

REGIONAL CLIMATE CHANGE IMPACT WEBINAR SERIES

U.S. Department of Energy

U.S. Global Climate Change Research Program



THE QUADRENNIAL ENERGY REVIEW WITH *KATE*

MARKS U.S. Department of Energy



QUADRENNIAL ENERGY REVIEW (QER)

ENERGY TRANSMISSION, STORAGE, AND DISTRIBUTION INFRASTRUCTURE



Minorities in Energy Climate Change Series

August 2015

Changing U.S. Energy Landscape

Increasing Energy Production

- Natural gas production growth
- Oil production growth
- Intermittent renewables
- Distributed generation/energy resources
- Increased generation, production, and demand efficiency

Policy Developments

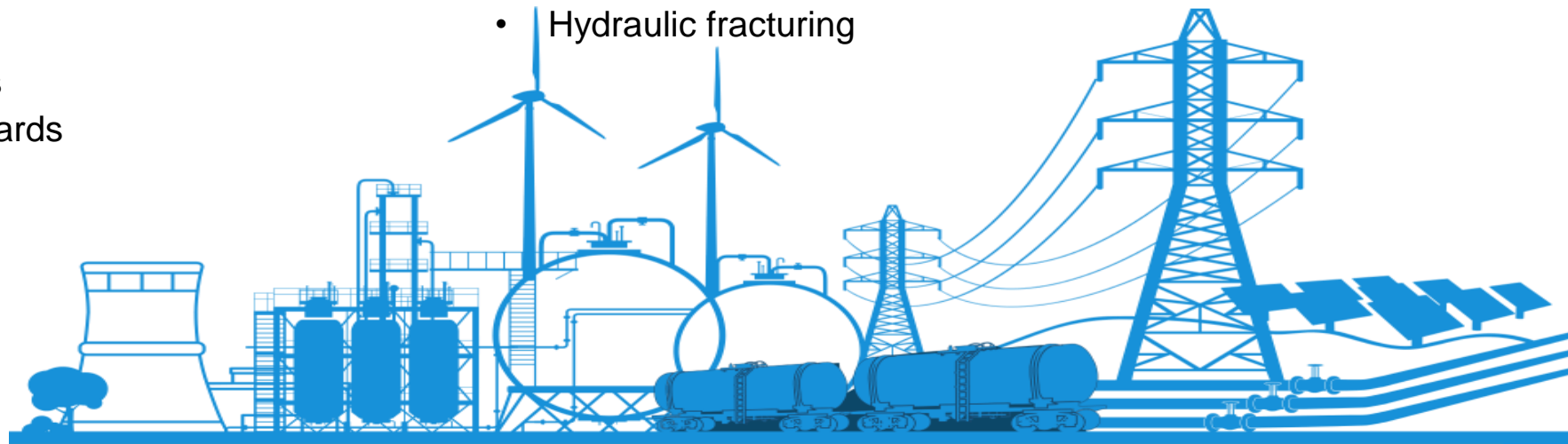
- Corporate Average Fuel Economy (CAFE)
- Clean Air Act - 111(D)
- Clean Water Act
- Renewable Fuel Standards
- Renewable Portfolio Standards
- RGGI (regional)

Energy Security Changes

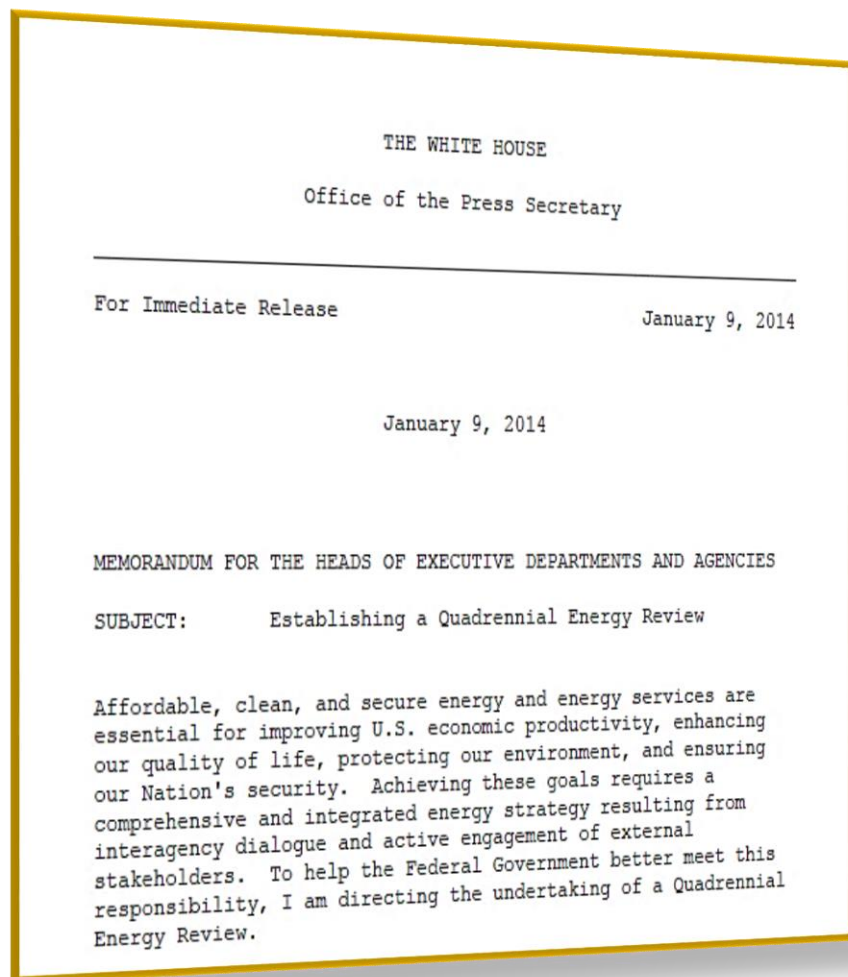
- Climate change impacts
- Vulnerabilities more evident: aging infrastructure, physical and cyber threats
- Decreased N.A. energy imports
- Increased interdependencies
- Increased support required by allies

Technology Advancements

- Solar (central and rooftop)
- Wind
- Demand-side
- Hydraulic fracturing



Presidential Memorandum



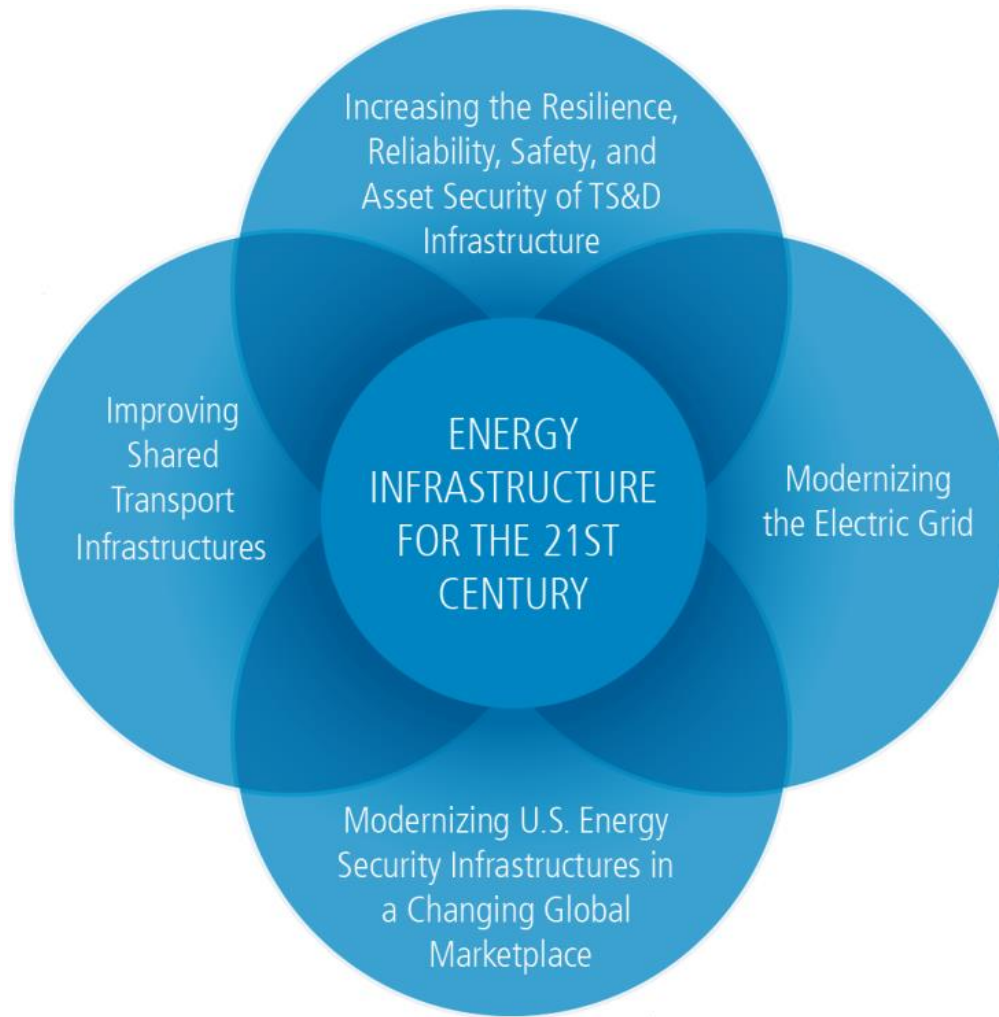
“Affordable, clean, and secure energy and energy services are essential for improving U.S. economic productivity, enhancing our quality of life, protecting our environment, and ensuring our Nation's security.

Achieving these goals requires a comprehensive and integrated energy strategy resulting from interagency dialogue and active engagement of external stakeholders.

To help the Federal Government better meet this responsibility, **I am directing the undertaking of a Quadrennial Energy Review.”**

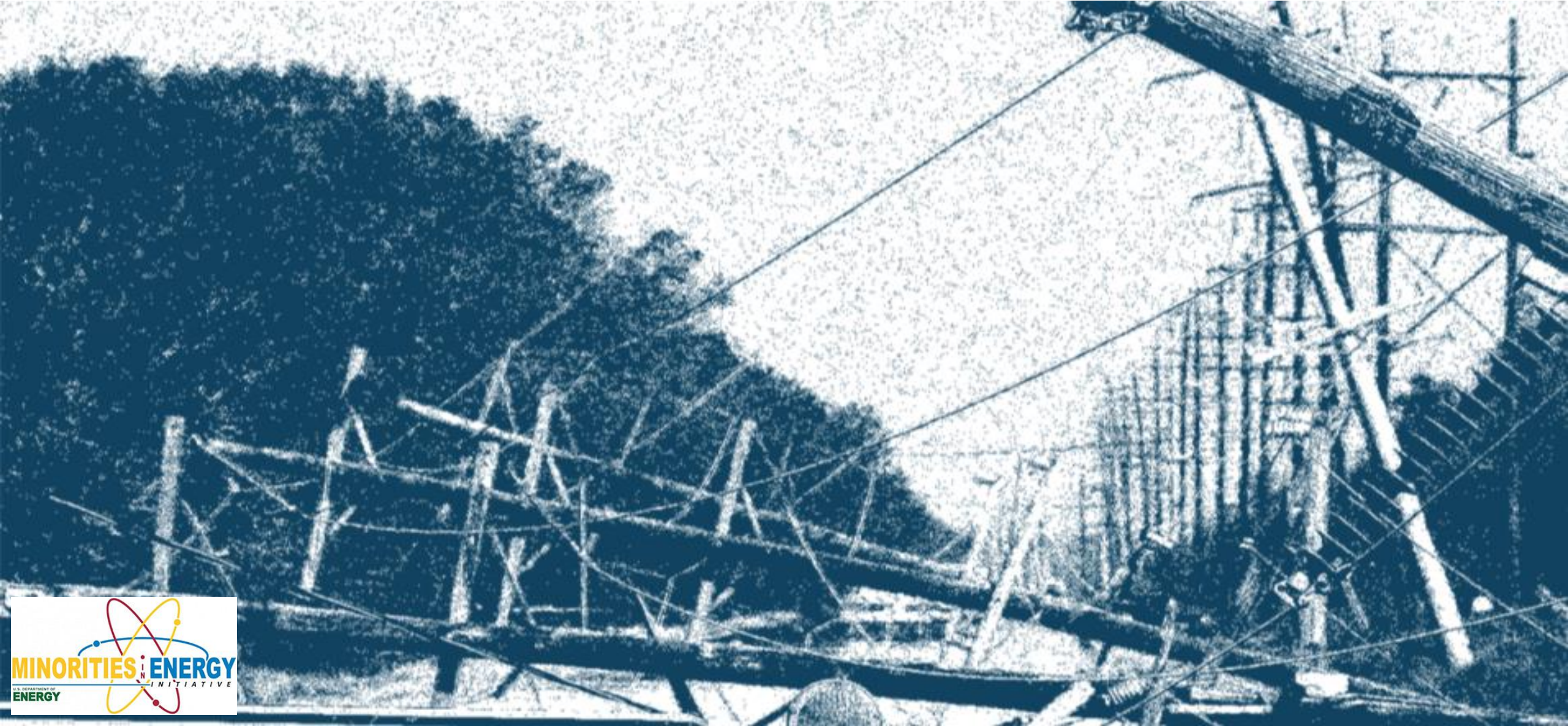
President Barack Obama
January 9, 2014

Purpose of the QER



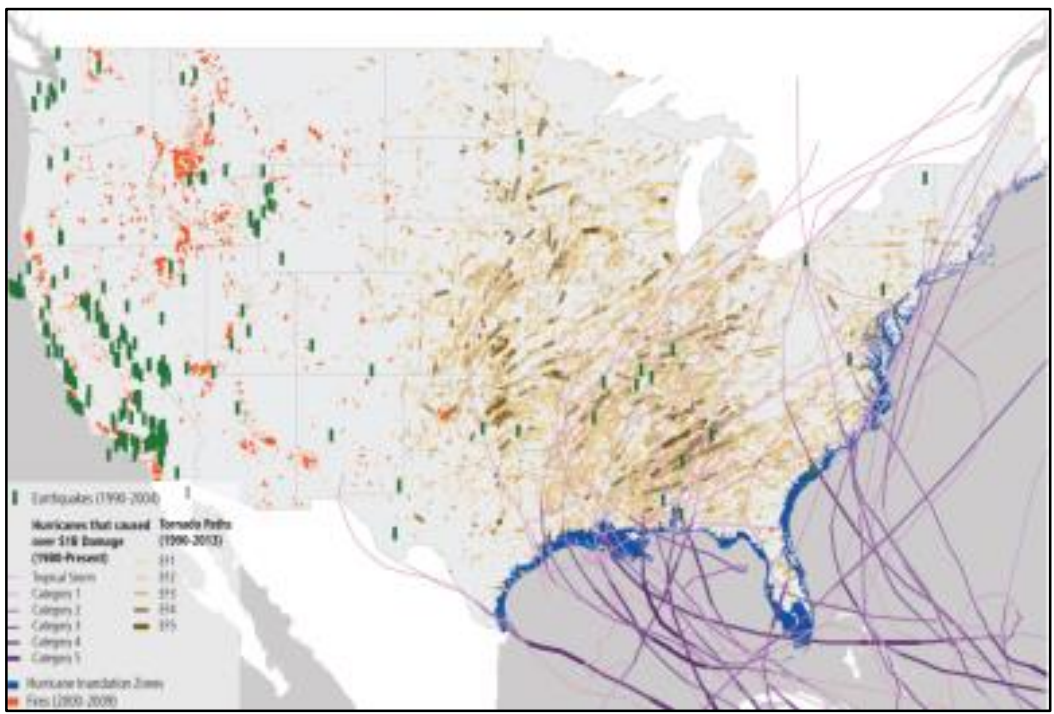
- Integrated view of objectives for policy development
 - Legislative proposals
 - Executive actions
 - R&D agenda
- Strong analytical foundation
- Cross-cutting topics

Increasing the Resilience, Reliability, Safety, and Asset Security of TS&D Infrastructure



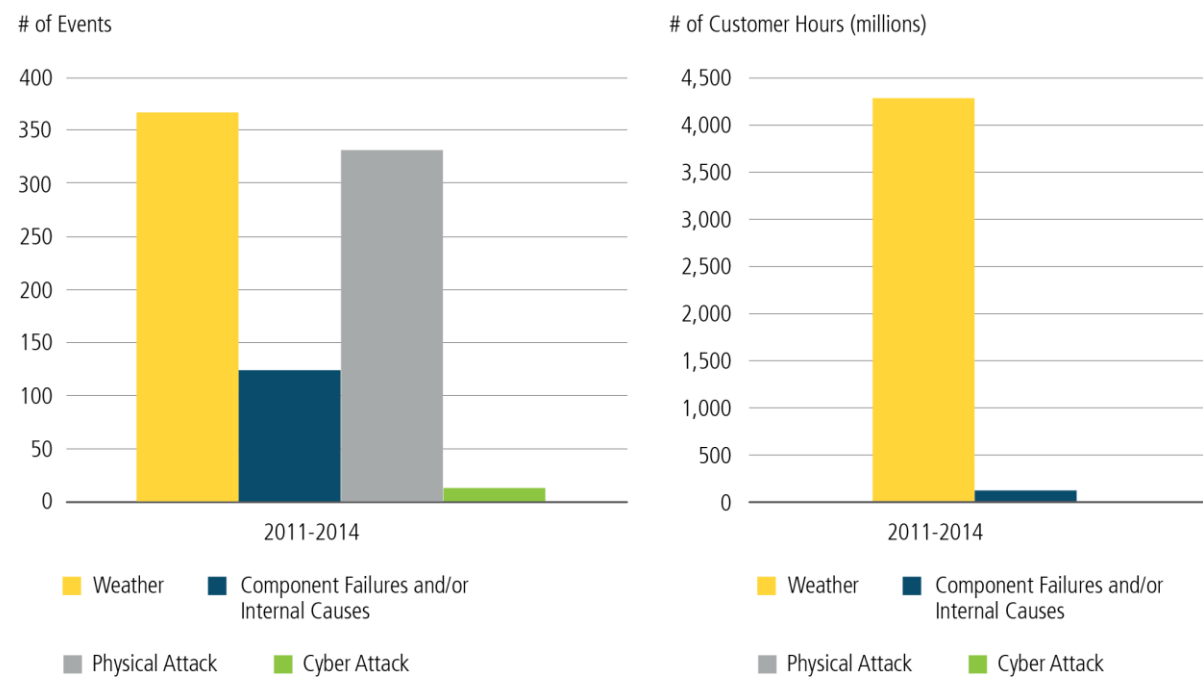
Vulnerabilities and Disruptions

Illustrations of Tornado and Hurricane Tracks, Wildfires, Earthquakes, and Coastal Inundation



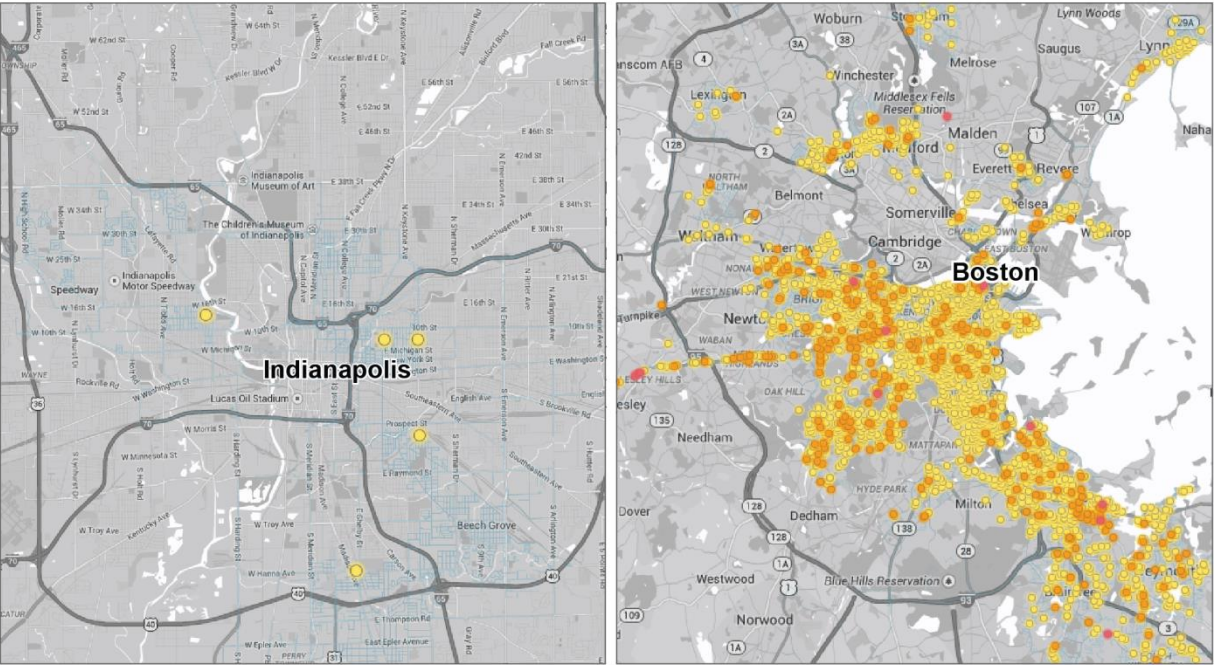
Disruptions of TS&D infrastructures have serious consequences for the Nation and many regions of the country. Extreme weather and climate change is a leading environmental risk to this infrastructure.

Electric Disturbances and Customer Hours Lost



Leak Prone Pipes in Local Distribution Systems

Methane Emissions from Natural Gas Distribution Systems in Indianapolis and Boston (2013)



States with Most Cast and Wrought Iron Pipelines

New Jersey

New York

Massachusetts

Pennsylvania

Michigan

Illinois

Connecticut

Maryland

Alabama

Missouri

States With Most Bare Steel Pipelines

Ohio

Pennsylvania

New York

Texas

Kansas

California

West Virginia

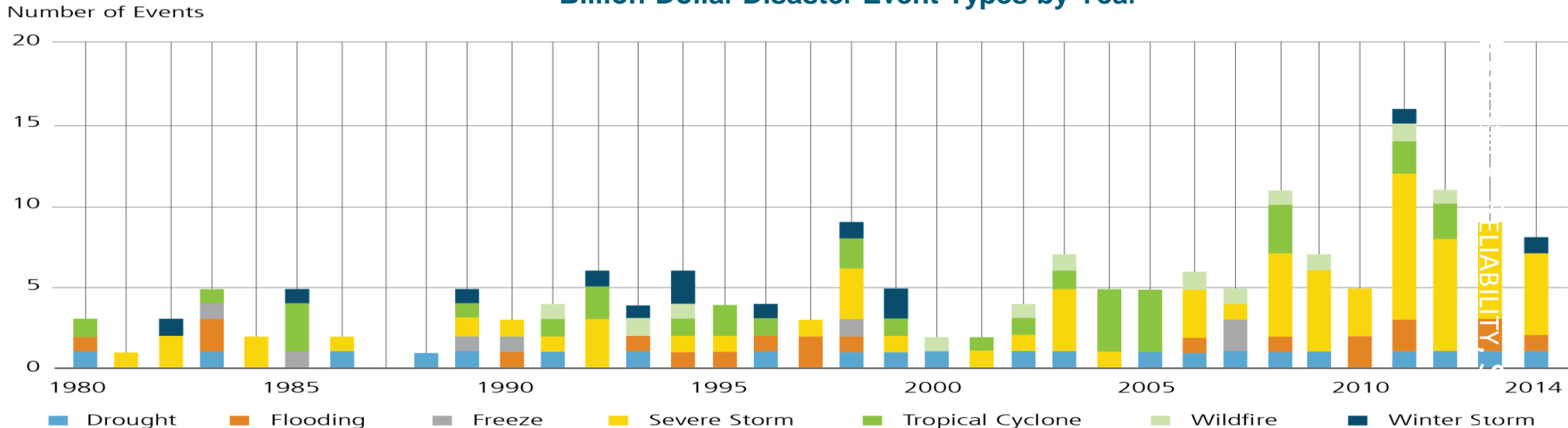
Oklahoma

Massachusetts

New Jersey

Resilience Recommendations

Billion-Dollar Disaster Event Types by Year

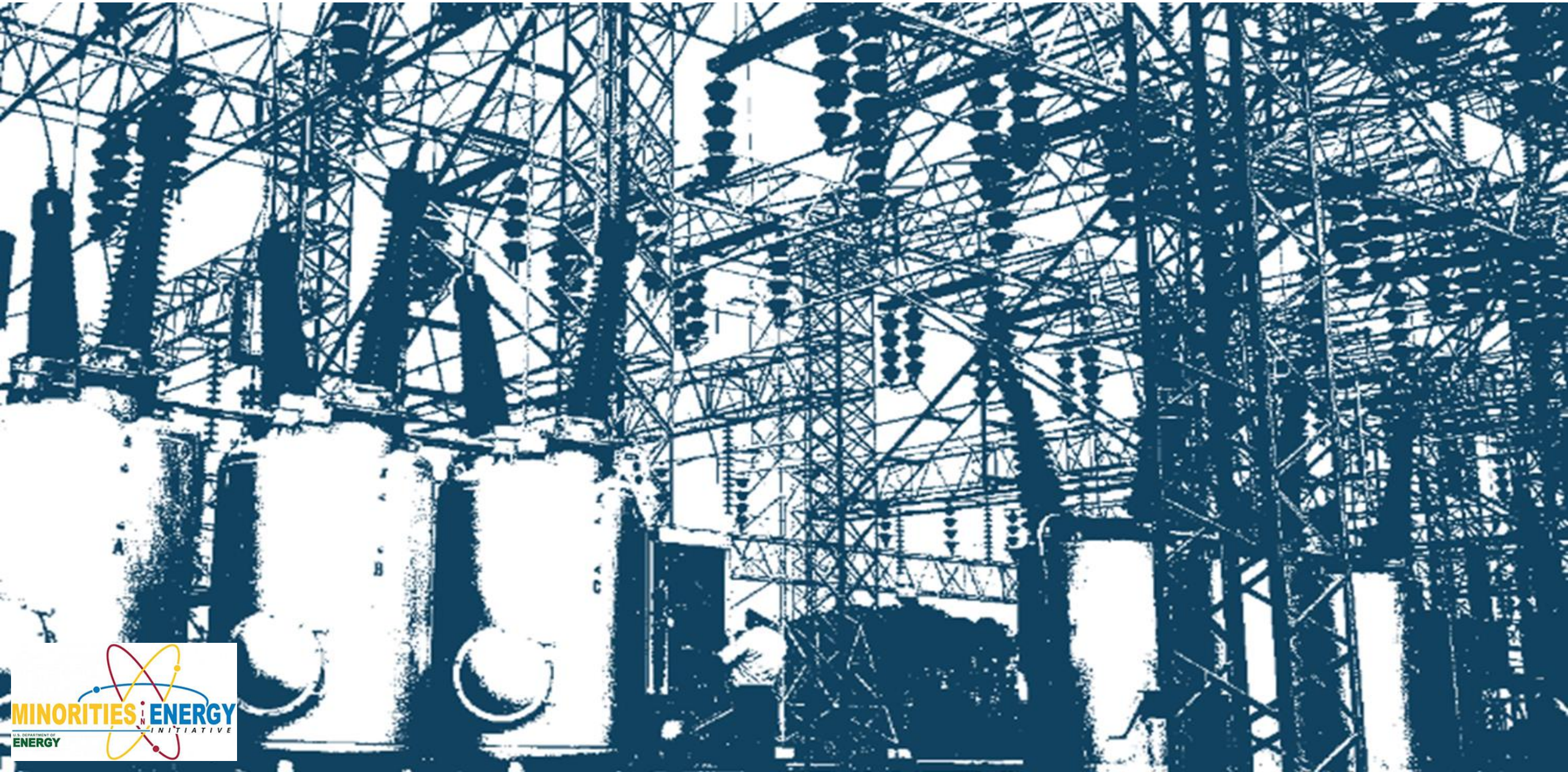


Selected Recommendations

- Establish a \$2.5-3.5 B competitive program to accelerate pipeline replacement and enhance maintenance programs for natural gas distribution systems.
- Provide \$350 - \$500 M in support for the updating and expansion of state energy assurance plans
- Establish a \$3-3.5 B competitive grant program to promote innovative solutions to enhance energy infrastructure resilience, reliability, and security
- Analyze the policies, technical specifications, and logistical and program structures needed to mitigate the risks associated with loss of transformers



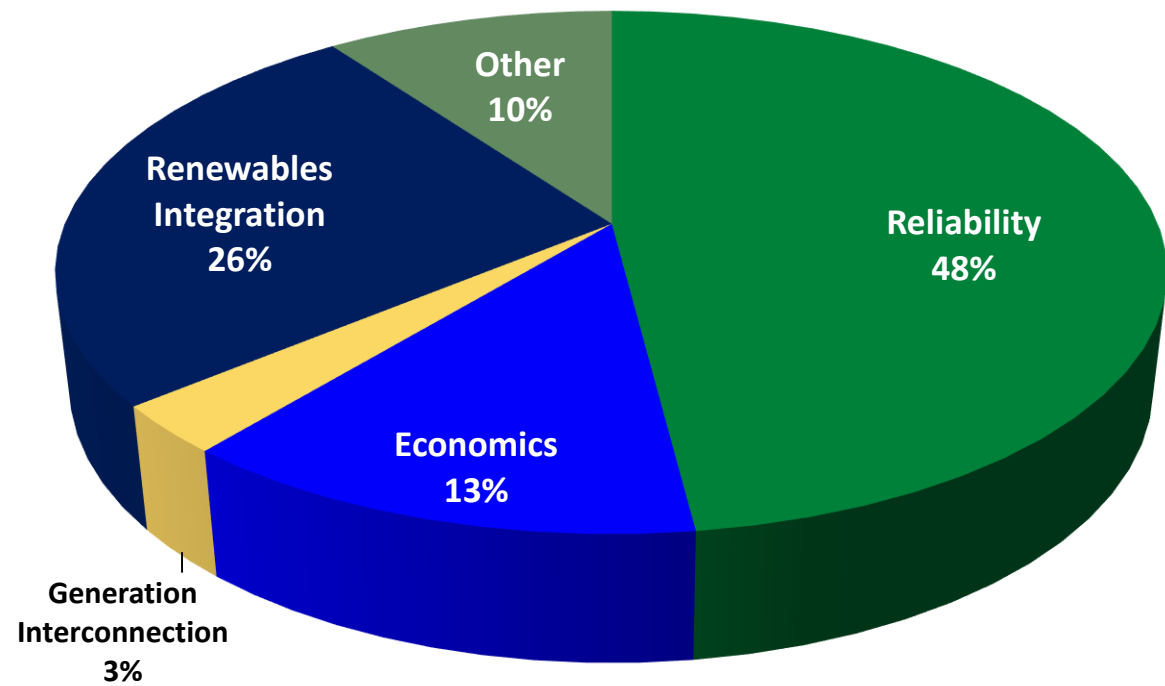
Modernizing the Electric Grid



Transmission Investment: Drivers

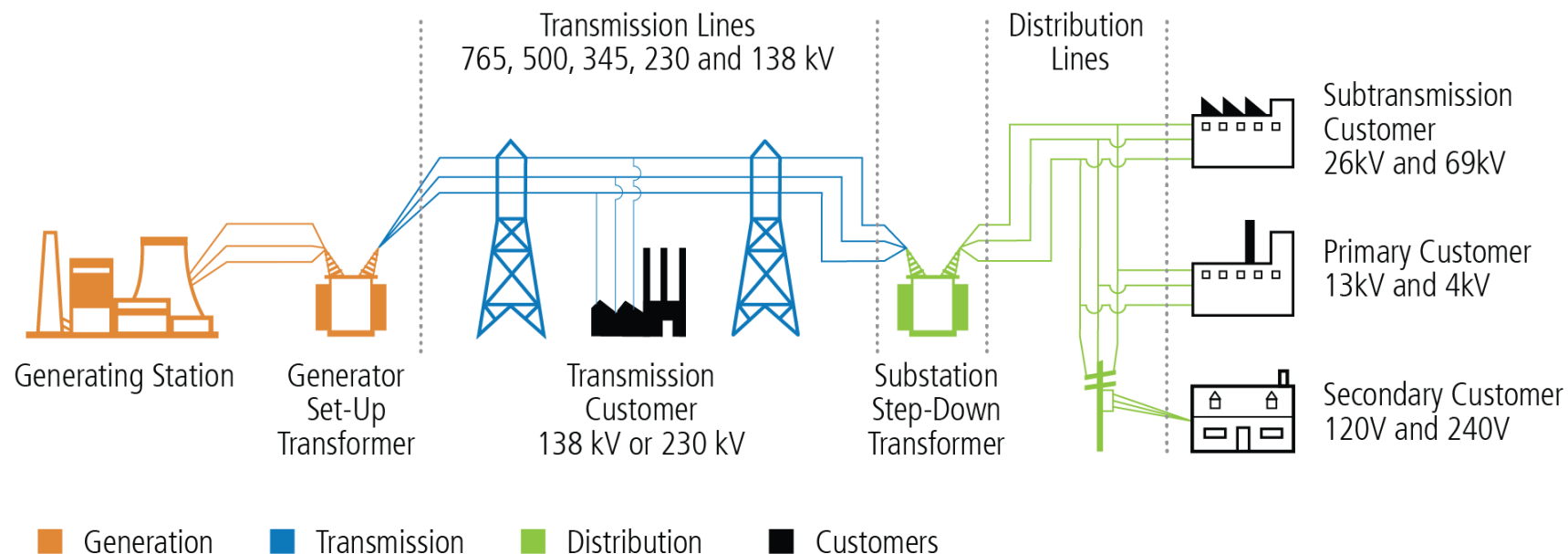
“Innovative technologies and services are being introduced to the system at an unprecedented rate, often increasing efficiency, reliability, and the roles of customers, but also injecting uncertainty into grid operations, traditional regulatory structures, and utility business models.”

MODERNIZING THE ELECTRIC GRID



Reported Drivers of Projected Circuit-Miles of Transmission Addition (2011-2015)

Grid Recommendations



Selected Recommendations

- Provide \$3.5 B in grid modernization research and development, analysis, and institutional support
 - Conduct a national review of transmission plans and assess barriers to their implementation
 - Provide \$300-\$350 M in state financial assistance to promote and integrate transmission, storage, and distribution infrastructure investment plans for electricity reliability, affordability, efficiency, lower carbon generation, and environmental protection
 - Value new services and technologies
- Improve grid communication through standards and interoperability

Improving Shared Energy Transport Infrastructures



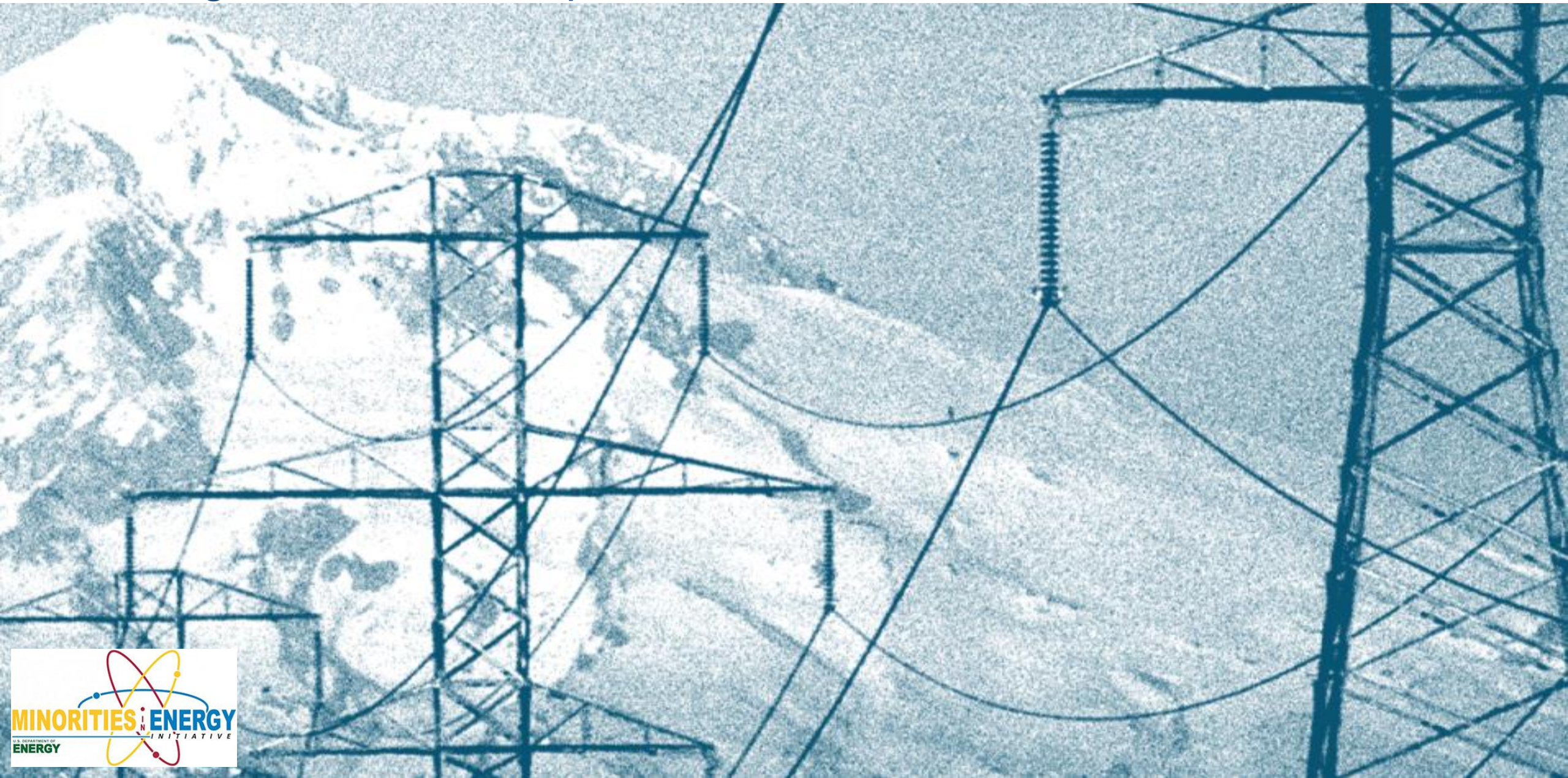
Shared Transport Recommendation

ASSETS: Actions to Support Shared Transport Systems

A new program of competitively awarded grants for shared energy transport systems.

- Provide \$2-\$2.5 billion over the next 10 years
- Dedicated to improving energy transportation infrastructure connectors
- Established and supported at DOT in close cooperation with DOE
- Spur an estimated \$4-\$5 billion in non-Federal investment based on TIGER grants

Addressing Environmental Impacts of TS&D



Enhancing Employment and Workforce Training



- Questions?

WORKFORCE DEVELOPMENT WITH *RUTH SAMARDICK*

U.S. Department of Energy



Energy Jobs Strategy Council

AGENDA

1. Opening Remarks
2. Mission and Charter Overview
3. Inventory of Workforce and Economic Development Activities
4. Working Group Activities
 1. Energy Jobs Data
 2. Economic Development Activities
 3. Workforce Development Programs
5. Focus on Tribal and Minority Communities
6. Closing Comments



Energy Jobs Strategy Council

The Energy Jobs Strategy was developed in response to the economic opportunities presented by the changing nature of energy production, distribution and consumption throughout the United States.

The mission of the JSC is to:

- Accelerate the growth of and access to jobs in all sectors of the United States energy economy while meeting the goals of the Administration's Climate Action Plan.

We accomplish the mission through:

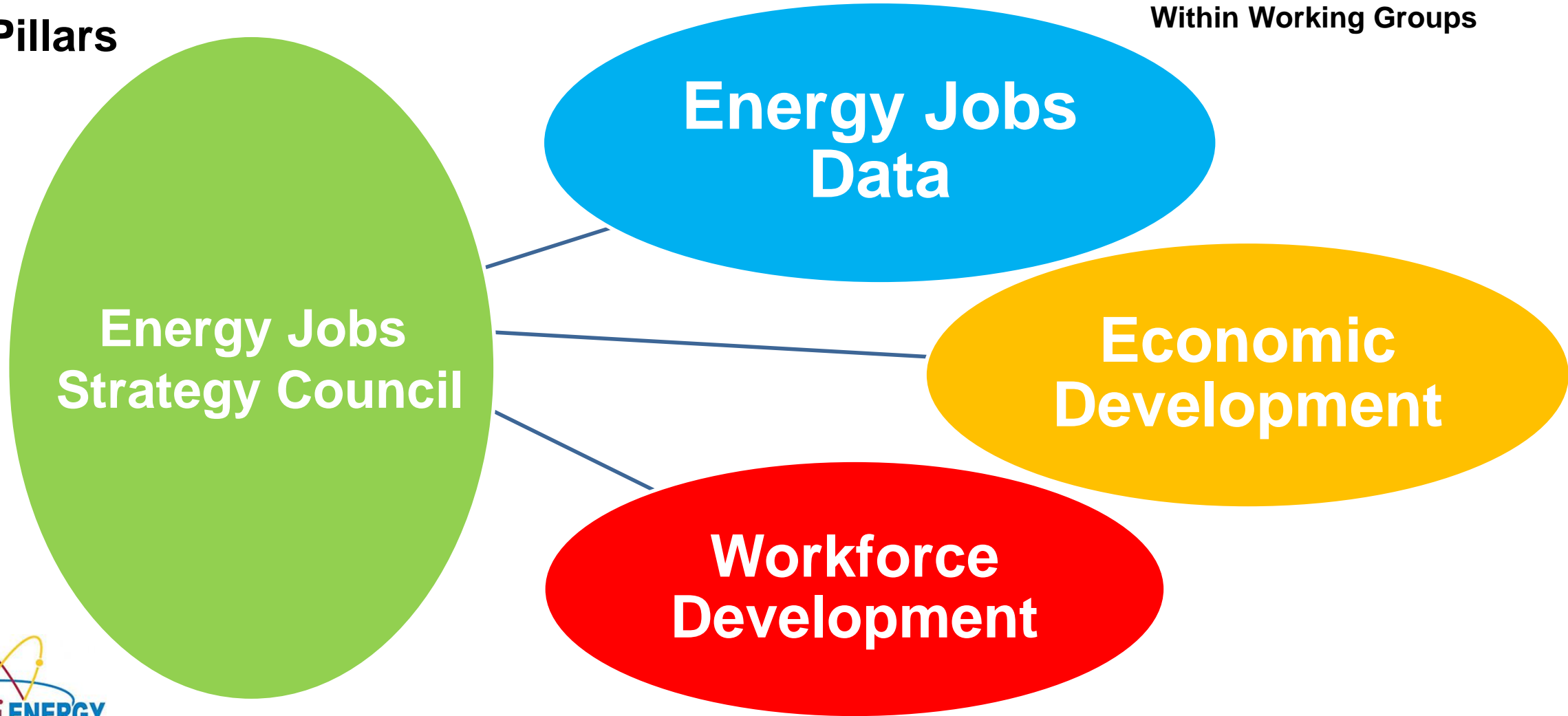
- A cross-cutting initiative that integrates the research, technology, and economic resources of the Department to respond to the economic and workforce development needs of the energy industry.



Energy Jobs Strategy Council

Intra and Interagency
Partnerships/Projects
Within Working Groups

3 Pillars



Status of DOE's Current Workforce and Economic Development Activities

- First Task was an inventory of DOE programs on workforce, technical assistance, and economic development.
- Virtually every DOE program office is involved in workforce development activities.
- Identified over 173 programs, including, traineeships, loan guarantees, the Solar Instructor Training Network, the Carbon Fiber Consortium at ORNL. established in 2011 to accelerate the development and deployment of new, lower cost carbon fiber composite materials. The Consortium draws on the broad experience that the Oak Ridge National Laboratory has in research, development, demonstration and deployment of fiber-reinforced composite materials, and leverages the expertise of more than 40 member companies across the entire carbon fiber value chain.



Current Workforce and Economic Development Activities

- Over 173 programs
 - 89 are EERE programs
 - Buildings
 - Clean Energy Manufacturing
 - Education and Guides
 - Weatherization and Intergovernmental Programs
 - Solar
 - Bioenergy
 - Fuel Cell
 - Wind
 - Water

Examples of DOE's Current Workforce and Economic Development Activities

Department	Examples of Activities
The Federal Energy Development Assistance Tools	Provides information for Tribes about federal grant, loan, and technical assistance programs available from more than 10 federal agencies to support energy development and deployment in Indian Country and Alaska Native villages.
Loan Program Office: Ability to issue loans and loan guarantees that will ultimately result in job creation.	ATVM Loan Program: Conditional commitment to Alcoa to support expansion of lightweight aluminum for cars and light-duty trucks. 200 permanent jobs and 400 construction jobs
EM- DOE FIU Fellows Program	The DOE-FIU Science and Technology Workforce Development Program to create a "pipeline" of minority engineers specifically trained and mentored to enter the Department of Energy workforce in technical areas of need.
Energy Efficiency & Renewable Energy	Solar Instructor Training Network (SITN), Grid Engineering for Accelerated Renewable Energy Deployment (GEARED), Solar Ready Vets, Clean Energy Entrepreneurship Training.

Energy Jobs Data Pillar

- Jobs that are primarily energy-focused are attributed to different sectors of the economy
- As a result, the role of energy in the American economy is poorly measured and understood.



**Translate energy trends
to energy job numbers
and projections.**

Goals

• Short-Term

- Develop definitions of energy jobs
- Identify industry-specific approach to enumeration of jobs
- Pilot the first comprehensive energy jobs report

Long-Term

- Work with BLS to institutionalize approach to enumerating energy jobs and producing annual report on energy jobs
- Long-term forecasts of energy jobs changes based on scenario planning
 - Targets: 2020; 2030, 2050
- Review economic impact of labs

Problems in capturing energy sector industry and jobs in energy sector

No official count for economic activity, businesses and jobs in the energy sector currently exists

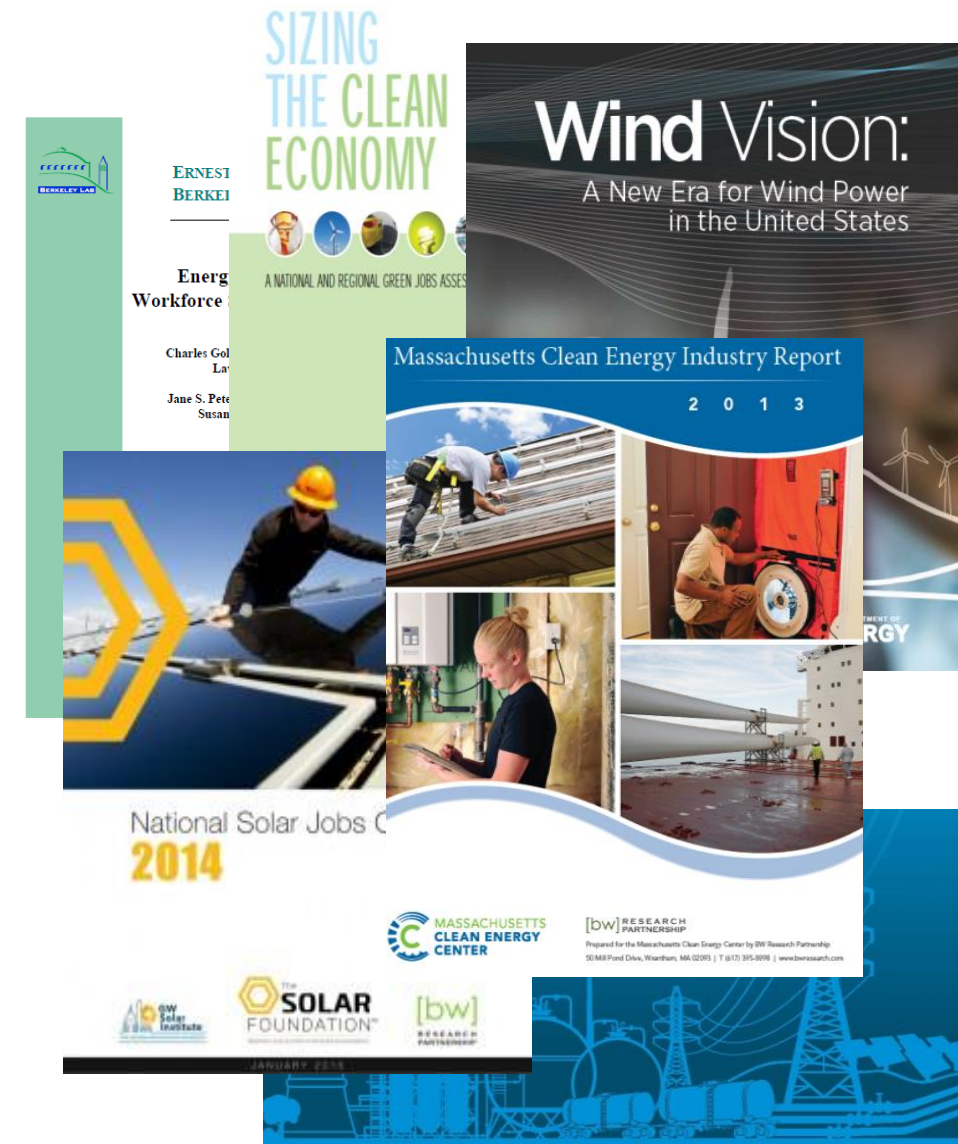
Growing number of governmental, industrial and public interest in job growth and economic activity in energy technologies

- From nascent to established and growing industries: ex. Wind and Solar
- Fossil Energy, Natural Gas, Nuclear, Electricity
- A number of methodologies, job classifications and results

For a variety of reasons, the current official mechanism (BLS employment surveys) for counting US jobs understates the energy sector

- Broad economic sectors and industry occupations: Agriculture, Manufacturing, Services, etc.
- Insufficient occupational classifications/definitions for some energy jobs, especially energy efficiency, renewable energy, and clean energy manufacturing.

As the energy economy grows being able to count where changes occur help form a better appreciation of the economic development the energy sector produces



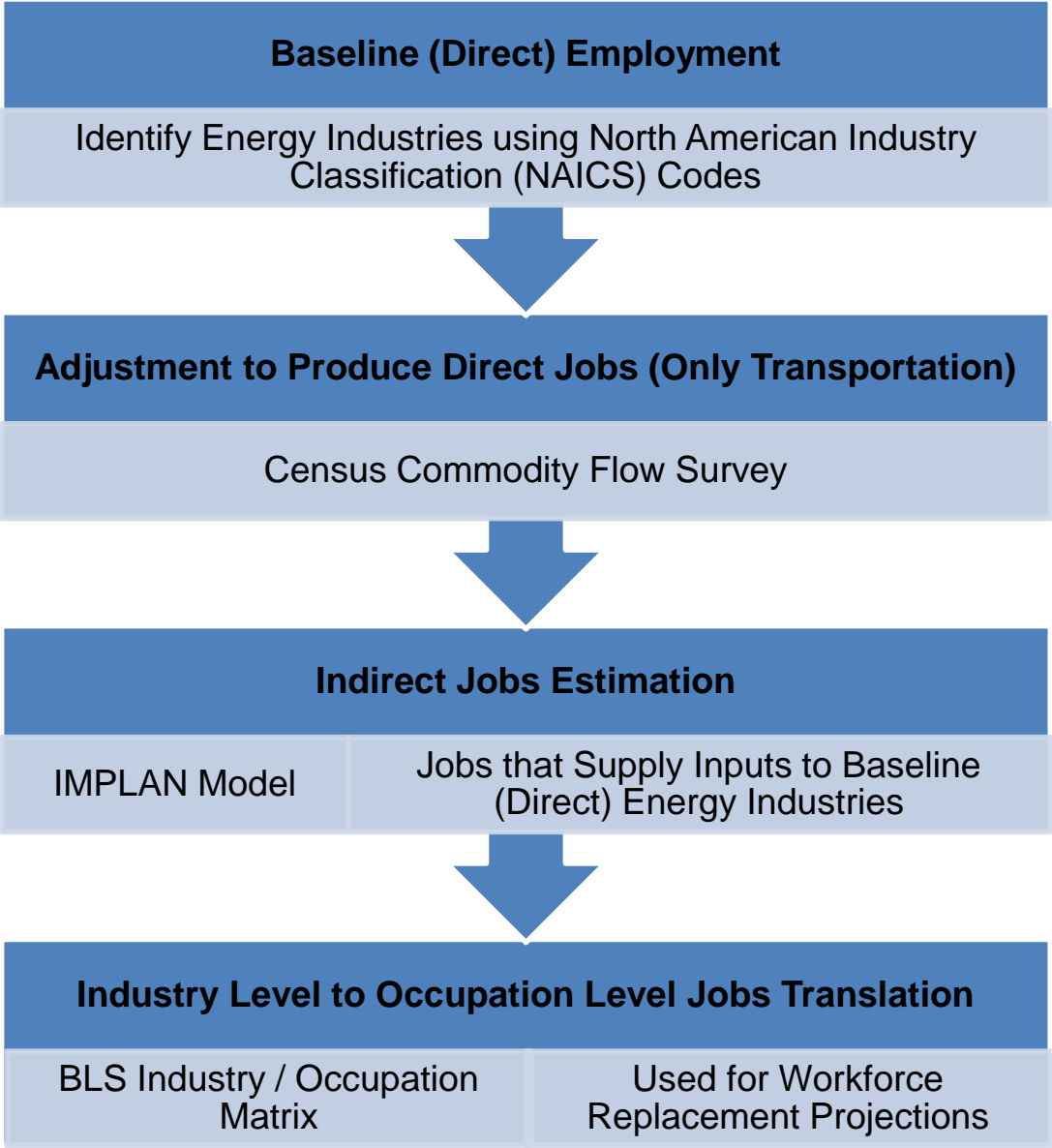
Energy Jobs Reporting: Preliminary Strategy and the QER

- Start from BLS employment survey data (current US employment: 141,183,000 US Jobs)
- Create standard definitions/classifications for Renewables, Energy Efficiency, Clean Energy Manufacturing Sectors/ classification schema to filter/Mine BLS data
- Leverage past (GGS/QER, Etc.) and ongoing work/ methodology
- Ex. QER classifications/estimations – traditional surveying and Modeling
 - Captured: Electricity and fuel transmission, storage, and distribution (TS&D), electricity generation, fuel extraction and production, and fuel sales



**QER-Chapter 8 – Enhancing Employment
and Workforce Training**

QER Jobs Estimation Methodology



Energy Jobs (2013)

Energy Sectors	Direct	Indirect	Total
Electricity TS&D	506,882	441,963	948,845
Fuel TS&D	470,204	436,087	906,291
Electricity Generation	295,316	407,733	703,049
Extraction and Production	764,539	843,525	1,608,064
Fuel Sales	1,031,318	208,523	1,239,841
Total	3,068,259	2,337,830	5,406,089

These are conservative estimates because baseline employment relies on energy-specific NAICS (industry) codes



Economic Development Pillar

- DOE supports technology, innovation and R&D, and can issue loans and loan guarantees to bring early deployment of new technologies to market and wide deployment of advanced vehicle technologies.
- However, no explicit jobs strategy links DOE's technical and financial resources with the economic development planning that takes place at the state, local and regional level.



Develop and deploy an Energy Jobs Toolkit and department interface with economic development planning departments at the state, local and regional level.

Goals

• Short-Term

- Toolkit Development & Testing
- Identify technical assistance tools available to assist states and localities.
- Establish toolkit website and work shop..
- Outreach Team: Form 3-person team to develop and pilot work shop presentations for states and localities in use of toolkit.
- Prepare State Grants Program to pilot in FY 16.

Long-Term

- State Grants Program: 15—20 competitive grants for state energy jobs coordinators (build off clean energy manufacturing grant structure).
 - FY16: 2 pilots, subject to approp
 - FY17: program launch
- Technical Assistance Team: Identify a cross-Departmental Jobs Strategy Technical Assistance Team to assist with use of toolkit.

Manage Special Projects (ongoing)

Carbon capture sequestration outreach; Energy Intensive Trade Exposed Industries Partnerships; Regional & National Initiatives, POWER+

Existing Program Collaborations

Loan Program Office

- Existing outreach team in LPO
- 30 state outreach visits completed since July, 2014
- Key element of state economic development workshops
- Develop LPO in Interagency POWER+ Initiative

The Asset Revitalization Initiative

- Supports economic diversification using DOE assets
- Initiated a study with NREL to determine the potential of developing energy resources on DOE lands
- The WJSC will use the assessment of best DOE renewable energy sites to:
 - Create three regional workshops to provide information and technical support
 - Engage LPO participation where appropriate
 - Perform reuse analysis for POWER+ on closed coal plants and mine sites.

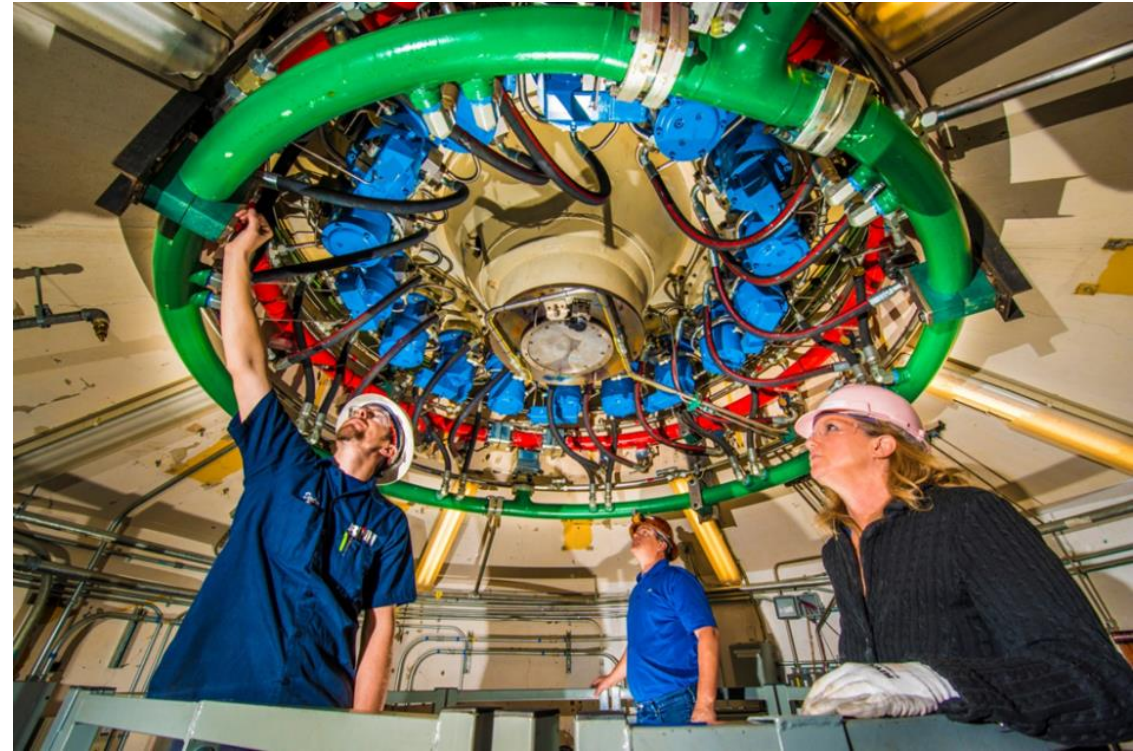
Workforce Development Pillar

- Secretary Moniz is a member of the Interagency Skills Working Group:
- Established to implement the Vice President's Jobs Driven Report which was prepared in response to a call from President Obama
- To review of America's job training programs to ensure that it is providing workers with the skills that are needed to secure good jobs that are ready to be filled.
- Employers – can't find skilled workers for in-demand jobs
- Education and Training Programs
 - Need better information on what skills these in-demand jobs require.
 - Provide employers and jobs seekers with good data that tells what jobs are available and the skills that are needed to fill these jobs.

Workforce Development Pillar

Changing technologies and rapidly aging energy workforces have created training and skilled workforce gaps in the energy sectors.

Must insure engagement and energy workforce development with underserved populations, including tribal and minority communities.



- Implement programmatic workforce development solutions to fill the skills gap that exists throughout all energy sectors.
- Leverage existing DOE work-based learning opportunities. Internships, traineeships, apprenticeships
- Work on barriers faced by disadvantaged individuals in accessing opportunities.

Goals

• Short-Term

- Institute Industry Workforce Councils to identify workforce needs and develop recruitment plans. (Utility Industry, Aluminum Association, Pittsburgh)
- Engage in outreach campaign with disadvantaged communities to:
 - market opportunities in energy
 - identify barriers that minimize participation by disadvantaged individuals and
 - develop ways to overcome those barriers.

Long-Term, the goal is to conduct an:

- Analysis of jobs skills for energy sector entry level jobs
- Address curricula/training/skills gaps with technical support from DOE Labs
- Biennial energy jobs' skills assessment to inform the energy workforce system, including employers and job seekers
- Interagency Skills Working Grp to Develop:
 - Expand Energy occupations apprenticeships (e.g. solar, advanced manufacturing, building energy efficiency, federal workforce)
 - Establish Career Pathways in energy sector occupations
 - Develop new Interagency Employment Forums and Jobs Fairs
- Extend work to recruit and train veterans and individuals from disadvantaged communities.

Existing Programs and Collaborations

• **Solar Workforce Development**

- Solar Instructor Training Network - addresses three critical gaps in solar workforce development:
 - the need to increase the number of qualified PV instructors at the community college level;
 - the development of solar training for building and electrical inspectors;
 - and the creation of a comprehensive system linking training and credentialing for the solar workforce across residential, commercial, and utility-scale PV installation activities.
- Solar Ready Vets - Based on the specific needs of high-growth solar employers, is tailored to build on the technical skills that veterans acquired through their service. Provides credentialed skills training prior to separation from military service and actively matches veterans with solar employers.

Place-Based Initiatives

- **SWLA** – To maximize the benefits of investments in the region by developing a local workforce and supplier diversity pipeline
- **Pittsburgh** – Connect federal resources to create a veteran employment pipeline
- **Employment Forums and Jobs Fair**
 - **Charlotte** - CEMI Regional Summit
 - **Detroit** – in partnership with DOL
 - **Appalachia** – Power+ Initiative

Tribal and Minority Communities

- Employment Forums and Jobs Fairs
- Tribal Energy Summit Workforce Development Workshops
- STEM Mentoring Café
- Alternative Solar Spring Break
- TechHire Initiative



- Questions?

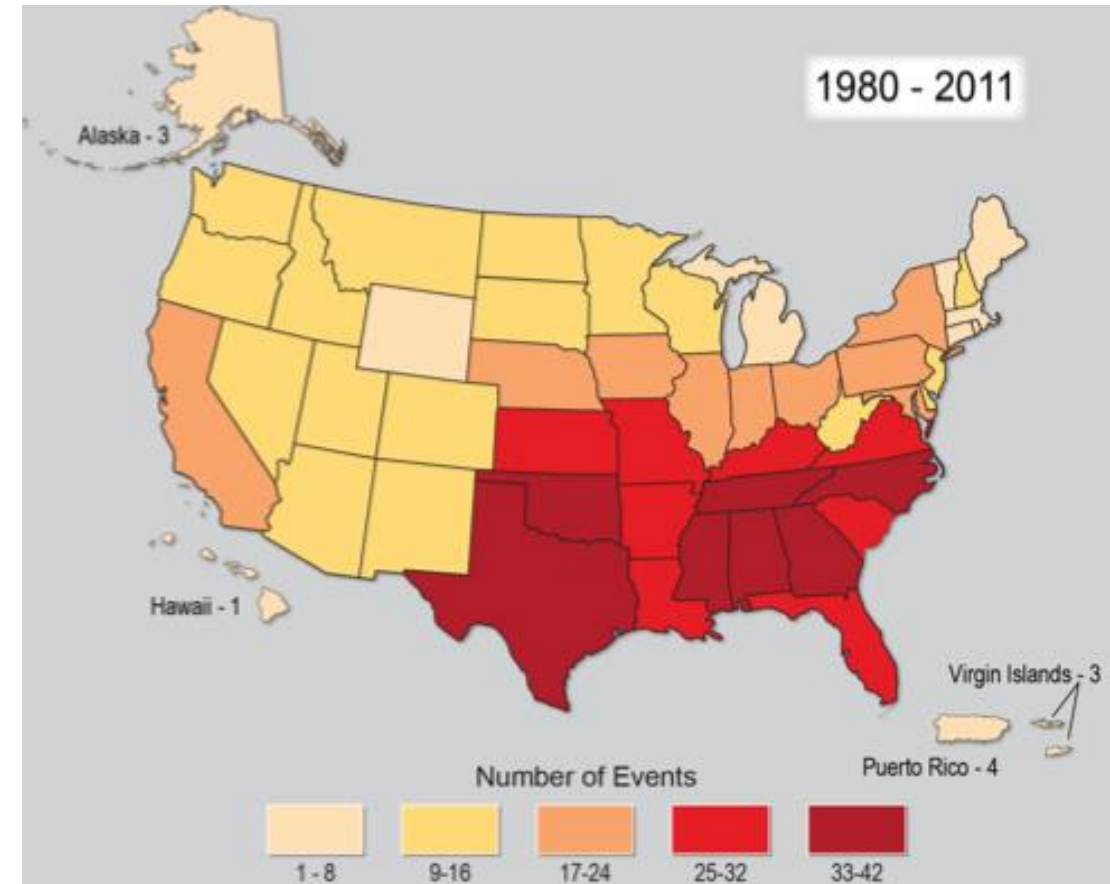
THIRD NATIONAL CLIMATE ASSESSMENT WITH *JAYANTHA OBEYSEKERA* ('OBEY') Chief Modeler, South Florida Water Management District

Vulnerability to Climate Change In the Southeast



The SE and Caribbean Region

- Geographies: Appalachian Mountains to coastal plains
- 80 million residents, hundreds of million visitors
- Includes one of the most populous urban areas in US (Miami), 4 of 10 fastest growing areas, 3 on coast – Palm Coast, Cape Coral/Ft Meyers, FL and Myrtle Beach area, SC.
- Major producer of seafood; coal; crude oil; natural gas
- Highest energy user of all regions
- Climate varies annually due to ocean and atmospheric patterns, influenced by many factors: temps decrease north and into mountains; precipitation decreases away from coasts



Southeast & South Central regions have the highest incidence of billion dollar weather/climate disasters

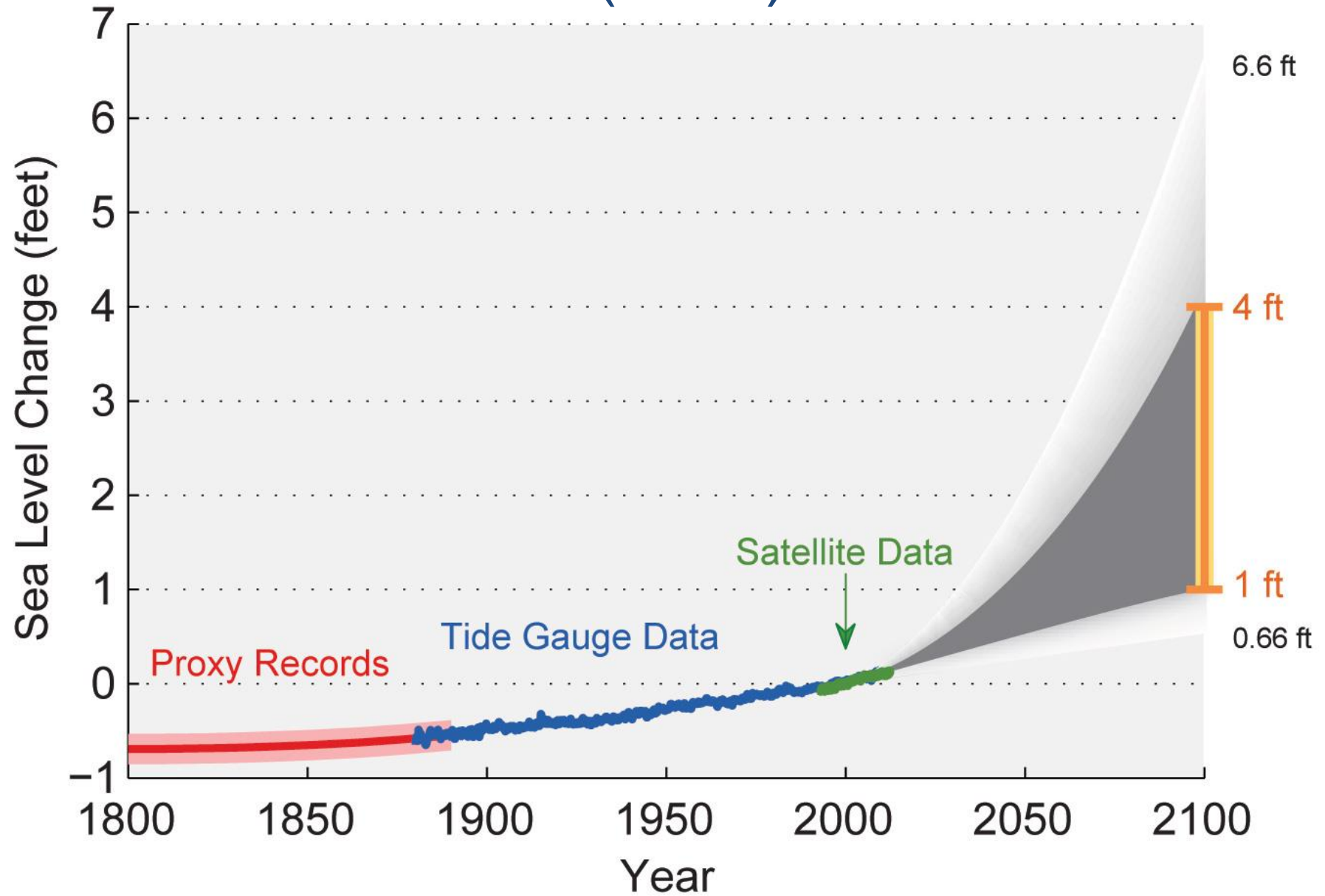
Key Messages

- **Sea level rise** poses widespread and continuing threats to both natural and built environments, as well as the regional economy.
- **Rising temperatures** and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry.
- **Decreased water availability**, exacerbated by population growth and land-use change, will continue to increase competition for water and impact the region's economy and unique ecosystems.



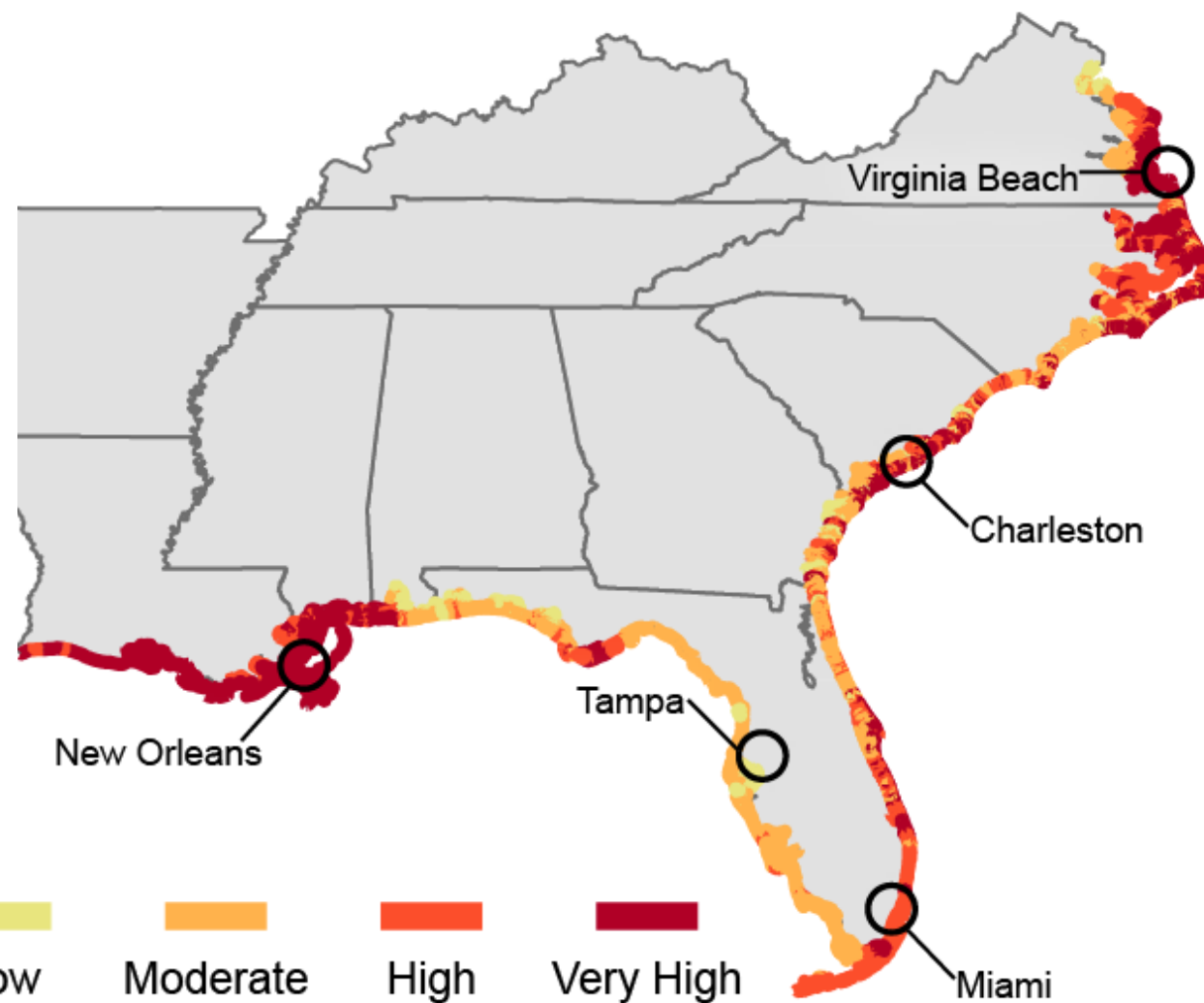
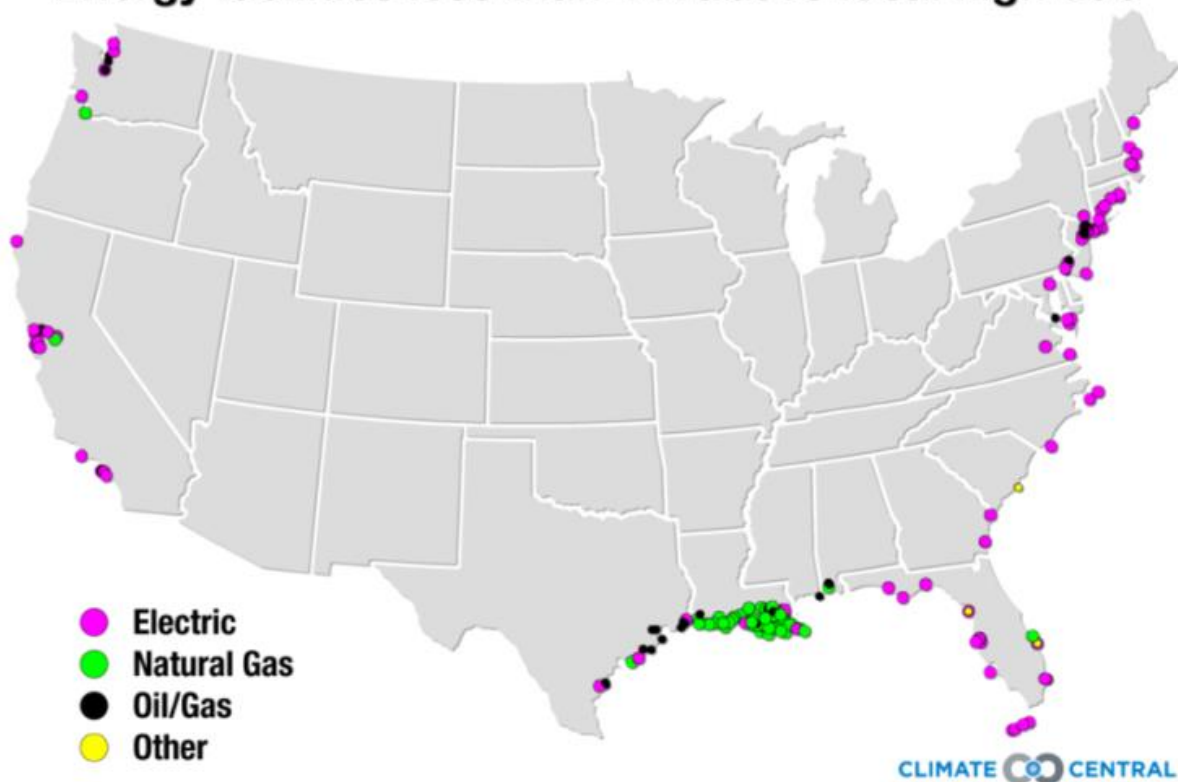
Region is responding already

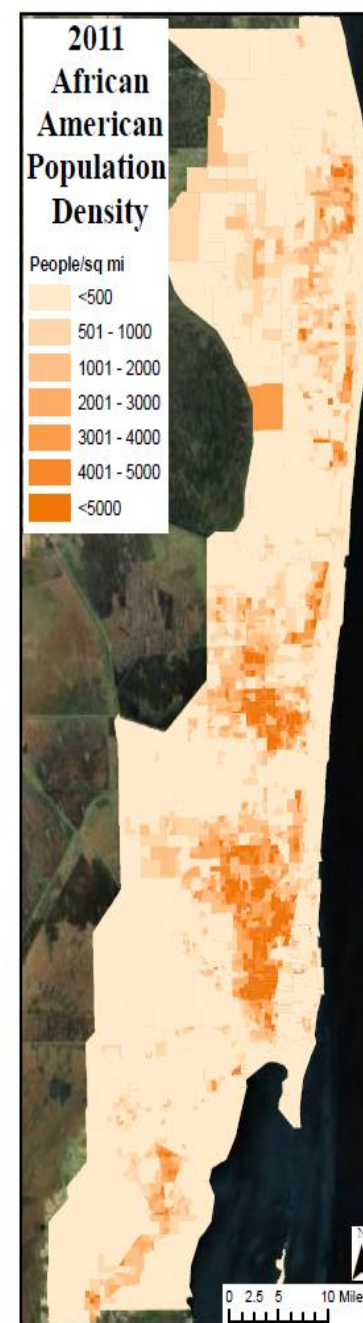
3rd National Climate Assessment (2014) Sea Level Rise Projections



Vulnerability to Sea Level Rise

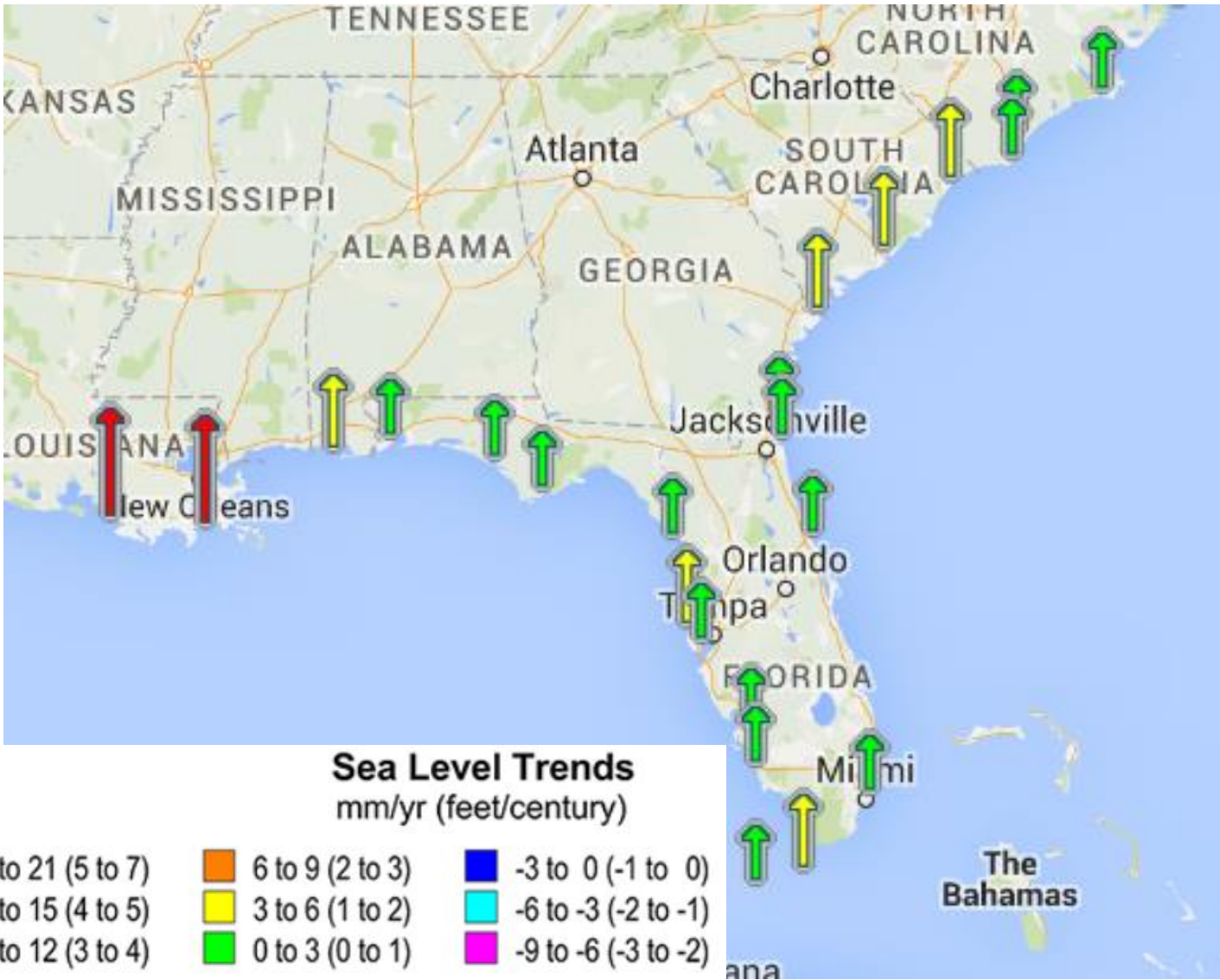
Energy facilities less than 4 ft above local high tide



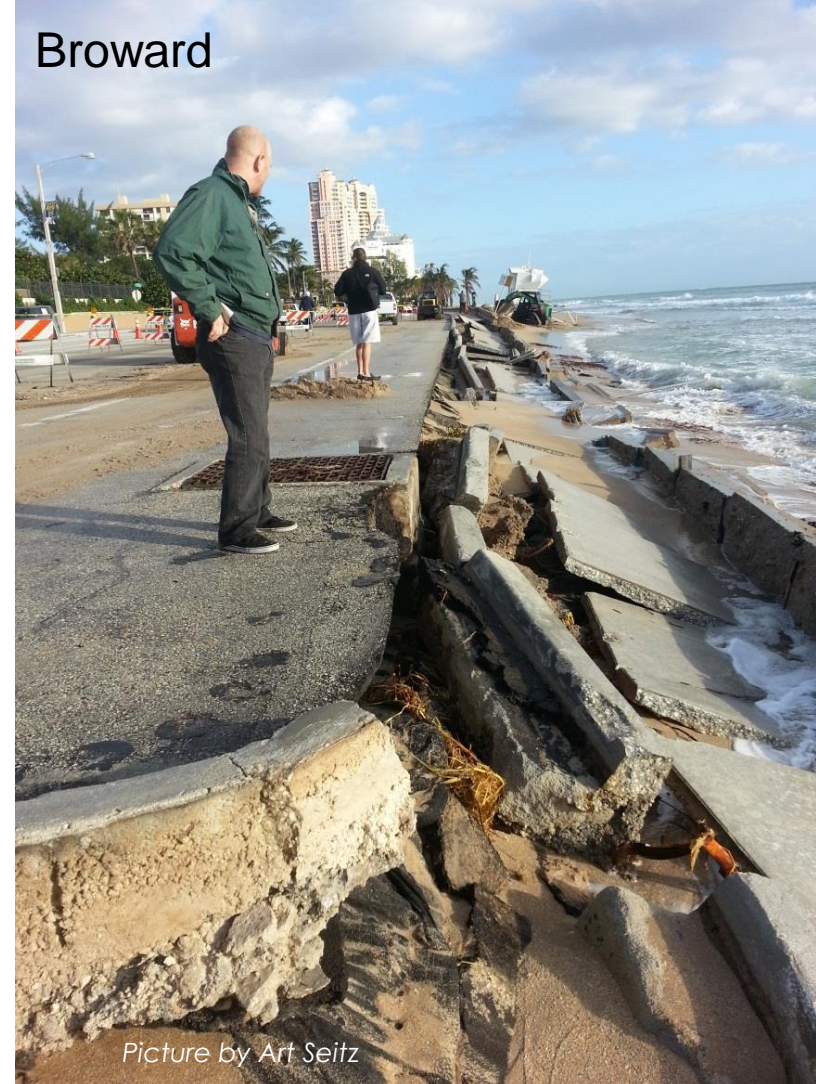


Credit: Keren Bolter

Sea Level Rise and Tidal Flooding



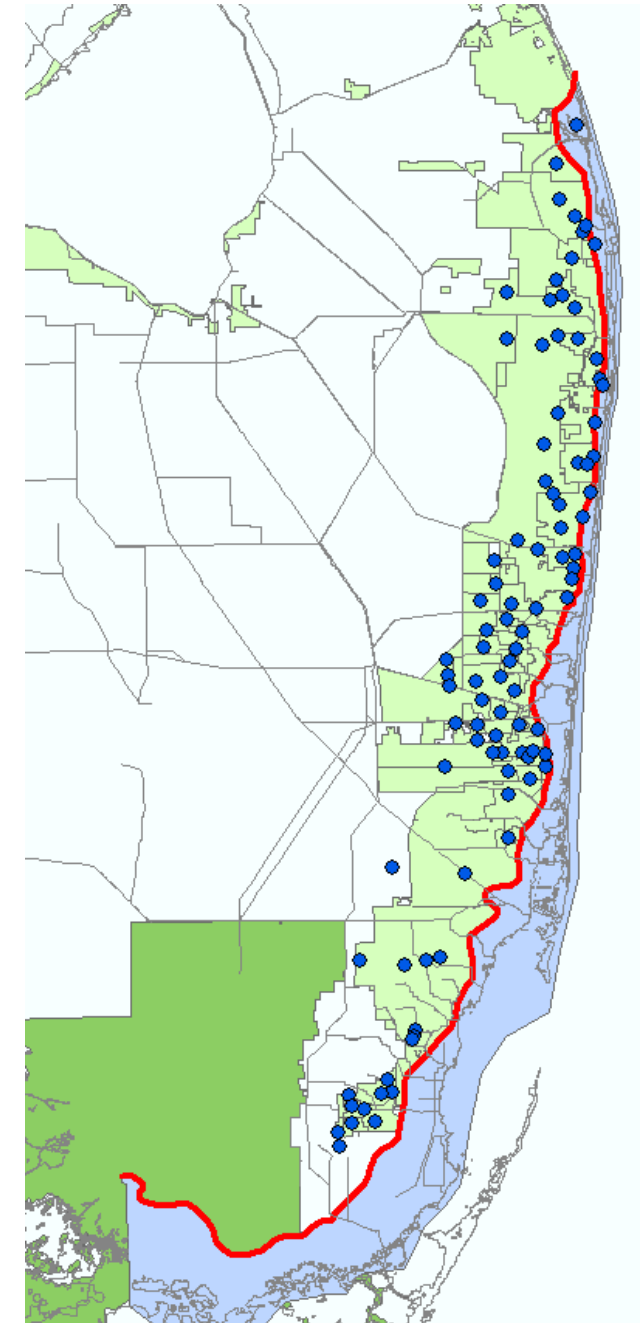
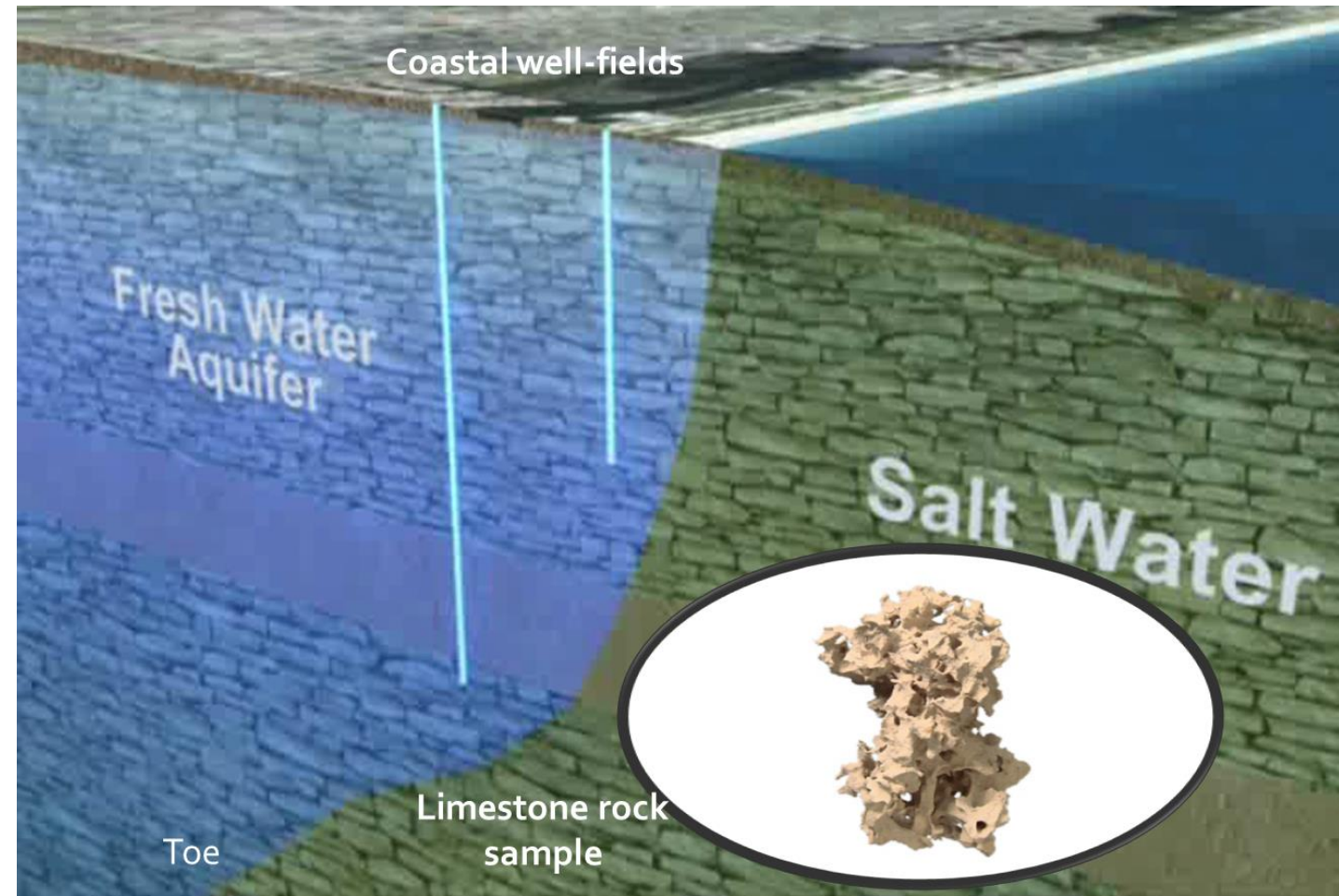
Storm Surge Damage (2012)



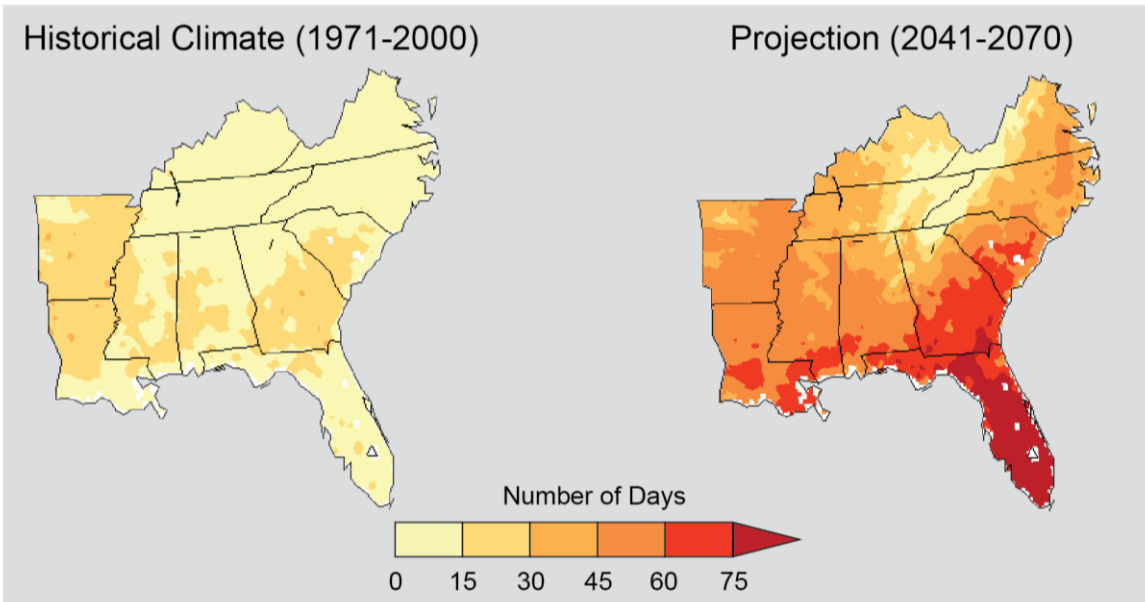
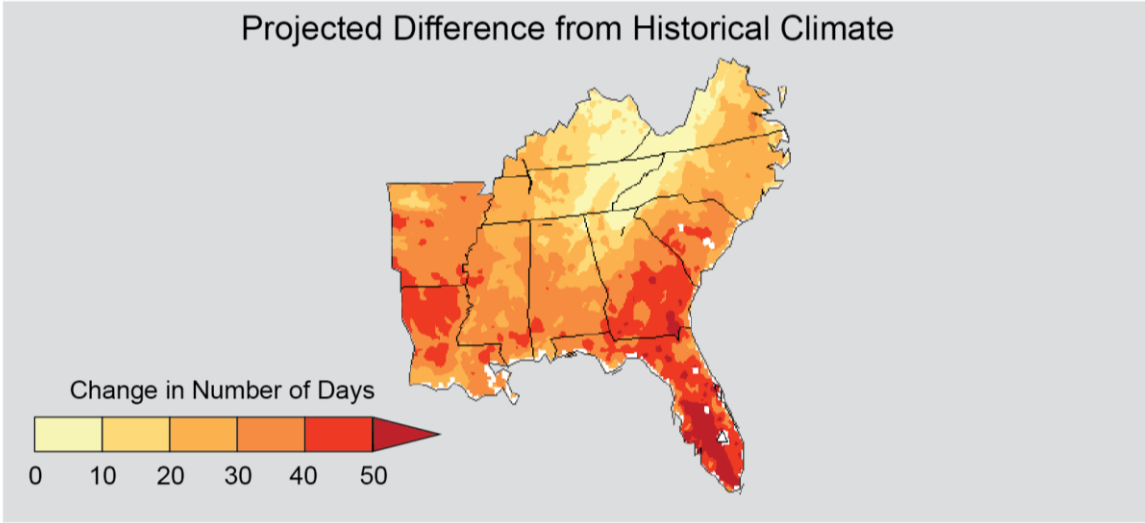
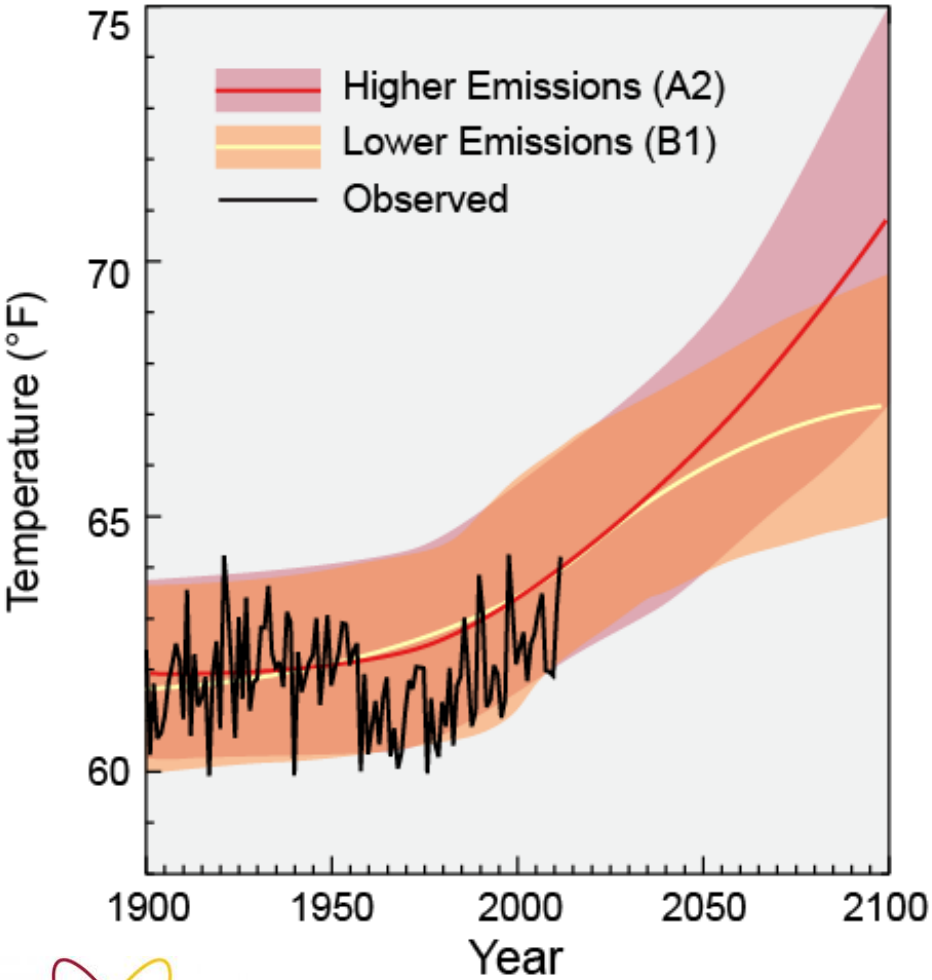
Adaptation Example: Forward Pumping near Miami Airport



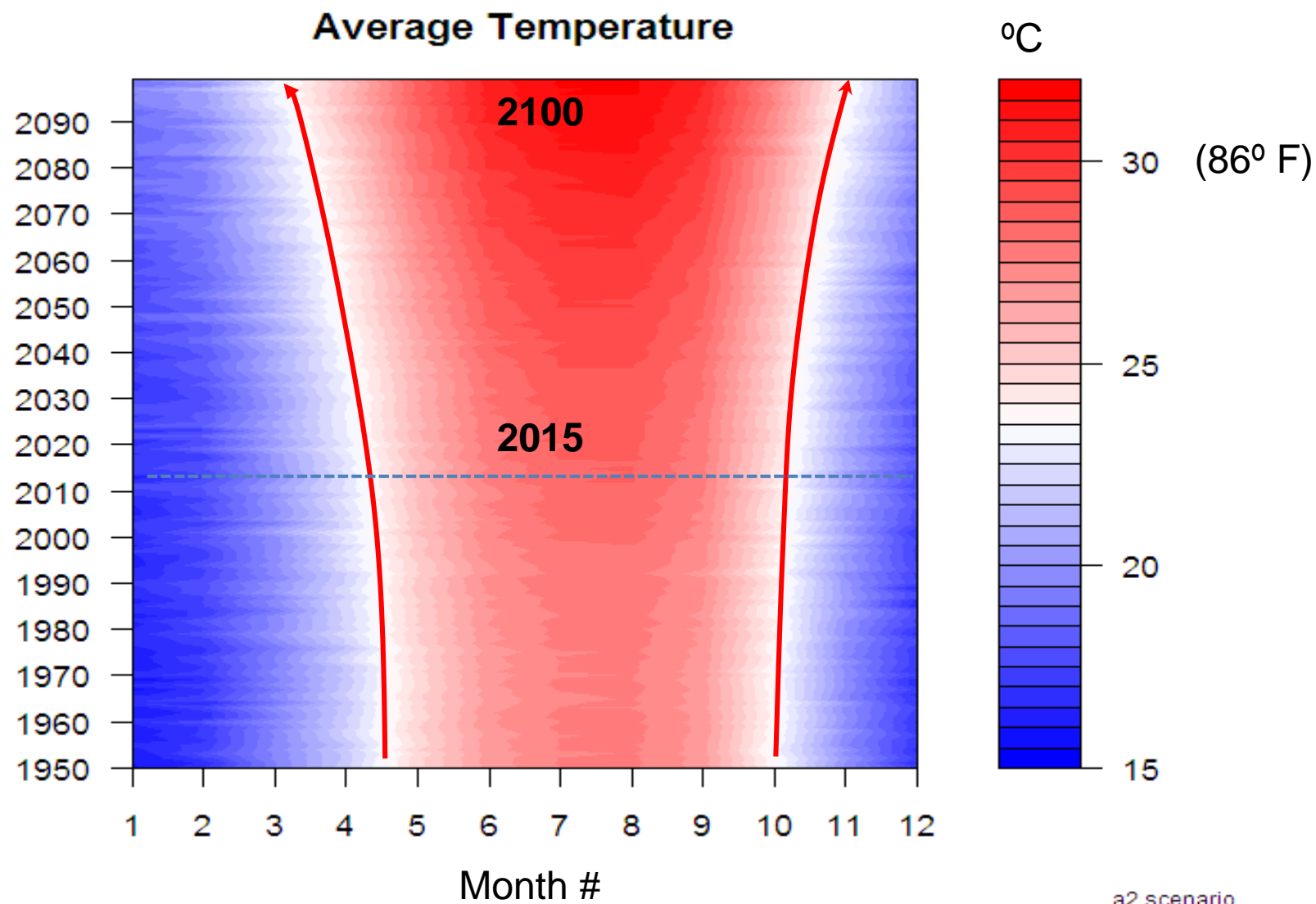
Saltwater Intrusion



Southeast Temperature: Observed and Projected



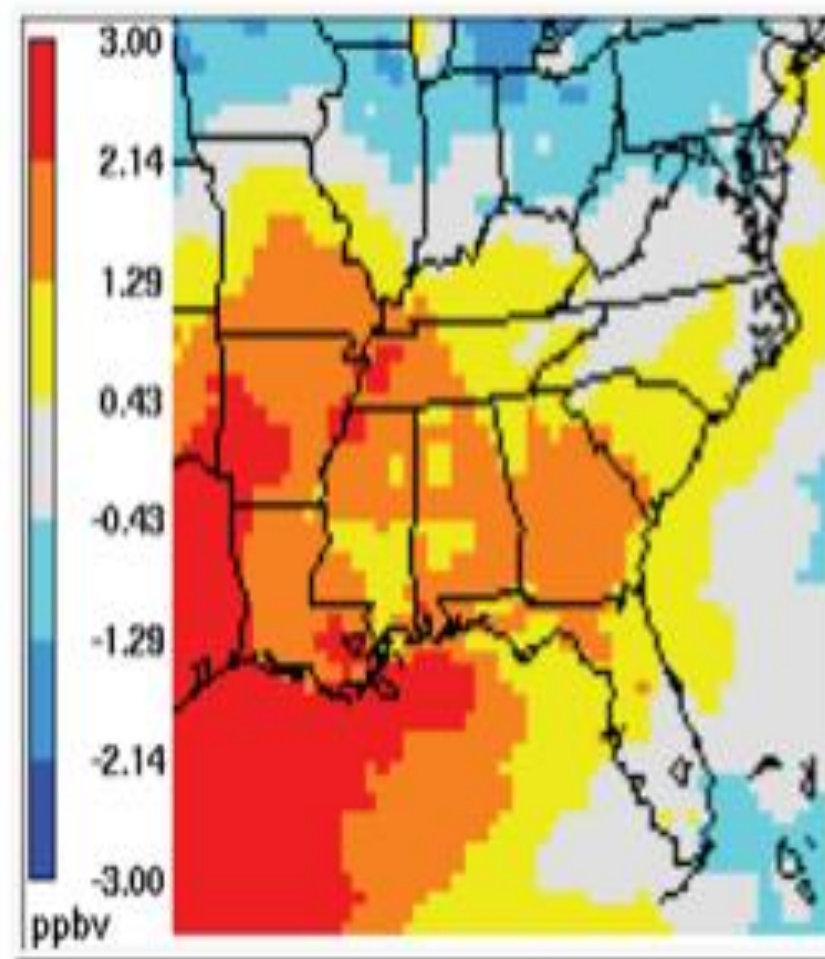
Hotter and Longer Summer?



Health Effects of Increasing Temperature

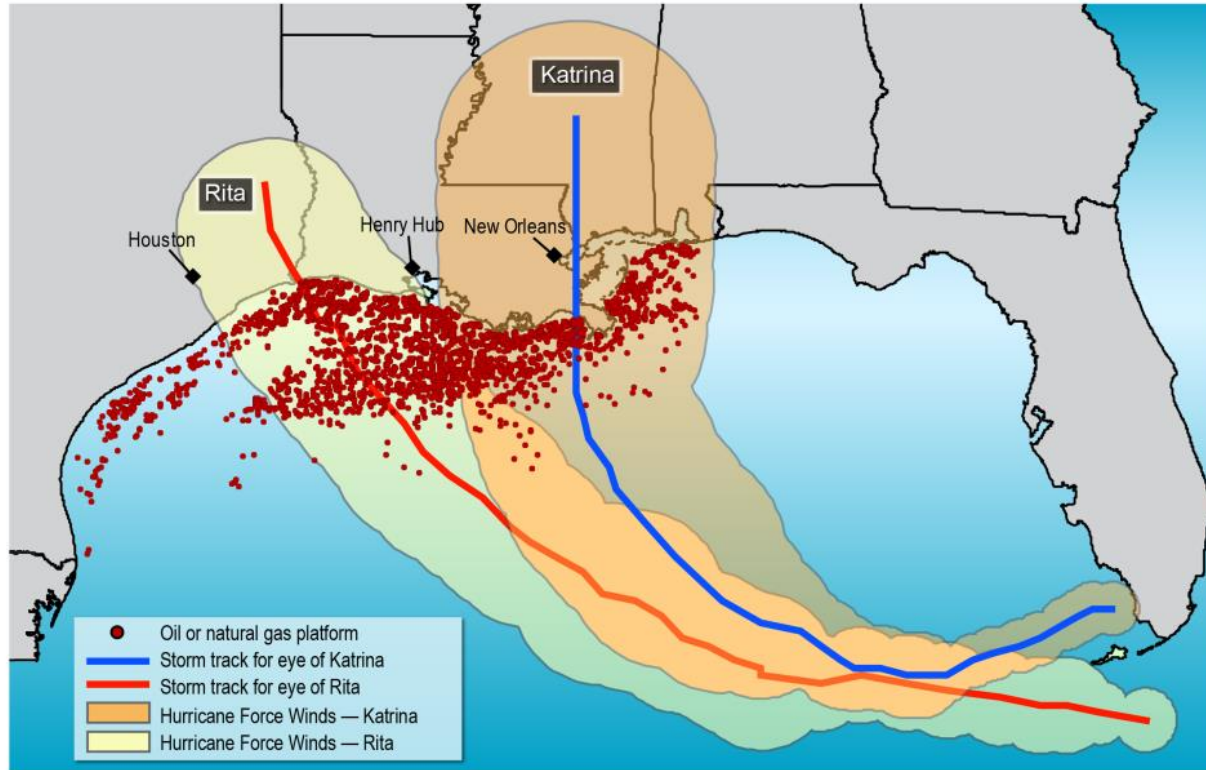
- Higher temperatures and extreme events threaten human health and well-being in many ways, including impacts from increased extreme weather events, increases in ground level ozone, wildfire
 - Climate change is increasing the risks of heat stress, respiratory stress from poor air quality and the spread of waterborne diseases.
 - Increasing temperatures may increase favorable conditions for transmission of vector-borne diseases like malaria and dengue fever
 - Bacterial infections in humans are frequently reported both one month earlier and one month later than traditionally observed due to warmer coastal waters and higher shellfish bacteria

Ground-level Ozone



Ozone is projected to increase across most of the SE USA as temperatures increase

Changes in Hurricanes

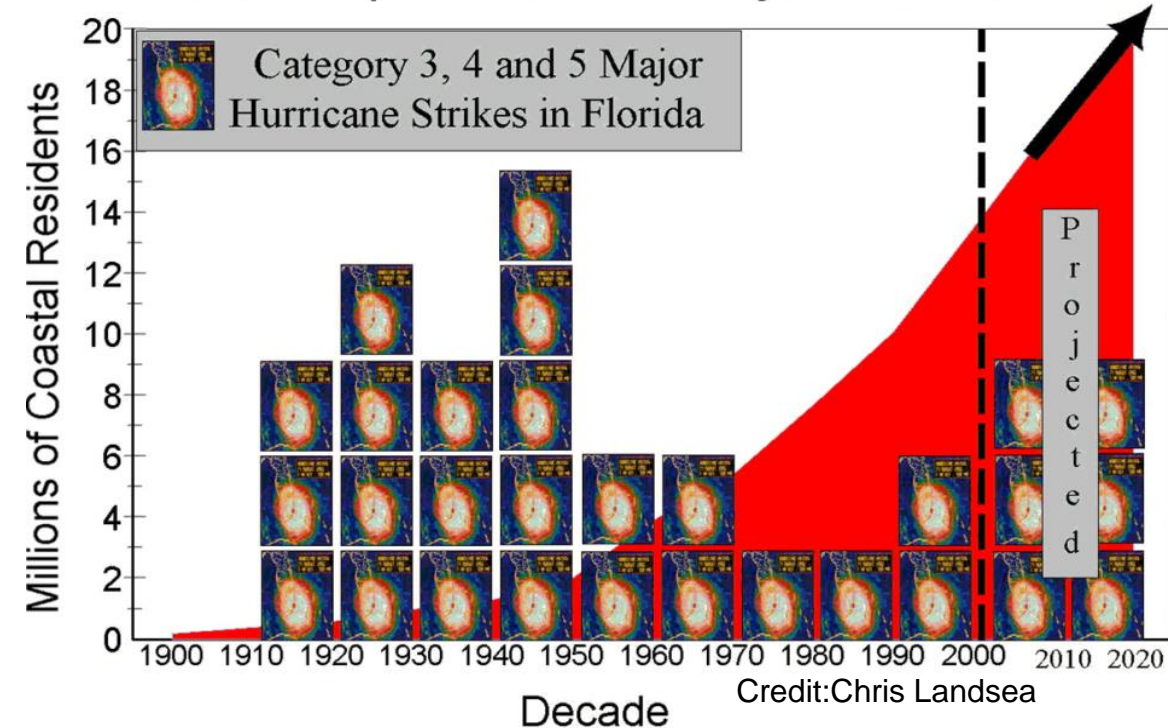


Hurricane-associated storm intensity and rainfall rates are projected to increase as the climate continues to warm.

The intensity, frequency, and duration of North Atlantic hurricanes, as well as the frequency of the strongest (Category 4 and 5) hurricanes, have all increased since the early 1980s.

The relative contributions of human and natural causes to these increases are still uncertain.

Florida Population and Major Hurricanes



Katrina Diaspora

Katrina Diaspora

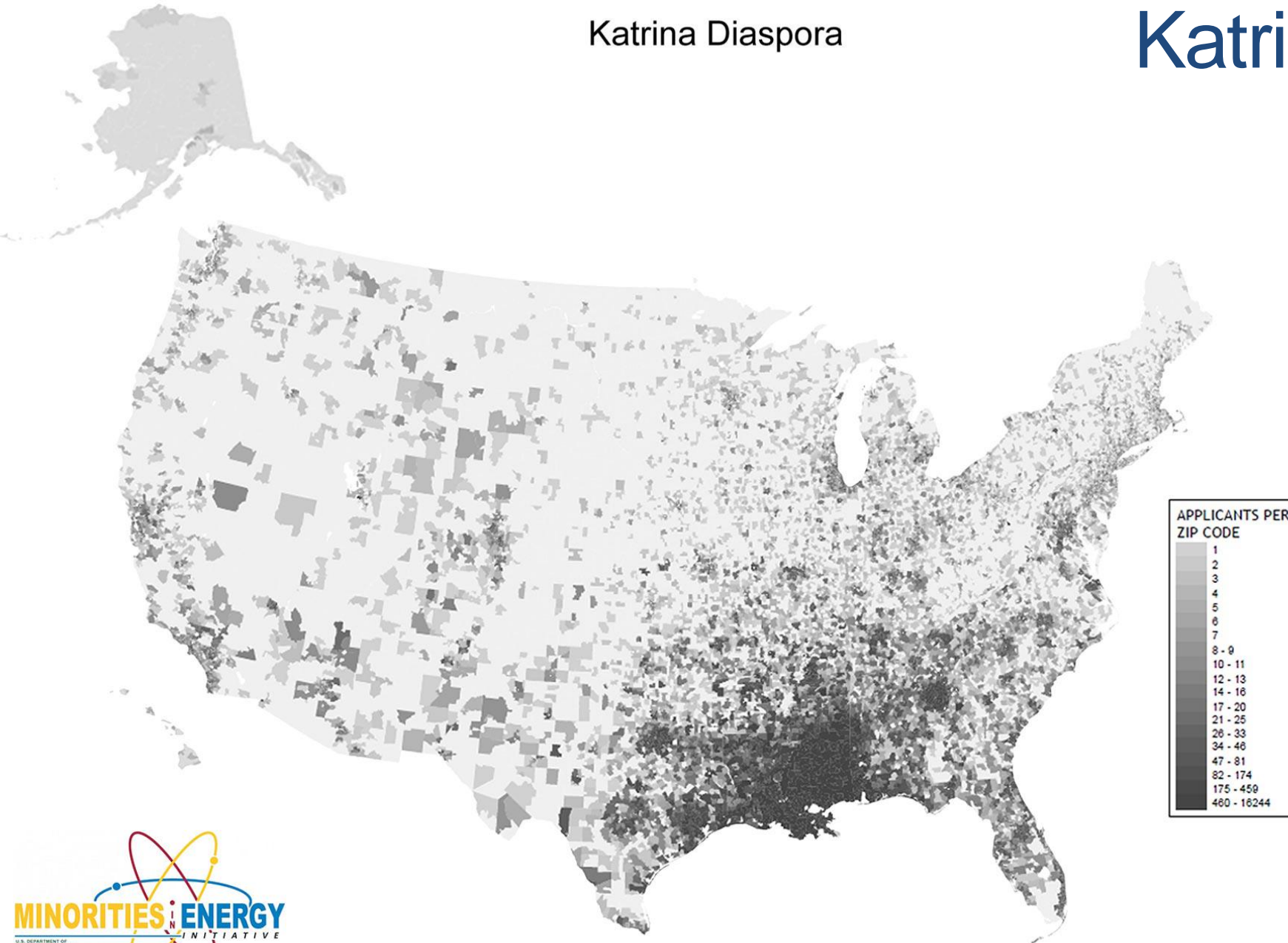


Figure source: Kent 2006

Water availability

- Large populations, unique ecosystems and economies (urban, agriculture, energy, tourism) depend on water
- Already experiencing droughts and water conflicts; examples are:
 - ACF river basin droughts and increased demand for water – ongoing water conflicts among GA, AL, FL
 - Drought in Puerto Rico in winter-spring of 1997-98 with water rationing to more than 200,000 people
- Such droughts and water conflicts are expected to worsen with climate change

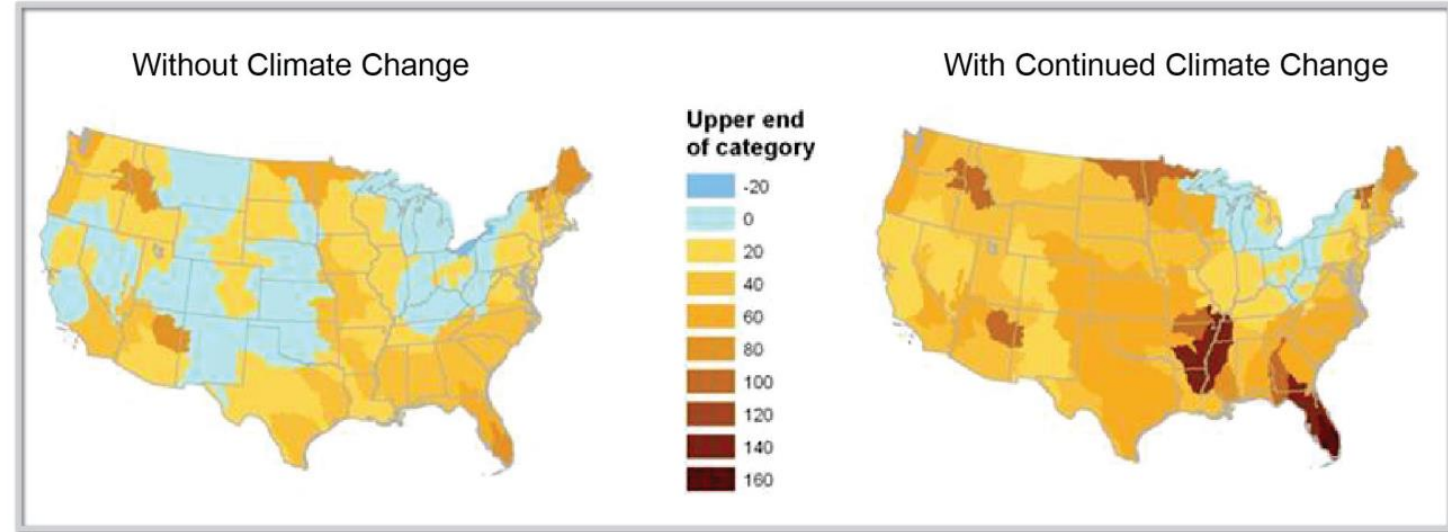


The Apalachicola-Chattahoochee-Flint River Basin in Georgia exemplifies a place where many water uses are in conflict, and this conflict is expected to be exacerbated by future climate change

Water availability (Cont.)

- Projected increases in urban development, conversion of rural areas, forests and wetlands into residential, commercial, industrial, and agricultural zones; increased transpiration, will intensify demand for fresh water.
- Effects of climate change, primarily due to increasing temperatures, are projected to significantly increase water demand across most of the SE (Foti et al. 2012).
- Net water supply in the SE is expected to decline over the next decades, particularly in the western part of the region and the Caribbean

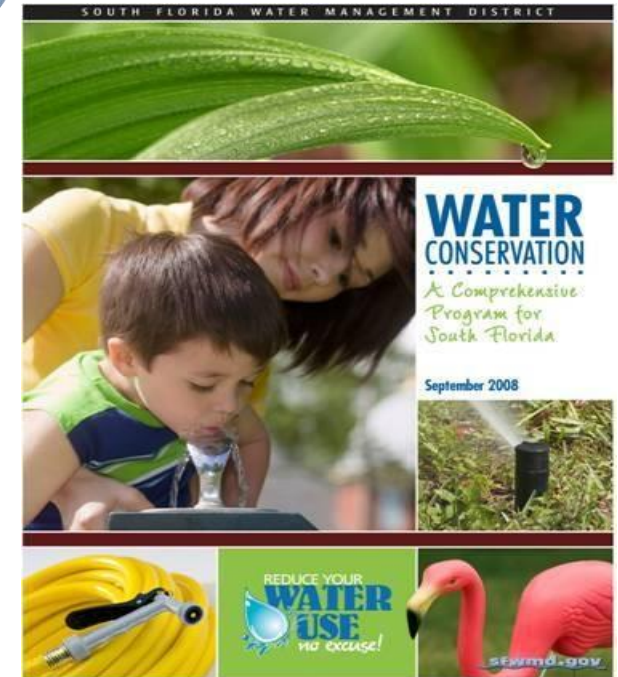
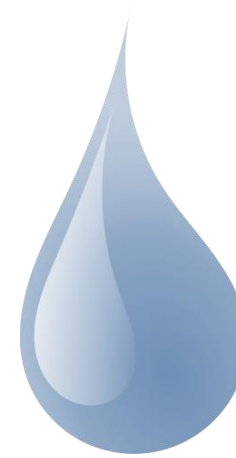
Projected Changes in Water Withdrawal



Percent change from 2005 to 2060 in projected water withdrawals assuming no change in climate (left) and continued growth in heat-trapping gas emissions (A2 scenario, right).

Water Conservation

- Development of a conservation ethic of all water sources
- No longer acceptable to use water once and dispose of it
- Effective conservation can postpone or eliminate need for development of expanded water supply
- Public Water Supply Water: Goal-based conservation
- Irrigation: Irrigation based on crops needs accounting for recent rainfall and soil moisture

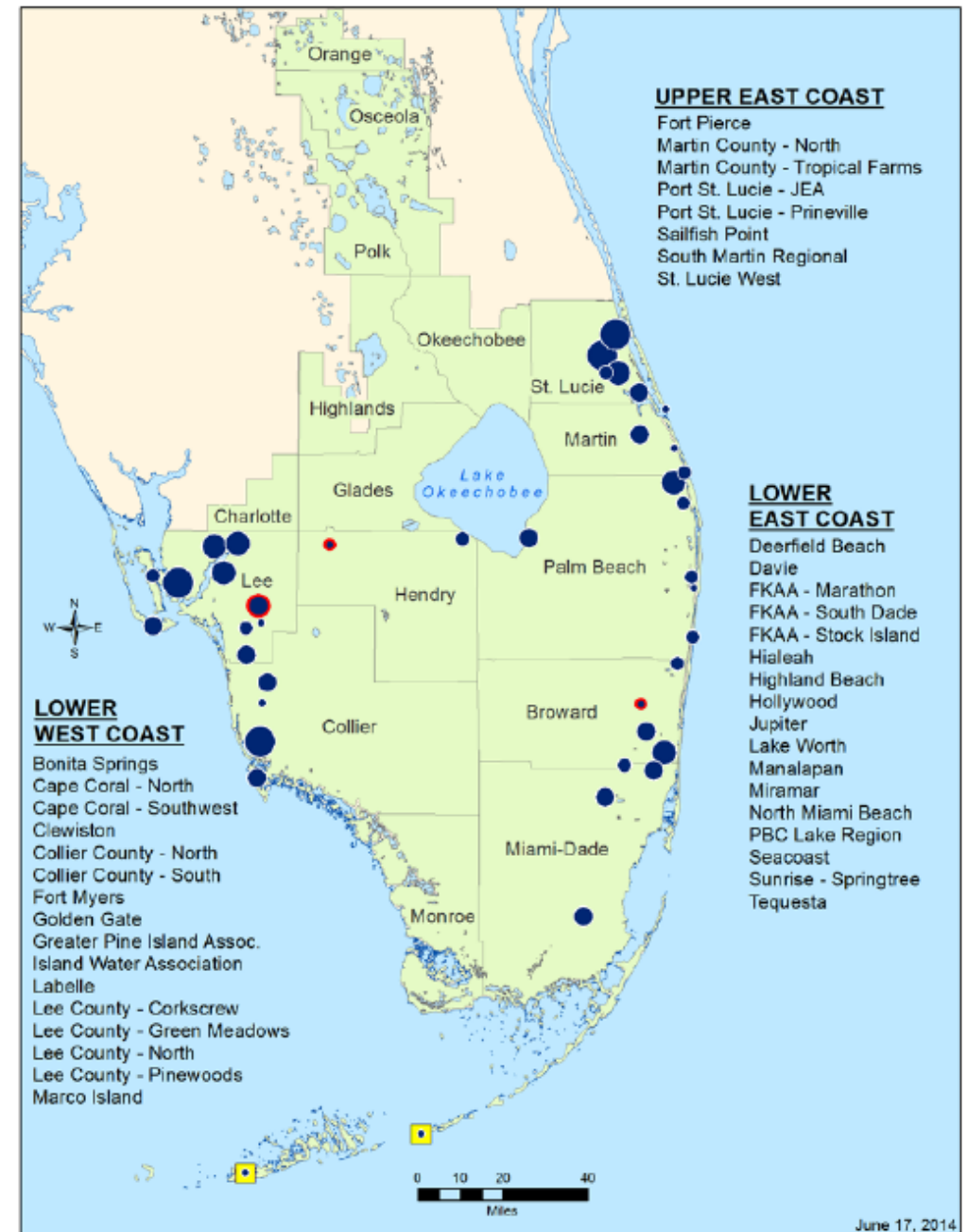
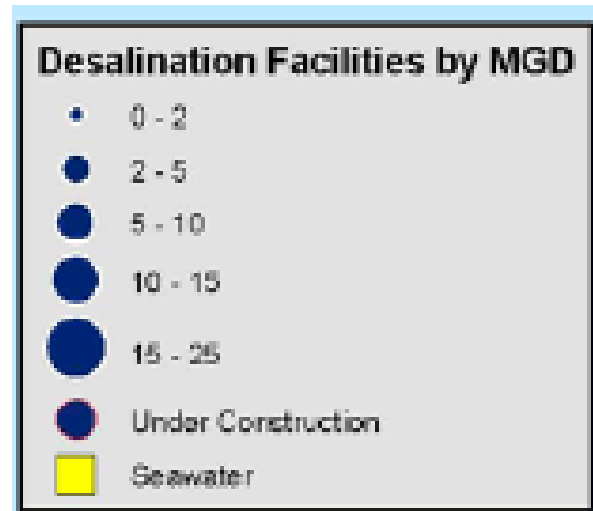


The cheapest gallon of water is the gallon we don't use

What is all this purple about?



Facilities Using Brackish Groundwater in South Florida (2014)



Southeast Florida Regional Climate Compact



- Fully Ratified January 2010
- Commitments include:
 - Policy Collaboration
 - Develop Regional Tools
 - Unified SLR Projection
 - Inundation Maps
 - GHG Emissions Baseline
 - Convene Annual Summits
 - 7th summit: December 1-3, 2015, Key West



<http://www.southeastfloridaclimatecompact.org/>

Southeast Florida Regional Climate Change Action Plan

- ❖ Completed October 2012
- ❖ Product of 3-year planning and public process
- ❖ Reflects contributions of 135+ work group members
- ❖ Details 110 recommendations across 7 planning areas
- ❖ Includes companion Implementation Guide



A Region Responds to a Changing Climate

Southeast Florida Regional Climate Change Compact Counties

Regional Climate Action Plan

October 2012



Download at
www.southeastfloridaclimatecompact.org

- Questions?

MINORITY COMMUNITIES AND CLIMATE CHANGE IN FLORIDA WITH *CAMILLE COLEY* Florida Atlantic University



Key Points

- Climate change is not a political issue for Latinos and African Americans. It's a values issue.
- Latinos and African Americans are actually among the most concerned about the environment, particularly global warming.
- Latinos and African Americans often live in areas where they are directly exposed to pollution, such as neighborhoods near highways and power plants.
- Both Hispanics/Latino Americans (69%) and Africans Americans (71%) are more likely than non-Hispanic white people (50%) to say climate change is a very serious problem confronting the country.

Hispanics and Climate Change

- In South Florida, the most heavily populated region of the state with a concentration of Cuban and Puerto Rican voters, rising sea levels are an “in-my-backyard” issue.
- The city of Miami Beach just approved an 84 percent increase in storm-water fees to upgrade infrastructure to withstand rising sea levels.
- The city is projected to need \$300 million for pumps to ease street flooding.



African-Americans and Climate Change



The majority of African Americans live in urban areas. The combination of climate warming, heat waves, and the urban heat island effect (which causes temperatures in major cities to be warmer than suburban and rural areas) renders many Blacks at risk of suffering heat-related health issues.

In the South, lower income African-Americans and Hispanics are employed as wage laborers either directly or indirectly in the agricultural industry, which is particularly sensitive to weather and climate variability, especially drought.

Minority Youth and Climate Change



- Questions?

CLIMATE DATA AND TOOLS WITH *EMILY CLOYD*

United States Global Change Research Program

Climate Resilience Toolkit
+ Climate Data Initiative



US Global Change Research Program



13 Federal Departments & Agencies + Executive Office of the President

Global Change Research Act (1990):

“To provide for development and coordination of a comprehensive and integrated United States research program which will assist the Nation and the world to **understand, assess, predict, and respond** to human-induced and natural processes of global change.”

More information:

<http://www.globalchange.gov>



Actions to Build Resilience to Climate Change Impacts in Vulnerable Communities

https://www.whitehouse.gov/administration/eop/ceq/Press_Releases/July_09_2015

- **Providing Data and Tools for Climate Preparedness.** The Administration's Climate Data Initiative (CDI) and Climate Resilience Toolkit (CRT), launched in 2014, have made hundreds of high-values datasets, tools, and case studies freely available to the public and decision makers. The recent releases of the "Energy" and "Transportation and Supply Chain" themes in June 2015 mark the completion of the initial focus areas of the CDI and CRT. Building on these early successes, content, tools, and functionalities will continue to be added as new themes – such as "Tribal Nations" – are developed. By the end of 2015, the CRT will include a new and improved "Climate Explorer," new topical map layers that are relevant to decision makers and planners, and a mobile app. These efforts will be supported by an increase in targeted stakeholder-engagement opportunities.



Climate Resilience Toolkit

<http://toolkit.climate.gov/>

U.S. Climate Resilience Toolkit

Get Started Taking Action Tools Topics Expertise

About | Contact | Funding Opportunities | FAQ

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Meet the Challenges of a Changing Climate

The Climate Resilience Toolkit provides resources and a framework for understanding and addressing the climate issues that impact people and their communities.

- 1 Identify the Problem
- 2 Determine Vulnerabilities
- 3 Investigate Options
- 4 Evaluate Risks & Costs
- 5 Take Action

Find Out How People Are Building Resilience

Adapting to Climate Change: A Water Utility's Approach (1:27)
[Watch video >](#)

Climate Outlooks Inform Water Management (0:53)
[Watch video >](#)

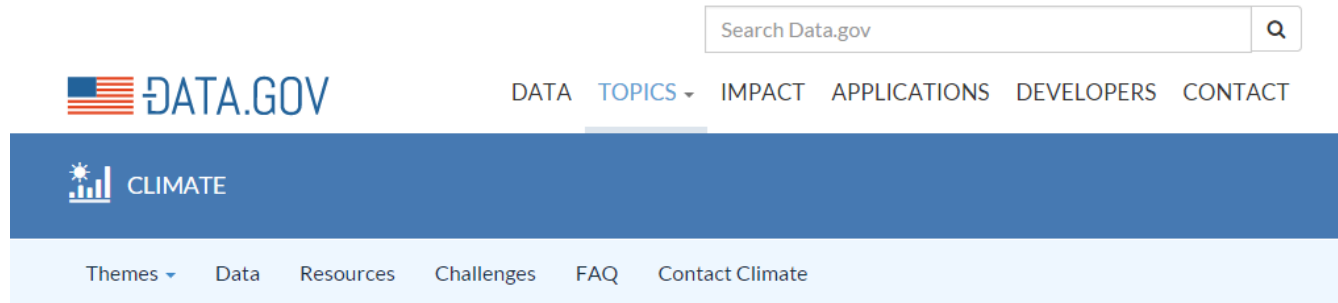
Building Smart in the Floodplain (1:14)
[Watch video >](#)

New Hydrology for a Resilient Road (1:55)
[Watch video >](#)

- Get Started – Learn about risk and resilience
- Taking Action – Case studies of businesses and communities
- Tools – Identify impacts and opportunities, manage risks, and build resilience
- Topics
 - Coastal flood risk | Ecosystem vulnerability | Energy supply and use | Food resilience | Human health | Transportation and supply chain | Tribal nations | Water resources
- Expertise – Training and Experts
- Funding Opportunities

Climate Data Initiative

<http://climate.data.gov/>



Here you can find data related to climate change that can help inform and prepare America's communities, businesses, and citizens. You can currently find data and resources related to [coastal flooding](#), [food resilience](#), [water](#), [ecosystem vulnerability](#), [human health](#), [energy infrastructure](#) and [transportation](#). Over time, you will be able to find additional data and tools relevant to other important climate-related impacts. Please share your [feedback](#).



Visit the [Climate Resilience Toolkit](#) to access resources and a framework for understanding and addressing the climate issues that impact people and their communities.



- Themes
 - Coastal flooding | Ecosystem vulnerability | Energy infrastructure | Food resilience | Human health | Transportation | Water
- Data – 500+ Federal datasets
- Resources – Climate model projections and scenarios
- Challenges – Innovation challenges issued by public, private, nonprofit, and other organizations

- Questions?