

# Wind Turbine Supply Chains

FRAMING FOR POTENTIAL FOSTERING  
MANUFACTURING IN NEW MEXICO

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# Why wind energy?

- Electricity demand expected to increase by > 40% in 2035
- Foster sustainable power and economic growth
- Save consumers money
  - ↑ share of wind energy in energy mix portfolio
  - Avoid imports and price volatility
- Reduce carbon emissions
- Potential development of **new industrial sector** → through **local supply chains** that enable sustainable socio-economic development

Source: GWEC Wind Energy Handbook  
VESTAS Annual Report (2018)



# Rationale for wind energy in New Mexico

## Potential

- 16<sup>th</sup> ranked state in wind capacity / 15<sup>th</sup> number of wind turbines
- ≈ 18.7% of in-state electricity provided by wind
- Wind capacity/potential: 1732 MW / 652,575 MW

## Policy

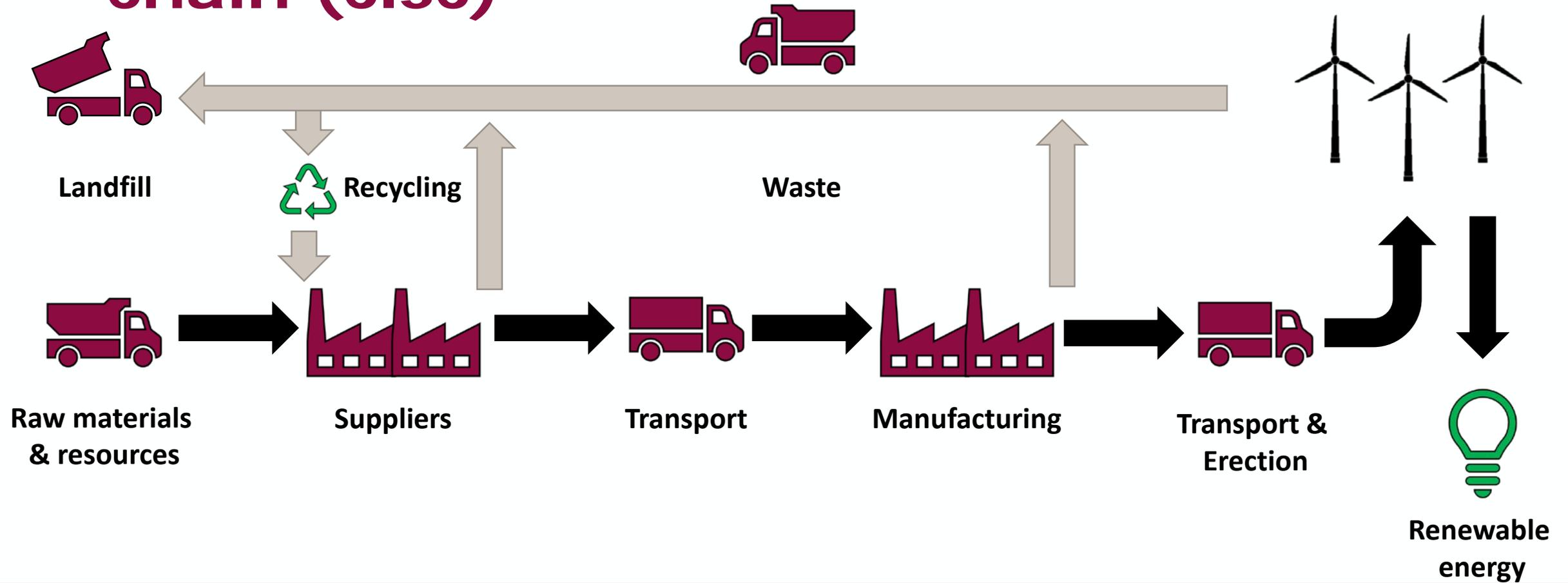
- RPS (2007) → revised in 2019 to require 80% electricity from renewable resources
- 100% electricity from zero carbon resources by 2045

## Benefits /Opportunities

- High growth rate
- Direct/indirect industry jobs; tax/lease payments.
- # active manufacturing wind-related facilities: 0

Source: AWEA.org

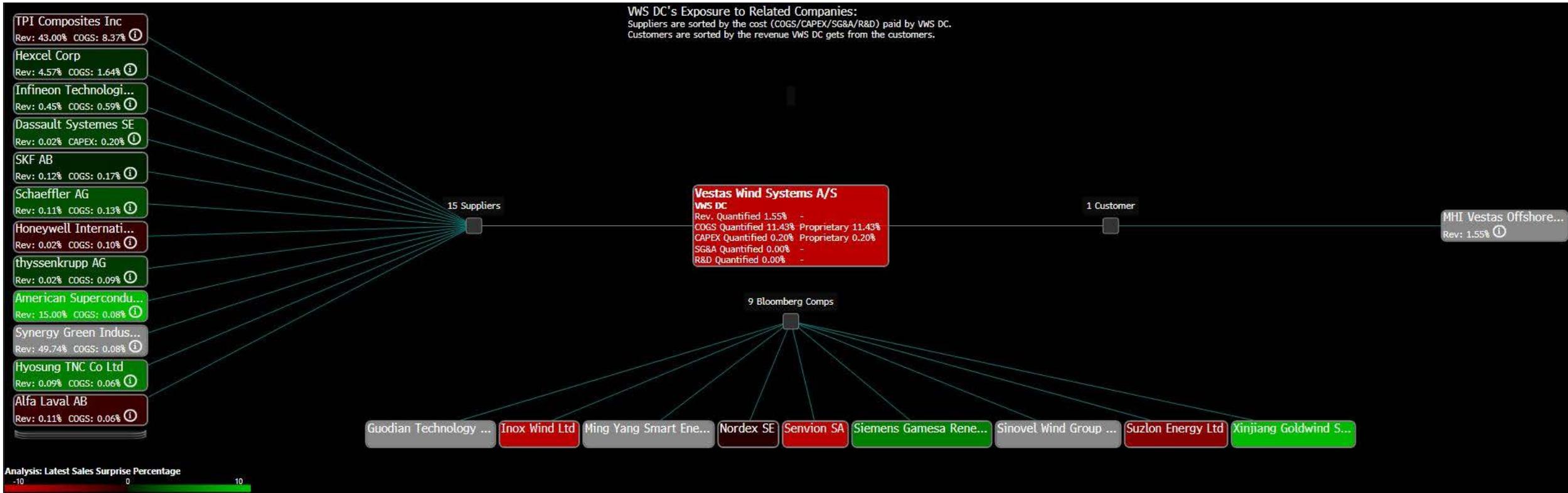
# Simplified view of wind turbine supply chain (clsc)



# Wind turbine major components

Component	Market concentration	Typical sourcing approach
Rotor/Blade	Highly concentrated. ½ OEMs supply internally	In-house strategic models
Bearings	Highly concentrated. ≈ 3 suppliers	Maximize quality supply partners to avoid shortages
Gearbox	Somewhat concentrated. ≈ 3 main players; 12 competitors	Heavy reliance on big players
Controls	Highly concentrated. ½ in-house sourcing	Single supplier sourcing, highly sensitive to turbine design
Generator	Highly fragmented	Several external suppliers
Castings (nacelle, blades)	Highly fragmented, localized sourcing	Multiple suppliers selected by region

# Vestas Wind Systems SC (example)

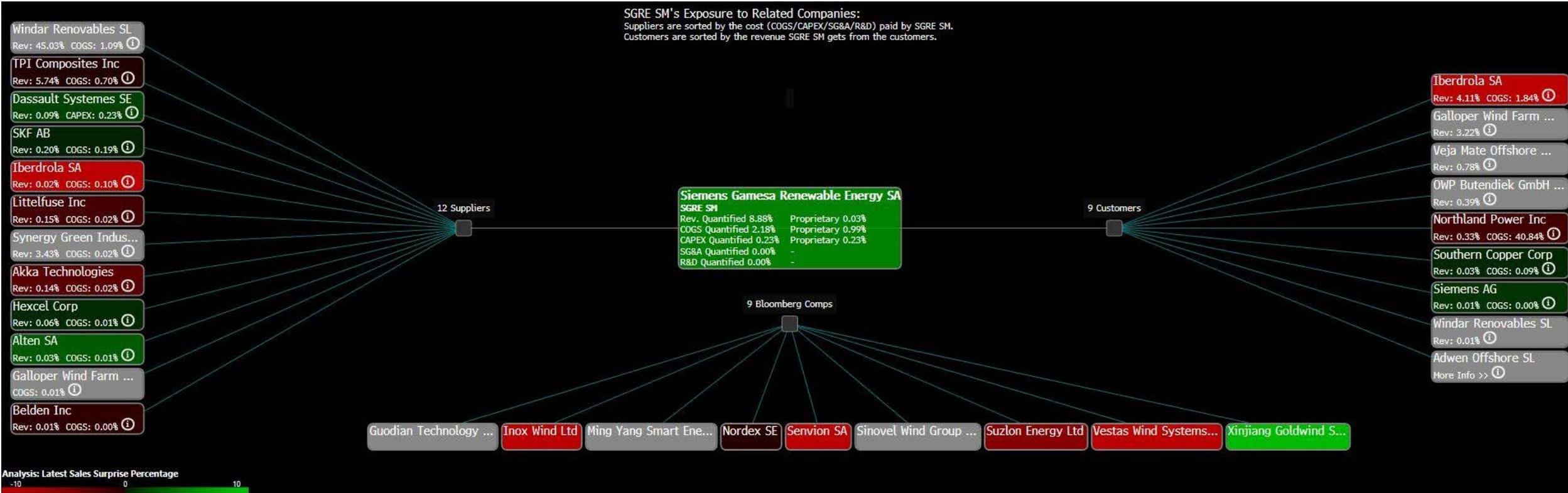


Source: Bloomberg



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# Siemens Gamesa SC (example)

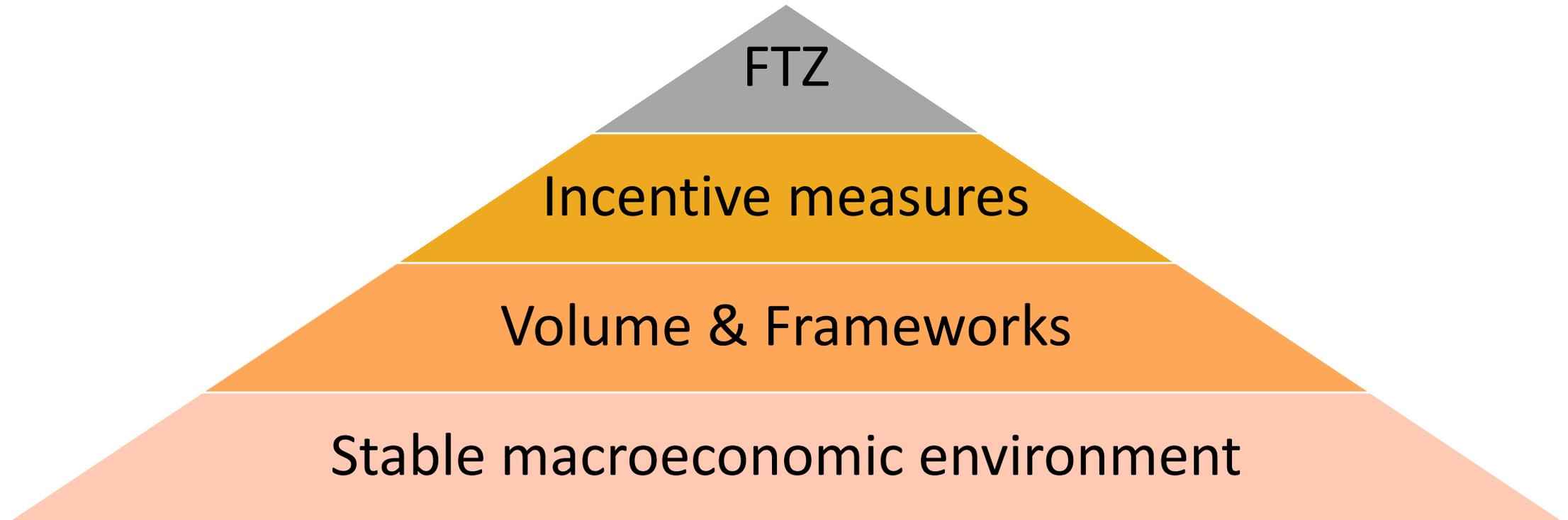


Source: Bloomberg



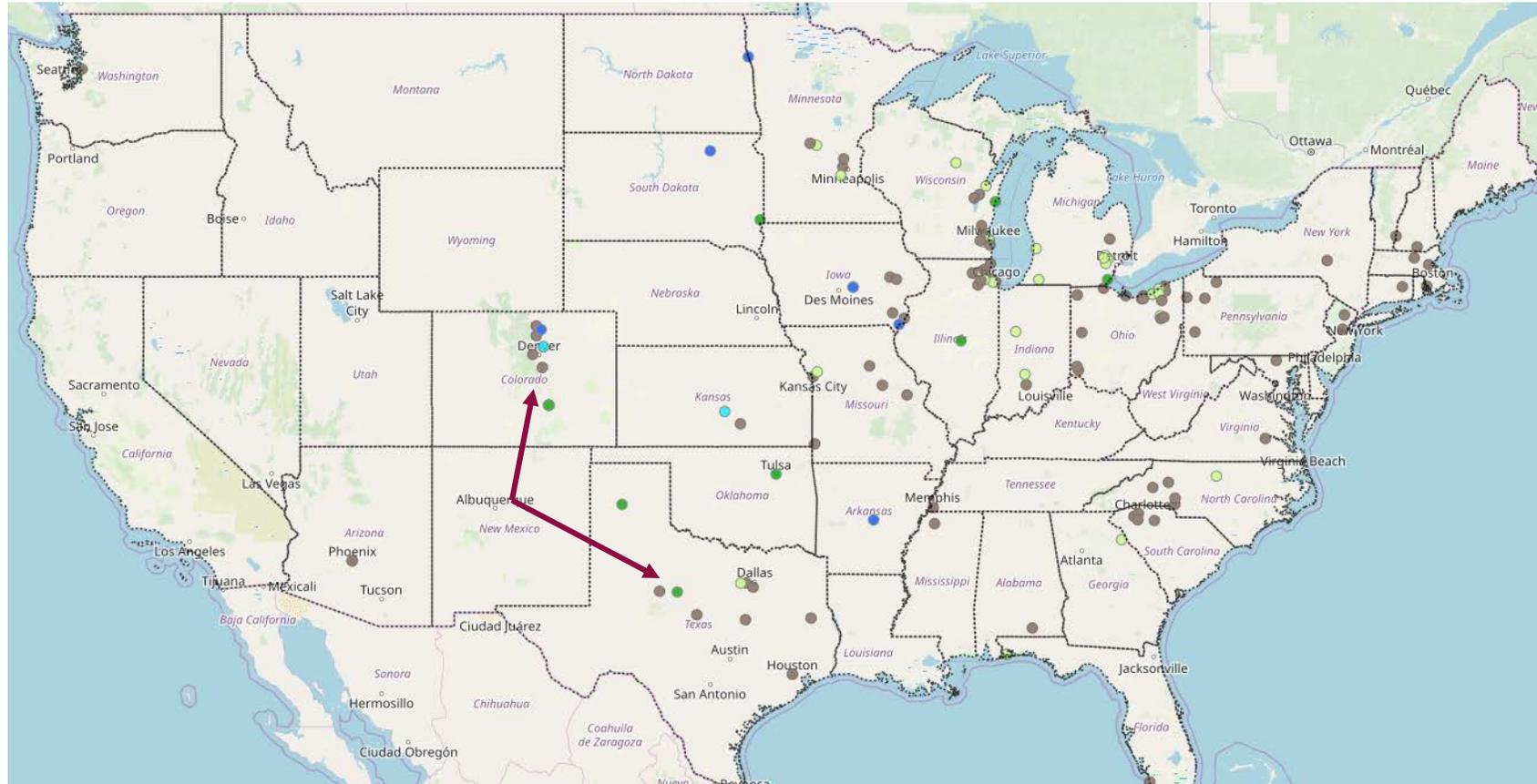
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# Drivers for maximizing local Supply Chain development



Source: GWEC Wind Energy Handbook

# Wind Manufacturing facilities (USA)

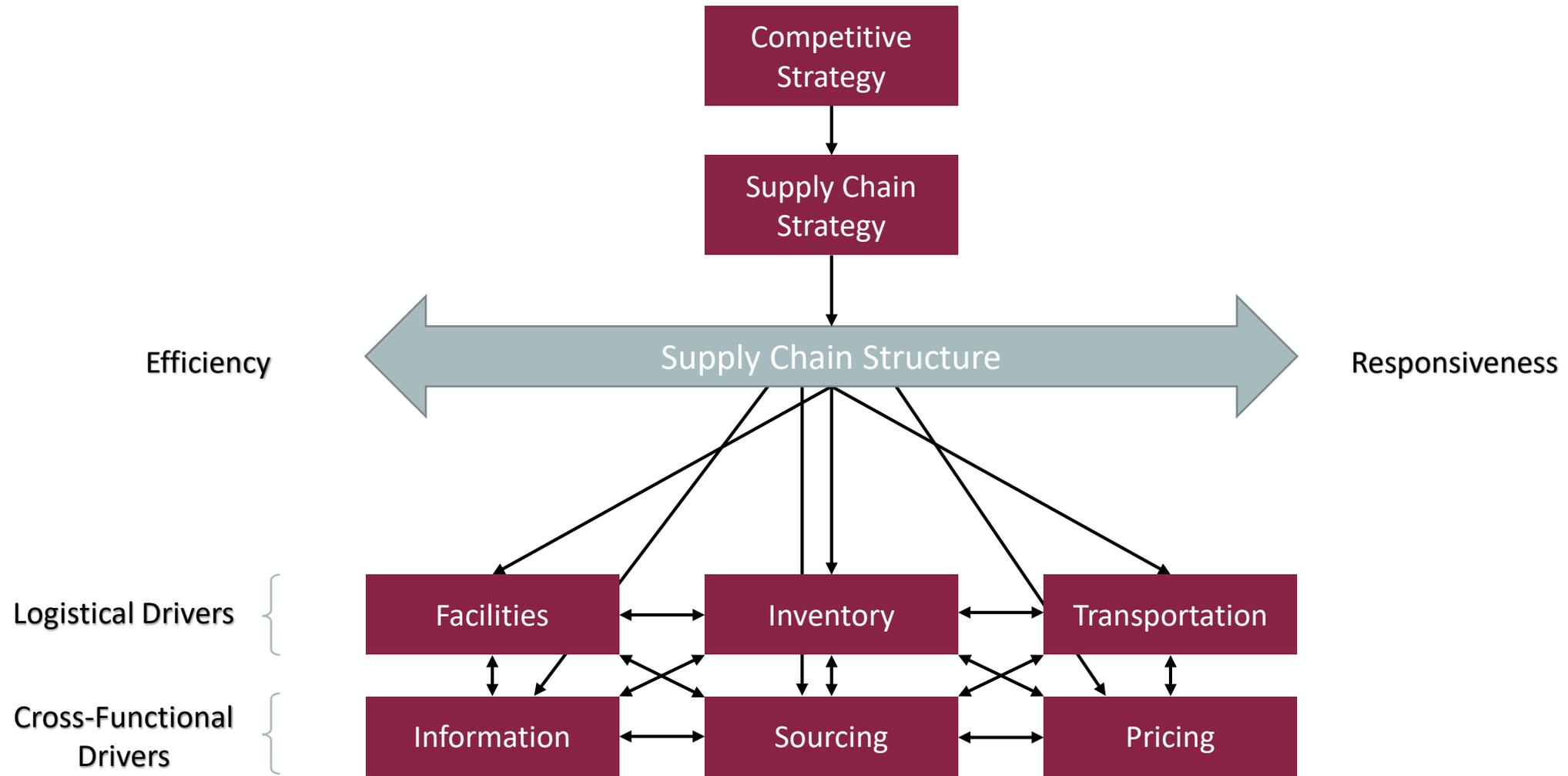


Source: maps.nrel.gov



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# Supply Chain Performance Drivers



# Cost analysis example (towers and blades)

## Tower Regional Cost Breakdown

Subcategory	Country		
	Germany	China	USA
Burden	\$229,882.00	\$101,438.00	\$55,354.00
Engineering	\$80,000.00	\$9,824.00	\$20,000.00
Labor	\$96,120.00	\$23,237.00	\$51,352.00
Logistics to U.S. Port	\$93,750.00	\$139,063.00	\$43,750.00
Materials	\$576,125.00	\$369,200.00	\$380,251.00
Profit	\$120,000.00	\$29,840.00	\$45,291.00
SGA	\$38,751.00	\$22,008.00	\$87,723.00
Tariff tax	\$0.00	\$210,000.00	\$0.00
Grand Total	\$1,234,628.00	\$904,610.00	\$683,721.00

## Blades Regional Cost Breakdown

Subcategory	Country		
	China	Germany	USA
Burden	\$15,615.00	\$93,130.00	\$64,165.00
Engineering	\$13,388.00	\$24,300.00	\$14,597.00
Labor	\$11,103.00	\$39,912.00	\$31,300.00
Logistics to U.S. Port	\$54,976.00	\$35,714.00	\$45,000.00
Materials	\$247,028.00	\$184,084.00	\$147,825.00
Profit	\$54,000.00	\$32,400.00	\$24,329.00
SGA	\$55,207.00	\$20,250.00	\$36,494.00
Grand Total	\$451,317.00	\$429,790.00	\$363,710.00

Source: GLWN.org

# SWOT Analysis – Wind Turbine SC in NM



# Contact Information

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