



NORTH CAROLINA

Department of Transportation



The Supply Chain and OSW Economic Development

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North Carolina Department of Transportation
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Introduction

Dana Magliola

- Statewide Multimodal Freight & Logistics Program Manager, NCDOT Rail Division
- NCDOT Supply Chain SME
- Connecting transportation strategy, planning and investment to commerce and industry
- Maritime, freight forwarding, applied research background
- Staff liaison for NC TOWERS Infrastructure, EJ, and Inclusion Subcommittee



If you have questions, please feel free to ask and we'll save time for questions at the end

THANK YOU
NC PORTS!



Objectives

- To set a baseline understanding of the broad industrial supply chain and its importance to North Carolina
- To introduce key supply chain concepts, current issues, trends and future developments for industrial development
- To strengthen the supply chain, freight, logistics expertise of industrial development stakeholders in North Carolina, especially supporting the growth of the OSW sector and supply chain

Defining & Illustrating the Supply Chain

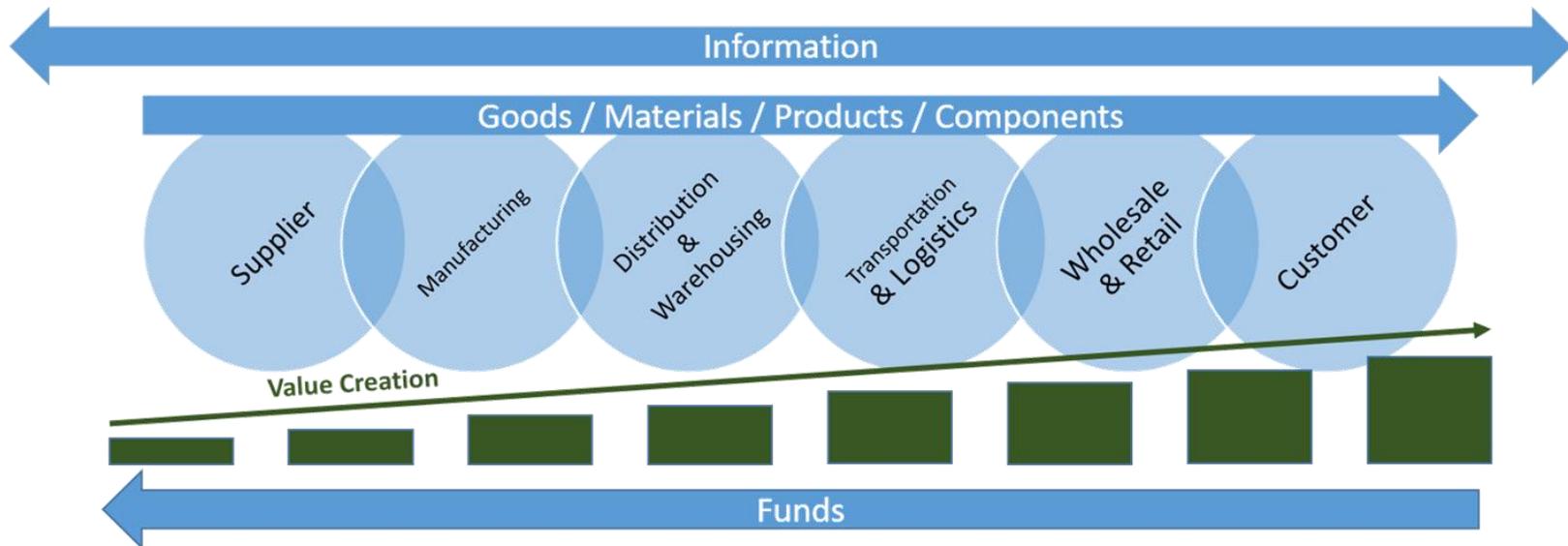
Now, we all know about the supply chain →





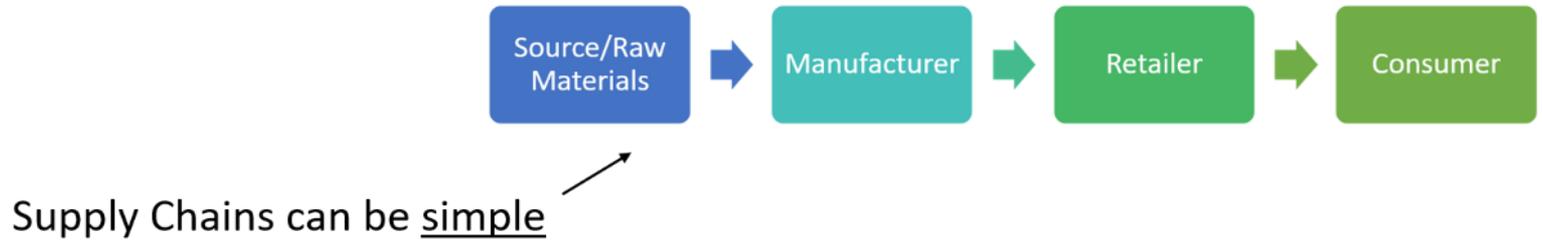
- Focused on successive steps of value creation versus final output
- North Carolina's supply chain IS different than other states

Defining the Supply Chain

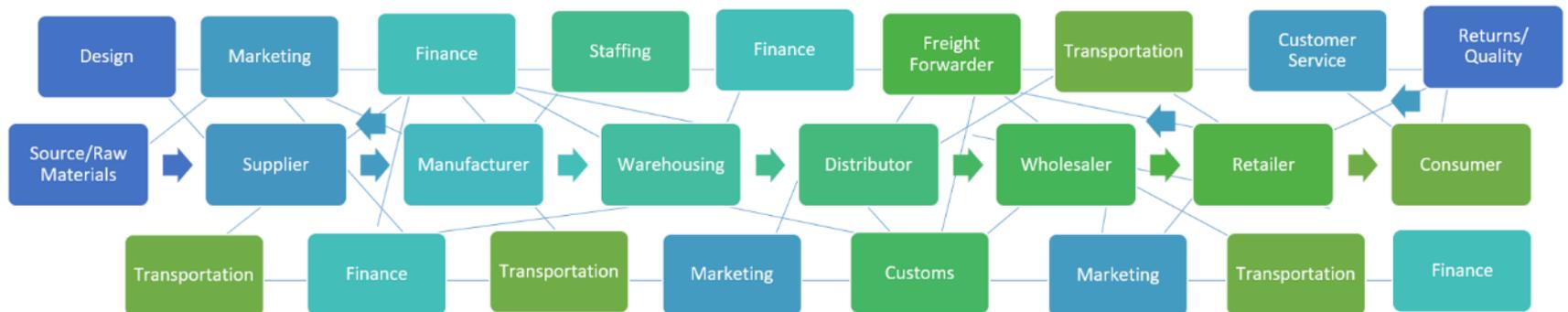


The flow of **Information, Goods, & Funds.**

Defining the Supply Chain



or very complex.



Basic Elements of the Supply Chain



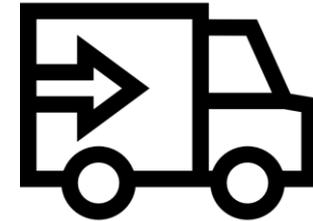
Procurement

- Sourcing
- Forecasting
- Vendor Qualification
- Negotiation
- Contracting
- Purchasing
- Cost Control & Analysis
- Quality
- Finance



Production

- Manufacturing & Assembly
- Process Improvement
- Forecasting
- Inventory Control
- WIP Management
- Data Collection & Analysis
- Capacity/Utilization Management
- Quality



Distribution

- Storage/Warehousing
- Transportation Management
- Material Handling
- Logistics
- Customs & Trade Management
- Inventory Management
- Customer Relations
- Return Logistics

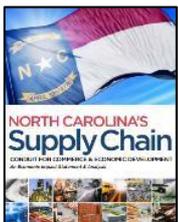
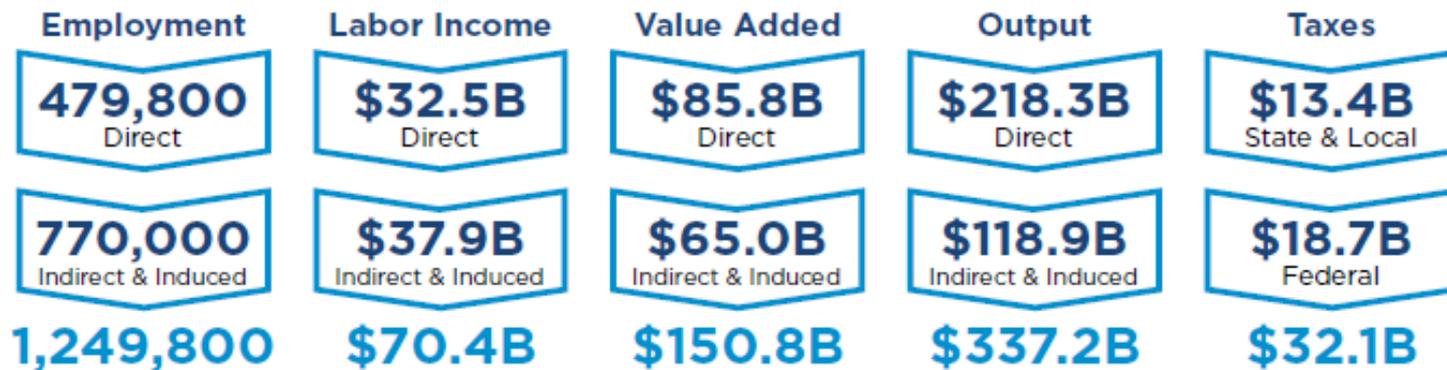
KEY ACTIVITIES

← COMMUNICATIONS & INFORMATION SHARING →

** These are only some of the key activities in the supply chain. Each company's supply chain is unique.*

Overall Supply Chain Impact

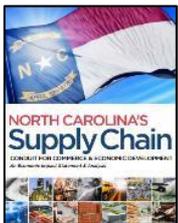
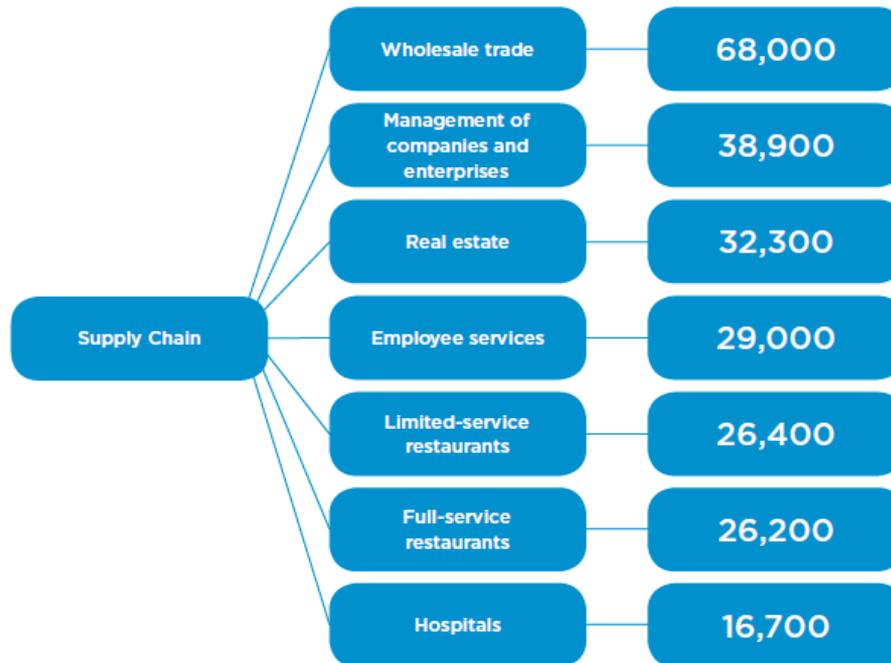
TOTAL ECONOMIC IMPACT OF THE SUPPLY CHAIN



*North Carolina's Supply Chain:
Economic Impact Statement & Analysis (2016)*

Overall Supply Chain Impact

JOBS CREATED IN NON-SUPPLY CHAIN INDUSTRIES



*North Carolina's Supply Chain:
Economic Impact Statement & Analysis (2016)*

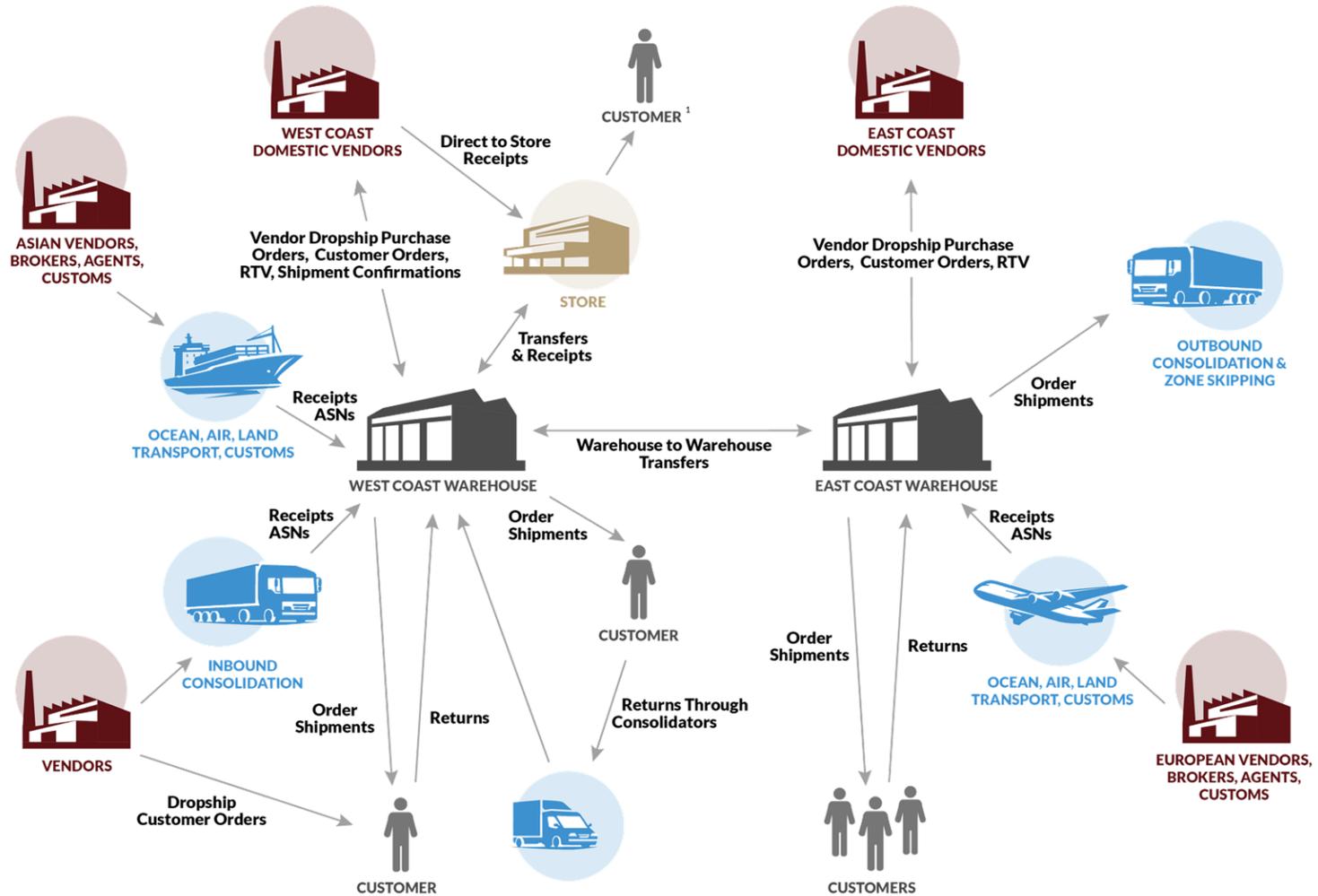




SUPPLY CHAIN ILLUSTRATED



Real-World Supply Chain Context



Supply Chain Structure – Product Viewpoint

- What does a supply chain really look like?



Men's Thermoball™ Eco-Hoodie



Supply Chain Structure – Product Viewpoint

- What does a supply chain really look like?



Men's Thermoball™ Eco-Hoodie



Supply Chain Structure – Product Viewpoint

- What does a supply chain really look like?



Men's Thermoball™ Eco-Hoodie



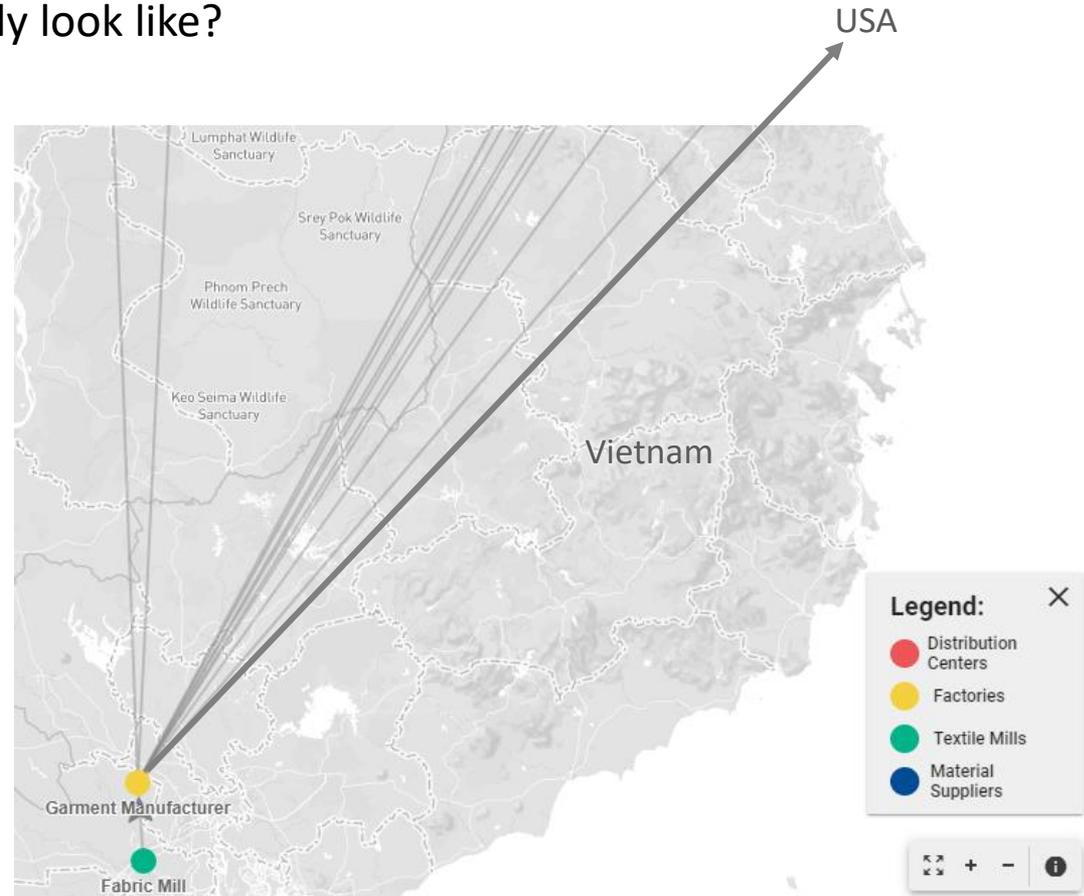
Vietnam

Supply Chain Structure – Product Viewpoint

- What does a supply chain really look like?



Men's Thermoball™ Eco-Hoodie





“Holy Supply Chain, Batman!”



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Rising Prices, Once Seen as Temporary, Threaten Biden's Agenda

- Supply chain disruptions, a worker shortage and pain at the gasoline pump have made inflation an economic and political problem for the White House.
- Rising prices have complicated President Biden's push to expand the social safety net and could hurt Democrats' chances in the midterm elections next year.



Los Angeles this month. Erin Schaff/The New York Times

Going Back to Eat in Midtown, Where the Main Dish Is New York

This often-maligned neighborhood is pulsing with a variety, energy and deep history that is the city's essence.



National alcohol shortage may re-ignite panic buying

Supply chain issues are impacting alcohol production



By Haley Weger

Published: Oct. 25, 2021 at 11:30 PM EDT | Updated: 9 hours ago



Lake Charles, LA (KPLC) - Supply chain issues are impacting the alcohol supply in the U.S. This is making alcohol more difficult for bars and liquor stores to get.

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FINANCE • SUPPLY CHAIN

Supply chain panic is creating a vicious cycle of shortages

By SPYRUS MELLOR
October 20, 2021 12:00 PM EDT



Related Articles

COMPANIES
What's causing supply chain delays? It's not just port disruptions

BY EMMER BARRETT

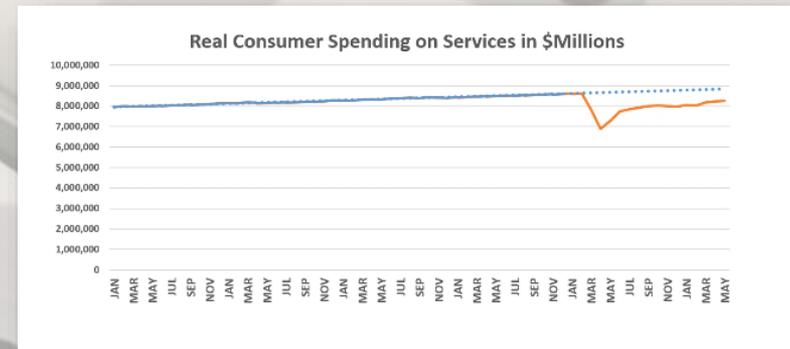
FEATURES
No chicken suggests, no PB&J: Supply chain issues are on the menu at schools across the country

BY ALEJANDRO FIGUEROA

Supply Chain Volatility

- *Broad* global economic shock impacting nearly all supply chains
- High-visibility sectors increase awareness of supply chain issues (Semiconductors, TP)
- Retail consumer behavior shift accelerates shift to eCommerce
- Supplier disruption and raw materials volatility (gas, foam)
- Inflation, war, **etc.**

** Not an exhaustive list*



Supply Chain Volatility

- Supply and demand mayhem
- Transportation rate volatility and record profits
- Unpredictable international production with COVID issues
- Truck driver shortages, protests
- Union negotiations, expanding unionization
- Intermodal boom, congestion
- NIL roster challenges





Supply Chain Volatility

- 20+ vessels awaiting berths at LA/LB
- Turnaround time up nearly 2 days over the past month
- Nearly 350 ships queued at Shanghai, 34% increase over last month
- China to US, nearly 75 days longer than average
- Fuel prices in Singapore (market indicator) up 66% over the past year
- Sanctions against Russian vessels at most ports

Supply Chain Ecosystem & OSW



Supplier Development

- A healthy *ecosystem* of suppliers, customers, transportation providers, and infrastructure will:
 - Provide resiliency and predictability
 - Help reduce OEM total cost of ownership (TCO) for capital investment
- **Efforts to develop 2nd and 3rd tier suppliers in OSW will enhance value proposition for OEMs in NC**

Critical

1. Better Total Cost of Ownership decisions
2. Increase effectiveness of ERP/MRP
3. Mitigate global risks
4. Reduce/manage volatility
5. Expand supplier matching capabilities to source for emergent needs
6. Improve OEM/Supplier product development collaboration

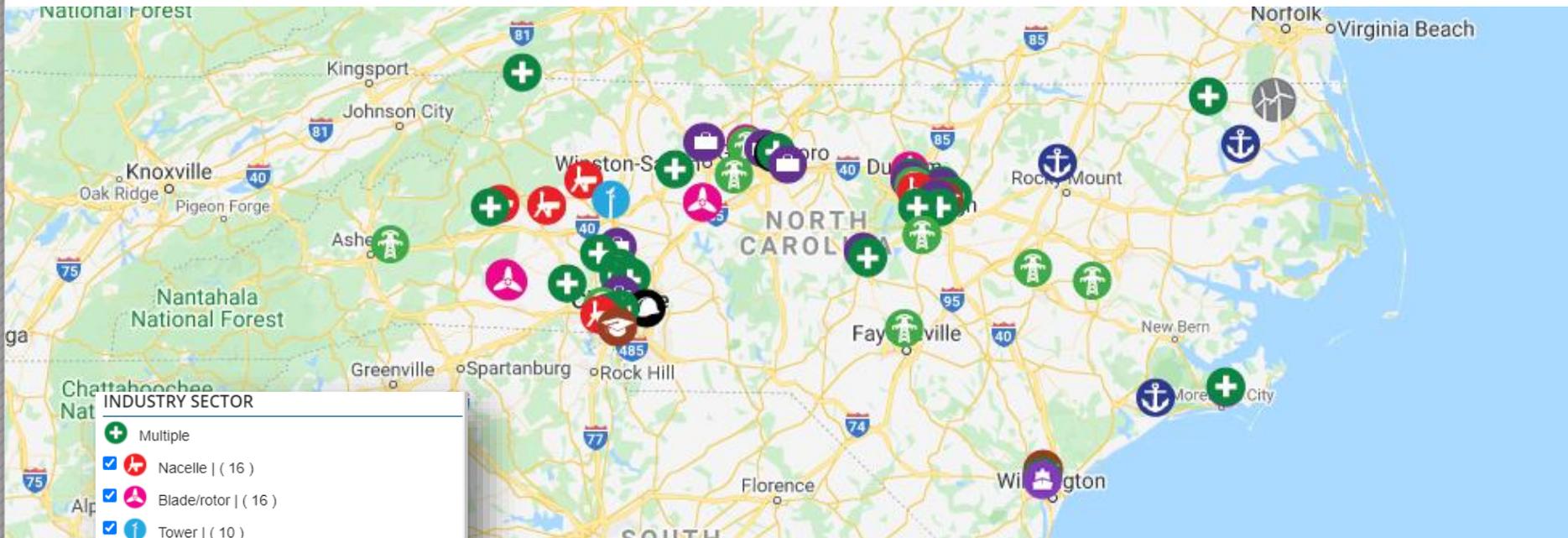
Highly Important

7. Document supply chain strategy
8. Align supply chain metrics with long-term business focus
9. Identify and address choke points in a sustainable manner
10. Optimization of supply chain
11. Recognize the emergent needs for future capabilities and technology
12. Enhance value chain collaboration among suppliers, OEMs and customers

“Manufacturers with optimized supply chains are more inclined to innovate and grow, further stimulating local, regional and global economies.”

- Hollings/NIST MEP

Supply Chain Ecosystems



INDUSTRY SECTOR

- Multiple
- Nacelle | (16)
- Blade/rotor | (16)
- Tower | (10)
- Foundation | (4)
- Transmission/Electrical | (19)
- Offshore Services | (7)
- Professional Services | (29)
- Field Services | (12)
- Research/workforce dev | (11)

SHOW FACILITIES THAT

- Currently supply the industry | (80)



SOUTHEASTERN
WIND COALITION

OSW Supply Chain Opportunity

The import gap on major components signals a significant domestic supply chain development opportunity

Where does each industrial production source hold an advantage over the US?

- Labor and labor costs
- Cost of materials
- Transportation cost or logistics
- Regulatory challenges

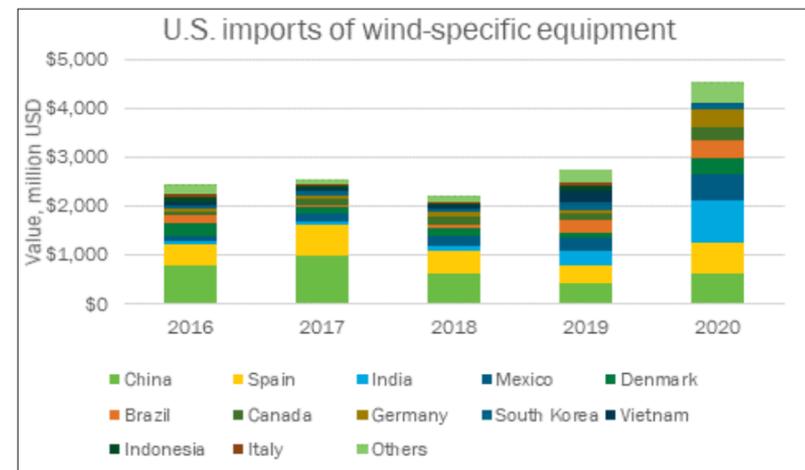


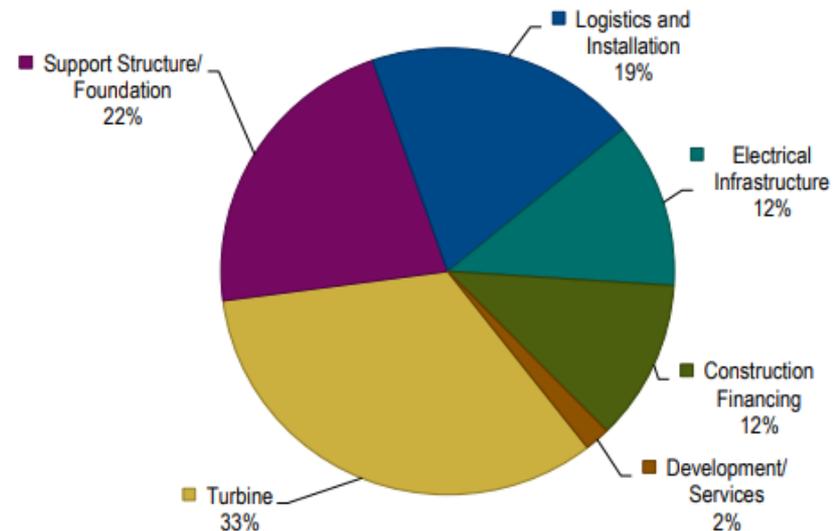
Figure 4. U.S. imports of wind-specific equipment, 2016-2020. Sources: BNEF, Berkeley Lab

OSW Supply Chain Opportunity

Where is the opportunity?

- Raw & Processed Materials
- Sub-components
- Components
- Logistics & Installation
- End-product
- EOL Recovery
- Significant sector-agnostic capital investment

Figure 1. Offshore Wind Plant Capital Cost Breakdown

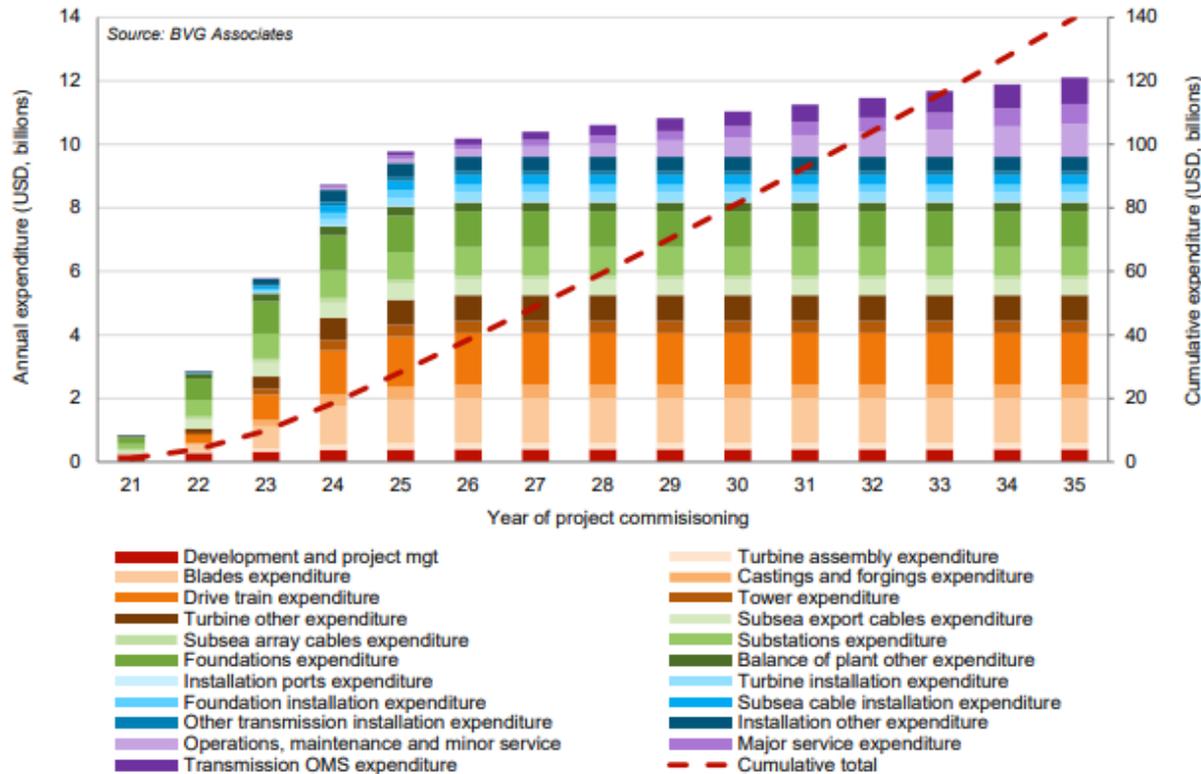


Which are short-to-medium term?

Which are long-term?

OSW Supply Chain Opportunity

2.2 Forecast of expenditure



What's Missing?

Components

- Semiconductors
- Rare earth elements
- Carbon fiber
- Metal castings
- Some nacelle components

Service Sectors

- Jones Act compliant vessels*

Workforce

- Short-term talent
- Long term resources

* Don't get me started...



3.1.1 Wind turbine tier-1 supply chain, the NC opportunity

Element	Likelihood of US supply within 5 years	Potential for NC supply	Short-term priority for NC	Notes
Nacelle, including hub	High	Medium	High	Needs a large pool of high-skilled labor and will pull in significant amounts of work from lower-tier component and manufacturing-process suppliers. It will anchor these jobs for the long term, leading to a steady and predictable workload for several decades. A facility would service the whole East Coast. Allocated a high priority as the benefits to NC would be so great.

Blades	High
Tower	High
Power take-off (transformer, converter, switchgear)	High

3.2.1 Foundations tier-1 supply chain, the North Carolina opportunity

Element	Likelihood of US supply within 5 years	Potential for NC supply	Short-term priority for NC	Notes
Monopile	High	Medium	Low	Expected to account for the majority of turbine foundations on the east coast. Rated low as EEW has already made a commitment to Paulsboro.
Jackets	High	Medium	Medium	
Steel plate	High	Medium	Medium	

3.3.1 Electrical balance of plant tier-1 supply chain, the North Carolina opportunity

Element	Likelihood of US supply within 5 years	Potential for NC supply	Short-term priority for NC	Notes
Export cable	High	Medium	Medium	As with foundations and monopiles, manufacturing facilities for this component may already be "promised" in other state PPA/OREC applications.
Array cable	High	High	High	As with foundations and monopiles, manufacturing facilities for this component may already be "promised" in other state PPA/OREC applications.
HV electrical equipment	High	High	High	We expect there to be several existing US plants which will manufacture HV electrical equipment for the onshore and offshore substations.
Topside fabrication and integration	Medium	Medium	Medium	Although the most likely suppliers will be existing oil and gas topside fabricators or ship builders, there is still the opportunity to establish a US specialist supplier.



What's Here Today?

- Manufacturing capabilities for turbine components and the OSW supply chain
- Domestic availability of raw materials
- Capacity to recycle wind components/materials
- Domestic infrastructure capable of facilitating OSW manufacture and installation
- Innovation, technology and workforce





Supply Chain Investment Truth

- **Supply chain asset investment follows the marketplace**
- Example: global cold-storage construction market anticipated growth to \$18.6B by 2027 vs. \$7B in 2019
- OSW: the top vulnerability in domestic OSW supply chain is uncertain demand in the OSW project pipeline



NORTH CAROLINA

STATE FOR BUSINESS

2018, 2017

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UNPARALLELED PORTS

Virginia's ports are known for their congestion-free channels, no overhead obstructions, short travel time to open sea, and the ability to handle any type of cargo.



SKILLED WORKFORCE

Virginia is home to over 500,000 highly skilled veterans many of whom have significant skilled trades experience.

STRATEGIC LOCATION

Virginia is one of the nation's most modern highway systems, multiple international airports, and one of the deepest ports on the east coast.

INDUSTRY

maritime workforce, repair market, and maintenance

FACILITIES

be found in Virginia, most highly-suited in the foundation construction.

PR

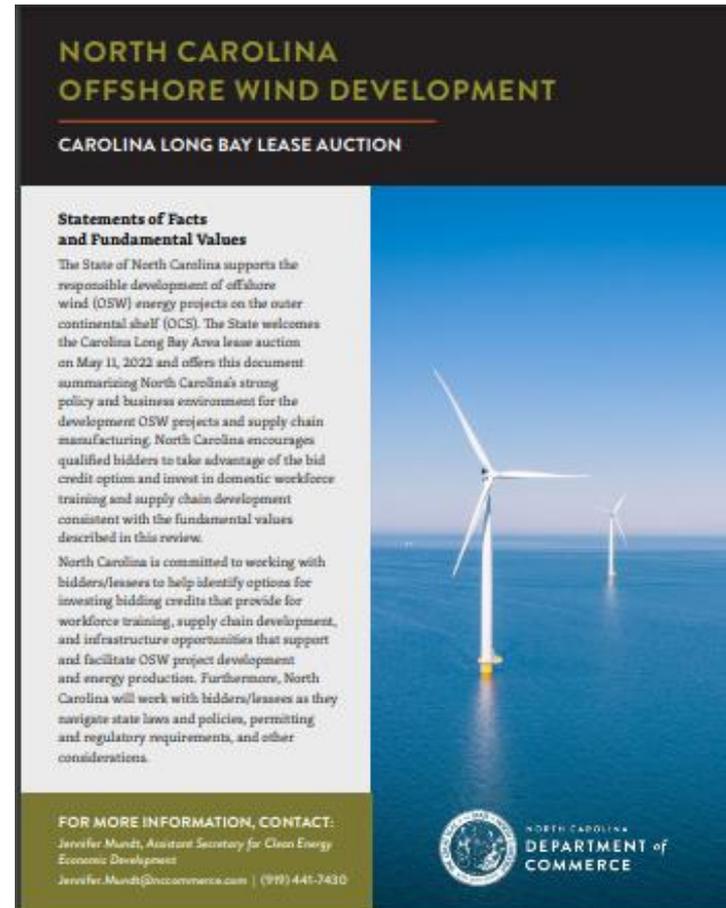
Year-
states

S CLIMATE

en ranked among the top both Forbes and CNBC.

Recommended Reading

- North Carolina Offshore Wind Development Facts & Fundamental Values



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Homepage:

bit.ly/NCDOTsupplychain

NCDOT Connect Resources:

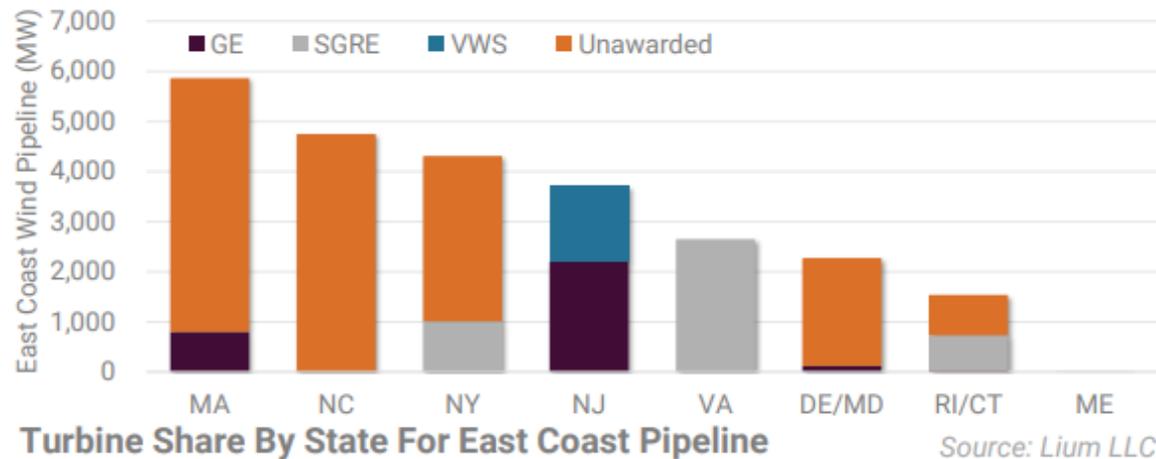
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OSW Supply Chain Opportunity

Where is the opportunity?

Local Footprint Will Factor Into Contract Awards

Localized roofline, as well as component standardization for multi-project developers, are both likely to underpin some competitive advantage for vendors when it comes to winning supply / service contract awards. In turbine packages, SGRE has had good wins in VA, NY, and RI/CT while GE's wins have come in NJ and MA. Vestas just won a project in NJ as well. NC is one state to watch with no clear frontrunner yet as projects there are earlier stage than in the states higher on the coast.



PREDICTIVE RESEARCH
for strategic decisions

David Criss, Partner
Joseph Trank, Partner
Joseph Trank
Taylor Jacobs, Research Analyst

