

By Sea, And by Air....

Port Administration and Legal Issues Seminar



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April 11, 2013



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OVERVIEW

Basics of Climate Change

What are we doing about it

A Bit about Air

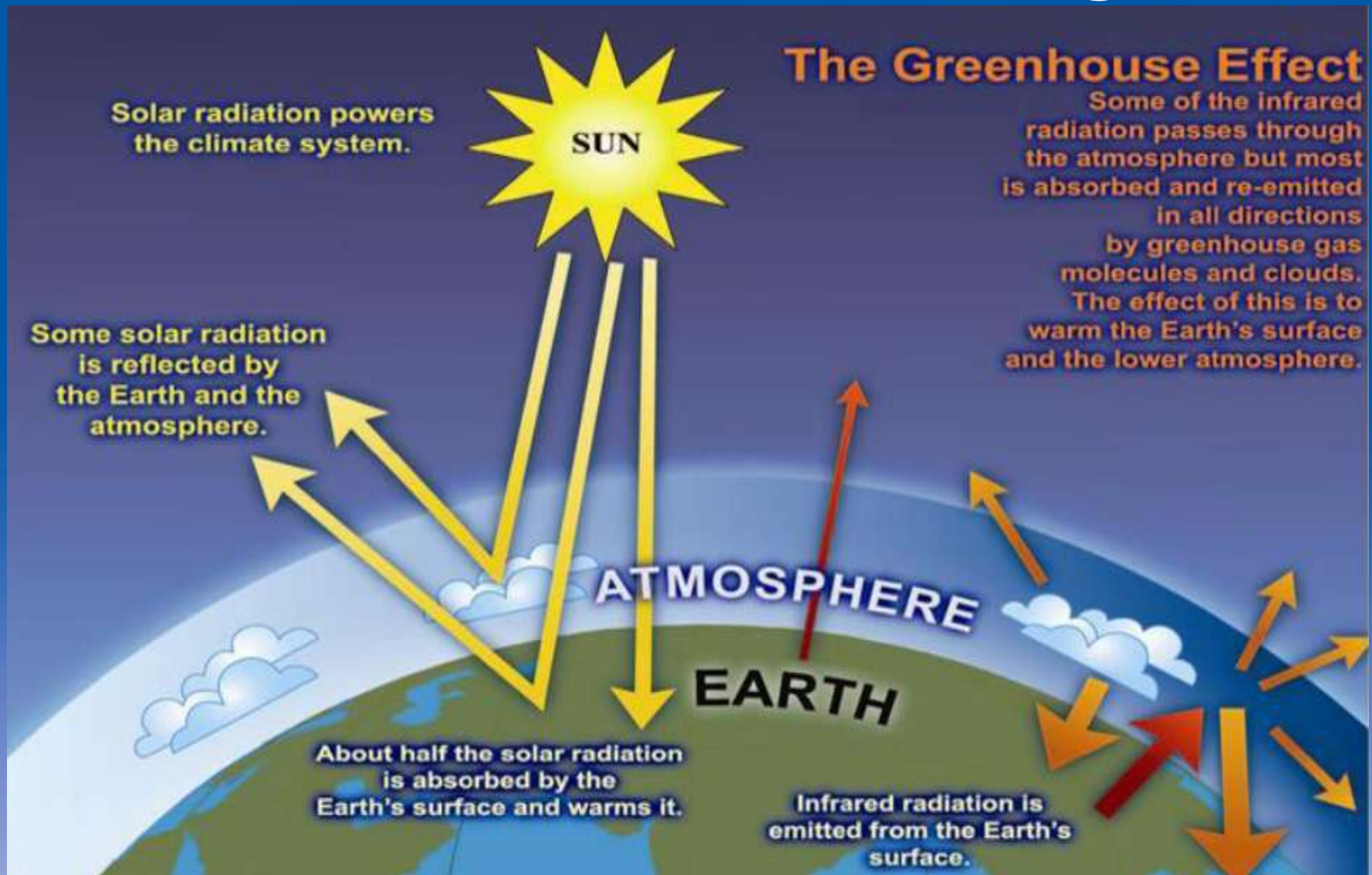
Next Steps



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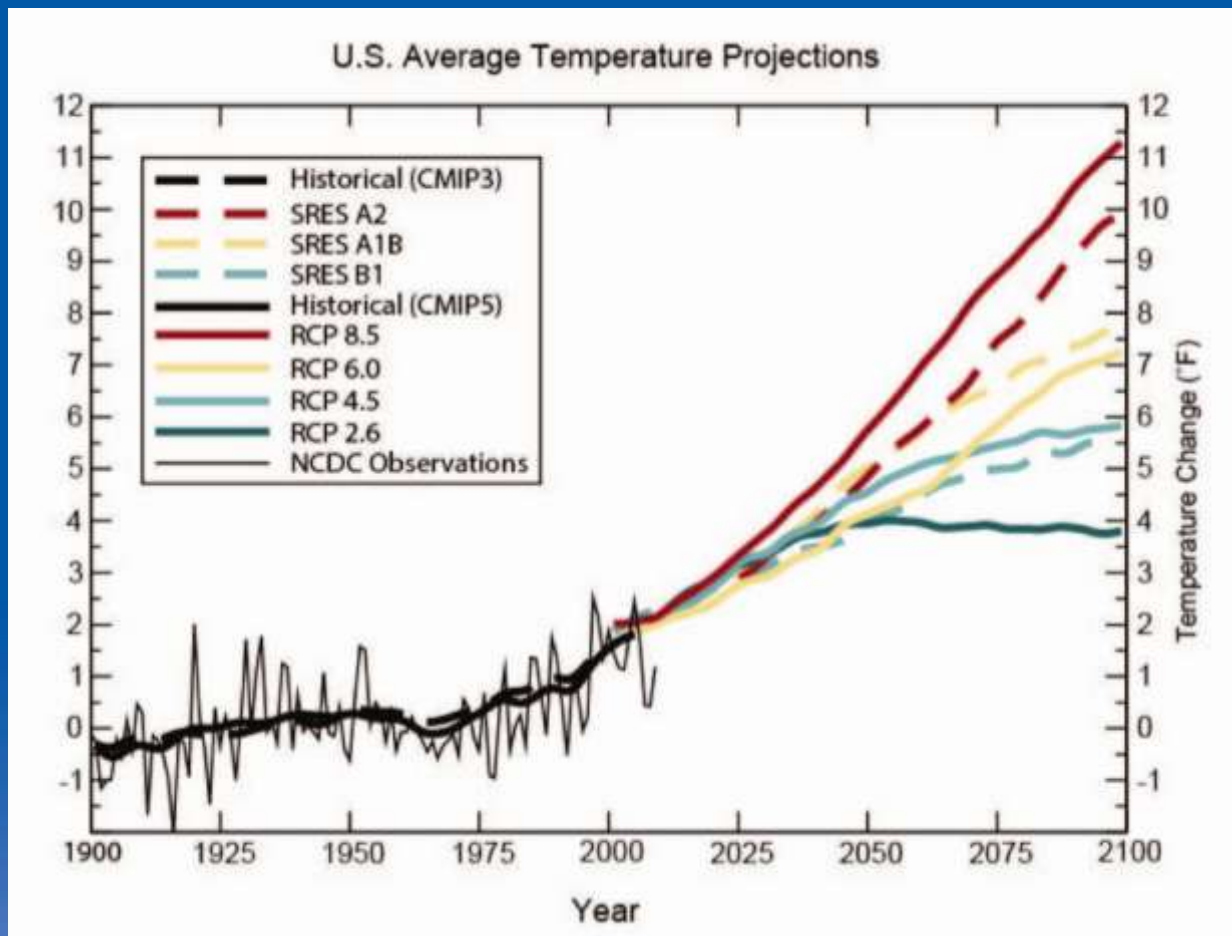


Basics of Climate Change



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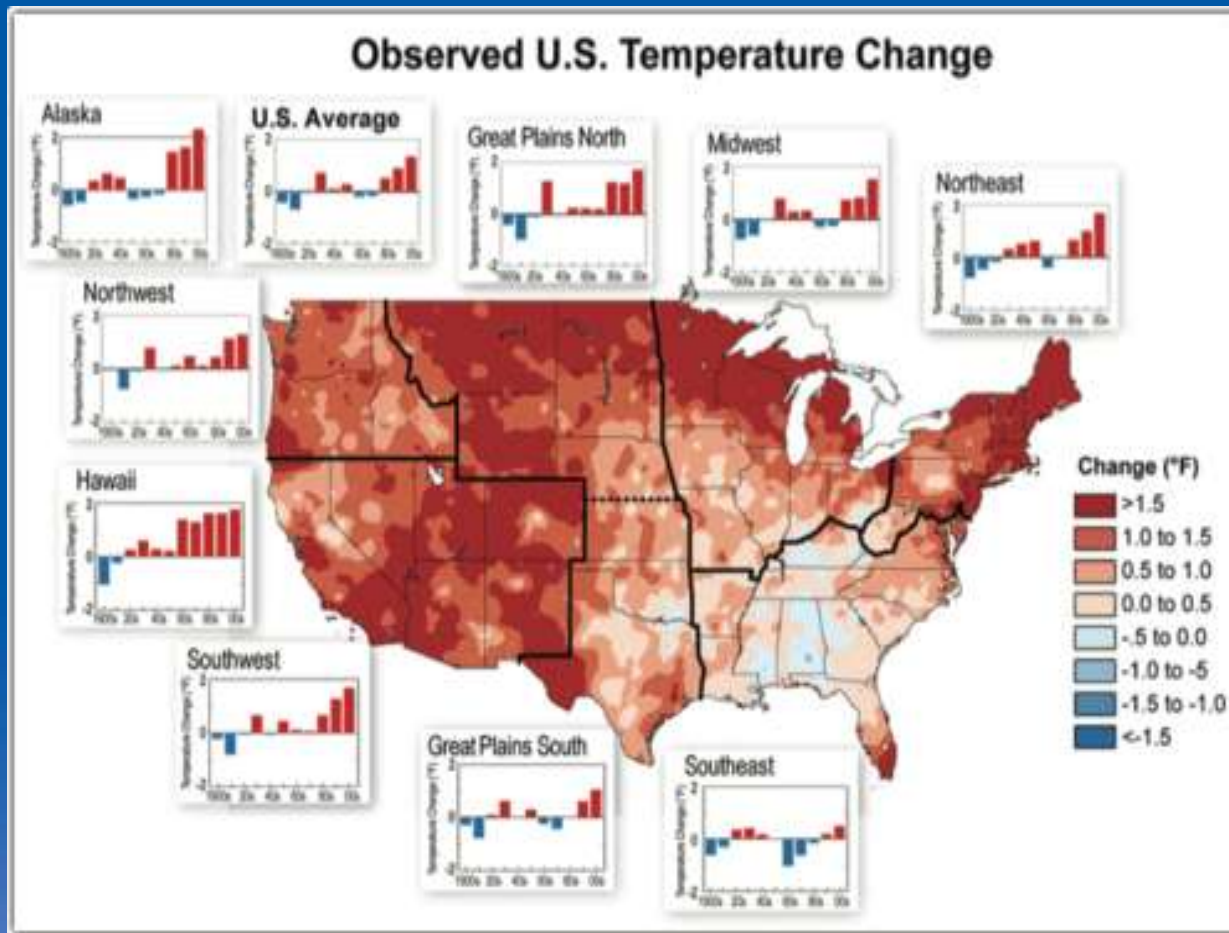




Range of temperature projections for 2100 goes from about 4°F to about 11°F

Third National Climate Assessment Report (2013 draft)





Massachusetts temperatures over the last 20 years have increased by about 1 – 1.5°F compared to the 1901-1960 average. The period from 2001-2011 was warmer than any previously recorded decade.

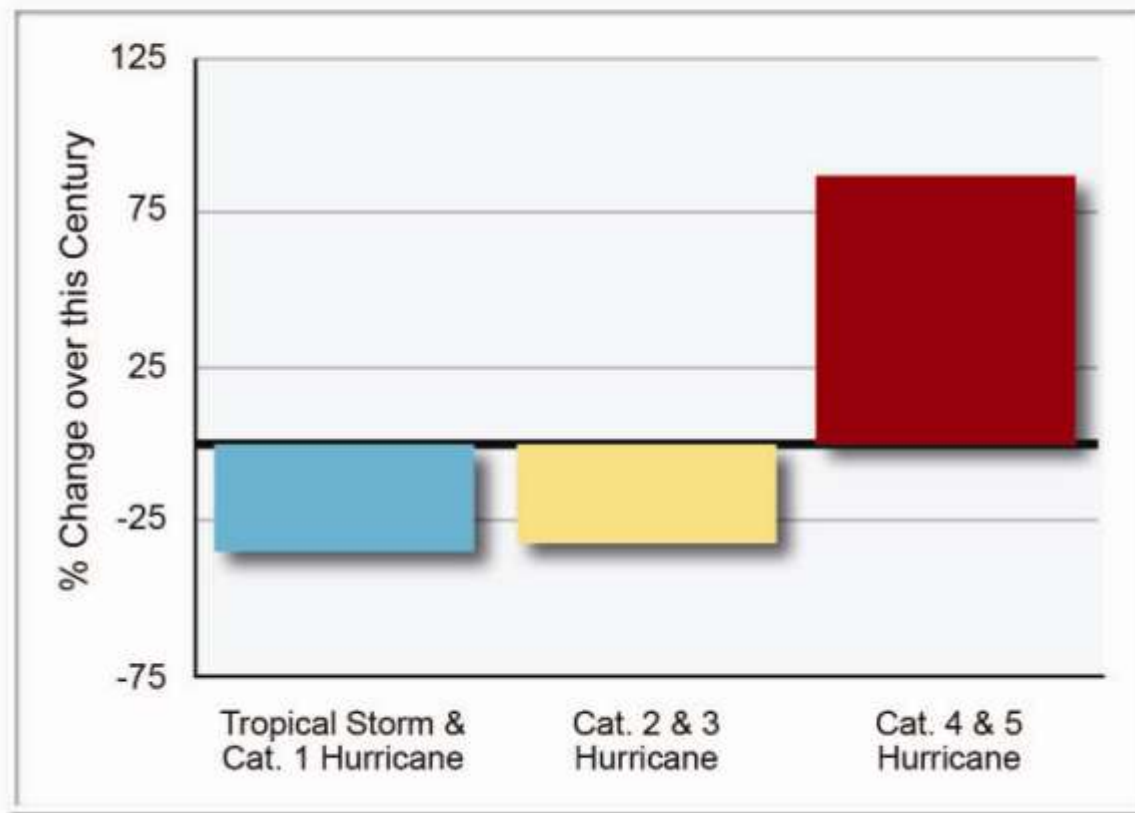
Third National Climate Assessment Report (2013 draft)



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Projected Changes in Atlantic Hurricane Frequency by Category

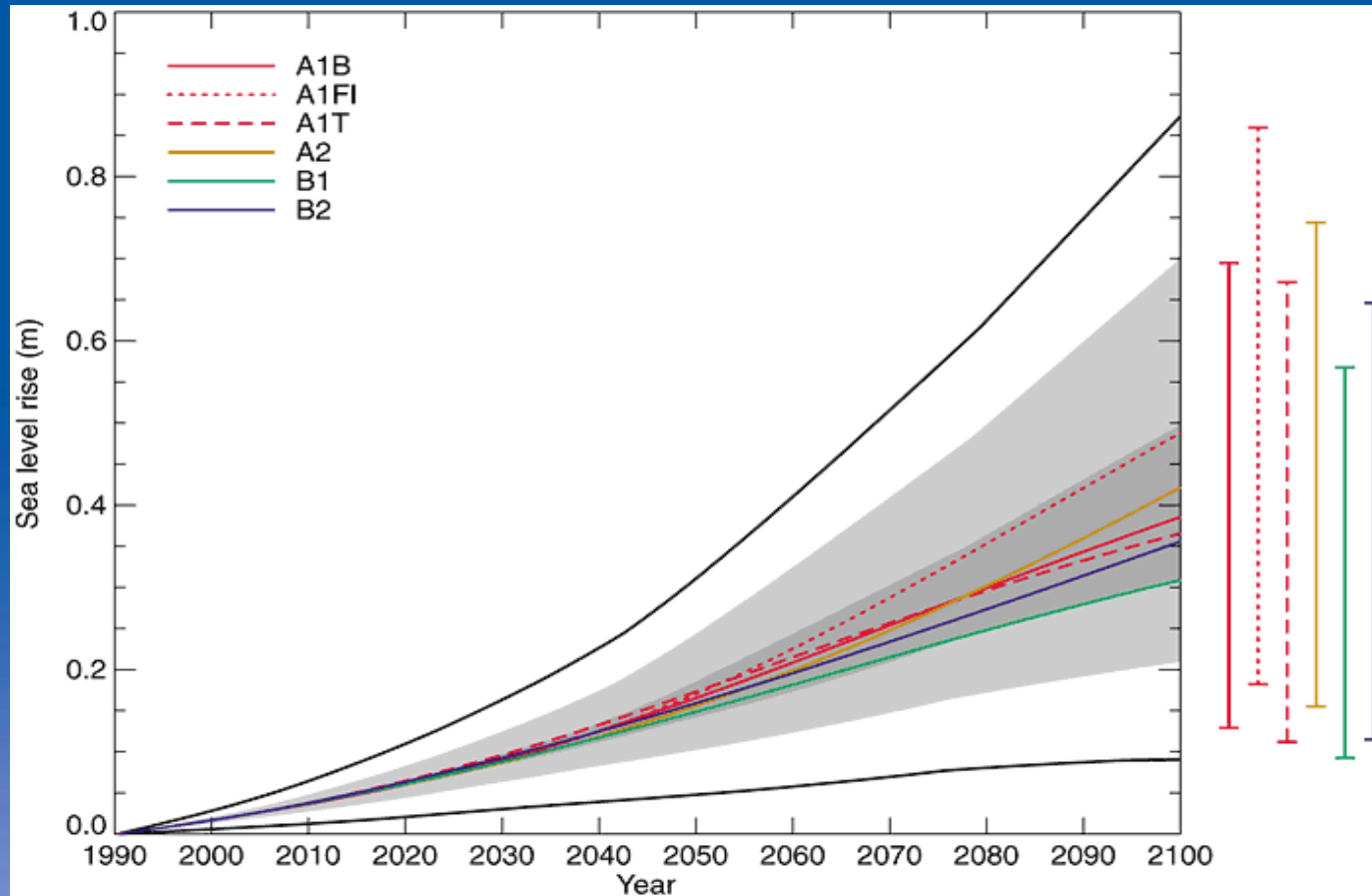


In addition, how do we adapt to, or mitigate, the effects of the increased frequency of major storms?

Third National Climate Assessment Report (2013 draft)



SEA-LEVEL RISE IS PROJECTED TO ACCELERATE **2-4 FOLD** DURING NEXT 100 YEARS.



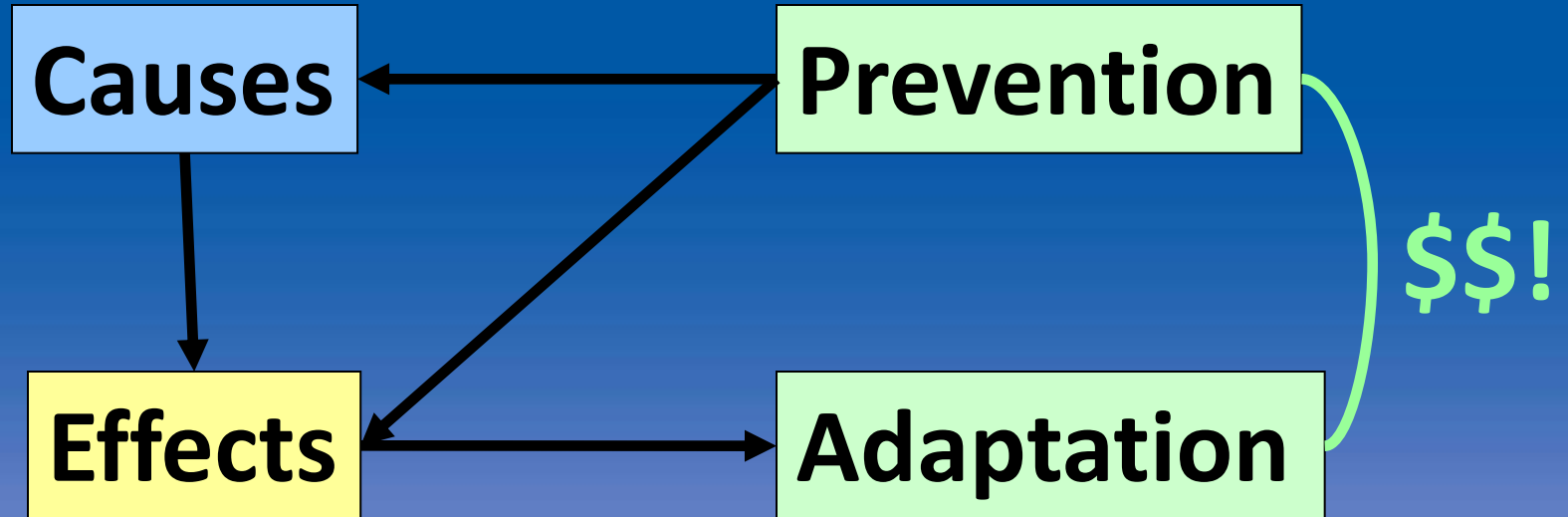
Global average sea level rise (1990 to 2100)
for the IPCC SRES emission scenarios



Climate Change Basics

Two down

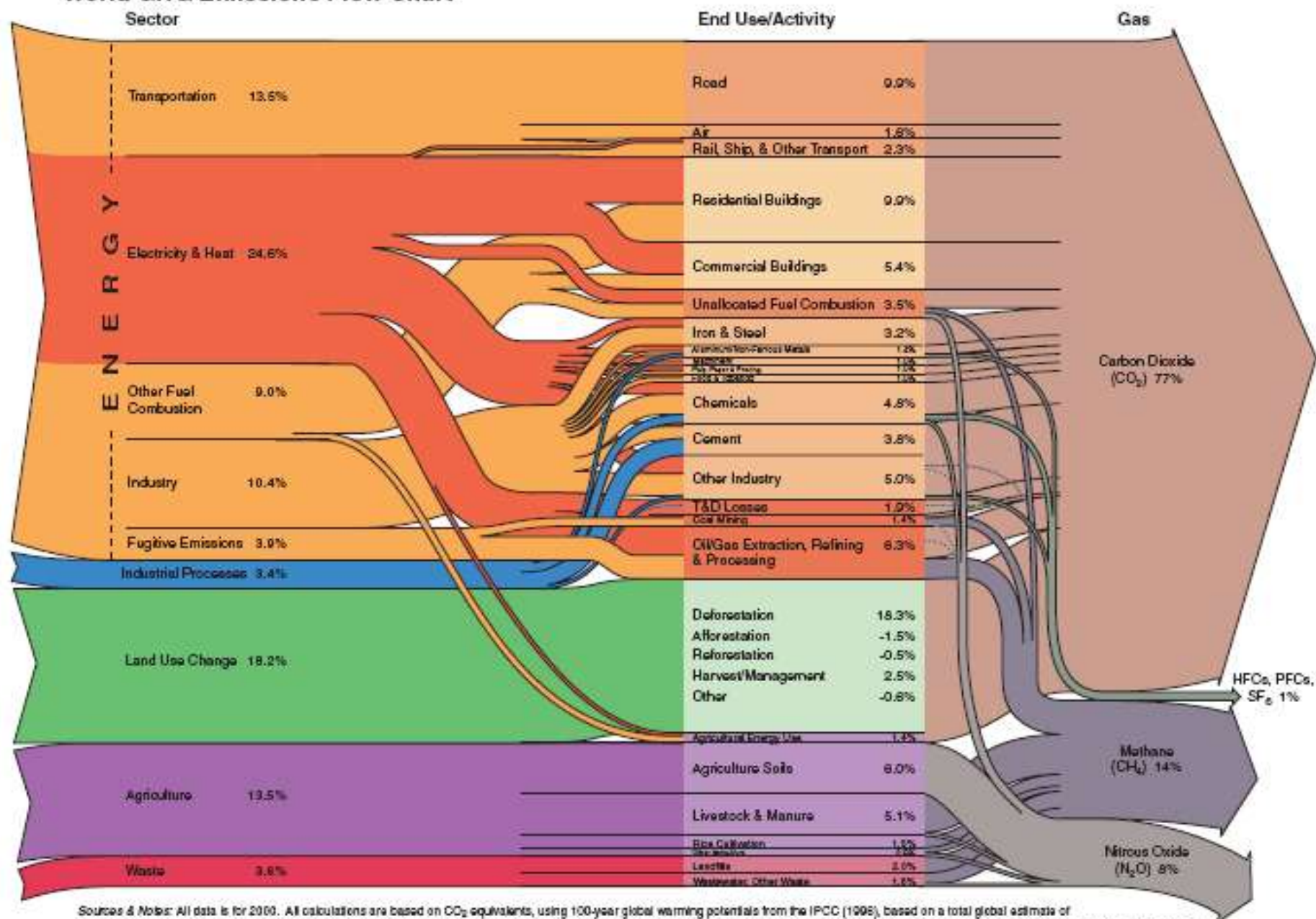
Two to go!



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World GHG Emissions Flow Chart



Sources & Notes: All data is for 2000. All calculations are based on CO₂ equivalents, using 100-year global warming potentials from the IPCC (1995), based on a total global estimate of 41,755 MTCO₂e equivalent. Land use change includes both emissions and absorptions; see Chapter 16. See Appendix 2 for detailed description of sector and end use/activity definitions, as well as data sources. Dotted lines represent flows of less than 0.1% percent of total GHG emissions.

SLR, Storms, and Impacts on Port Infrastructure

Stormwater drainage systems

- increased tailwater level for the storm drain

Increased vulnerability of wharves to wave slam during storms

Risk of coastal flooding

- implication for storage of hazardous materials, insurance for damage to other assets and implication for operations during and after a flood event.

Coastal erosion

- causing loss of land and loss of habitat

Changing ground water levels and pore water pressure on rubble mound structures, sea walls, and other structures

Saline intrusion into freshwater aquifers

Reduce dampening effect of offshore sand banks



CCSP Product 4.7 findings on climate change effects on transportation in the Gulf Coast

Modes	Precipitation	Temperature	Sea Level Rise	Storm Surge Flooding
Highway/ Transit	Erosion and runoff +/-	Pavement buckling	24% of interstate vulnerable to flooding	64% of interstate vulnerable to flooding
Air	Pavement runoff +/-	Longer runways	8 airports vulnerable to flooding	29 airports vulnerable to flooding
Rail	Erosion of rail bed +/-	Track buckling	9% of miles vulnerable to flooding	41% of miles vulnerable to flooding
Port	Changing river level +/-	Increased maintenance	72% of ports vulnerable to flooding	99% of ports vulnerable to flooding
Pipeline	Minor impacts	Not significant	Dislodged pipelines	Pipeline damage



So, what are we doing about it?

- Nationally
- Massport



Three National Studies on the Effects of Climate Change on Transportation:

- **Transportation Research Board (TRB)**, Special Report 290: Potential Impacts of Climate Change on U.S. Transportation (2008)
- **U.S. Climate Change Science Project (CCSP)** Synthesis and Assessment Product 4.7: Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I (2008)
- **Transportation Research Board**
Adapting Transportation to Impacts of Climate Change (2011)



Port of Boston



What is Massport Doing?

-  Massport Property
-  Other Public (USCG & BRA)
-  Private Port Facilities



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CONLEY GREEN INITIATIVES

- Conley Terminal Environmental Management System and ISO 14001 Certification
- Recycling of specialized waste
- ULSD conversion for yard equipment
- Equipment retrofits
- “Green” equipment replacement program
- Truck idling reduction
- Designated/dedicated truck routes
- Buffer zones
- Clean truck program



GENERAL GREEN INITIATIVES

- 2001 Environmental Management Policy
 - Operate facilities in an environmentally sound and sustainable manner;
 - Minimize impact of operations on the environment;
 - Incorporate sustainable design principles in planning, design and operation of the facilities; and
 - Consider environmental factors in business, financial, operational and programmatic decisions.
- Energy Master Plan to include additional sustainability and energy conservation programs and targets.
- Inventory of Massport's port-related emissions



BOSTON FISH PIER BERTH ELECTRIFICATION PROJECT

- National Clean Diesel Funding Assistance Program and DEP Grants
- \$400K project electrified 18 berths
- Eliminates use of on-vessel generators while berthed
- Completed in 2011

Boston Fish Pier



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SUSTAINABLE PLANNING AND DESIGN

- Massport Sustainable Design Standards and Guidelines mandatory for all Massport capital projects as of June 2009
- Voluntary compliance with “LEED Plus” green building requirements
- Seek to redevelop underutilized and brownfield properties and support regional “smart growth” policies
- “Green” lease terms with tenants, environmental audits, and voluntary sustainable tenant initiatives



WHY BUILD

GREEN

Massport Goals:

- Asset Management**
sustainability increases the value and revenue generating potential of projects on Massport properties
- Environmental Benefits and Permitting Strategy**
reduce environmental impact of buildings and reduce permitting time for individual projects
- Citizenship**
positively impact the communities surrounding Massport-owned property
- Design Excellence**
promote innovative, environmentally responsible and beautiful design



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FIRST-CLASS PUBLIC OPEN SPACES

- Massport owns and operates more than 30 acres of parks and buffer open spaces
- In East Boston: Piers Park, Bremen Street Park, and Logan Airport edge buffers
- Award-winning South Boston Maritime Park opened in 2004, includes interpretive elements that address the history and modern activities of the working Port of Boston
- Parks designed, built, and maintained incorporating green practices



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Massport Disaster and Infrastructure Resiliency Planning Study

Strategy

- Modeling of storm surge for 25 years
- Identification of critical infrastructure for resiliency planning
- Implement Short and Long Term Programs

Program Elements

- Planning
- Existing Buildings and Infrastructure
- New Buildings
- Emergency Response



Selected

Prime: Kleinfelder

Team Members

- Northeastern University
- University of New Hampshire
- U Mass Boston
- Atmos Research & Consulting
- Catalysis Adaptation Partners
- VJ Associates of New England
- Architectural Engineers, Inc.



Challenges & Risks

- Challenges
 - Come up with a Program that:
 - Is Actionable
 - Is Measurable
 - Is Financially Feasible
 - Involves both Infrastructure Upgrades & Operational Changes
 - Allows us to Carry the Philosophy Through all New Buildings & Third-Party Development as a Standard
- Risks
 - Model is not consistent with other models being used
 - Program must be scalable



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A Bit About Air

North American Emission Control Area

Compliance is expected to result in annual reductions starting 2020 of:

- 320,000 tons of NO_x
- 90,000 tons of PM-2.5
- 920,000 tons of SO_x

Sulfur requirements effective August 1, 2012

Codified in APPS

- Act to Prevent Pollution from Ships (40 CFR 1043)

Enforcement Split between Coast Guard and EPA with Coast Guard as the lead.



Conley Drayage Truck Replacement Project

Objective: Replace 20 Class 8b trucks with 1985-1996 model year engines with newer truck with a 2007 emission compliant engine

Annual Emission Reductions by Diesel Emission Quantifier:

- 63% for hydrocarbons

- 92% for carbon monoxide

- 2% for carbon dioxide

- 76% for nitrogen oxides

- 92% for particulate matter

Program started in September 2011

Total Funding 1.1 M

Vehicles Bought to Date: Seven



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Next Steps

- Ports are supposed to be at sea level
- Prevention and Adaptation is where we are
- Work with communities and stakeholders to develop plans for infrastructure (short and long term)
- Climate change is already happening and will continue



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In Closing



QUESTIONS?



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