National Renewable Energy Laboratory
Innovation for Our Energy Future

Wind Energy and Economic Development In Nebraska

Nebraska Wind Energy Conference

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Economic Development from Wind Power in Nebraska

- *Goals*
  - To estimate the economic development impacts of building wind power in Nebraska at the level presented in the DOE national *20% Wind Energy by 2030* report (7,800 MW in Nebraska) and at the 1,000-MW level.
  - To provide a context for understanding NREL's economic development results.

- *Acknowledgements*
  - Larry Flowers and Wind Powering America
  - John Hansen of the Nebraska Farmers Union and Ken Lemke from NPPD

A few prefacing points

Economic Development Theory

•Economic development is driven by spending and investment

•Economic impacts cascade through the economy providing direct, indirect, and induced impacts

•The rural nature of wind projects can increase the benefit to rural regions but project ownership and business involvement is critical to ensuring benefits remain local.

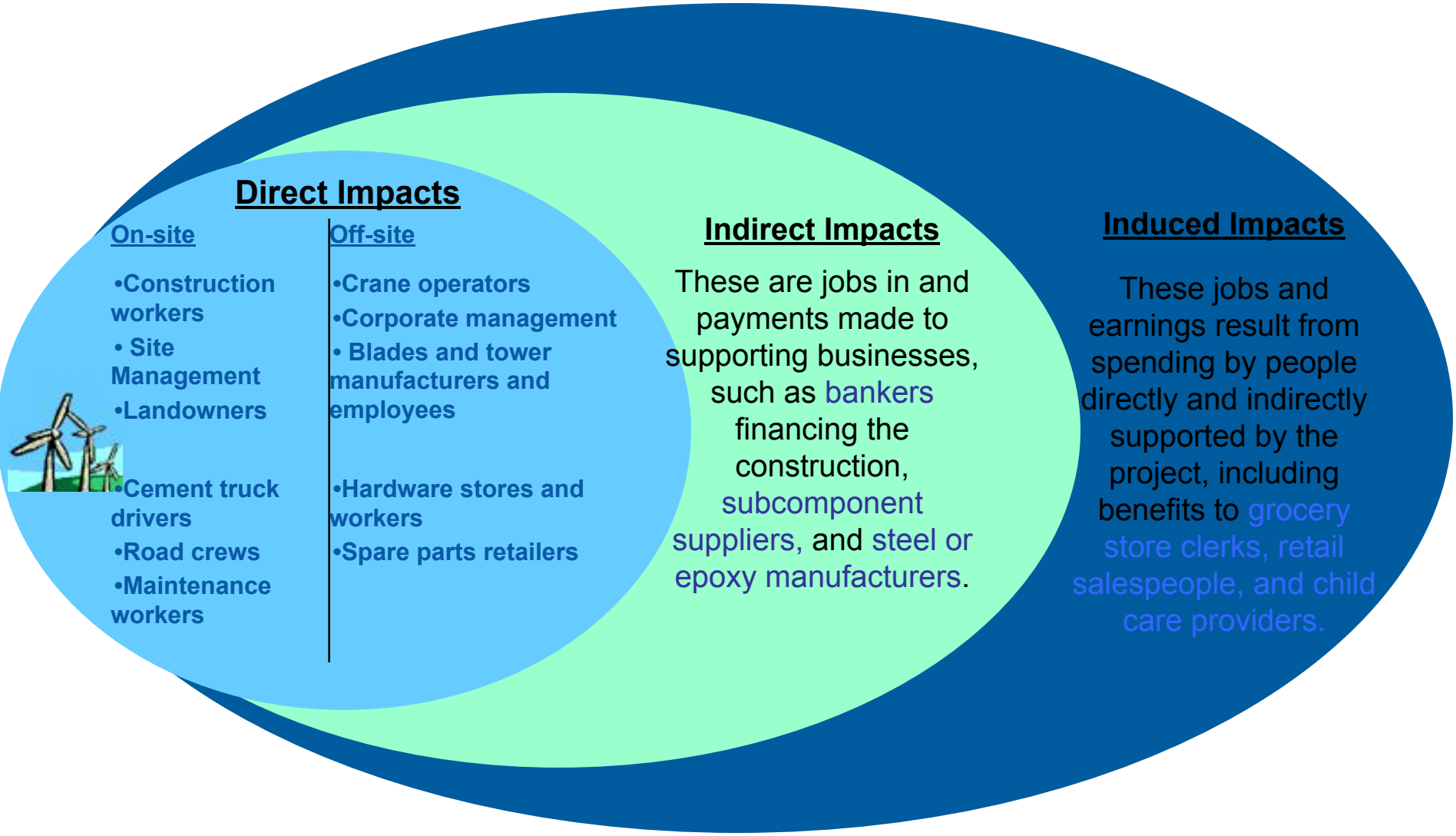
Analysis Themes

•Building wind power provides economic development to Nebraska and the country

•Local manufacturing is the single largest factor that can influence the outcome of economic development impacts, but project ownership also matters.

Basics of Wind Energy Economic Development

The wind energy economic "ripple" effect



Projects currently under development are expected to have direct impacts in Nebraska

Crofton Hills Wind Farm – 42 MW

- Lifetime property tax payments: $3.2 million
- Work for 50 construction workers
- 4 permanent jobs
- Landowner lease and project revenue payments in excess of $300,000 per year
- Project revenue payments to Nebraska individuals and businesses that are at least 33% of gross power production revenues

Elkhorn Ridge Wind Energy Project – 82 MW

- 15% of the total $140 million investment is expected to go to Nebraska goods and services
- Lifetime property tax payments: $5.7 million
- Land lease payments in excess of $325,000 per year
- Work for more than 100 construction workers over the 9-month construction period
- Project revenue payments to Nebraska individuals and businesses that are at least 33% of gross power production revenues

Modeling relies on an established tool and uses scenarios to bound uncertainty

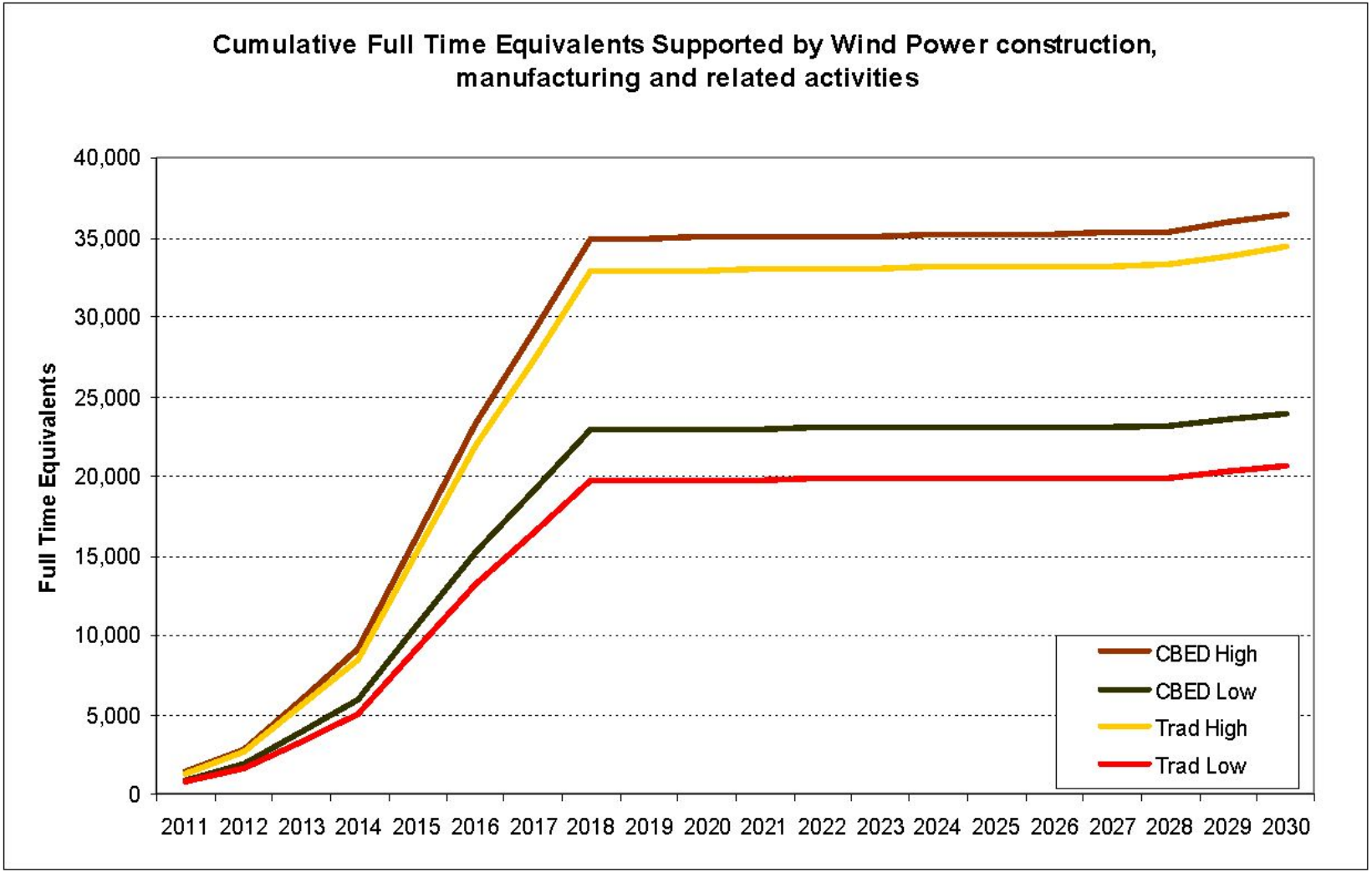
- NREL's JEDI Model
- Four scenarios*

	Scenario Description	Projects Designated as C-BED	Construction Local Share	Operations Local Share
Scenario 1	C-BED High	80%	25%	58%
Scenario 2	C-BED Low	80%	15%	42%
Scenario 3	Traditional Development High	10%	24%	57%
Scenario 4	Traditional Development Low	10%	13%	37%

C-BED projects also require a minimum of 33% of project revenues to flow back to qualified Nebraska businesses and individuals; this a great economic boost.

* With a few exceptions, the same four scenarios are used for modeling 7,800 MW and 1,000 MW. In the former case significant development begins in 2011. At this time we assume costs have declined and local manufacturing is established. 1,000 MW modeling assumes moderate local tower manufacturing in high cases and today's costs

Cumulative FTEs to Nebraska, supported by building 7,800 MW, reach the tens of thousands by 2015



Total GDP Contribution: $2.8 billion to $5.2 billion

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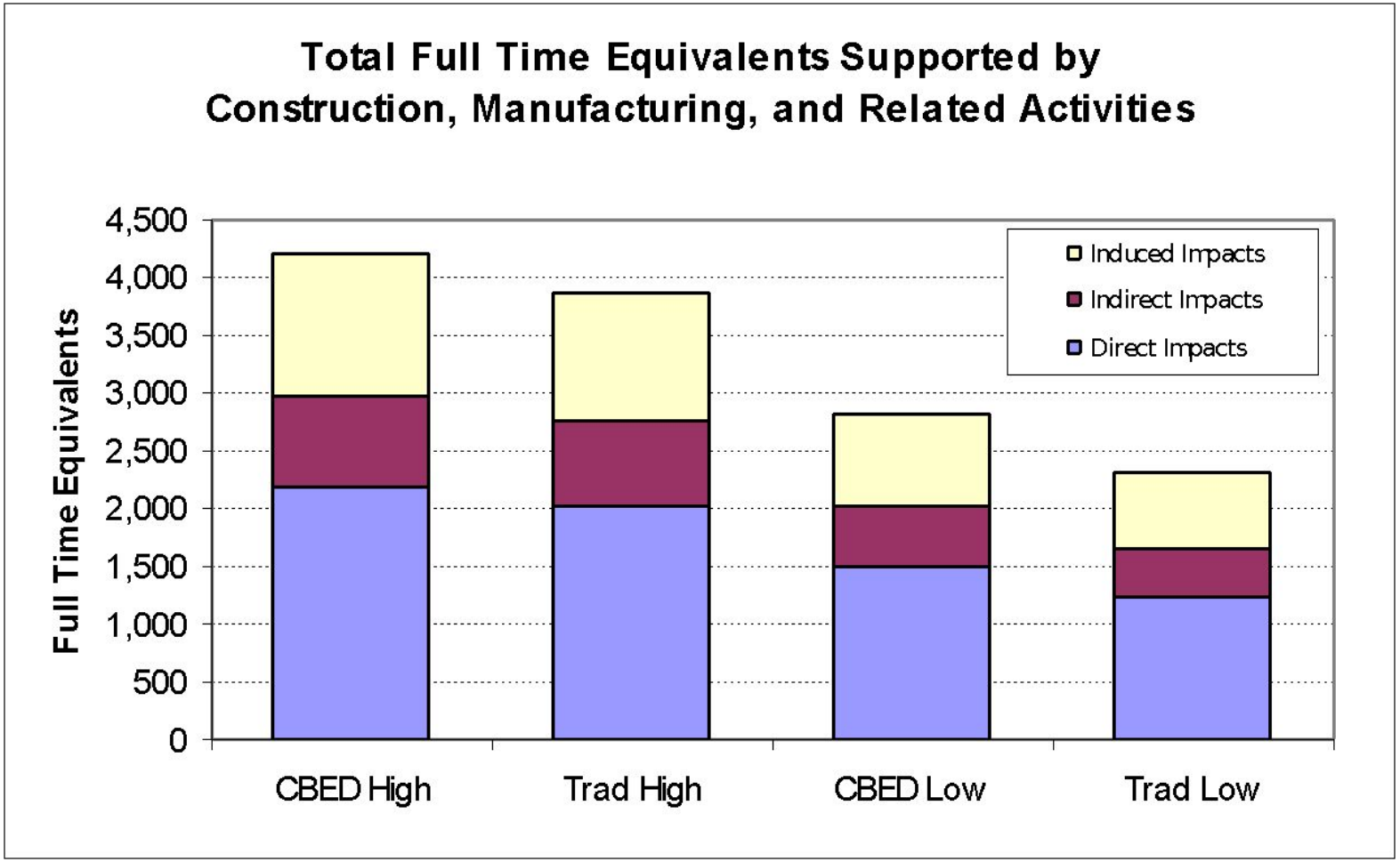
Building 1,000 MW supports thousands of FTEs in Nebraska



Total GDP Contribution: $260 million to $514 million

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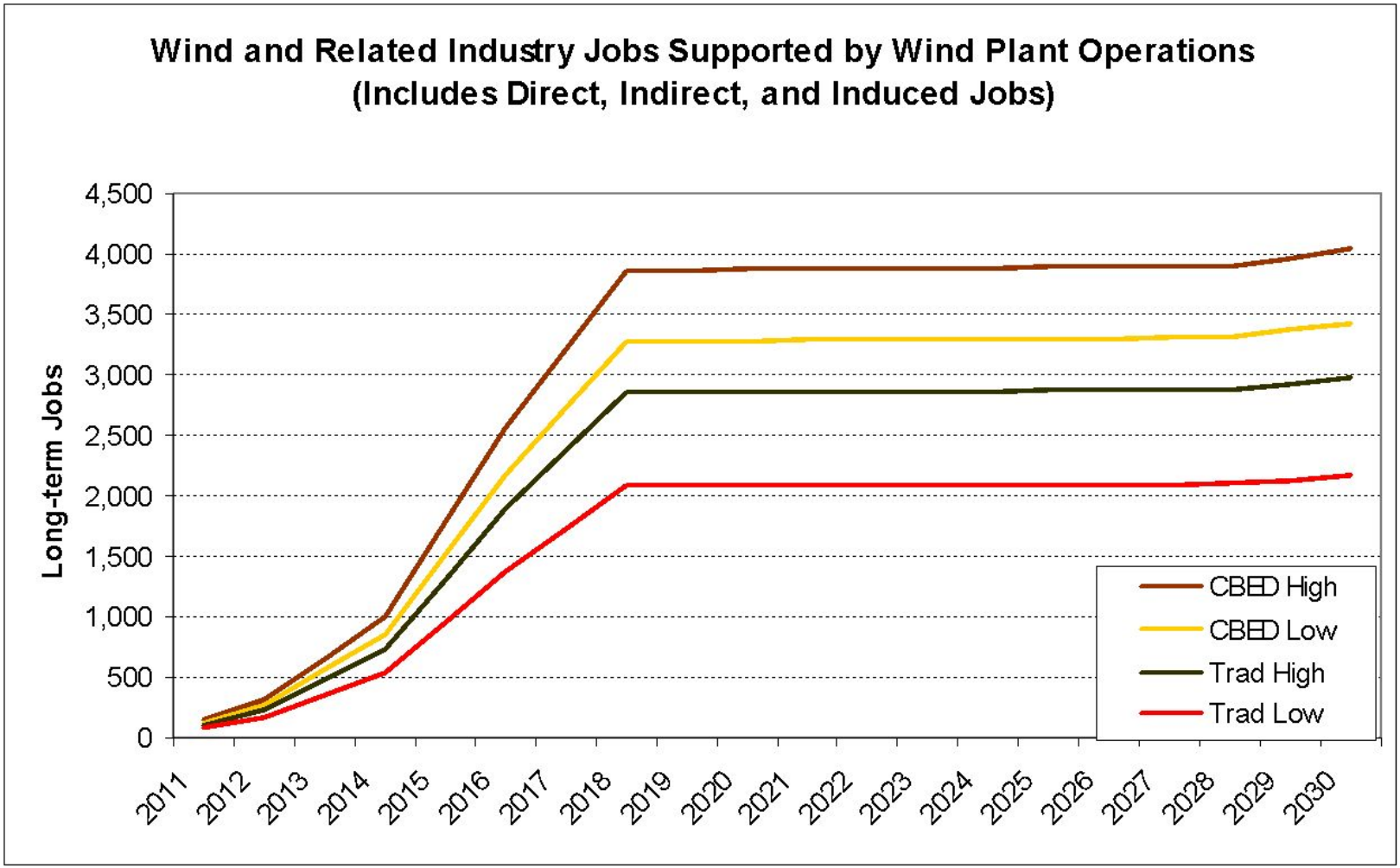
Operating 7,800 MW of Nebraska wind power supports thousands local, long-term jobs



Annual GDP Contribution by 2018: $245 million to $450 million

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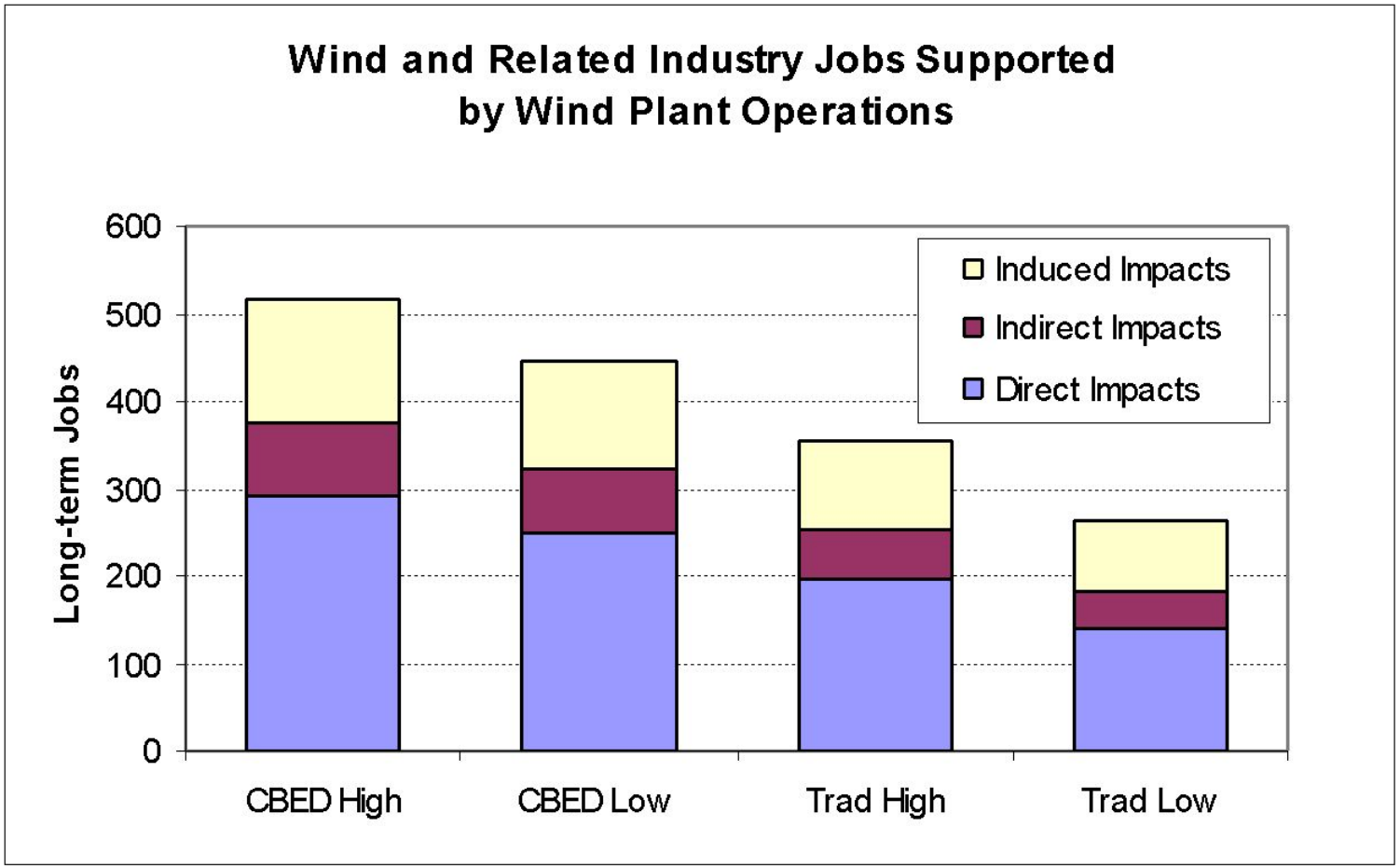
Operating 1,000 MW supports hundreds of long-term jobs in Nebraska



Annual GDP Contribution: $30 million to $55 million

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Lifetime* Results Summary

		Lowest Scenario	Highest Scenario
7,800 MW	Total FTE Jobs	64,000	117,000
	Total Economic Output (millions)	$7,800	$14,100
	Total Land Lease Payment (millions)	$547	$641
	Total property tax payments (millions)	$570	
1,000 MW	Total FTE Jobs	7,600	14,500
	Total Economic Output (millions)	$870	$1,640
	Total Land Lease Payment (millions)	$70	$82
	Total property tax payments (millions)	$73	

*Based on construction period and 20 years of operations

A few considerations

- Results accrue as wind projects are built; no presumptions are made about the likelihood of such development materializing; developing 7,800 MW is likely to require additional transmission and may require additional policy support.
- Consolidation and specialization in the construction and/or O&M fields may limit development impacts; ensuring a trained workforce is present may mitigate the impact of increased specialization and consolidation.
- Additional C-BED impacts result from profitable projects; These results are modeled with a 9% annual return on equity; Variability from the assumed return will change C-BED project impacts.
- Our modeling assumes C-BED projects meet the bare minimum requirements; equity ownership at levels above 33% will increase the Nebraska benefits from profitable projects.
- Traditionally developed projects rely on high levels of local labor and materials where possible; in this analysis, there is a moderate preference for increased local procurement under C-BED conditions.
- Contributions from local manufacturing are modeled as moderate, but they are still significant; without local manufacturing the construction period results are diminished.

Conclusions

- Across all scenarios, the economic development impact of utility-scale wind power is large.
- Present trends suggest that the C-BED development trajectory will remain popular and may dominate wind development in Nebraska.
- The greatest economic development benefits to Nebraskans are derived under conditions where local ownership is high and manufacturers are located in Nebraska