



SP 1.4

Theme 1. Cities and Infrastructure

Climate risk management and adaptation in ports



Introduction

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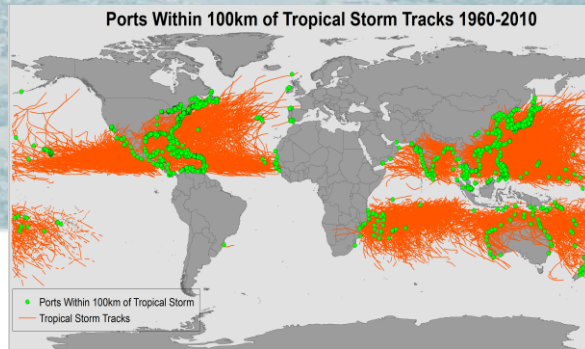


Critical, complex, constrained

- Critical - Economic engines at every scale and operational hubs for global supply chains
- Complex – Multiple stakeholders across space and time
- Constrained - Dependent on specific and environmentally-sensitive locations

Why are ports **vulnerable** to climate change?

- Susceptible to rising sea levels, changes in storminess and waves
- Coastal and surface flooding
- Incidence of hurricanes



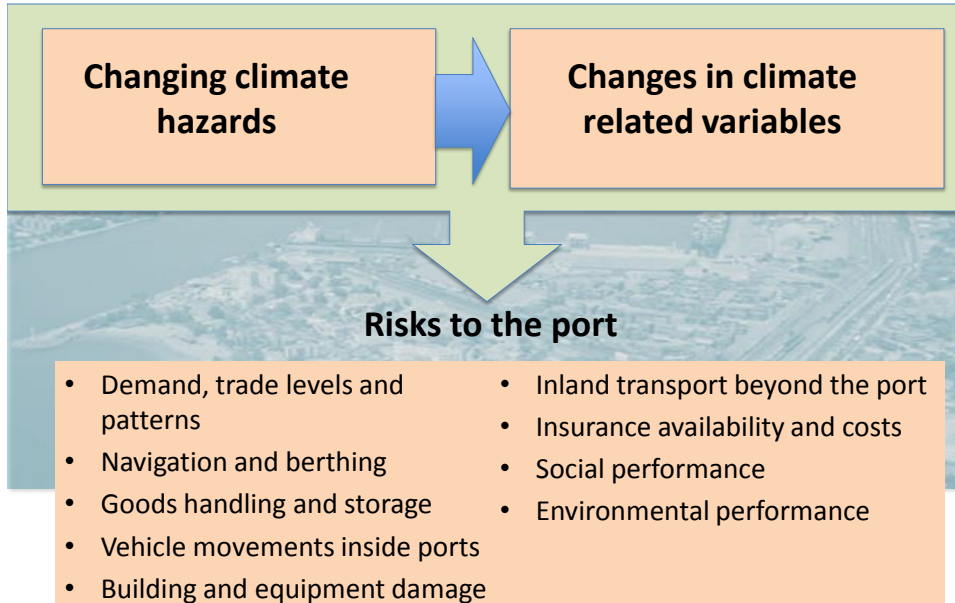
Changing climate **hazards**

- Mean sea level
- Storm surge heights
- Storm intensity
- Seasonal precipitation
- Extreme rainfall
- Seasonal air temperatures
- Temperature extremes
- Sea surface temperatures
- Increasing CO2 concentrations



Changes in climate **related variables**

- Wave climate
- Sea currents
- Sea water pH
- Seabed conditions
- Water resources
- Drought
- Water quality
- Coastal flooding
- River flows
- Surface flooding
- Soil erosion
- Coastal erosion
- Subsidence
- Landslip



Element of value chain	Example
Goods storage	Increased temperature, dust and flooding can affect storage of goods
Goods handling	High winds, extreme rainfall and lightning can affect crane operations
Equipment, buildings and infrastructure	Intense rainfall events, storms and wind speeds can damage infrastructure
Maintenance requirements	Coastal and riverine erosion driven by high rainfall events and extreme wind speeds may result in greater accumulation of sediments.
Port services	Reduced precipitation may result in lower water flows, hindering navigability in rivers, lakes and channels and affecting port access
Trade routes	Maritime shipping can be disrupted by major storm events
Environmental performance	Climate change may affect vulnerable ecosystems at / in the vicinity of ports Impacts on air quality (e.g. dust) may require ports to undertake additional mitigation
Social performance	Health and safety of workers can be affected by more extreme climatic conditions Relationships between port and local community can be affected
Demand & consumption patterns	Impacts of climate change on economies of trading partners can affect trade flows at ports
Competition with other ports	Use of a port may become more dependent on its perceived reliability in the face of extreme weather events
GHG agreements	Changes in regulations and standards may have implications for a port's business lines
Insurance market	Ports may face higher premiums and deductibles if they make more claims for weather-related losses



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FEATURE 1 July 2009

Sea level rise: It's worse than we thought

By Anil Ananthaswamy



Greenland is already heating up



Climate guru James Hansen warns of much worse than expected sea level rise

Former Nasa researcher and father of climate change awareness says melting of ice sheets could cause 'several meters' rise in a century, swamping coastal cities



Arizona Avenue is seen underwater following coastal flooding in Atlanta, City, New Jersey, in January. More than 13 million Americans are at risk with a 6ft (1.8-meter) rise in sea level. Photograph: Tom Mihalek/Reuters



Energy and Environment

Scientists nearly double sea level rise projections for 2100, because of Antarctica

By Brady Dennis and Chris Mooney March 10



Uh Oh: Antarctica Might Melt Much Faster Than We Thought

By Eric Holthaus

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STUDY REVEALS ECONOMIC IMPACT OF NYNJ PORT ON REGION

PORT JOBS HAVE INCREASED 13 PERCENT IN THREE YEARS

SHARELINES

The port also generates:

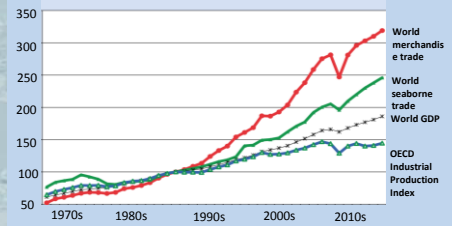
- 190,100 direct jobs
- \$21.2 billion in pers. income
- \$53.5 billion in bus. income
- \$7 billion + in taxes

New York Shipping Association, Inc. (NYSA)

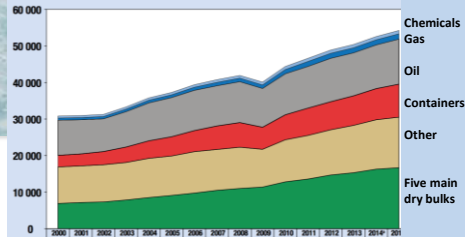
Over 330,000 jobs are generated by activity in the port of New York and New Jersey. [...] jobs directly associated with port activity increased by more than 13 percent since 2012

Why is this a **problem**?

The OECD Industrial Production Index and indices for world GDP, merchandise trade and seaborne shipments (1975–2014) (1990 = 100)



World seaborne trade in cargo ton-miles by cargo type 2000–2015 (billions of ton-miles)



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