Adapting to Climate Change: Practical Strategies at the Port Authority

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Port Authority of New York and New Jersey
Climate Change Adaptation at PANYNJ

Introduction

• Port Authority of New York and New Jersey
  • 1921 Bi-State Compact:
    “To enhance the region's competitiveness and prosperity by providing transportation services that efficiently move people and goods within the region and facilitate access to the nation and the world “
  • 6 operating arms; 31 major facilities
  • Financially self-sufficient
    • $3.1 Billion in capital funding 2010
  • We’re BIG
PANYNJ Sustainability Policy

Policy Overview

• PANYNJ Sustainability Policy, March 2008

• Policy Goals
  
  • Reduce GHG emissions by 80% by 2050 (2006 baseline)
  
  • For GHG emissions that cannot be reduced, purchase offsets (goal of net-zero emissions by 2010)
  
  • Promote sustainability among tenants and customers
  
  • Adapt facilities to reduce climate change risks
PANYNJ Sustainability Policy

Why have a Sustainability Policy?
PANYNJ Sustainability Policy

Climate Change Predictions

Source: ClimAID

Source: USEPA

<table>
<thead>
<tr>
<th>Region 4</th>
<th>Baseline</th>
<th>2020s</th>
<th>2050s</th>
<th>2080s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1971-2000</td>
<td>+1.5 to 3.0°F</td>
<td>+3.0 to 5.0°F</td>
<td>+4.0 to 7.5°F</td>
</tr>
<tr>
<td>Air temp.</td>
<td>53°F</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Precipitation</td>
<td>47 in</td>
<td>0 to +5%</td>
<td>0 to +10%</td>
<td>+5 to +10%</td>
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</table>

Stations used for Region 4 are New York City (Central Park and LaGuardia Airport), Riverhead, and Bridgeport.
PANYNJ Vulnerable Facilities

- PANYNJ infrastructure is coastal

- Over Half of PANYNJ facilities are potentially vulnerable
  - Sea level rise
  - Storm surges
  - Increased precipitation
  - Wind
PANYNJ Adaptation Program

Projects and Collaboration

• **Internal Projects**
  • Inventory and assess
    – Multi-hazard Risk Assessment
  • Mitigate
    – Sustainable Design Guidelines
    – Physical and operational projects

• **External Collaboration**
  • NY City Panel on Climate Change (NPCC)
  • ClimAID (NY State)
  • NY State Climate Action Council
  • NY State Sea Level Rise Task Force
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Security and Climate Change

- **Federal Grant:** Climate Change as Security Risk

- **SMRT**
  - System-wide
  - Multi-Hazard
  - Risk
  - Tool

- **Measuring Risk**
  - Across different scenarios
  - Weigh risks against each other
  - Prioritize funding

- **Applied Center of Excellence**
PANYNJ Adaptation Program
Operational Adaptation Projects

• Property Insurance
  • Green Coverage Endorsement Program
  • $5 million towards rebuilding to green

• Sustainable Design Manual
  • July 2006 Board adopted Policy
  • Sustainable Design Guidelines (complete)
  • Sustainable Infrastructure Guidelines (in progress)
  • Includes adaptive design measures
  • Issued memo on interim design criteria
    – LGA Airport Terminal Modernization
PANYNJ Adaptation Program
Physical Adaptation Projects

• **PATH**
  - Address flooding
  - 1992 Nor'easter, Hoboken station
    - flooding
    - commuter service interrupted for 10 days
  - Flood gates at Hoboken
  - Sealing all openings below 100 year flood

• **LGA**
  - Addressing power outages due to heat waves
  - Redundancy built into substations
PANYNJ Adaptation Program

Physical Adaptation Projects

• Protecting Natural Systems

• Hudson-Raritan Estuary Resources Program
  • $60M to preserve open space in Hudson-Raritan Estuary
    • $30 million New Jersey
    • $30 million New York
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*Operational and Physical Adaptation Projects*

- **WTC Design and Construction**
  - Elevated structures
    - Bulkhead wall raised to 305’
    - Plaza at 313’
    - West Street at 308’
  - Flood gates at WTC PATH station
  - Structural and operational redundancy
  - Sustainable design
    - 20% Energy reduction
    - Fuel cells at WTC Tower 1
      » 1.2MW fuel cell plant installed
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Energy Adaptation

- Port Jersey Wind Farm
  - $3.6M grant
- PSE&G Direct Install Program
  - Approx 5M KW-hours
  - $1M in annual savings
  - $6M in avoided capital costs
- Demand Response Program Participation
  - 11 facilities over $45,000 in direct revenue
  - Adaptive strategy for climate change
PANYNJ Adaptation Program
Challenges Towards Adaptive Management

- Funding and Budgeting
  - Capital Planning
  - Economic Realities
- Politics and Regulatory
  - State and Federal Regulatory Guidance
- Immediate Problems
  - Aging Infrastructure
  - Congestion and Growth
  - Economy
- Geographical and Operational Boundaries
  - Infrastructure Location
  - Transportation System-wide Planning
- Technology and Research
  - Hard Infrastructure Limitations
  - Costs and Benefits
Adaptive Management Challenges

Financial Concerns

- **10 year Capital Capacity**
  - Shrank by $5 billion
  - $29.5B, to $24.5B

- **Net income from operations:**
  - Negative $39 million in 2010
  - A decline of $197 million from the 2009 Budget

- **Committing $21 million**
  - Port Clean Air Program
  - Reducing GHG emissions
  - Promoting environmental protection
  - Conserving energy
Adaptive Management Challenges

Immediate Problems

• Growth

<table>
<thead>
<tr>
<th>Service</th>
<th>Forecasted Increase in Demand</th>
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<tbody>
<tr>
<td>Air Passenger</td>
<td>40%</td>
</tr>
<tr>
<td>Air Cargo (by volume)</td>
<td>70%</td>
</tr>
<tr>
<td>Port Cargo (by volume)</td>
<td>100%</td>
</tr>
<tr>
<td>PATH Passenger</td>
<td>60%</td>
</tr>
<tr>
<td>Truck and Bus Traffic, Tunnels and Bridges</td>
<td>20%</td>
</tr>
<tr>
<td>Auto Traffic, Tunnels and Bridges</td>
<td>16%</td>
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</table>
Adaptive Management Challenges

**Immediate Problems**

- **Infrastructure** designed for a different time

*Crossing the Outerbridge, 1928. The bridge, named for Eugenius Outerbridge, the Port Authority’s first chairman, connects Staten Island, N.Y., with Perth Amboy, N.J.*
Adaptive Management Challenges

Immediate Problems

• Issues are not new
PANYNJ Adaptation Program

**PANYNJ Recommendations**

- **Promote Research**
- **Adopt Climate Change Projections**
  - State adopted projections
    - Sea level rise and storm surge
    - Precipitation rates
    - Temperature: extremes and averages
    - Wind direction
  - Regional contour maps and projections
- **Provide State and Federal System Level Guidance**
  - Adaptation strategies
  - Cost-benefit analyses
- **Provide State and Federal Funding**