#### NATIONAL Sciences ACADEMIES Medicine

Engineering

TRE TRANSPORTATION RESEARCH BOARD

TRB Webinar: Solutions for Resilient Supply Chain Management

November 16, 2023 10:30AM - 12:00PM



#### **PDH Certification Information**

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at <a href="mailto:TRBwebinar@nas.edu">TRBwebinar@nas.edu</a>

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.



### **AICP Credit Information**

1.5 American Institute of Certified Planners Certification Maintenance Credits

You must attend the entire webinar

Log into the American Planning Association website to claim your credits

Contact AICP, not TRB, with questions

## **Purpose Statement**

This webinar will share knowledge and best practices in supply chain resilience and business continuity planning in a disruptive environment. Presenters will share lessons learned from public-private partnerships (P3 or PPP), public sector efforts to effectively implement freight resilience strategies and polices, and models and methods that can help both public and private sectors anticipate and plan for supply chain disruptions.

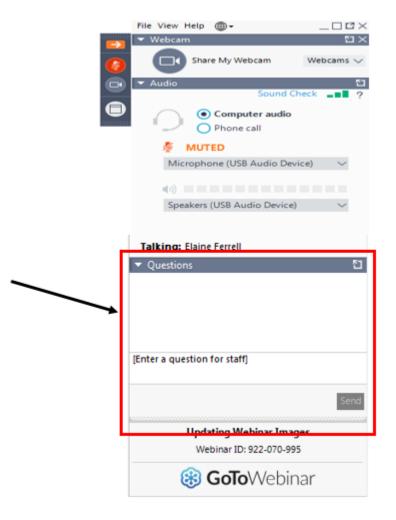
## **Learning Objectives**

At the end of this webinar, you will be able to:

- (1) Use best practices in P3 for business continuity and resilience planning
- (2) Share insights and best practices in public sector freight resilience planning and implementation
- (3) Adopt innovative methods in disruption forecasting to inform planning and investment decisions in both the public and private sectors

#### **Questions and Answers**

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



## Today's presenters



Rahil Saeedi rsaeedi@cpcstrans.com





**Annie Dixon** Annie.Dixon@indyMPO.org





**David Baxter** baxterintdev@gmail.com





**Gene Shearer** eugene.shearer@fema.dhs.gov





Sciences Engineering

# **Regional Resiliency Snapshot**

Annie Dixon – Indianapolis MPO

Annie.Dixon@indympo.org

**Snapshot Website** 



# The Indianapolis MPO By the Numbers

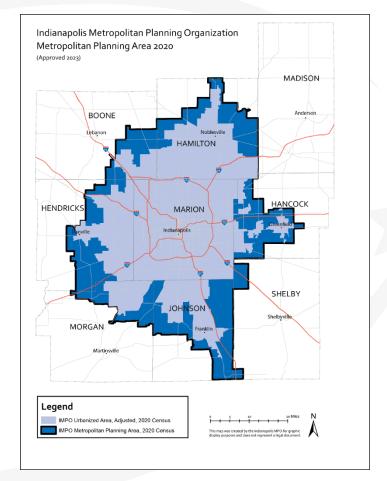
Population: 1.6 Million

Jobs: 1.4 Million

Counties: 8

Cities/Towns/Excluded Cities:
 33

- Study Goals:
  - Assess holistic regional resilience
  - Position the region to pursue federal PROTECT discretionary funding
  - Identify vulnerabilities and recommendations



## **Planning Process**

Resources

• Identify natural, social, financial capital

Threats

- Identify potential threats multi-hazard mitigation plans
- Prioritize threats

Transporta -tion  Use VAST to identify specific vulnerable assets in transportation network (PROTECT funding)

Holistic

- Identify impacts of highest threats to the region
- Identify recommendations

# **Capital Resources**

Capital	Category	y Resources	
Natural		Parks, Botanical Gardens, Nature Conservatories and Recreation Areas	Agricultural lands/areas
		Forests	Rivers and Lakes
	Transportation and Utilities	Bridges	Pipelines (Oil, water, gas)
		Roads	Water-related
		Railways	Power Plants
	Education	Schools (Pre-K Facilities,	
		elementary, high schools)	
		Colleges/Universities	
Financial	Special Interests	Fairgrounds/stadiums/speedw ay	
	Healthcare	Hospitals/Clinics	
	Government	Fire Stations	Government Buildings
		Law Enforcement/Police	<b>Emergency Operation</b>
		Stations	Centers
		Military Facilities	
	Housing	Housing Density	
Social		Employment (industries, labor force)	Population/Demographics (age, education, race, income)
		Employment density	Social Vulnerability Index

## **Hazards / Threats Prioritization**































# **Hazards / Threats Prioritization**

**Stakeholders Public Air Quality Climate Change Extreme heat Policies/misinformation** Flood/hail/severe **Extreme** heat storms

## **Bifurcation of Threats based on Input**

## Holistic Snapshot

Transportation Assessment

Physical and non-physical threats (prioritized by the public)

- Air quality
- Policy/misinformation
- Population flux
- Drought
- Earthquake
- Etc.

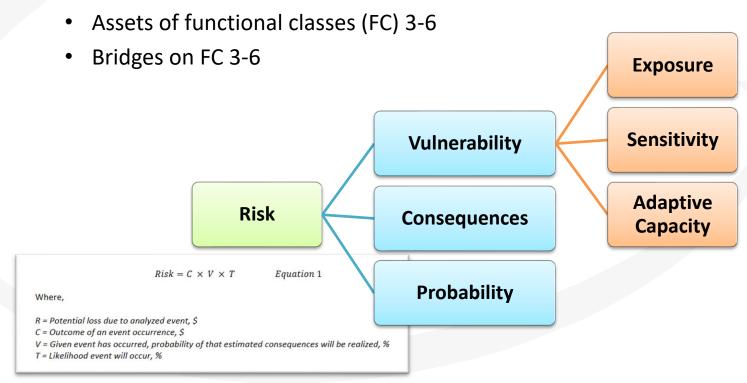
High-impact physical threats (prioritized by stakeholders)

- Extreme heat
- Winter weather
- Flooding
- Tornado

## TRANSPORTATION VULNERABILITY ASSESSMENT

## **Assessment of Transportation Infrastructure**

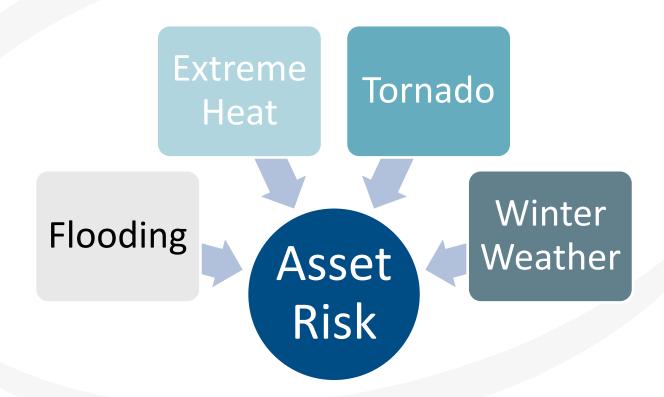
Using FHWA's <u>vulnerability assessment scoring tool (VAST)</u>



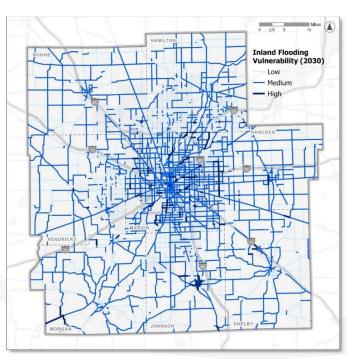
# **Prioritization Goal**

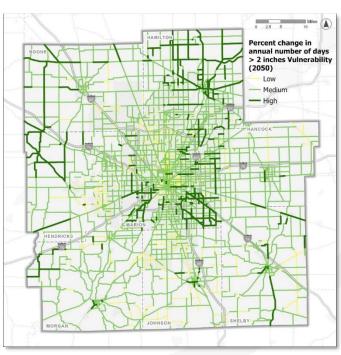
	High	High Risk Low Criticality	High Risk Moderate Criticality	High Risk High Criticality	
Risk	<b>Risk</b> Moderate	Moderate Risk Low Criticality	Moderate Risk Moderate Criticality	Moderate Risk High Criticality	
	Low	Low Risk Low Criticality	Low Risk Moderate Criticality	Low Risk High Criticality	
		Low	Moderate	High	
	Criticality				

## **Risk Score**

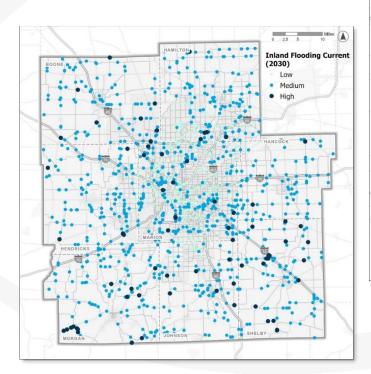


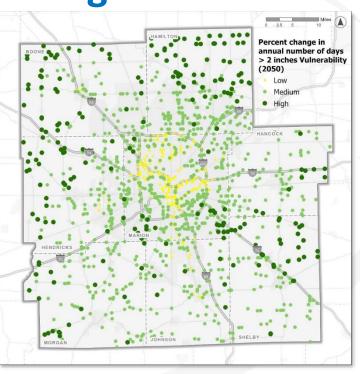
# **Flooding Vulnerability - Roads**



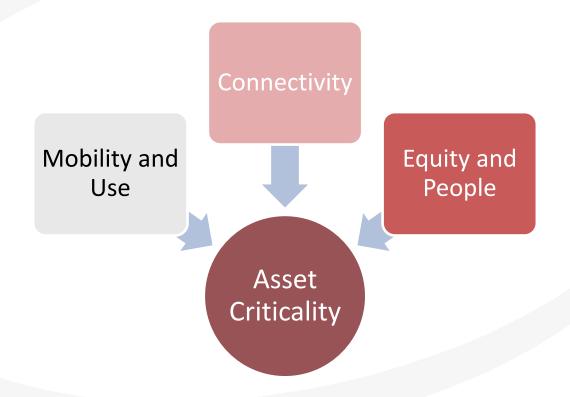


# **Flooding Vulnerability - Bridges**





# **Criticality Score**



## **Criticality Factors**

#### **Mobility & Use**

- » Functional Classification
- » Total AADT
- Truck AADT
- » Number of transit routes

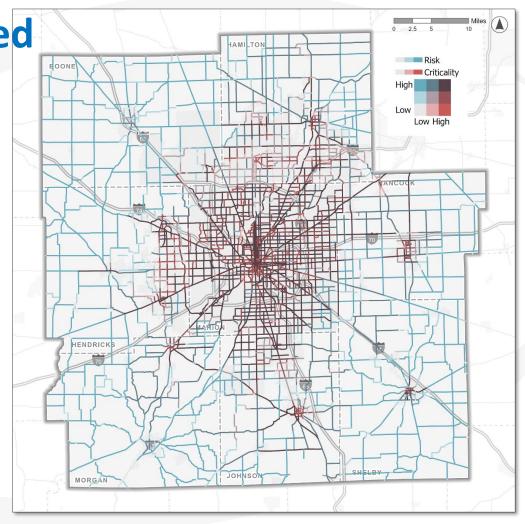
#### Connectivity

- » Access to hospitals
- Access to grocery stores
- Connection to other transportation infrastructure (walkways, bikeways, sidewalks)

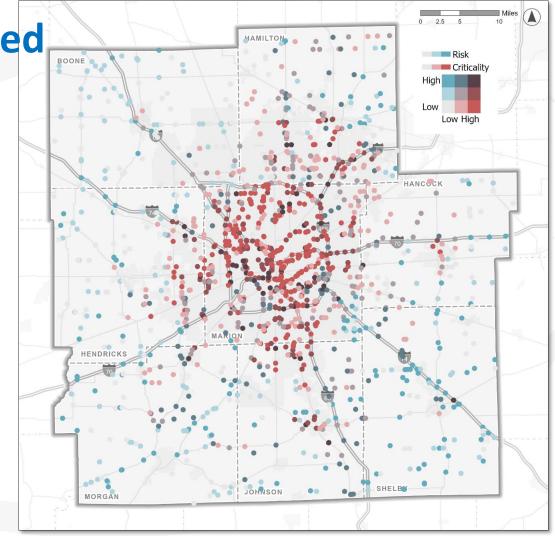
#### **Equity and People**

- » Population density
- » Employment density
- Transportation
   Disadvantaged Census
   Tracts Historically
   Disadvantaged
   Communities
   (Justice40)

Prioritized Roads



Prioritized Bridges



https://arcg.is/minzb1

## TRANSPORTATION VULNERABILITY ASSESSMENT

**Public Engagement- Criticality** 

- Public survey
  - Prioritizing resources and threats
- Attended two in-person events for criticality weighting
  - Selected based on gaps in the region from public survey zip code responses
- Engagement on recommendations



## **Key Emerging Themes**

- Demand for regional resiliency planning is high (still identifying threats)
  - Examples of requested analyses/work:
    - Utility supply lines vulnerability to physical hazards
    - Municipal cooperation for water withdrawals
- Air quality is a major concern despite Central Indiana being considered in compliance by Federal standards
- Vulnerability of transportation assets varies by threat

## **Next Steps**

- Identifying holistic vulnerability
  - Mapping probability and impact of threats to the region
- Draft transportation vulnerability assessment results for Technical and Policy committees
- Public engagement for recommendations to increase regional resilience
- Seeking final plan by February 2024



# Thank you!



Annie Dixon Annie.Dixon@indympo.org

## Solutions for Resilient Supply Chain Management

Leveraging PPPs for business continuity and resilience planning - Lessons Learned

Presentation by David Baxter

#### **Opening Comments**

The last two years have seen a fundamental refocusing of the approach to PPP infrastructure and services by governments around the world because of the global pandemic, climate change and regional conflicts

There is elevated awareness of the need to build sustainable and resilient infrastructure, in tandem with implementing adaptation strategies and governance through innovative and collaborative partnerships between the public and private sectors.

Without resilient infrastructure we don't have resilient supply chains

#### United Nations

#### ECE/CECI/WP/PPP/2023/10



#### Economic and Social Council

Distr.: General 11 October 2023

Original: English

#### **Economic Commission for Europe**

Committee on Innovation, Competitiveness and Public-Private Partnerships

Working Party on Public-Private Partnerships

Seventh session

Geneva, 30 November-1 December 2023

Item 4 of the provisional agenda

Review of the work since the sixth session of the Working Party on Public-Private Partnerships on 1-2 December 2022

Guidelines on delivering Public-Private Partnerships projects for sustainable economic recovery and reconstruction in support of the Sustainable Development Goals

#### Note by the Bureau1

#### Background

This document contains guidelines with policy options and recommendations for governments on the pros and cons of simplifying and accelerating the delivery of Public-Private Partnerships (PPPs) projects in support of the Sustainable Development Goals (SDGs) for sustainable economic recovery and reconstruction.

The document was prepared by an international drafting team led by Syed M. All Zalid (Canada) and has been endorsed by the Brueus of the Working Party on Public-Private Partnerships with a recommendation for the Working Party to endorse it. The drafting team leader was supported by yore contributor, Doris Chevalier (Direaue observer) and RFMG (in alphabetical order); Folgle Banjaku, Jennifer Collier, Kevin Masters, Christobal Pollman, Richard Threffall and Tom Williams.

The document is submitted to the Working Party for decision

The Bureau is grateful to the drafting team experts (listed in Annex II) for their contribution.

#### I. Introduction

An innovative approach to delivering Public-Private Partnerships (PPPs) is required to deliver benefits at pace in challenging environments.

There is an understandable push in post-conflict and post-disaster contexts to bring communities back together by rebuilding damaged physical infrastructure at a considerable pace. This guide aims to ensure that policy makers are equipped with the right insights to

This document was scheduled for publication after the standard publication date due to consultations with interested parties and stakeholders.

#### **Opening Comments**

A recent Washington Post Article, <u>A changing climate is buckling</u> concrete and flooding roads. States are moving slowly to guard the nation's infrastructure, highlighted the need for states to consider resilience when planning and designing U.S. infrastructure in partnership with the private sector that could collaboratively assume some of the risk associated with climate change. This is particularly pertinent as the Post article revealed that only a handful of the 24 state Department of Transportation's that responded indicated they have any projects that have been designed with climate changedriven weather in mind.

Without resilient transportation infrastructure - we don't have resilient supply chains.

#### Resilience - Surviving the unexpected

- ➤ Supply chain resilience is "the adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions, and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function" (WIKI)
- ▶ A popular implementation of this idea in supply chain management is given by measuring the *time-to-survive* and the *time-to-recover* of the supply chain, allowing to identify weak points in the system
- ▶ Infrastructure PPPs are focused on risk management of project disruptors that can impact the construction and operations / maintenance of long-term PPP projects – 25 to 30 years – and the functionality of supply chains
- There is also a focus on future proofing of infrastructure to the best of our abilities

#### Semantics - Avoiding Confusion

Misuse of words can lead to confusion and misdirected policies and initiatives focused on future-proofing infrastructure (and supply chains)

The United Nations defines -

- sustainability as "meeting the needs of the present without compromising the ability of future generations to meet their own needs." This view of sustainability requires an approach to PPP infrastructure and services that creates opportunities where a balance is introduced between users of infrastructure and services with the planet's resources
- ▶ **Mitigation** on the other hand refers to concise actions that reduce threats to PPP projects as well as by the PPP projects themselves
- Finally, adaptation involves strategic actions undertaken to blunt "adverse event" impacts on PPPs and prepare for current and future impacts

#### **Future Proofing**

- ► Future-proofing is described as the process of anticipating the future and developing methods to mitigate its impacts
- ► Future-proofing when considered in infrastructure Public-Private Partnerships (PPPs) adds a layer of resilience to projects that will ensure their sustainability and longevity
- ► Future-proofing leans towards resilience planning strategies that accommodate future events and changes that ensure infrastructure facilities do not become prematurely obsolete
- ▶ It must be tied to building infrastructure that will be resilient to future adverse weather events that are occurring with increasing intensity and frequency
- ► Future-proofing additionally adds value to infrastructure in the sense that investors are more likely to invest in infrastructure that has built-in buffers that increase the project's resilience and financial sustainability of their investment

#### **Future Proofing Principles**

- Strong partnerships between likeminded stakeholders are required
- Acknowledging that construction materials and technology deteriorate and that deterioration can be mitigated through wise selections.
- Adopting interventions (strategic planning and governance) that stimulate flexible approaches and adaptability strategies to supplies
- ▶ Adapting supply chain strategies that fortify infrastructure against extreme events
- Using durable building materials that require fewer interventions and enhance service life of infrastructure facilities that support supply chains
- Constantly evaluating and reviewing trends that reduce the possibility of obsolescence
- Identifying and pursuing long-term life-cycle benefits for large infrastructure PPPs (value proposition)

#### Resilience Best Practices - Relevant to Supply-Chains

The global architectural and engineering community has been actively calling for resilience best practices that include the following:

- ▶ **Robustness** building infrastructure (and supply chains) that can withstand prescribed levels of stress and demand in the event of an adverse natural event.
- ▶ **Redundancy** requiring the inclusion of a measure of in-built sustainability that can withstand repeated adverse events and keep infrastructure functional during an event.
- ▶ **Resourcefulness (innovation**) developing institutional capacity to mobilize recovery and mitigation resources in the event of a major adverse weather event.
- Rapidity introducing measures that enhance the capacity to contain losses or prevent further degradation of infrastructure in a timely and efficient manner before, during, and after an adverse natural event

# **Closing Comments**

- ▶ It is important that the rationale for resilient infrastructure is focused on delivering resilient supply chains
- ▶ Without well structured sustainable infrastructure PPPs, supply chains are not sustainable and therefore not resilient.
- ▶ Public-Private Partnerships require the support of all stakeholders
- Resilient PPPs move beyond design-build standards and include sustainable operations and maintenance to support supply chains
- ▶ Supply chain supporting infrastructure needs to be integrated
- ▶ A common knowledge needs to be established

### Referenced Articles

- ► Putting words into action to implement sustainable & resilient infrastructure PPPs <a href="https://blogs.worldbank.org/ppps/putting-words-action-implement-sustainable-resilient-infrastructure-ppps">https://blogs.worldbank.org/ppps/putting-words-action-implement-sustainable-resilient-infrastructure-ppps</a>
- ▶ Regenerative PPPs (R+PPP): Designing PPPs that keep delivering https://blogs.worldbank.org/ppps/regenerative-ppps-rppp-designingppps-keep-delivering
- ▶ 2018: Are we ready to commit to building resilient infrastructure? <a href="https://blogs.worldbank.org/ppps/2018-are-we-ready-commit-building-resilient-infrastructure">https://blogs.worldbank.org/ppps/2018-are-we-ready-commit-building-resilient-infrastructure</a>
- ► Future-Proofing Resilient PPPs https://blogs.worldbank.org/ppps/future-proofing-resilient-ppps



# Thank You





## **Gene Shearer**

**FEMA Director of Logistics Analysis; Supply Chain Advisor** 

TRB – Supply chain management lessons learned from recent disasters



## **Understanding Private Sector Supply Chains**

- What We have Learned -

# National Academies of Sciences, Engineering & Medicine (Harvey, Irma and Maria)

#### Study Recommendations:

- 1. Shift focus from replacing to restoring private sector supply chains
- 2. Build system-level understanding of private sector supply chains
- 3. Support mechanisms for coord, info sharing, and preparedness
- 4. Develop and deliver training on supply chains and best practices





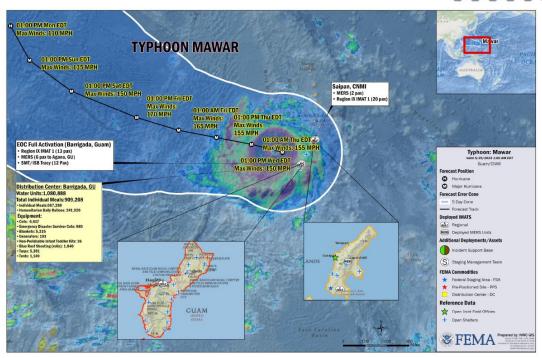


#### Senior Leadership Brief Typhoon Mawar May 25, 2023, 7:30 a.m. ET



# **Discus**!





Lifeline & Supply Chain System	Key Findings
Food/Grocery	In all areas, the vast majority of food consumed is shipped in from outside the state or territory. The share of imported food ranges, from 95% in Alaska to 80-90% in Hawaii. Because of USDA and FDA standards, most food must come from the U.S. mainland.  Local production of food is primarily for individual and family consumption, with the exception of commercial fishing operations in American Samoa and Alaska, for example. Hawaii is working to boost local food production.  D-SNAP and other food assistance needs may be higher in Pacific states and territories, relative to their size.
Water Systems Water	Water service providers are highly concentrated in Hawaii and the Pacific territoties, and rely on aquifers and some surface water for drinking water. In Alaska, there are many small independent water systems. In general, densely populated areas have water systems while rural areas rely on wells and bottled water.      The CNMI are highly dependent on water bottlers in blue sky; these bottlers can serve a significant portion of demand if running at full capacity after a disaster.      Critical to providing clean water is having fuel to power the water treatment plan, and chemicals on hand to treat the water as well as the ability to test its efficacy.
Garage Energy (Power & Fuel) Liquid Fuel	Hawaii and Alaska both have fuel refining capabilities. One fuel refinery on O'ahu serves the Hawaiian islands. All other locations studied rely on imported refined fuel. Fuel is also moved by inter-island barge in Alaska, CNMI, American Samoa, and Hawaii.     Fuel powers a number of essential facilities and services, including water distribution and treatment, food storage and distribution.     Except for Alaska, the islands receive petroleum product from foreign sources (Singapore, Japan, and South Korea for Guam and CNMI); Argentinian and Libyan sources making up over half of crude refined in Hawaii.

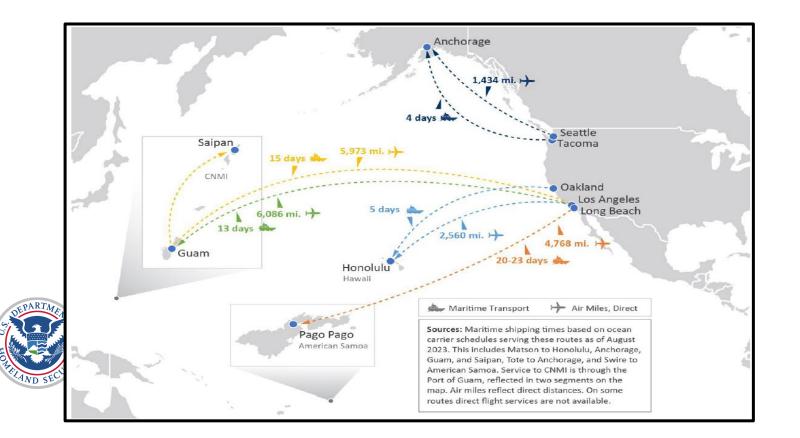
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# Lifeline & **Supply Chain System Electric Power**

## **Key Findings**

- Electricity in Guam, CNMI, American Samoa, and Hawaii is generated using diesel fuel. Alaska generates about half of its electrical power with natural gas. Pacific states and territories are focused on increasing their reliance on renewable energy sources. Renewable sources, similar to traditional generation, remain vulnerable to disaster; damage to solar farms can contaminate soil and groundwater.
- Ports, Intermodal & Freight
- All geographies studied rely on a port system to handle the bulk of goods consumed locally. The ALCAN highway offers a slower, lower capacity alternative in Alaska. • Impacts to West Coast ports can quickly impact Alaska (Seattle/Tacoma), Hawaii, CNMI, Guam, American Samoa (Los Angeles/Long Beach/Oakland).
- Alaska uniquely has a freight railway system, and significant portions of the state are routinely inaccessible for portions of the year due to weather conditions. Roadways serving ports are a key vulnerability in Guam, American Samoa, CNMI, and
- Hawaii, where they do not have alternate routes and are at risk of flooding. • Ports of Honolulu, Anchorage, and Guam serve as ports where goods are received and then loaded back onto a barge headed to other islands.





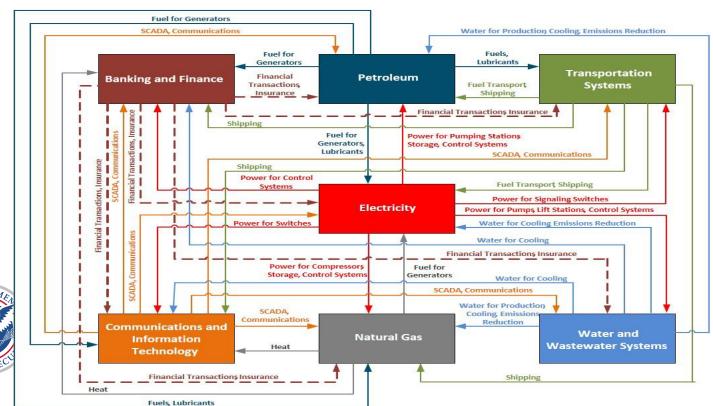
#### Senior Leadership Brief Hurricane Idalia

August 30, 2023, 6:00 p.m. ET

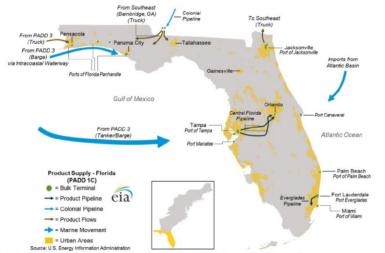
FL (1969)



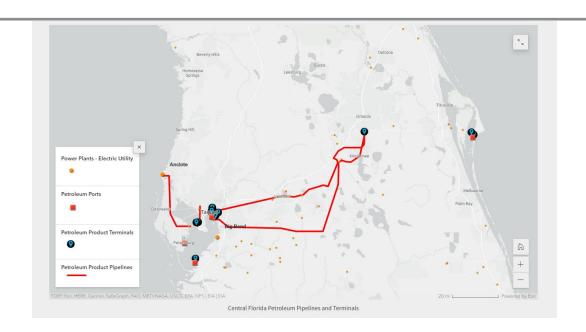


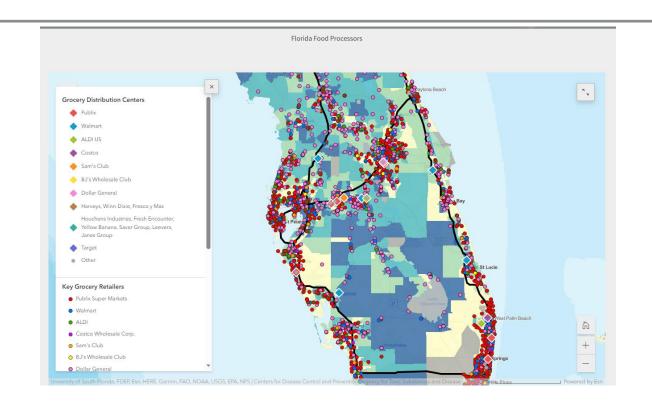


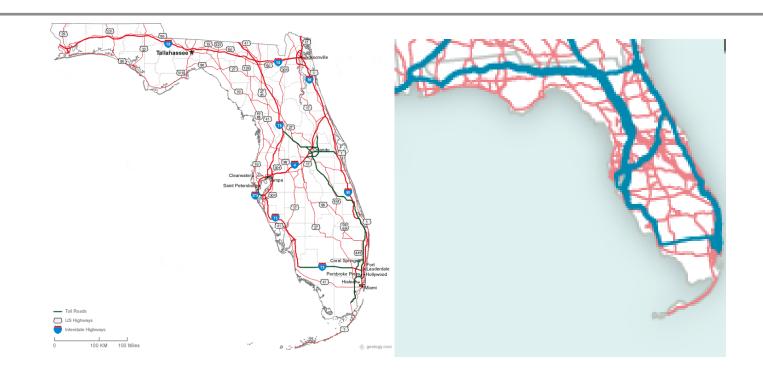




https://www.eia.gov/analysis/transportationfuels/padd1n3/images/PADD%201C%20-%20Florida.png







#### **Monitored Port Summary**

Landfall missed major ports in Florida and Southeast. All Ports Open under Normal Operations.

#### Port of:

#### 1. Tampa Bay

- · Normal (Open)
- 2. Jacksonville
- · Normal (Open)

#### 3. Savannah

- Normal (Open)
- 4. Charleston

  Normal (Open)
- 5. Wilmington

  Normal (Open)
- 6. Mobile

FEMA

· Normal (Open)



#### Freight Rail

Railways

Class 1 Rail

• Class 1 Rail Normal Operations, minor disruptions recovered by Friday - Sunday (9/30 and 10/1)

Intermodal (Container Goods)
Central FL ILC Reopen 0800 Friday
Tampa, FL Reopen 0800 Friday
Jacksonville, FL Open

TDSI (Automobile Distribution)

Orlando, FL Reopen Friday
 Palm Center, FL Reopen Friday
 Tampa, FL Reopen Friday
 Jacksonville, FL Reopen 1200 Friday

TRANSFLO (Bulk Commodities, oil, food grade, plastics, etc.)

Tampa/Port Reopen Friday
 Sanford, FL Reopen Friday
 Jacksonville, FL Reopen Saturday

Savannah, GA
 Reopen Sunday

FEMA Current as of 10/04/22 16:00 EDT Source: CS

### **Understanding Private Sector Supply Chains**

- What We have Learned -

# National Academies of Sciences, Engineering & Medicine (Harvey, Irma and Maria)

#### Study Recommendations:

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# **Today's presenters**



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**David Baxter** baxterintdev@gmail.com





**Gene Shearer** eugene.shearer@fema.dhs.gov





Sciences Engineering

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- Top research across the industry



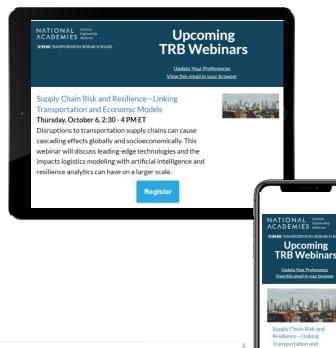
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