Developing Freight Data into What-if Scenario Analyses for Freight Planning: Location-Based Disruptors for Texas Freight Movements

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presented by

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with

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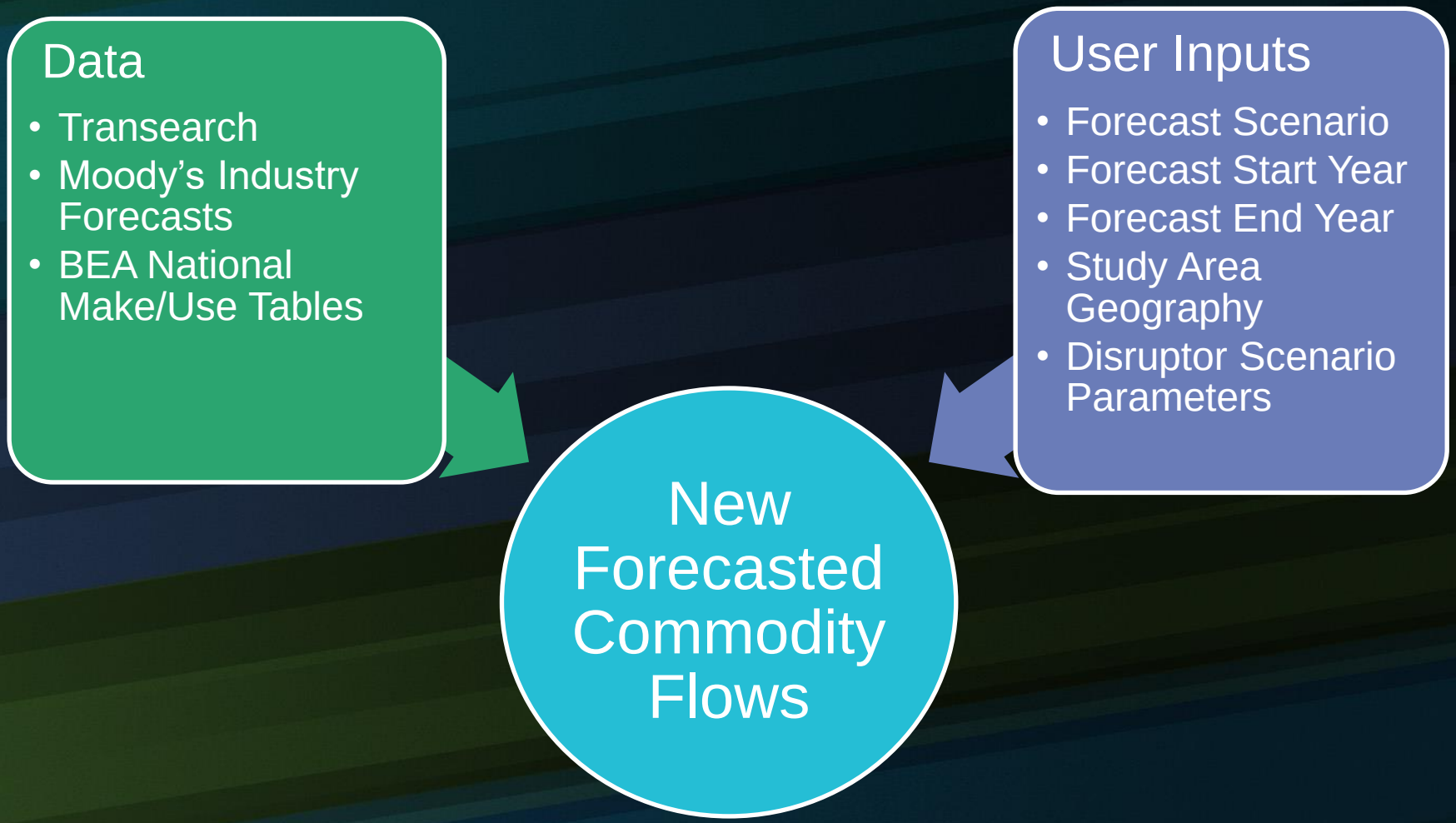
Think *Forward*

Overview

- Commodity flow databases (Transearch, FAF) give a snapshot estimate of future freight flows
- Planners often want to use the forecast data to explore "disruptor" scenarios
- This work looks at one methodology of location-based "disruptor" scenario **– where freight flow origins shift from one location to another.**
- Sample policy question: What if there is a change in manufacturing trends where more commodity tons are produced domestically in the US and fewer tons are imported?

TxDOT Freight Forecasting and Scenario Planning (FFSP) Tool



Shift Toward Domestic Manufacturing

- Considers an “on-shoring” policy change: fewer manufacturing commodities are imported, and more are produced domestically
  - Could be due to changes in trade policies, supply chains
- Affects the following commodities:
  - Apparel & Finished Textile
  - Machinery (incl. Electrical)
  - Transportation Equipment
  - Instruments & Optical Goods

"Location-Based" Disruptor Methodology

"Pre-Disruptor" Forecast

- Identify import freight flows
- Identify domestic production freight flows

Calculate Change in Tons

- User input determines magnitude of change
- Differential factors increase domestic tons and decrease import tons

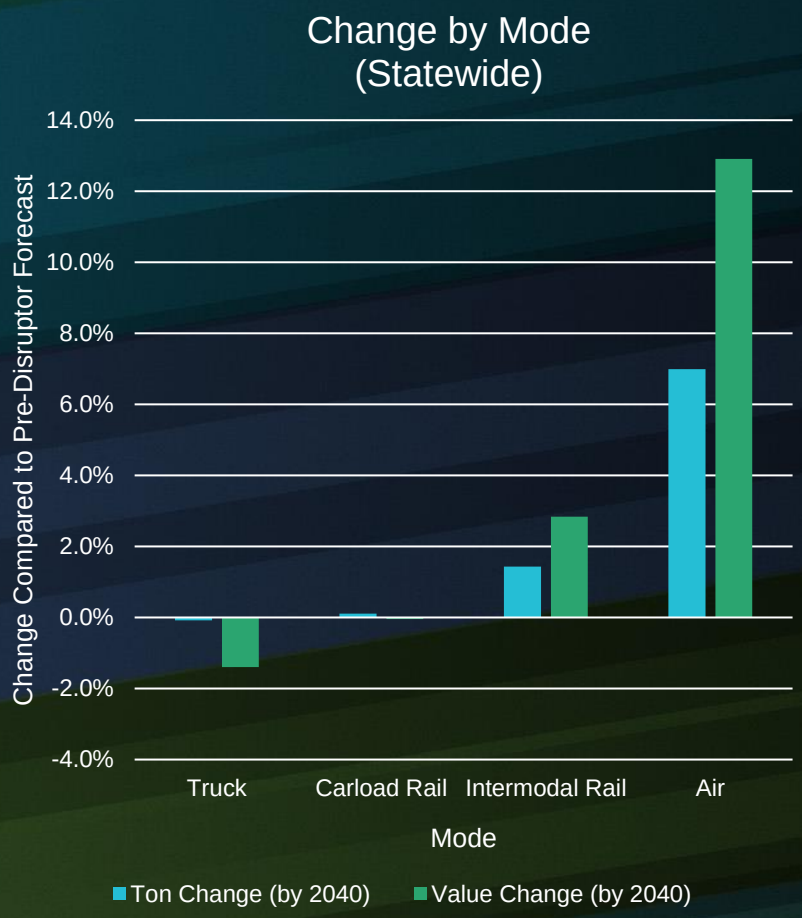
Calculate Change in Value

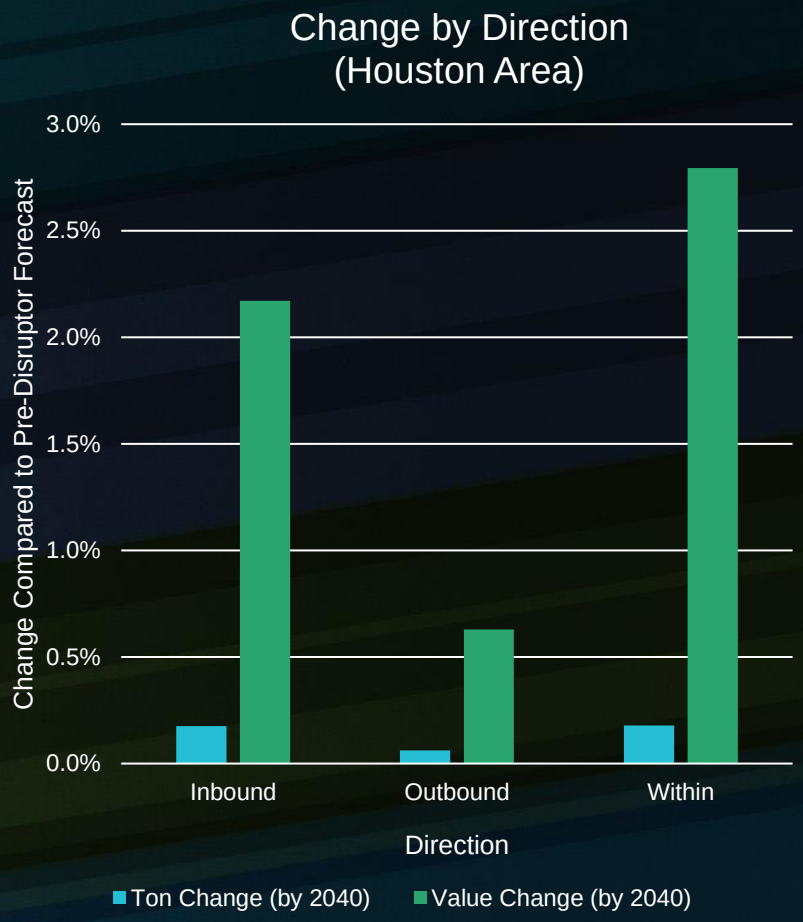
- Calculate differential factors to change value
- Import value is decreased in the same proportion as tons.
- Domestic value is increased using the **import price-per-ton ratio**

Results: High-Level

- Sample scenario: increase domestically produced commodities by 1% each year between 2020 and 2040 and decreases imports of those commodities by the same amount
- Relative to the original commodity forecast, by 2040, there will be a 22% increase in tons and 19% increase in value of domestic production and an 11% decrease in import tons and value.
  - » Ex: for Electrical Machines and Equipment commodities, the tool predicts a shift of about 2.3 million tons of commodities worth about $35 billion.

Results: Mode and Direction





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Conclusions

- Simple yet targeted methodology to estimate change in tons & value from one origin to another
- The process is zero-sum: no change in overall tons/value, but change in where those tons/value originate
- Can be tailored to address various policy questions
- Can analyze scenario impacts on a variety of commodity flow measures (e.g. mode or direction)

References / Contact

References

1. **Cambridge Systematics, Inc. with WSP and Cheng Solutions, LLC.** *2050 Freight Industry Level Forecasts Study.* New York: North Jersey Transportation Planning Authority, 2020.

2. **Cambridge Systematics, Inc. With Anne Strauss-Wieder, Inc., Parsons Brinckerhoff, and Rutgers, The State of New Jersey.** *2040 Freight Industry Level Forecasts.* North Jersey Transportation Planning Authority, 2012.

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