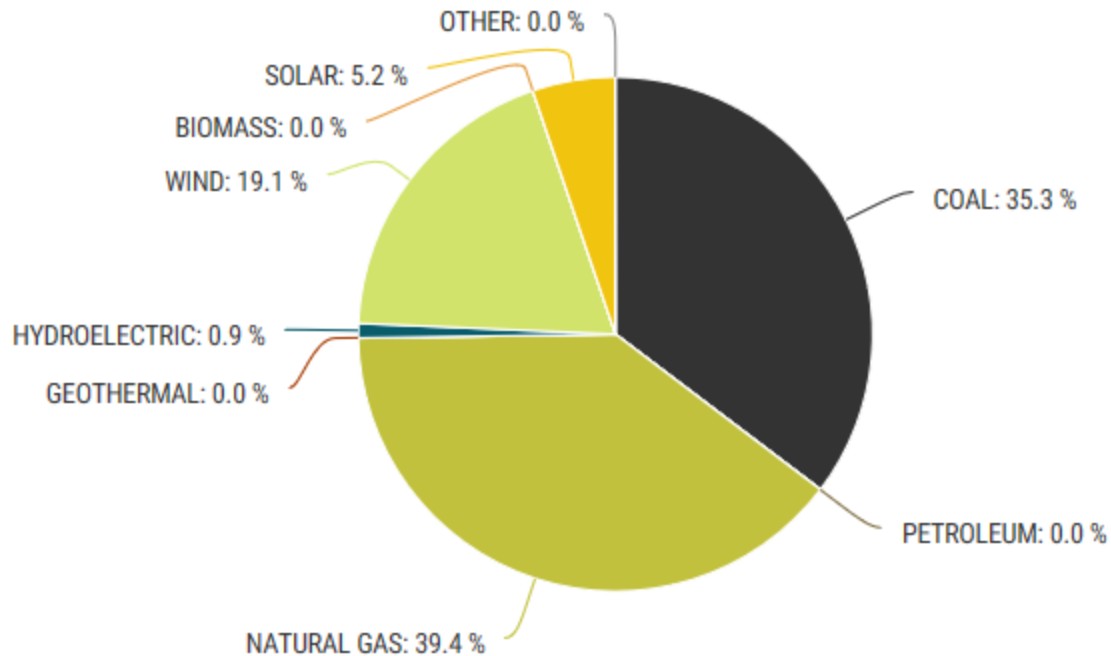
# Clean Energy Jobs in the West

State	Energy Efficiency Jobs	Wind and Solar Jobs
Arizona	41,000	10,000
Colorado	30,000	15,100
Nevada	10,000	(all solar) 11,000
New Mexico	4,500	5,000
Utah	7,200	Fewer than 300
Wyoming	31,100	6,000

Source: Department of Energy's Energy and Employment Report (2017)

# NM Electricity Mix

## Electric Generation Mix



Total GWh: 2,848  
source: [EIA Beta Data](#)

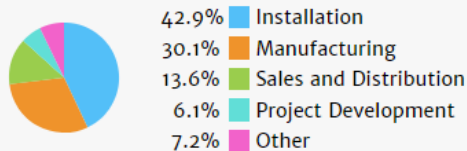
# Senator Pat Woods' Op Ed

“We must be decisive to take full advantage of the untapped economic potential in using our renewable energy resources to diversify our economy. The good, stable jobs in renewable energy are rock-solid real and the revenues injected into our state economy are there for the taking. Lets act now to bring in out-of-state money and create jobs for our local citizens. It is far better to export electricity out of state than force our young people to go out of state to obtain employment.”

- ABQ Journal 10/10/18



# New Mexico Solar Job Data



**-407** New solar jobs since 2016

**-13.9%** Solar jobs growth rate in 2017

**9<sup>th</sup>** Solar jobs per capita rank 9/51

**76** Total solar companies 31/51

**5<sup>th</sup>** Solar resource rank 5/51

**174,706** Equivalent number of homes powered by solar 13/51

**9.7 cents/kWh** Average electricity price 24/51

**B** Net metering policy grade

**A** Interconnection policy grade

**20% by 2020** Renewable Portfolio Standard (RPS) target

**4% Solar, 0.6% Distributed Generation** Percentage of RPS targeted for solar

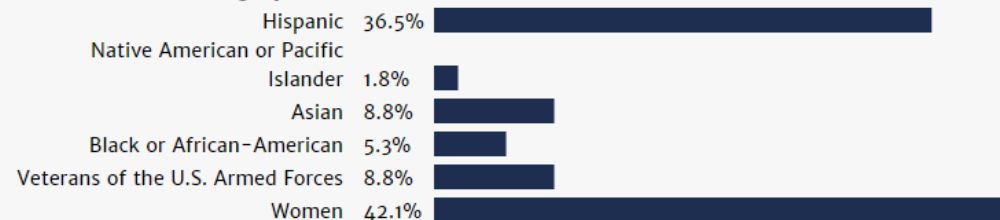
Legal status of third-party ownership:

**Authorized by state or otherwise currently in use, at least in certain jurisdictions within the state**

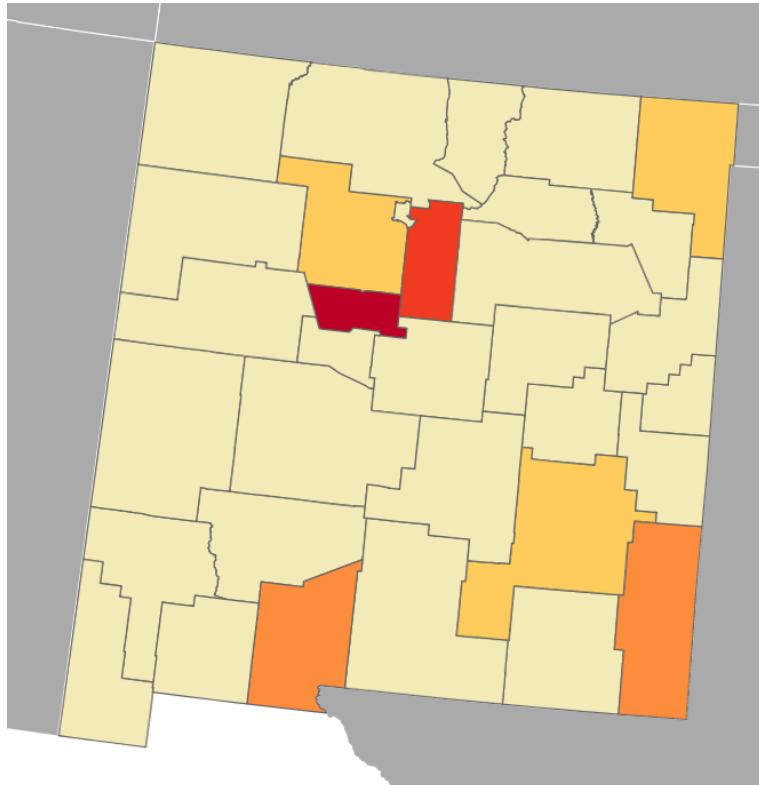
PACE financing status: **PACE enabling legislation**

Community solar policy: **N/A**

## Solar Worker Demographics



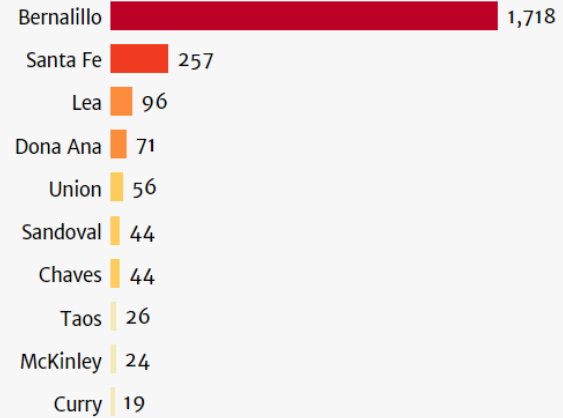
# NM 2017 Solar Jobs by County



<https://www.solarstates.org/#state/new-mexico/counties/solar-jobs/2017>

2,522  
New Mexico

## Top Ten Counties



## New Mexico

[New Mexico Fact Sheet](#)

	rank among states
<b>2,522</b> Solar jobs	29/51
<b>1,083</b> Installation jobs	29/51
<b>760</b> Manufacturing jobs	12/51

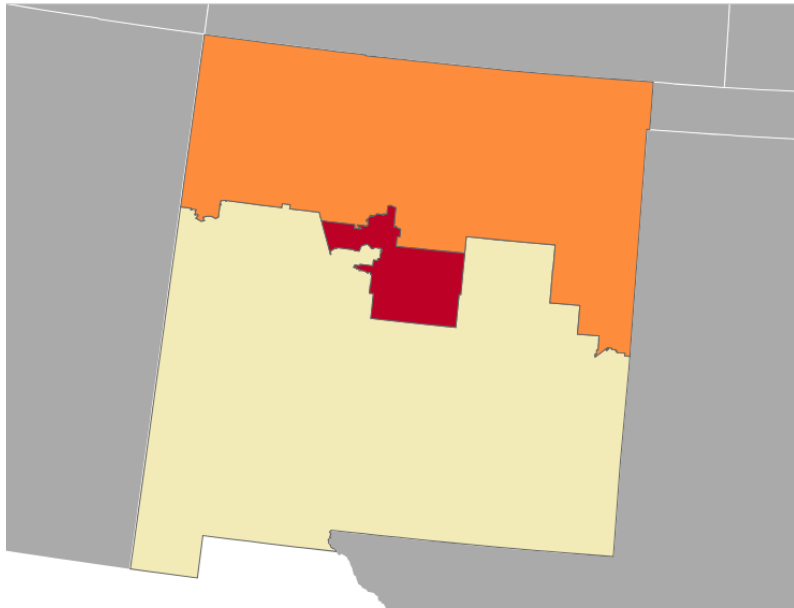
# Solar Jobs in New Mexico U.S. Congressional Districts

US CONGRESSIONAL DISTRICTS

METROS

STATE HOUSE DISTRICTS

STATE SENATE DISTRICTS



N/A

2,522  
New Mexico

### Top Us Congress Districts



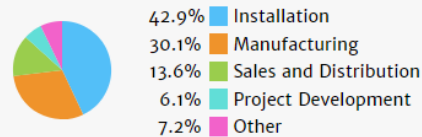
### New Mexico

[New Mexico Fact Sheet](#)

2,522 Solar jobs

rank among states

1,083	Installation jobs	29/51
760	Manufacturing jobs	12/51
342	Sales and distribution jobs	24/51
155	Project development jobs	36/51
181	Other solar jobs	22/51



-407 New solar jobs since 2016

-13.9% Solar jobs growth rate in 2017

9<sup>th</sup> Solar jobs per capita rank 9/51

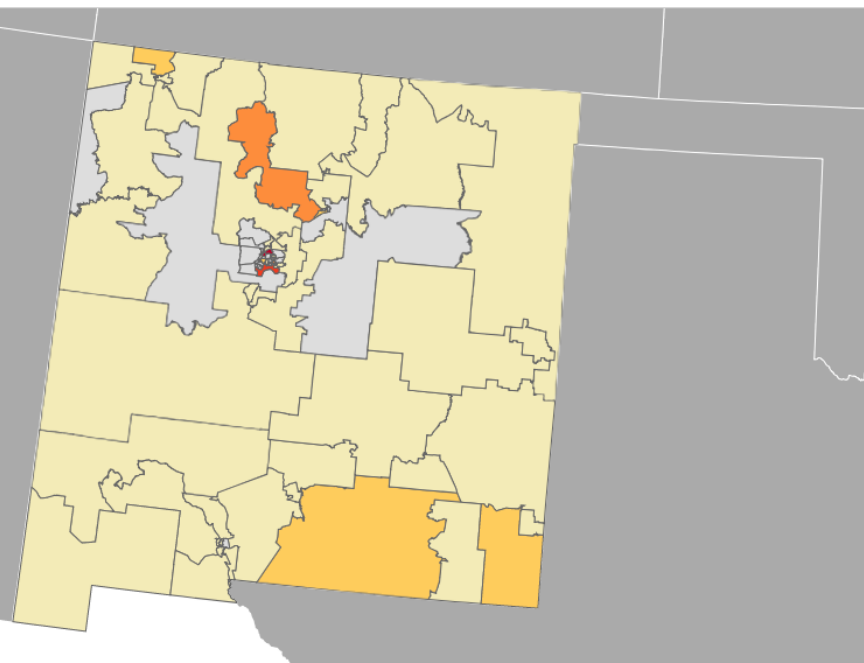
76 Total solar companies 31/51

5<sup>th</sup> Solar resource rank 5/51

# NM Solar Jobs by State House District

New Mexico

[CONGRESSIONAL DISTRICTS](#)
[METROS](#)
[STATE HOUSE DISTRICTS](#)
[STATE SENATE DISTRICTS](#)



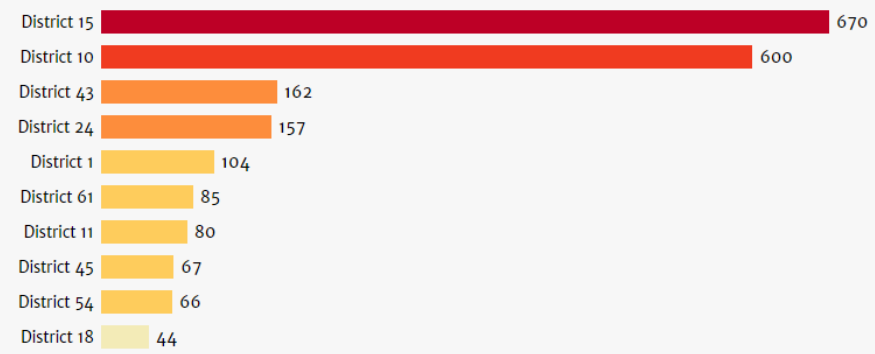
2015 / 2016 / 2017

**2,522**  
New Mexico

**8,873**  
Texas

SHARE

### Top Ten State House Districts



### New Mexico

[New Mexico Fact Sheet](#)

	rank among states
<b>2,522</b> Solar jobs	29/51
<b>1,083</b> Installation jobs	29/51
<b>760</b> Manufacturing jobs	12/51
<b>342</b> Sales and distribution jobs	24/51

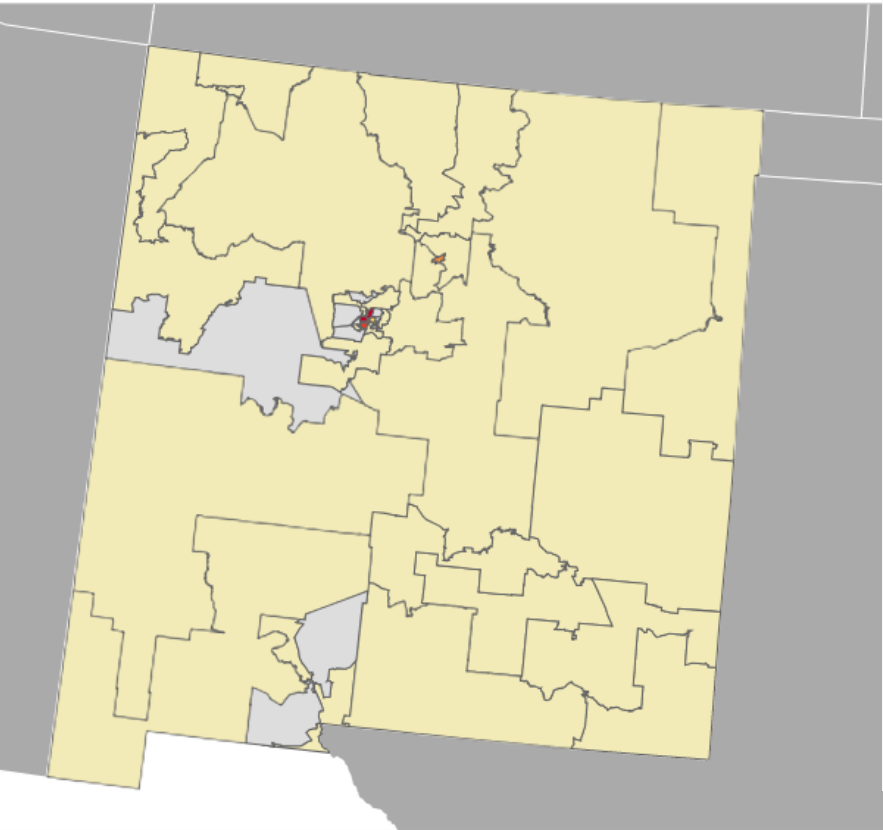


# NM Solar Jobs by State Senate District

1 > New Mexico

- CONGRESSIONAL DISTRICTS
- METROS
- STATE HOUSE DISTRICTS
- STATE SENATE DISTRICTS**

2015 / 2016 / 2017

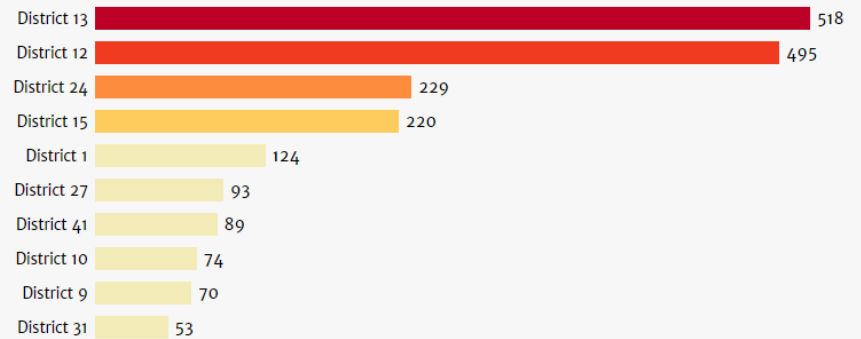


2,522  
New Mexico

33  
State Senate District 7

SHARE

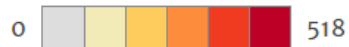
## Top Ten State Senate Districts



## New Mexico

[New Mexico Fact Sheet](#)

	rank among states
2,522 Solar jobs	29/51
1,083 Installation jobs	29/51
760 Manufacturing jobs	12/51



N/A

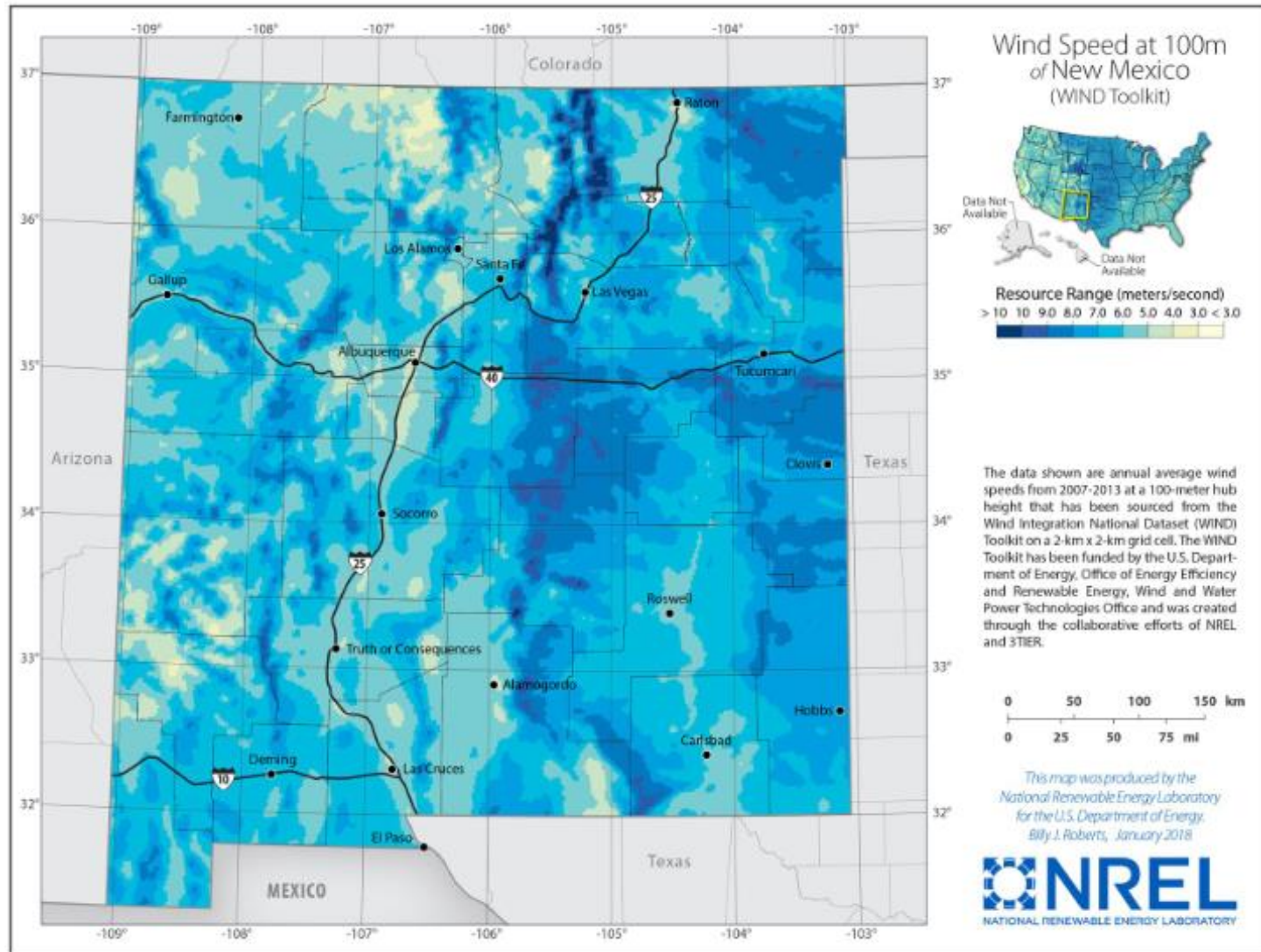
# NM Wind Power

*New Mexico emerges as a leader, growing wind power faster than any state. In 2017, 89 MW, enough electricity to power 26 million American homes.*

“I’m proud that New Mexico’s wind power capacity grew at a faster rate than any other state and generated an unprecedented level of private sector investment and job growth. With our robust wind and solar resources, New Mexico is at the epicenter of the rapidly growing clean energy economy. As consumers and major companies demand cheaper and cleaner power sources, our state stands to benefit and become an even bigger leader in this booming energy sector--especially in rural communities,” **said U.S. Senator Martin Heinrich.** “We should be doing everything we can to meet our state’s full potential as a wind energy powerhouse, from building new transmission infrastructure to investing in job training programs. I will keep fighting for policies that move New Mexico’s energy economy forward.”

Source: American Wind Energy Association [www.awea.org](http://www.awea.org)

# New Mexico Wind Speed Map




Energy projects produce an economic ripple effect.

# Economic Ripple Effect from Wind Energy

JEDI Model Versio

## Wind energy's economic "ripple effect"

### Project Development & On-site Labor Impacts

- 
- Construction workers
  - Management
  - Administrative support
  - Cement truck drivers
  - Road crews
  - Maintenance workers
  - Legal and siting

### Local Revenue, Turbine, & Supply Chain Impacts

- Blades, towers, gearboxes
- Boom truck & management, gas and gas station workers;
- Supporting businesses, such as bankers financing the construction, contractor, manufacturers, and equipment suppliers;
- Utilities;
- Hardware store purchases and workers, spare parts and their suppliers

### Induced Impacts

Jobs and earnings that result from the spending supported by the project, including benefits to grocery store clerks, retail salespeople, and child-care providers

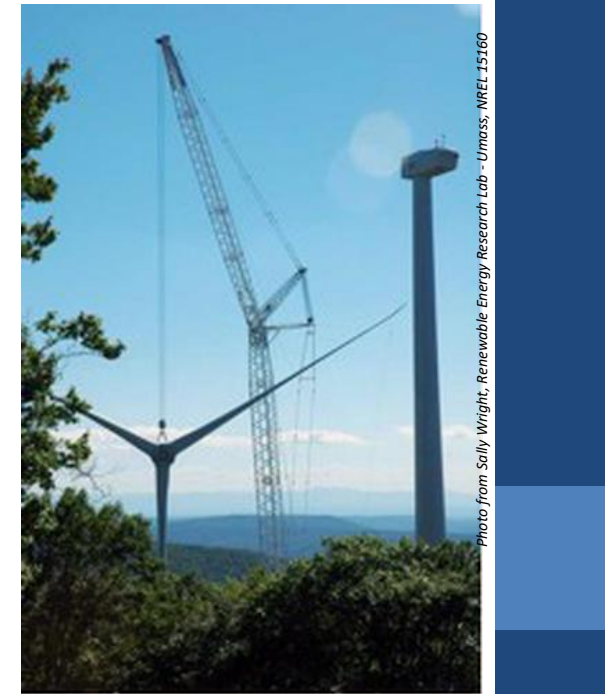
Construction Phase = 1-2 years  
Operational Phase = 20+ years

Source: National Renewable Energy

# Project Development & Onsite Labor Impacts

## Sample job types

- Truck driving
- Crane operation, hoisting, rigging
- Management, support
- Earth moving
- Panel installation
- Cement pouring
- Siting

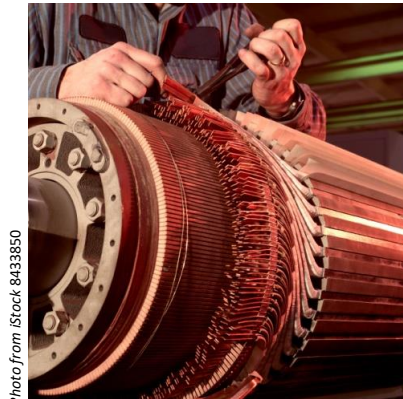




# Local Revenues, Turbine, Module, & Supply Chain Impacts

## Sample Job Types

- Steel mill jobs, parts, services
- Equipment manufacturing and sales
- Module, blade and tower manufacturers
- Property taxes, financing, banking, accounting



# Induced Impacts are real.



**Money spent in the local area on goods and services from increased revenue, including: *hotels, sandwich shops, grocery stores, clothing, other retail, public transit, cars, restaurants, and medical services.***

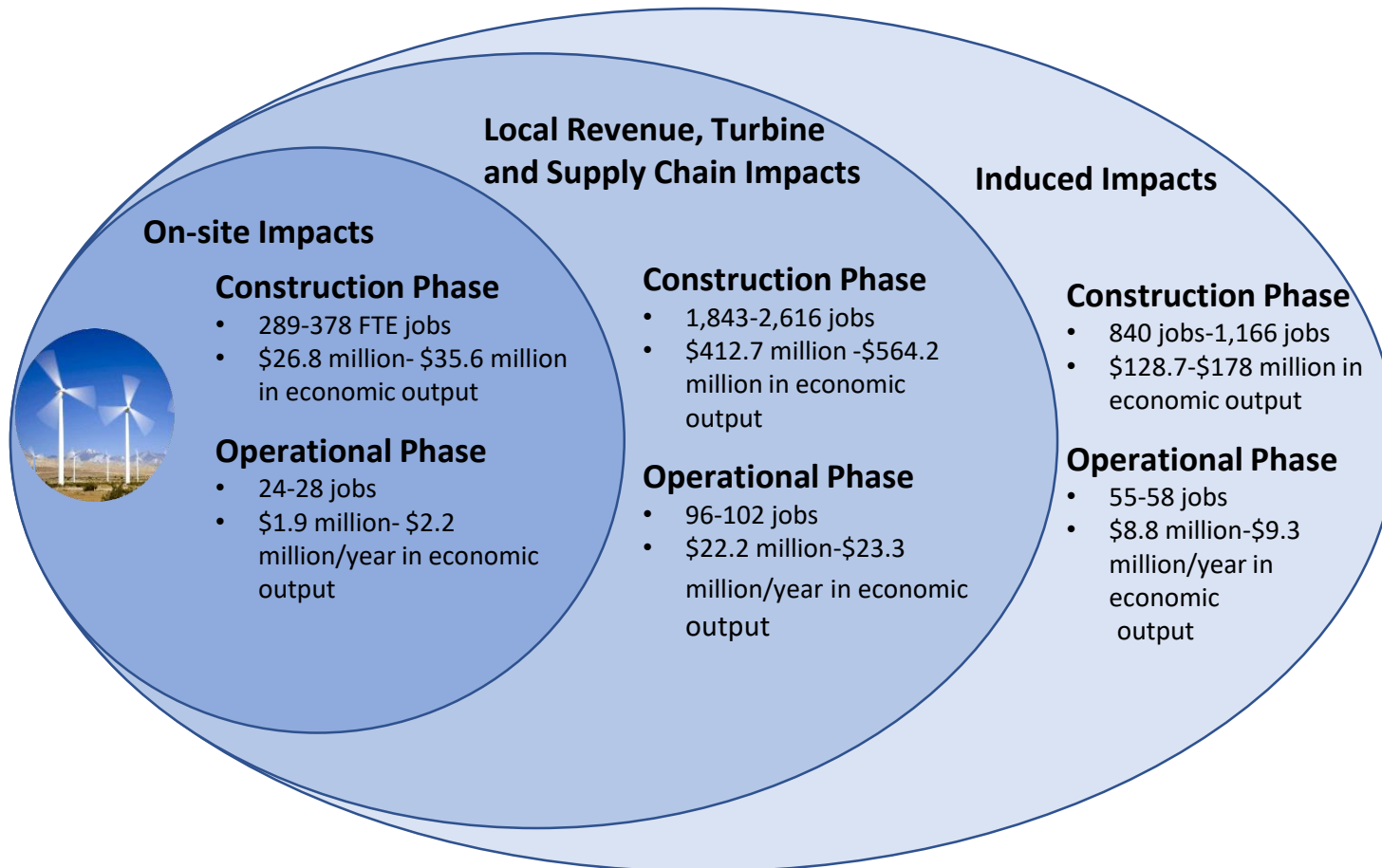




# Jan and Virgil Kochis, Colorado Wind Farm Landowners

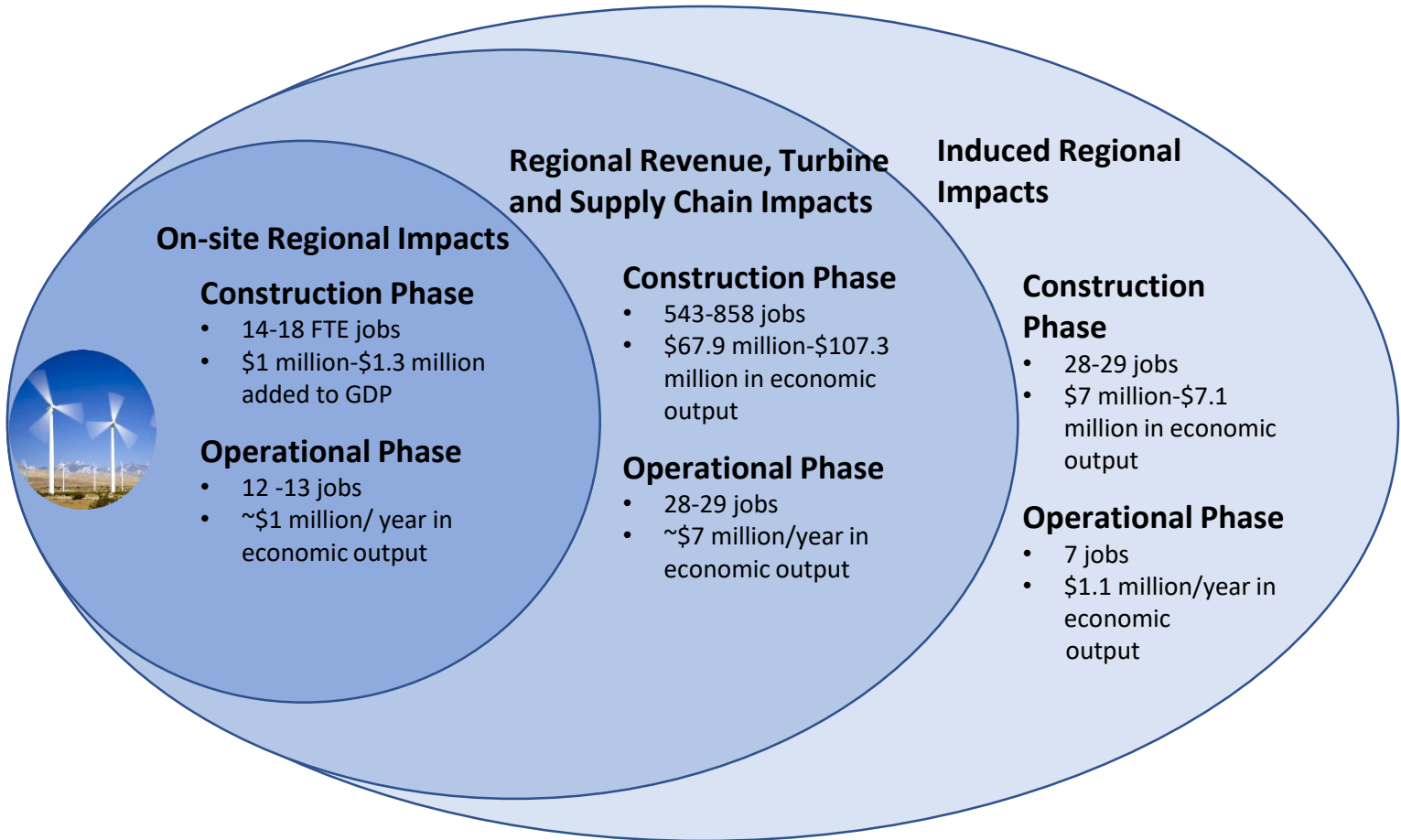


# Example from Colorado: Rush Creek Wind Farm Multiplier Effect on Colorado



**Construction Phase: 18 months**  
**Operational Phase: 25 years**

# Rush Creek Wind Farm Multiplier Effect: 4-County Impacts



Construction Phase: 18 months  
Operational Phase: 25 years

# Wind Energy Supports Landowners Financially

- Wind energy is seen as another cash crop:
  - **\$1.8 million to the four-county region = annual estimated landowner lease payments from Rush Creek.**
- Additional income provides stability for farmers and ranchers.
  - Farms and ranches near Rush Creek are primarily for dryland farming of wheat, corn, millet, and beef cattle.
  - **Turbine payments help offset decrease in farm revenues during drought and other hard years.**



Rush Creek Wind Farm, 2018

# Money is reinvested into the economy.

- 70 percent of the revenue from wind energy goes to landowners who live in counties with below average incomes, providing a welcome source of new income (2015).
- Landowners with wind turbines on their property invest twice as much money into their farms for things like home improvements, outbuildings, and equipment, than landowners who lived in townships without windfarms.
- They also purchase more farmland and plan for their farm to continue in the future. (Mills, 2014)



# Economic and Other Clean Energy Impacts

- Construction jobs in rural areas
- Long-lasting, well paying operations jobs in rural areas
- Manufacturing, supply chain, logistics jobs
- Domestic manufacturing content is high for wind power
- Indirect jobs (steel, cement, trucking, business services)
- Increased revenue for local businesses
- Land-owner payments for leased land and “good neighbor” payments
- Property tax revenue for rural counties (for schools, roads, etc.)
- Rural areas can save schools, keep young people
- American energy independence
- Cleaner air, cleaner water, less pollution, fewer asthma cases

# References and Resources on Energy Economics and Clean Energy

- WINDEXchange [www.windexchange.energy.gov](http://www.windexchange.energy.gov)
- Jobs and Economic Development Impacts models: [www.nrel.gov/analysis/jedi](http://www.nrel.gov/analysis/jedi)
- U.S. Energy and Employment Report (2018) by NASEO and the Energy Futures Initiative: [www.usenergyjobs.org](http://www.usenergyjobs.org)
- Solar Foundation 2017 National Solar Jobs Census <https://www.solarstates.org/#state/new-mexico/counties/solar-jobs/2017>
- Wind on the Wires <https://windonthewires.org/blog/70/new-study-shows-local-economic-benefits-of-wind-farms>
- Clean Transportation Deployment <https://www.nrel.gov/transportation/deployment.html>
- Advanced Vehicles and Alternative Fuels Laws and Incentives by State: <https://www.afdc.energy.gov/laws/state>