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# Use of Predictive Scenario Analytics to Support Economic Development

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# Site Selection Options...

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by the smell test?

or  
flying by the seat of your pants?

# Future Risk?

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COMPLACENCY in the face of economic change is the surest path to loss.



- *Manage location decisions*
- *Site development + packaging*

PROACTIVE planning and action enables new paths.

# Site Location Involves Investment

*Optimize future return,  
allow for uncertainty +  
disruptive possibilities*



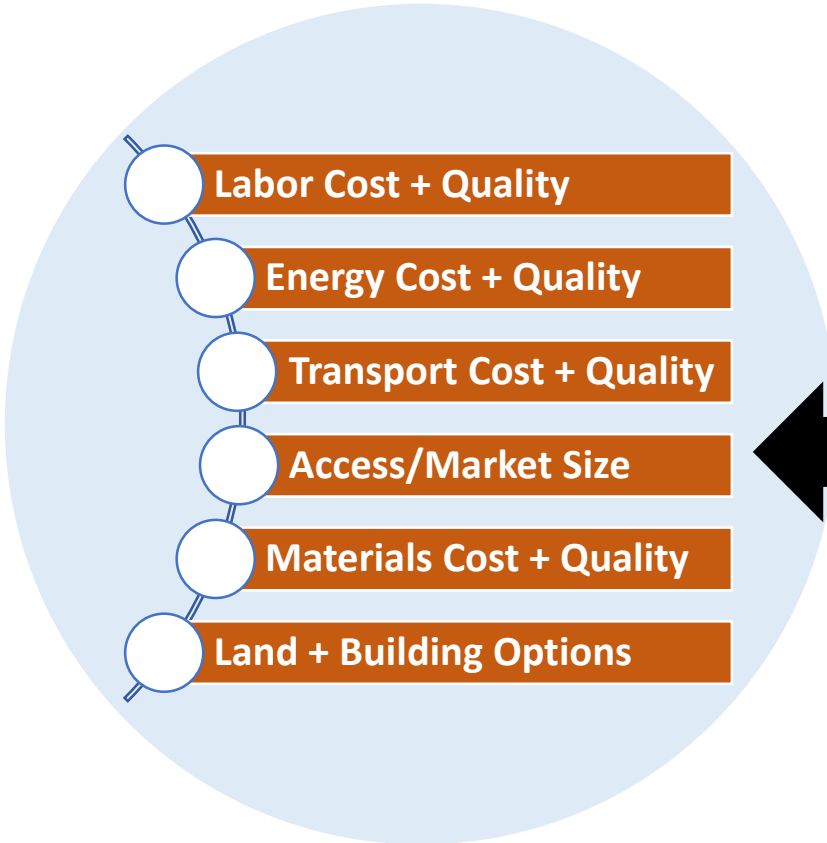
Missed Opportunity

Stranded Investment

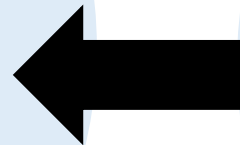
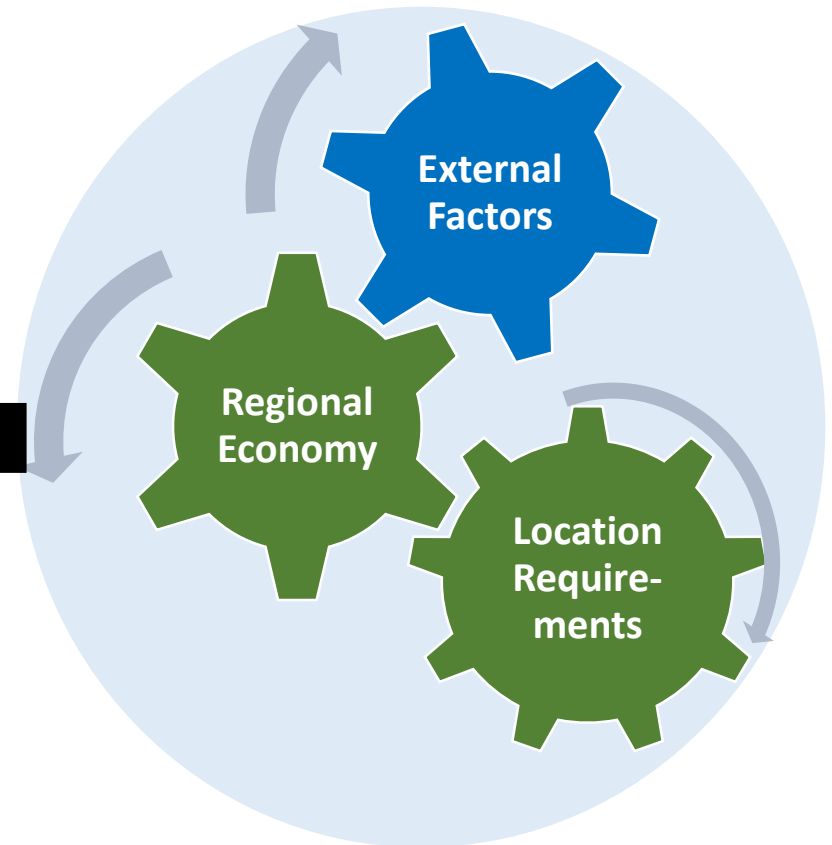
Payoff from Investment

# Planning Site Selection Decisions

## Site Factors



## Future Change



# Types + Implications of External Factors

## Organic Change from LR Trends:

- Evolving Economic Growth/Pattern
- Evolving Technology Performance
- Evolving Population Growth/Pattern

## Hard-to-Anticipate LR Change:

- Resources (energy price, availability)
- Economy (exchange rates, trade regs)
- Disruptive Events (weather, seismic)
- Technology Innovation

## Possible Futures

- $\Delta$  Future demand for workers, customer markets
- $\Delta$  Future supply for input materials, worker skills
- $\Delta$  Needs for investment in training + facilities

*Predictive future analytics courtesy of*

**TREDPLAN**

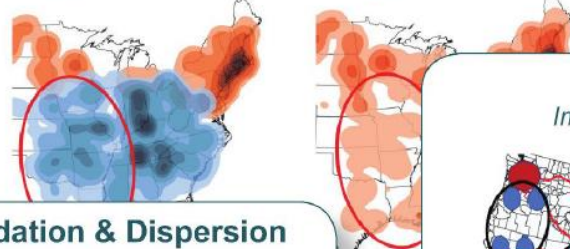


# External Factors Causing Future Change

## Climate Change & Energy Costs

Impact on business cost

(with *stable* future energy prices)      (with *higher* future energy prices)



## Technology Adoption

Impact on trucking & warehousing



## Industry Consolidation & Dispersion

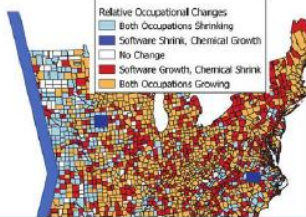
Impact on occupations

Computer software occupations



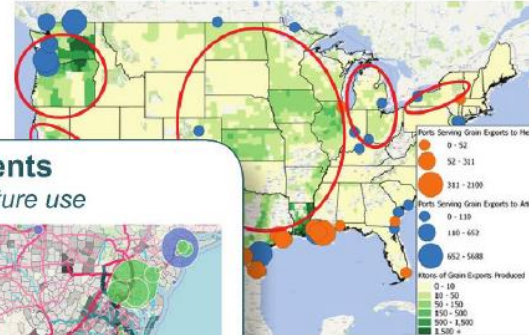
Red = more relative demand  
Blue = less relative demand

Chemical engineering occupations



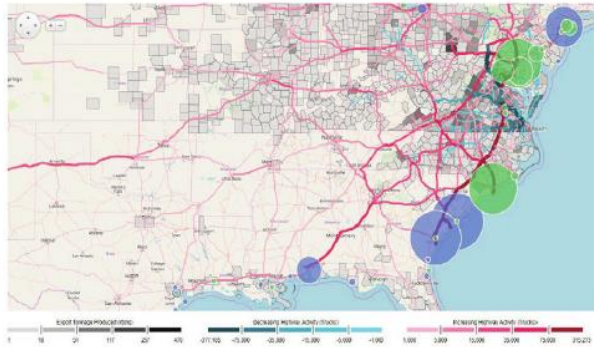
## Global Tariffs & Trade

Impact on ports & producers



## Disruptive Events

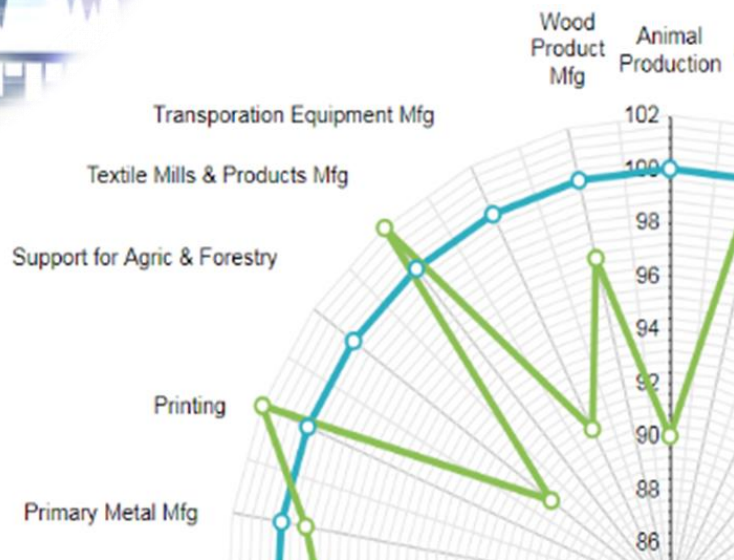
Impacts on infrastructure use



# Predictive Analytics Identify Local Risk + Opportunity

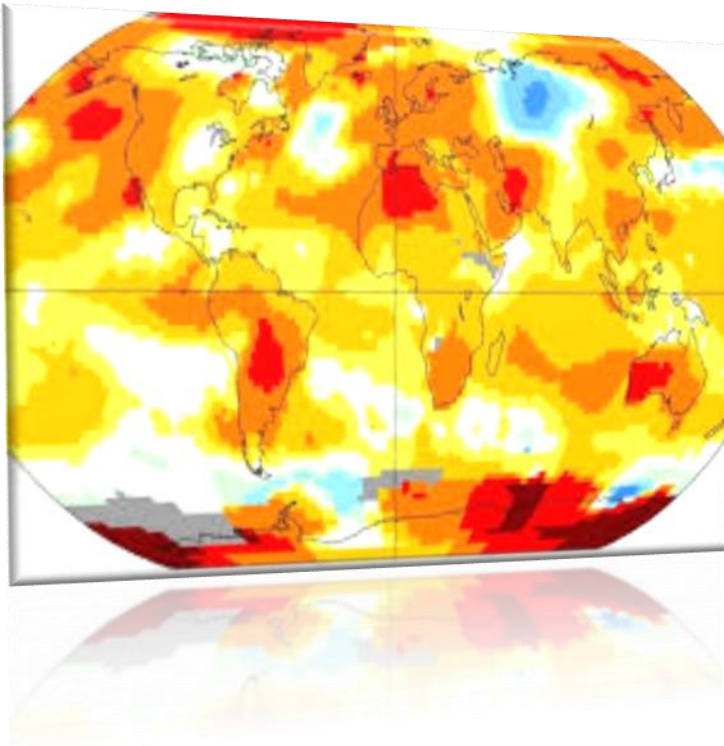
## *Future change*

- Energy
- Transport
- Labor Force
- Global Trade
- Technology
- Climate





# Example 1: Changing Weather Conditions



## *Anticipated changes (trending)*

- Less cold winters  
→ *reduction in \$ costs for heating*
- Hotter summers  
→ *increase in \$ costs for cooling*
- Greater frequency and \$ cost of flood & storm disruptions

## *Why it matters*

Building operating cost/employee - **up** in some areas, **down** in others

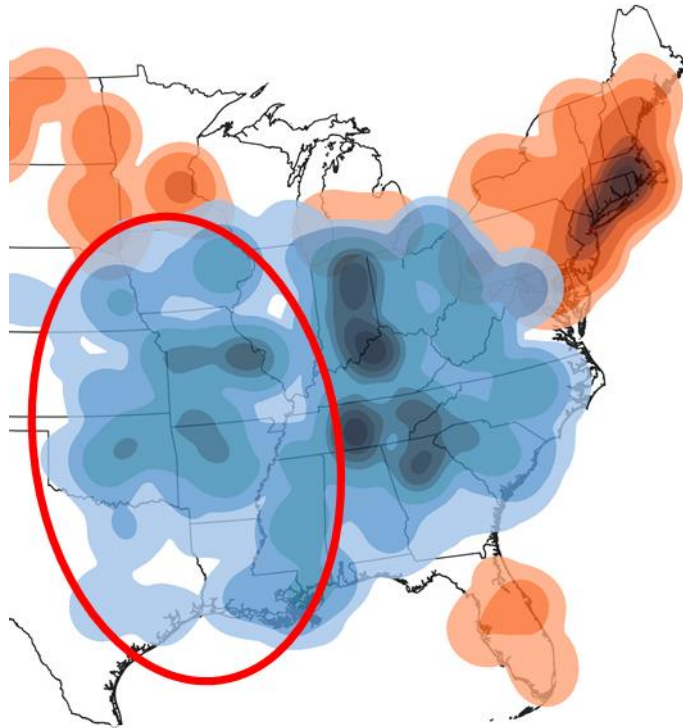
Highly affected industries: warehousing, chemicals, metals, electronics

# Shift Location Advantages with Changing Weather

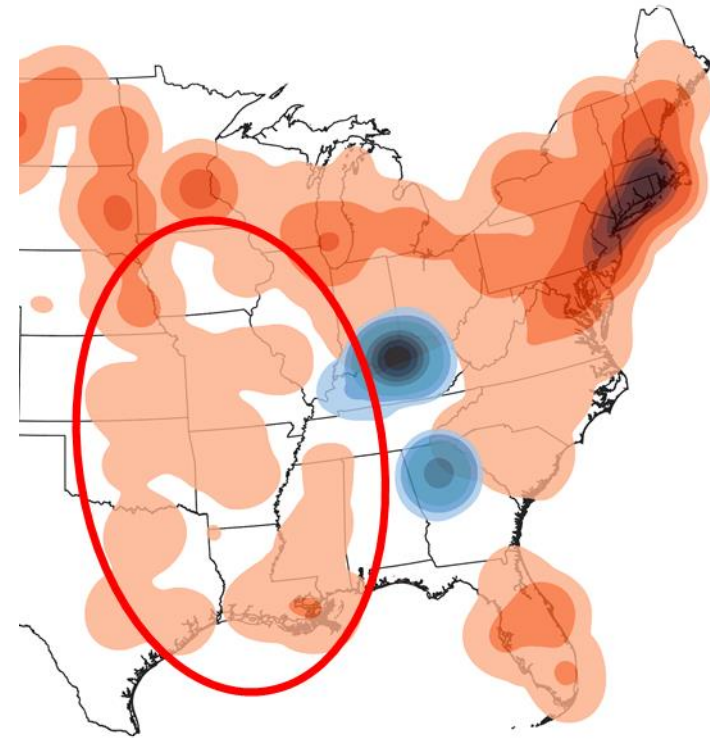
## Future Change in Energy cost per worker

*Red* = Higher \$ Cost    *Blue* = Lower \$ Cost

(with *stable* future energy prices)

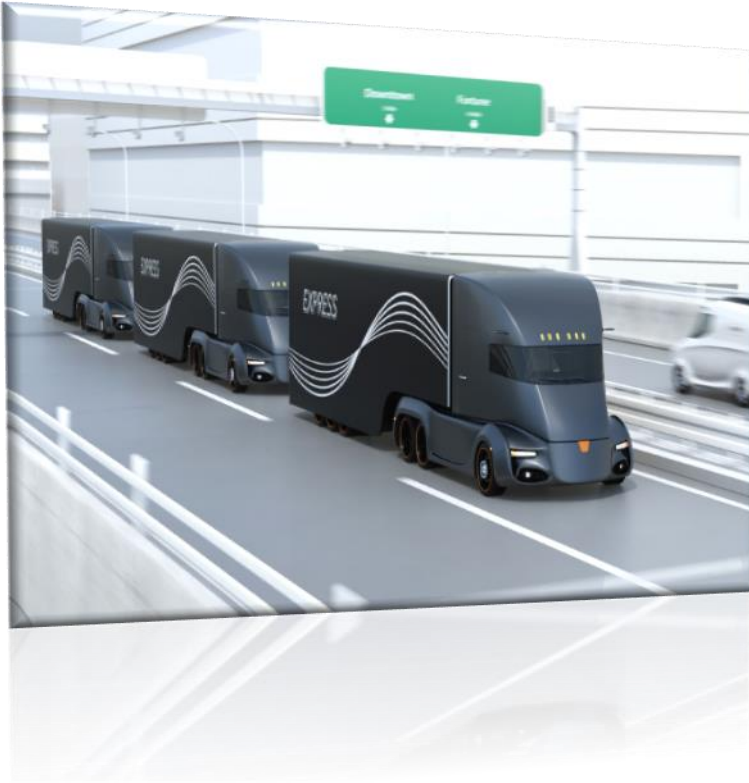


(with *higher* future energy prices)



Most affected industries: Warehousing, chemicals, metals, electronics

# Example 2: Autonomous Vehicle Technology



## *Anticipated changes (disruptive)*

- Driverless trucks eliminate
  - driver cost
  - driver/operator time limits
  - driver breaks
- Connected 3-truck platoons enable
  - operating cost savings
  - safety + emissions improvement

## *Why it matters*

Supply chains: “Same-day” deliveries with longer distance + lower cost

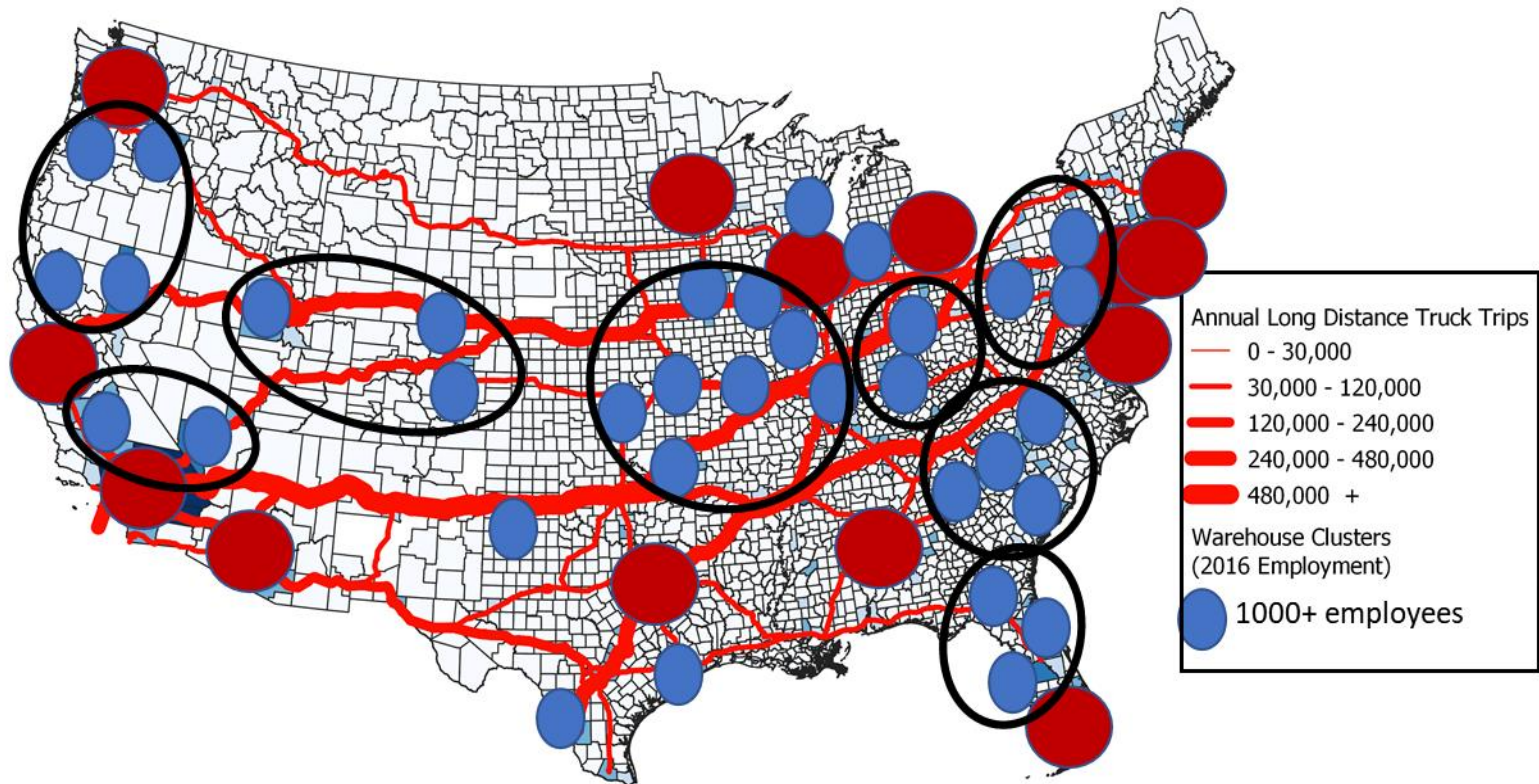
Shift locations for warehouses + truck facilities

# Shift Location Advantages with Longer Distance Deliver

## Warehousing Centers along long distance truck routes

*Red* = Largest Metro Areas

*Blue* = Regional Distribution Centers



Most affected industries: electronics, pharmaceuticals, instruments, machinery

**TREDPLAN**



# Example 3: Changing Occupational Growth



## *Anticipated changes (evolving)*

- Consolidation of Pharma + Chemical industries
- Dispersion of Software and Electronic industries
- Emerging shifts in job training needs

## *Why it matters*

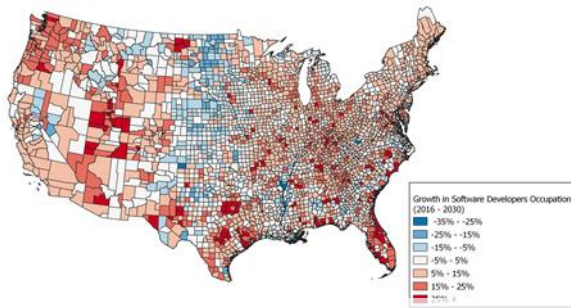
Job training needs - anticipate spatial shifts, not just industry trends



# Shift Occupational Demand + Skill Training Needs

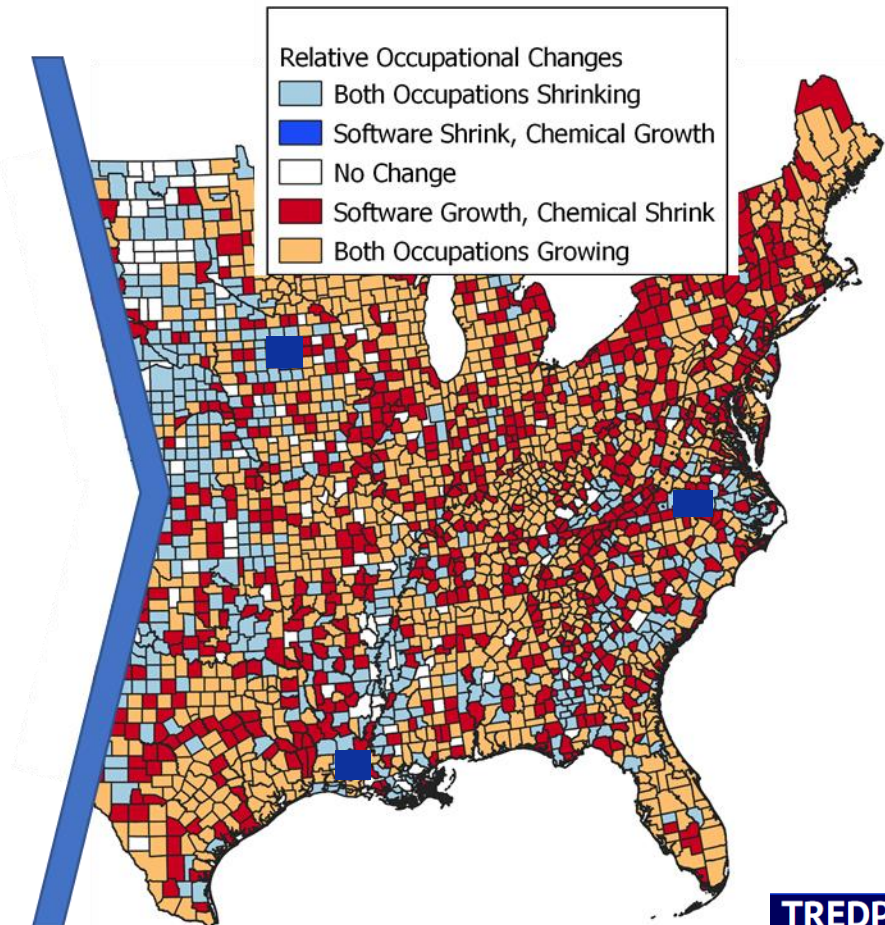
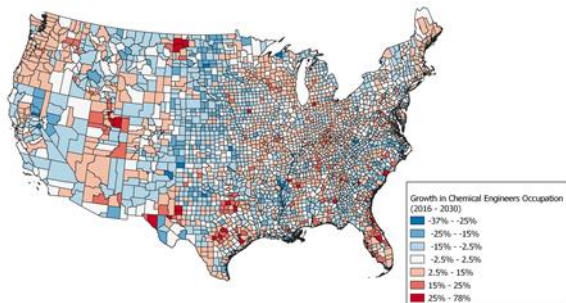
## Expected Change in Occupational Demand

### Computer software occupations



*Red* = more relative demand  
*Blue* = less relative demand

### Chemical engineering occupations



TREDPLAN

# Example 4: Changing Trade Tariffs

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## *Possible changes (range)*

- Hard-to-anticipate duration + levels
- Places: Asia? Mexico? Europe?
- Commodities + goods: grains? Metals? manufactured products?
- Self-applied on US imports, or applied by others on US exports

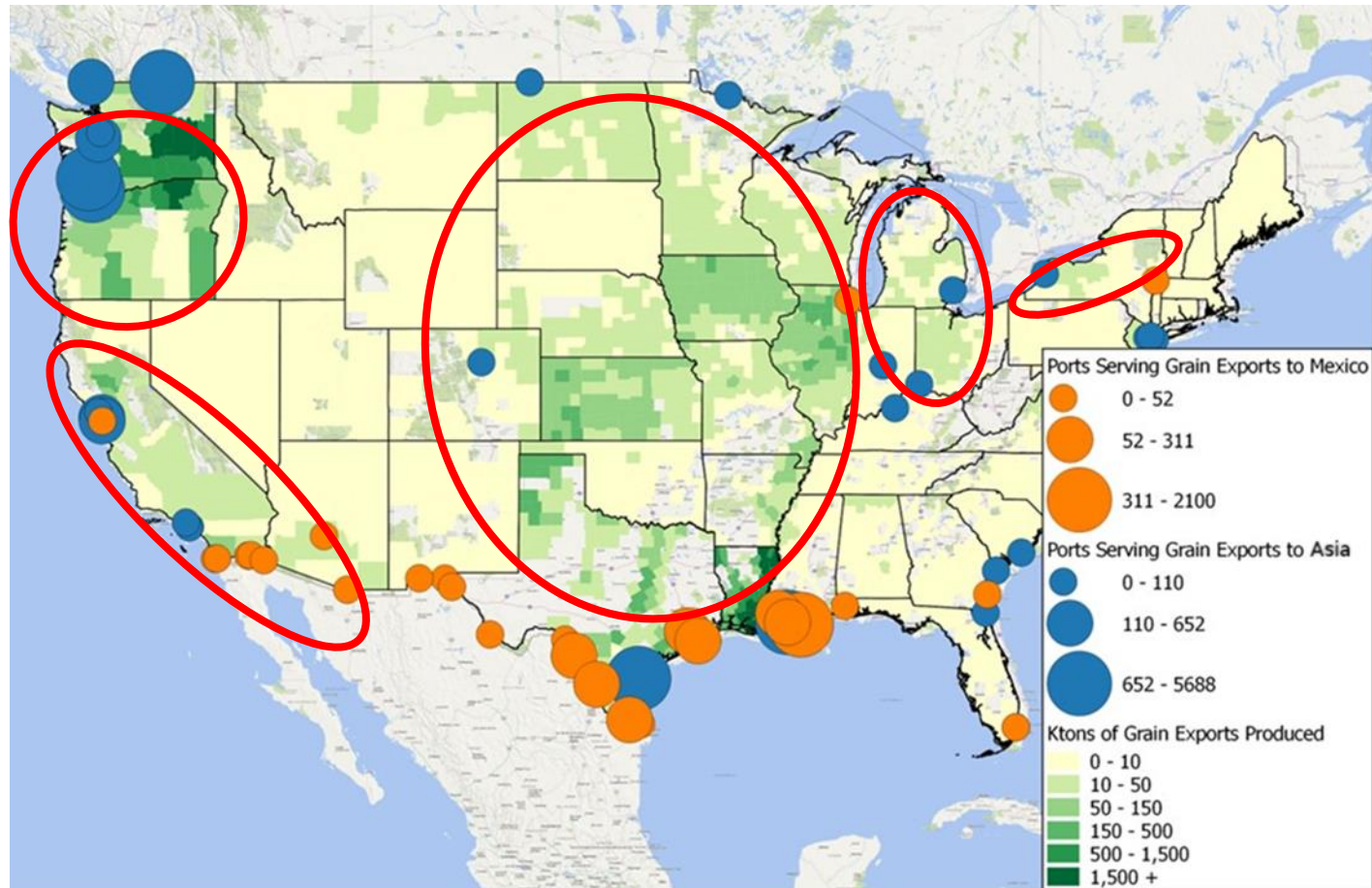
## *Why it matters*

Vulnerability - location clusters with high export or import dependence

Need - alternative export customers or alternative domestic suppliers

# Shift Location Vulnerability to New Export Tariffs

Shift between exports to Mexico and exports to China



Most affected industries: grains, metals, manufactured products

TREDPLAN



# Many Further Examples

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## *Other changes*

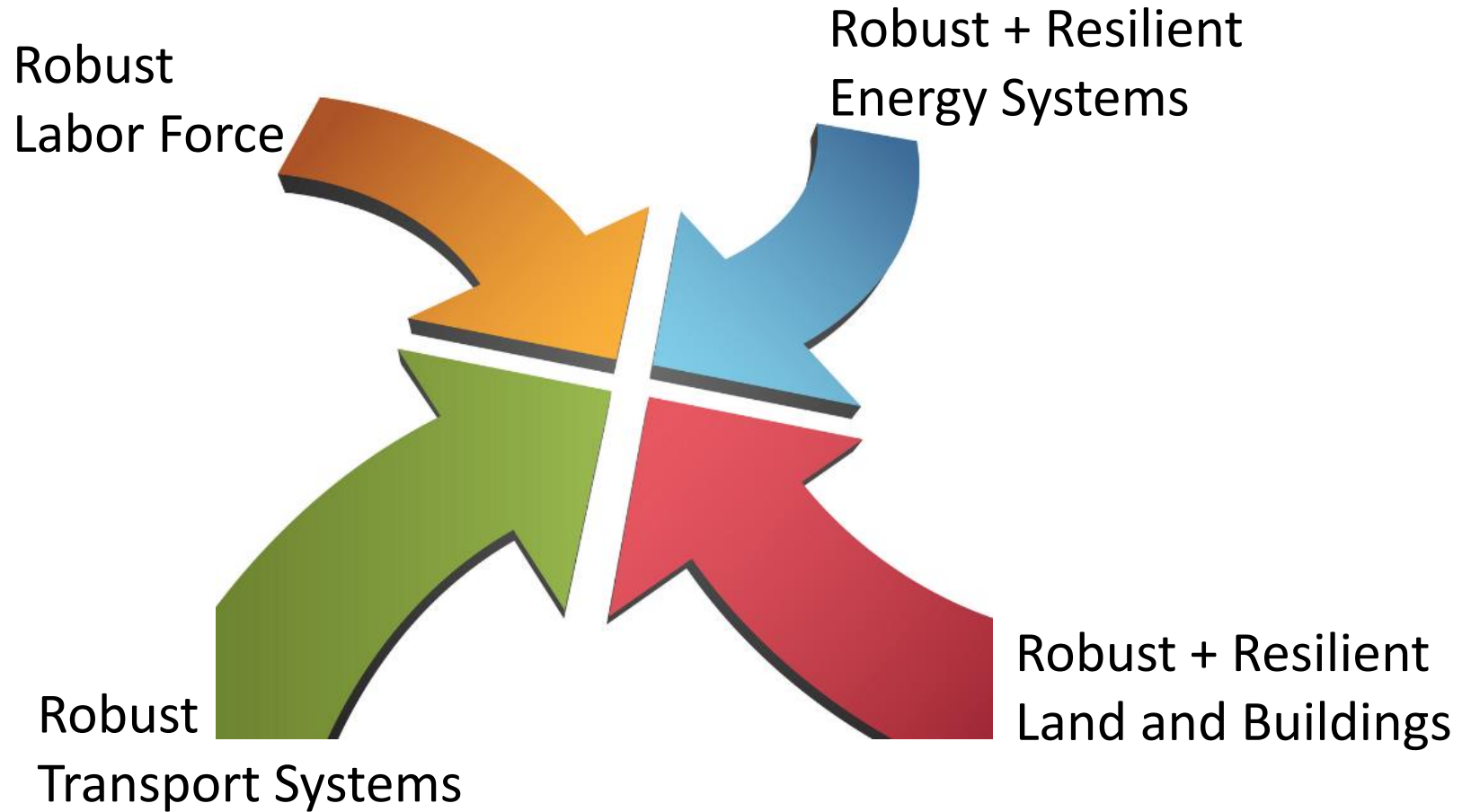
- 3-D Printing (disruptive)
- 5G Internet-of-Things (disruptive)
- Automation (trending)
- Non-carbon fuels (evolving)
- Renewable power + storage (evolving)
- Geopolitics (evolving)

## *Why they matter*

Energy, transportation and supply chain location requirements

Labor force, land and building requirements

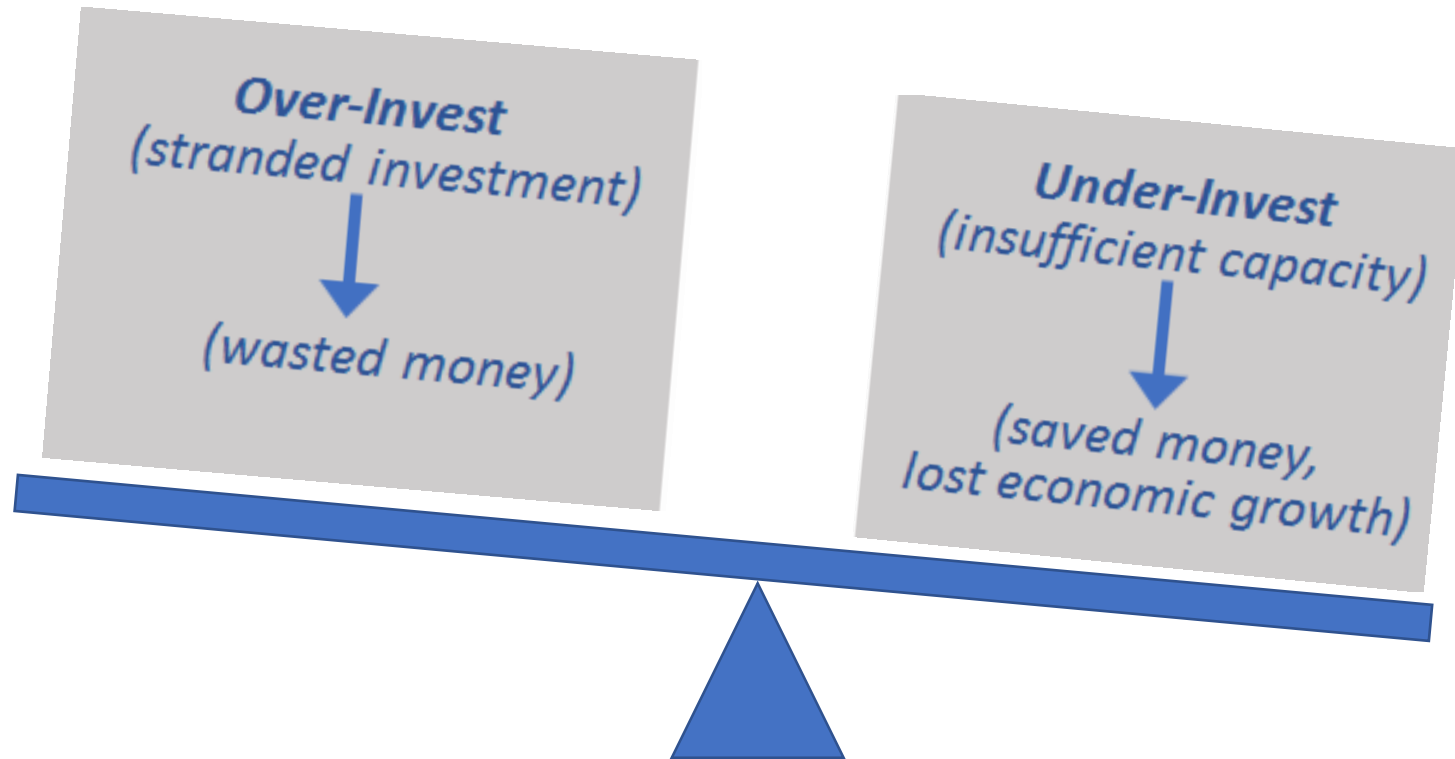
# View 1: Space-Time Factors Create Opportunity



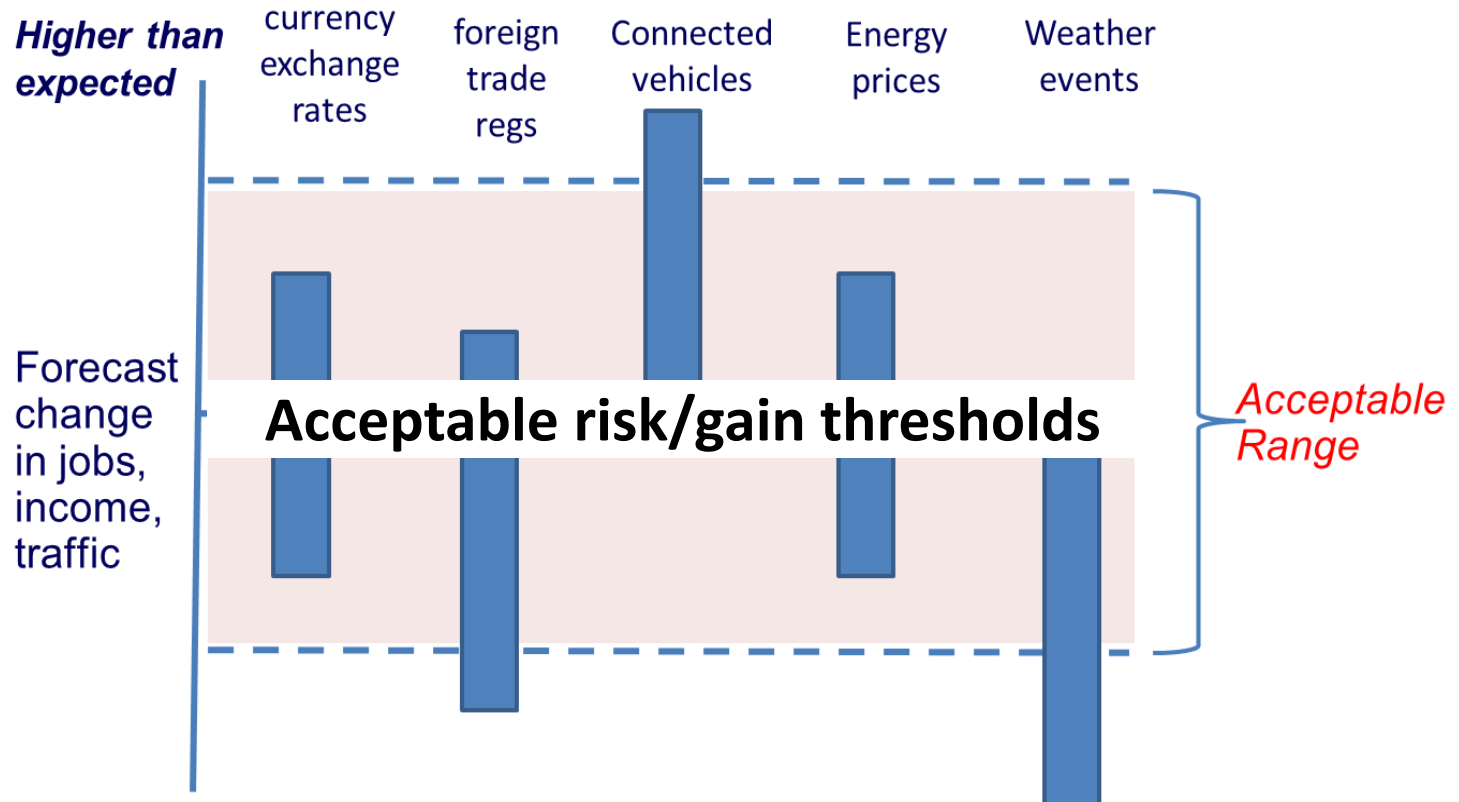


# View 2: Space-Time Factors Generate Tradeoffs

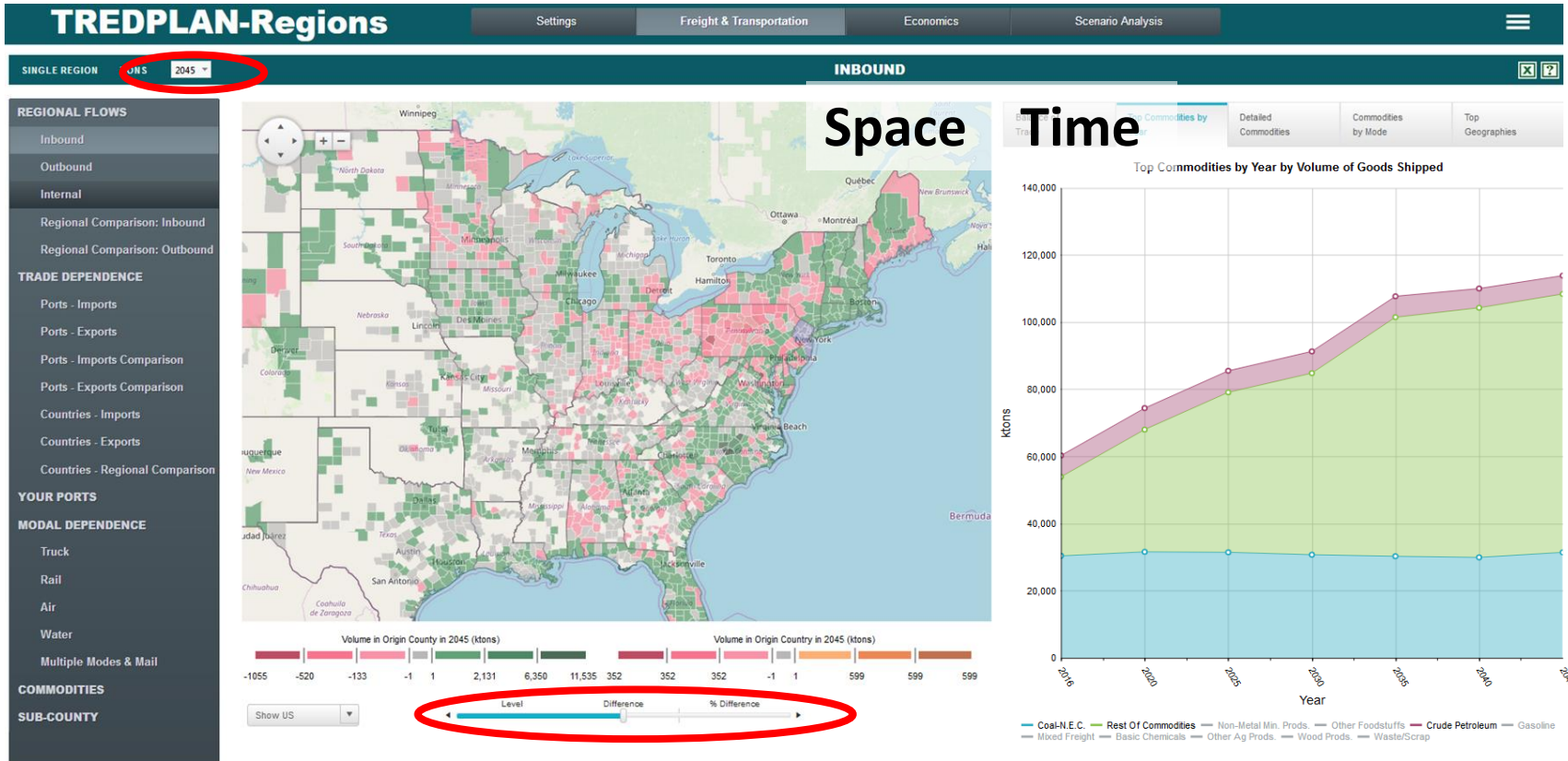
*Miss-investment consequences are NOT symmetrical*



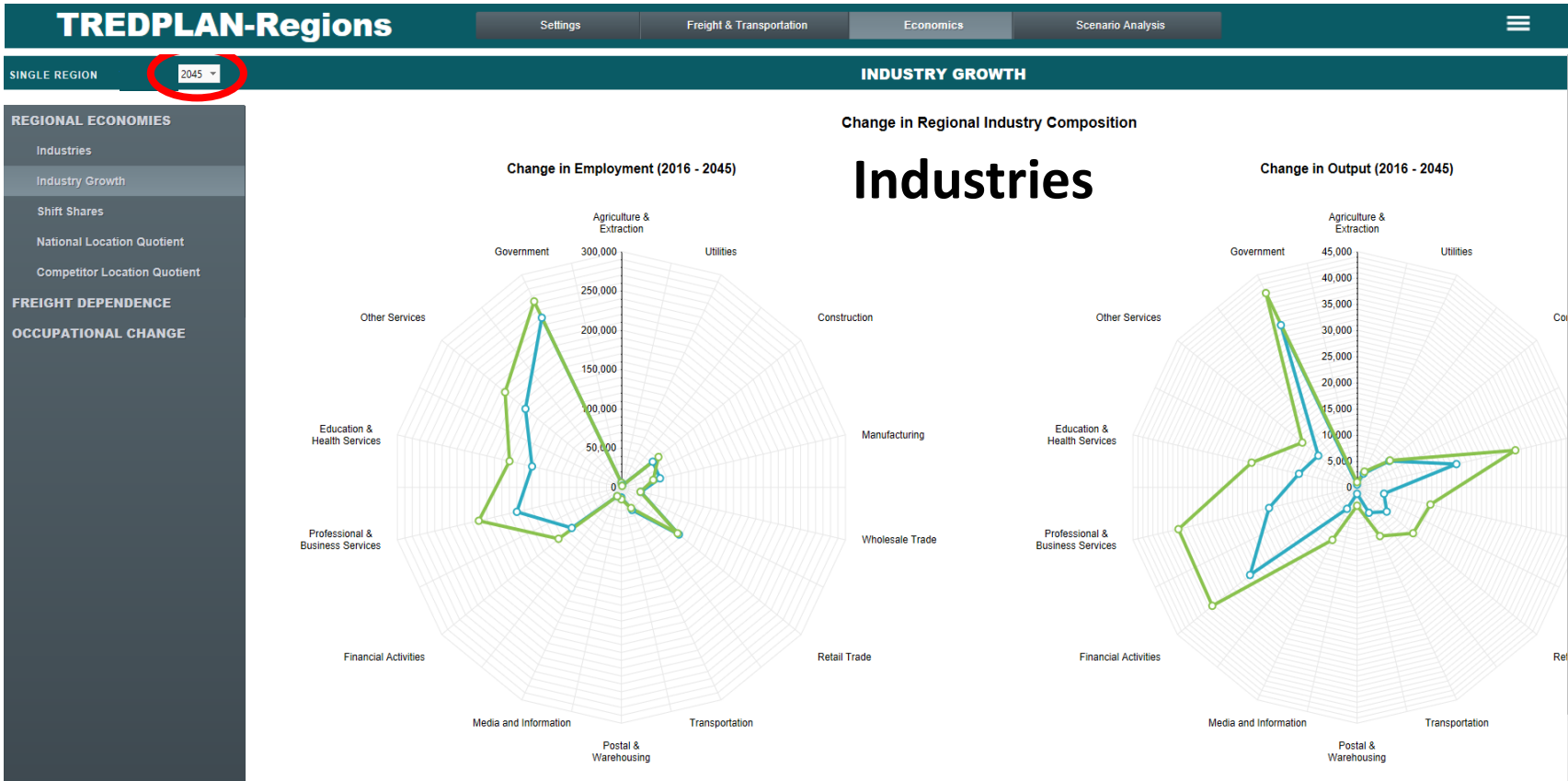
# “Acceptable Range” of Uncertainty



# Predictive Analytics: Compare Across Futures



# Predictive Analytics: Compare Across Futures



# Anticipating the Future

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- **Every industry + every area** can gain or lose
  - *opportunity for advantage (hedge bets, target investment)*
- **The pace of change is accelerating** *for economic developers*
- **Predictive analytics + risk portfolio concepts** *can inform decisions*



# Questions? Comments?

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