TRIBAL ENERGY SYSTEMS: CLIMATE PREPAREDNESS AND RESILIENCY
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Lincoln, California




National Association of State Energy Officials

Climate Change and the Need for Energy Resiliency

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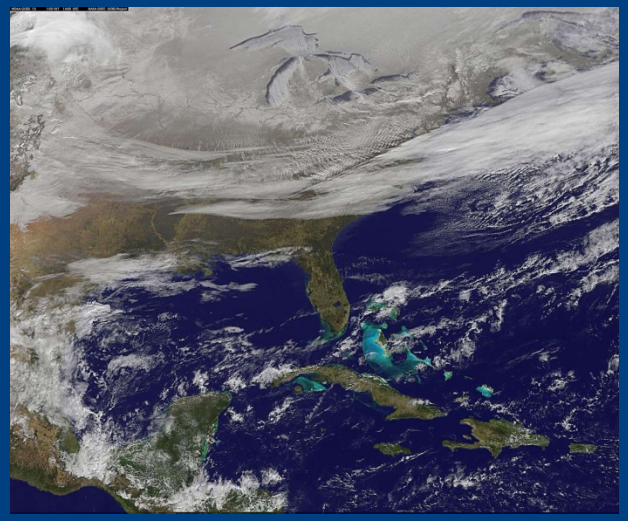
What is Resilience?



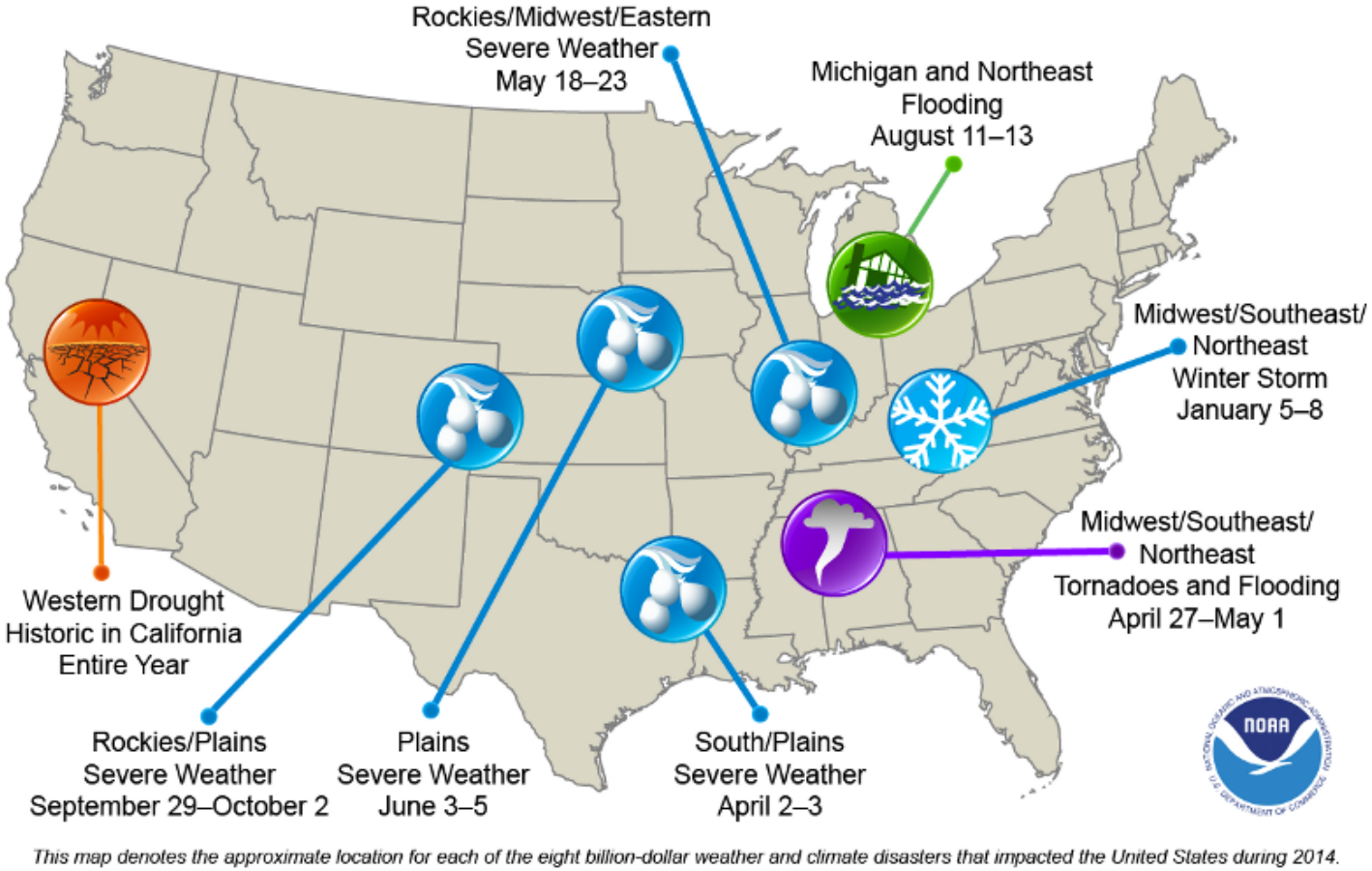
January 7, 2015 winter storm

- **Resilience**, is defined in Presidential Policy Directive 21, as *"the ability to prepare for and adapt to changing conditions and withstand and recover rapidly from disruptions...[it] includes the ability to withstand and recover from deliberate attacks, accidents, or naturally occurring threats or incidents."*

- **Security and Resilience** are strengthened through risk management which is the *"process of identifying, analyzing, and communicating risk and accepting, avoiding, transferring, or controlling it to an acceptable level at an acceptable cost."*

Source: National Infrastructure Protection Plan 2013

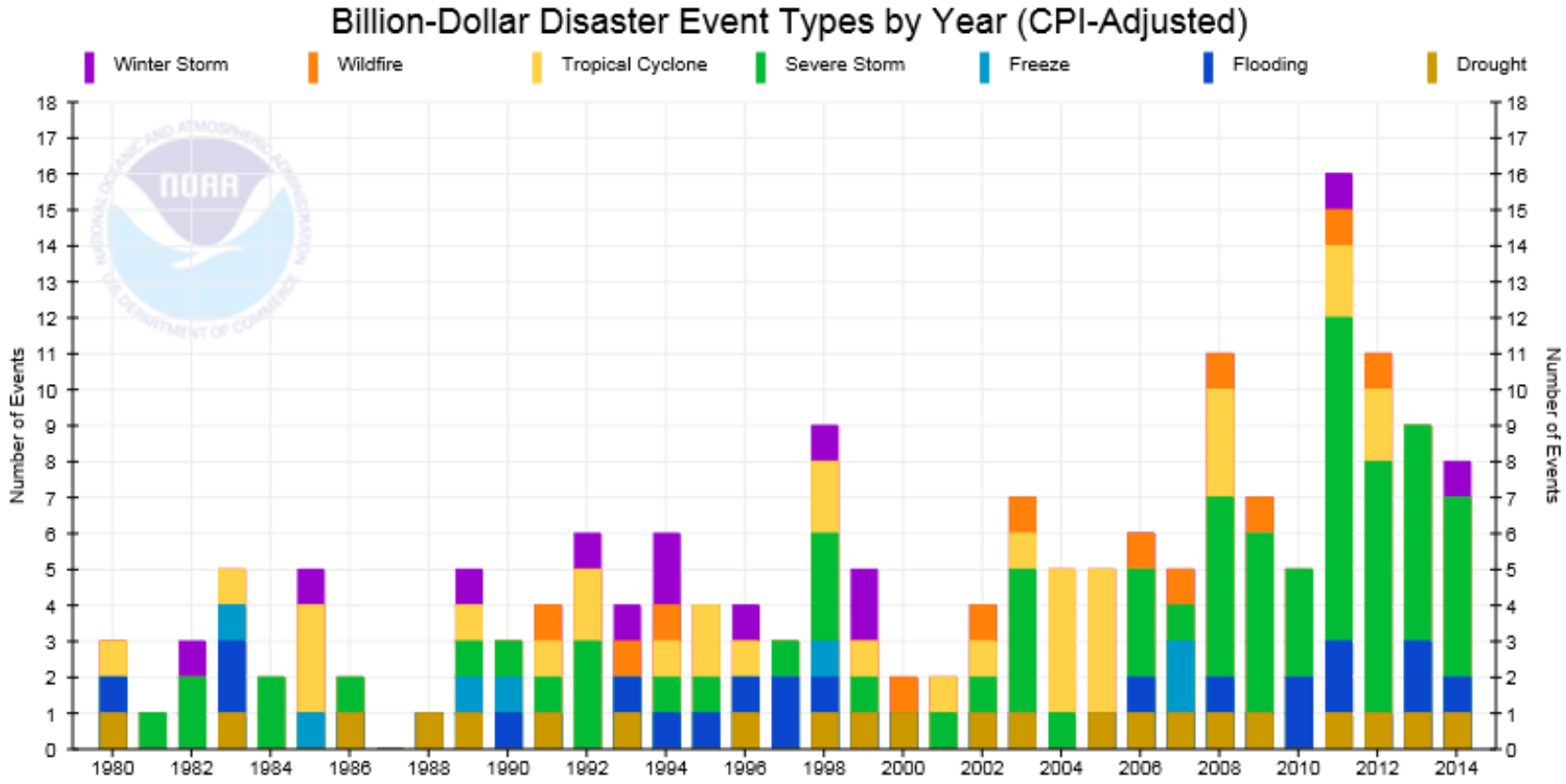
In 2014, the U.S. had eight weather disasters costing over a billion-dollars



This map denotes the approximate location for each of the eight billion-dollar weather and climate disasters that impacted the United States during 2014.

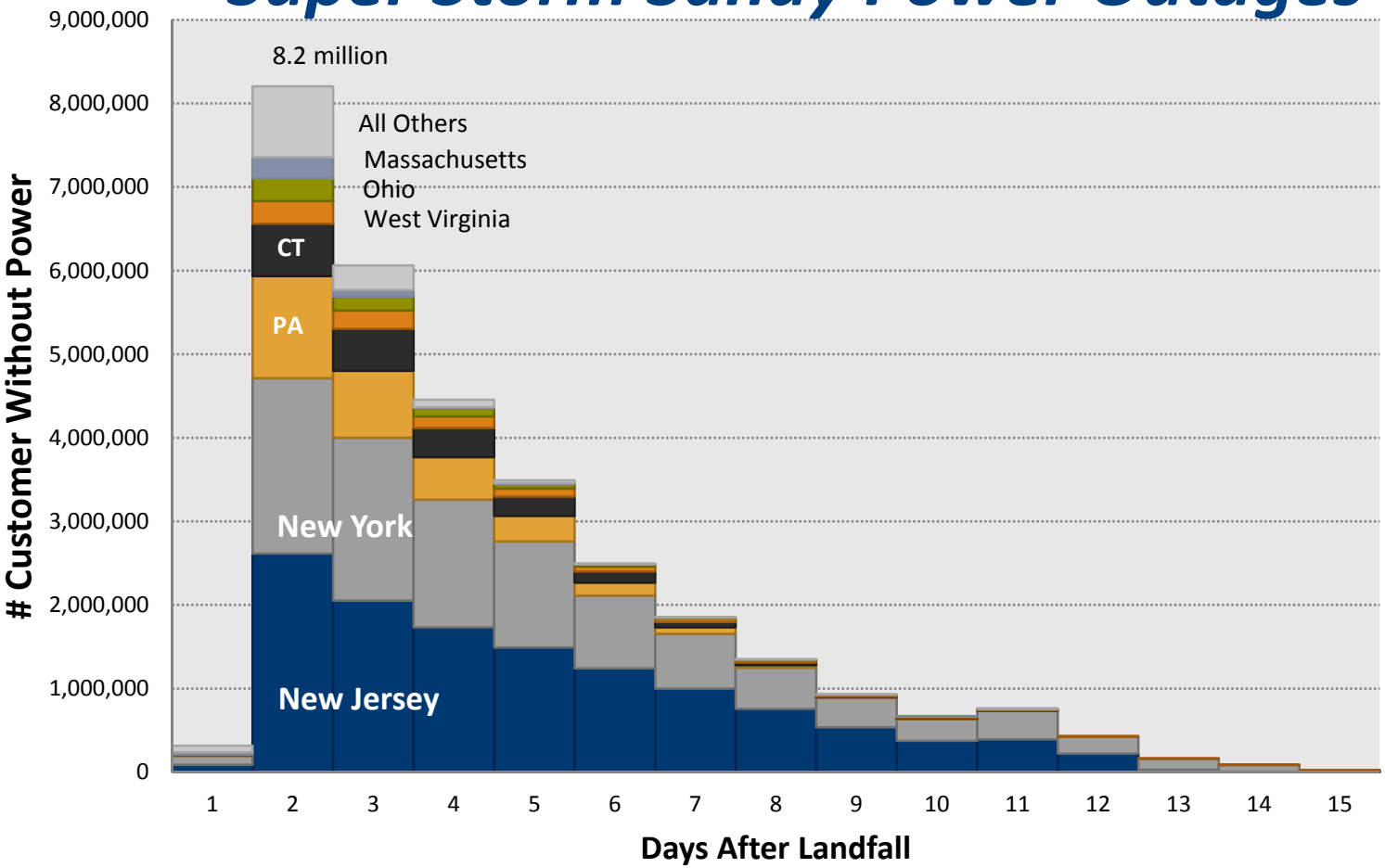
Source: National Oceanic and Atmospheric Administration

In the last four years there have been 44 weather and climate disasters costing over a billion-dollars



Source: National Oceanic and Atmospheric Administration

Super Storm Sandy Power Outages



All Others: Maryland, Virginia, New Hampshire, Rhode Island, Maine, Michigan, Delaware, Indiana, Kentucky, Vermont, District of Columbia, Tennessee, North Carolina, Illinois.

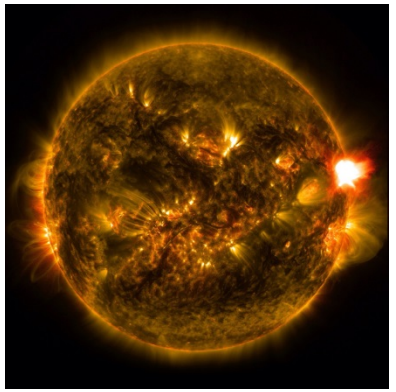
Source: DOE's Office of Electricity Delivery and Energy Reliability, Infrastructure Security and Energy Restoration (ISER) Division Situation Reports Hurricane Sandy

Energy Assurance is the Capability to:

- **Plan and Respond** to events that disrupt energy supply and assure a rapid return to normal conditions. This is a coordinated effort involving the private energy sector's response, augmented by State, Local, Tribal, Territorial, and Federal governments as needed; and

- **Mitigate Risks** through policies, programs, and investments that provide for more secure and resilient energy infrastructures that also reduces interdependencies impacts.



State Energy Assurance Planning

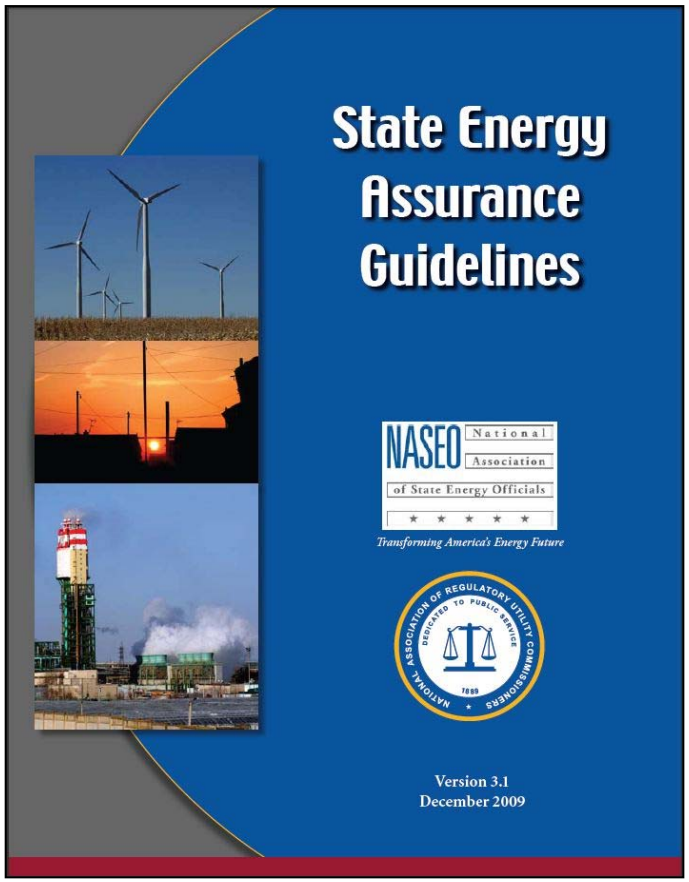
Responding to energy emergencies & reducing risk to critical energy infrastructure

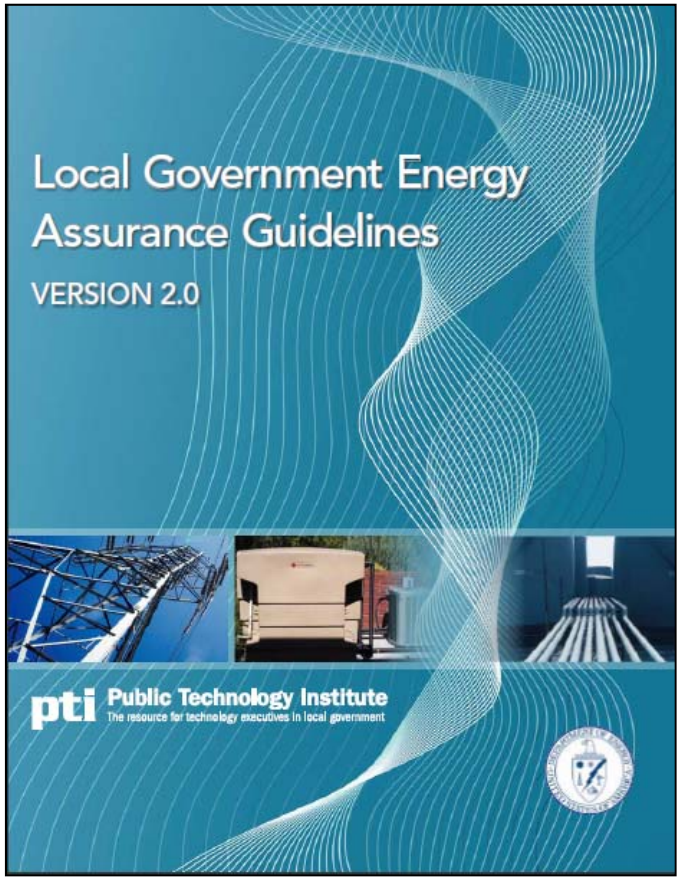
- **Nearly all states, some territories, and 43 local governments have energy assurance plans to:**
  - Respond to energy supply disruptions, assure the continued operations of essential public services, and mitigate or reduce risks to critical energy infrastructure
  - Create and sustain expertise on smart grid systems, cybersecurity, interdependencies, and communications
  - Develop processes for tracking energy supply disruptions
  - Prepare workforce development plans and training
  - Conduct energy emergency exercises
  - Revise state policies, procedures, and practices
- **Benefits for States and Local Governments:**
  - Enhance the speed and effectiveness of the energy emergency response
  - Improve coordination across state agencies as well as among states and regions
  - Expand situational awareness
  - Improve recovery and restoration capabilities and reduce risks

For more information visit: naseo.org/energyassurance

Energy Assurance Planning:

Available Resources

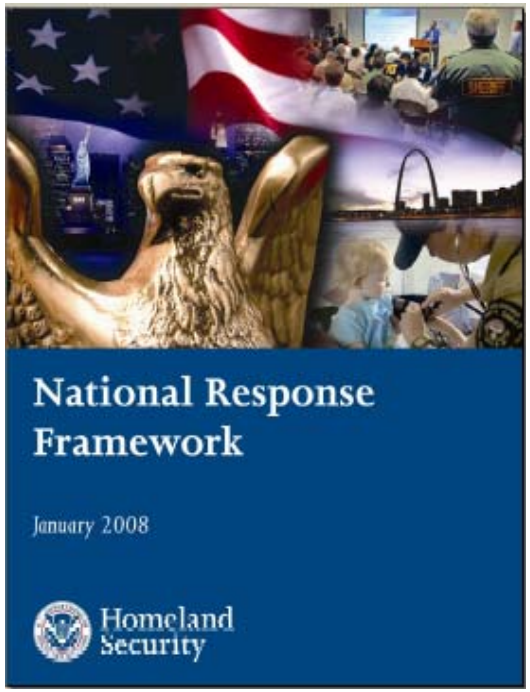


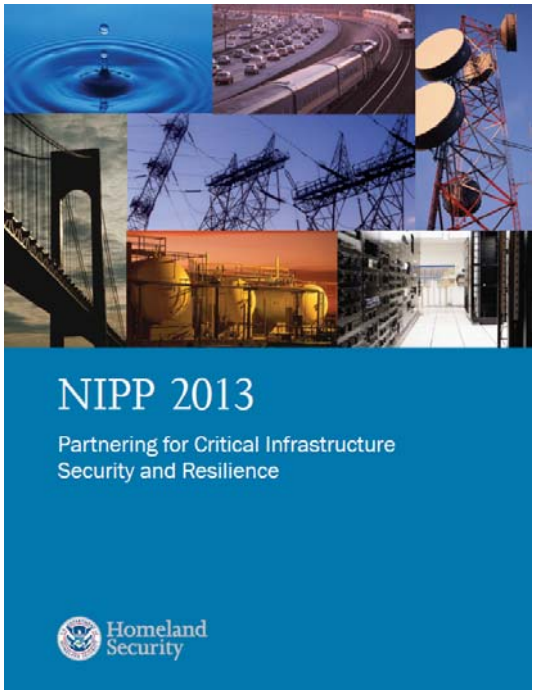


State and Local Energy Assurance Guidelines available for download at:
http://www.naseo.org/eaguidelines

Key National Strategies

- **National Response Framework**
  - http://www.fema.gov/emergency/nrf/
- **National Infrastructure Protection Plan**
  - http://www.dhs.gov/nipp





Energy Assurance Planning Framework

- Executive Summary and Management Guide
- Introduction and purpose of the document(s)
- Summary description of the state's energy use and expenditures
- Description of events that have caused energy shortages, the state's response, and the risk of future events
- Description of state agencies, their roles and responsibilities (include organizational charts), and relationship with Federal, Regional, and Local Authorities
- Linkage and coordination with:
  - Federal response plans
  - Other states' response plans
  - Local and Tribal government plans
  - Private sector/energy sector plans

Energy Assurance Planning Framework
(Cont'd)

- **Energy Emergency Response Plans**
  - Natural gas including local distribution companies (LDC) and interstate pipelines
  - Electricity including LDC, transmission, independent system operators, and energy resources used to generate electricity
  - Petroleum for transportation and heating (include ethanol, biodiesel, and other alternative fuels)

- **State Plan for Enhancing Resilience and Protecting Critical Energy Infrastructure**
  - Energy Infrastructure Risk Assessments
  - Mitigating vulnerabilities, threats and hazards and enhancing resiliency

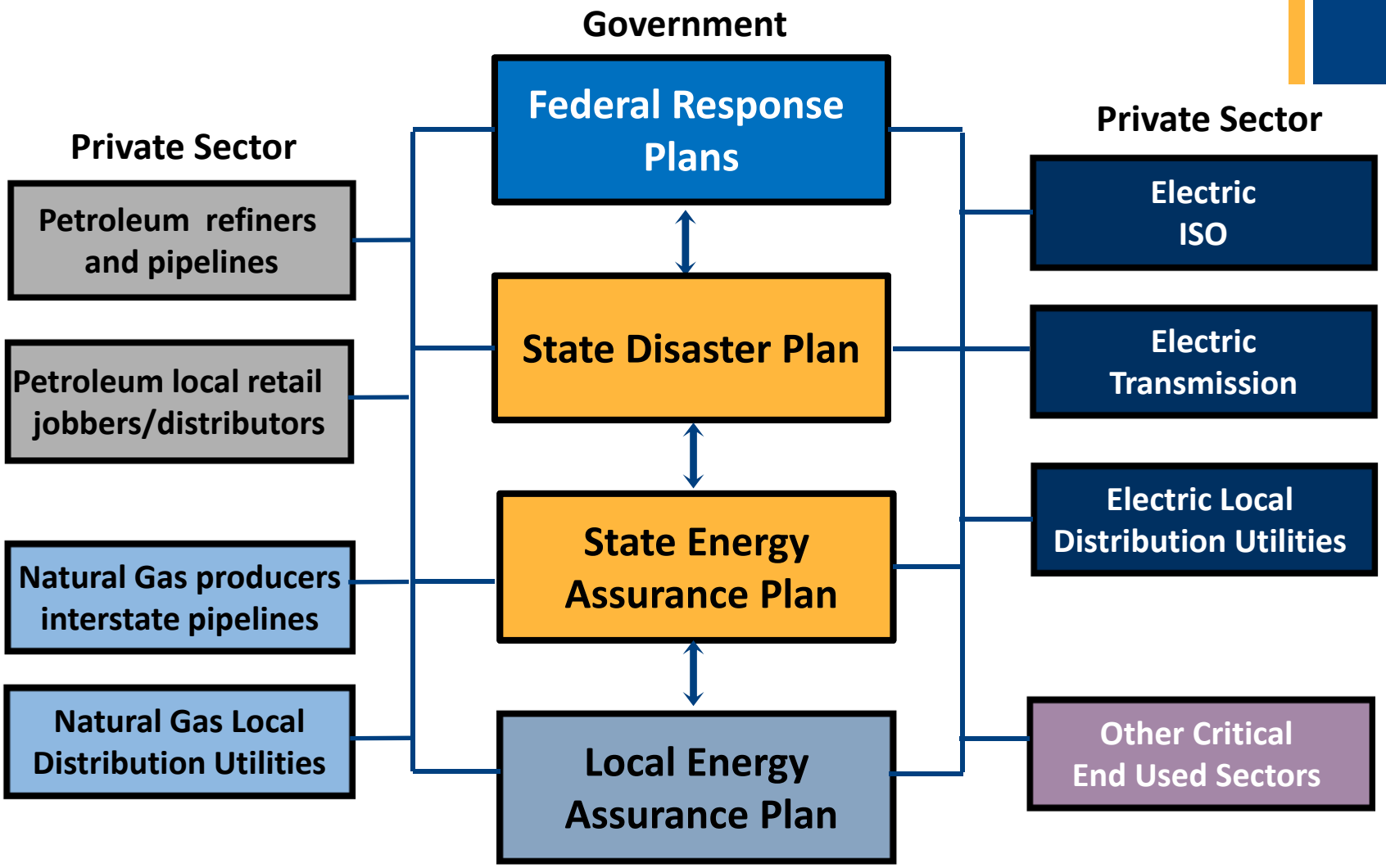
Continuity of Operation Planning

- Prime Objectives for Local Governments Include:
  - Ensuring the continuous performance of government's essential operations during a disaster
  - Reducing loss of life and minimizing damage to property
  - Achieving a timely and orderly recovery from a disaster
  - Protecting key assets, including facilities, from damage
  - Mitigating disruptions to operations
  - Ensuring minimal loss of energy and electricity to key assets

Source: Local Government Energy Assurance Guidelines – Version 2.0

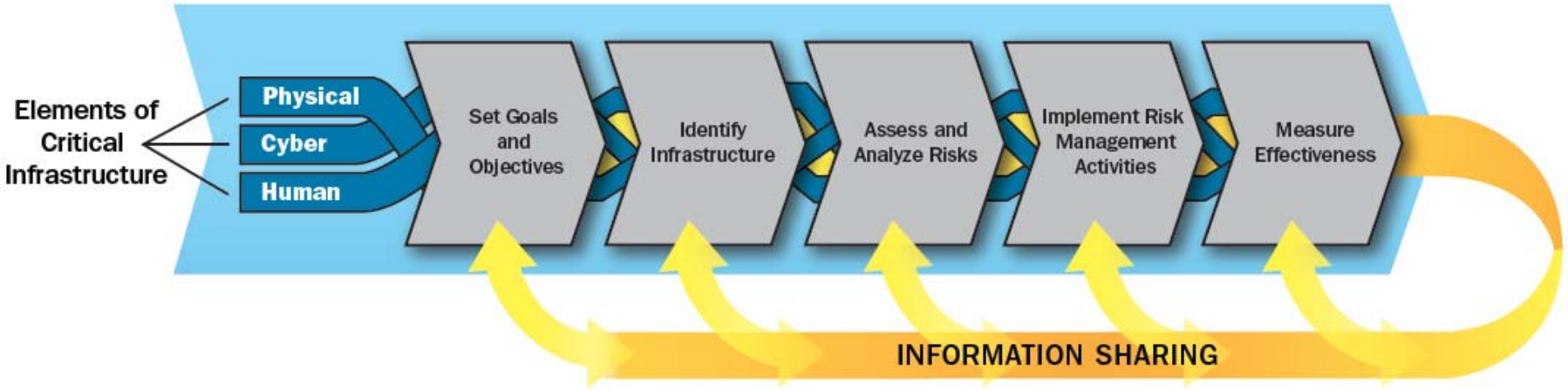
Coordination of Plans

Planning interfaces



National Infrastructure Protection Plan Framework

- Set Goals and Objectives
- Identify Assets, Systems, Networks, and Functions
- Assess Risk (Consequences, Vulnerabilities, and Threats)
- Implement Rick Management Activities
- Measure Effectiveness



Partnering for Critical Infrastructure Security and Resilience

Risk Assessment

Risk is a function of

[Consequence x Threat x Vulnerability]

$15 million Rifle Attack Visible Line of Site

The April 16, 2013, assault on the Pacific Gas and Electric Company's Metcalf substation near San Jose, California damaged 17 transformers, caused $15 million in damage, and put the facility out of service for nearly a month.

Examples of Risk Assessment for weather and climate disasters

Risk is a function of:

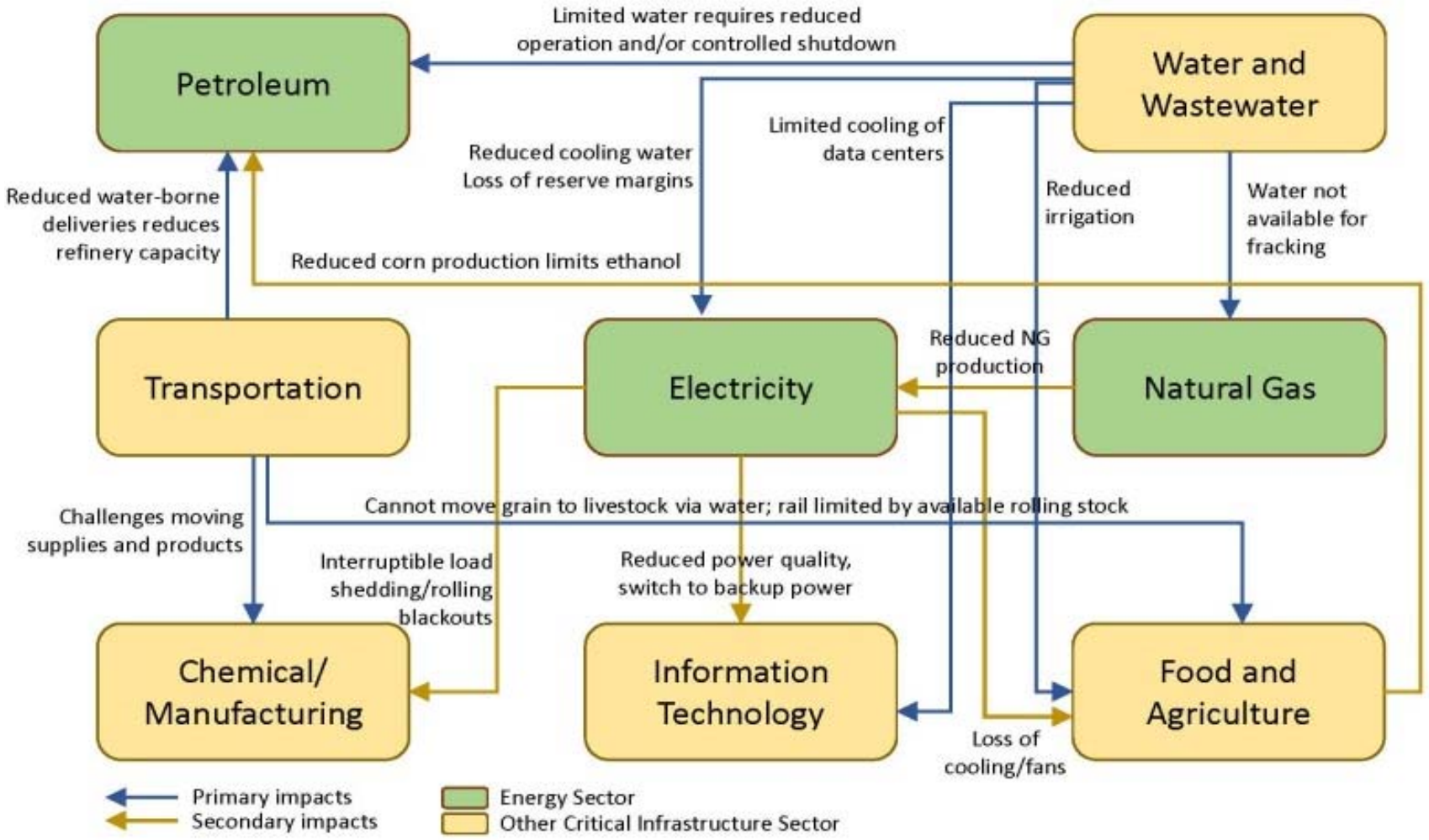
[Consequences x Vulnerabilities x Threats]

- Loss of revenue
- Economic losses
- Public safety
- Injuries and loss of lives
- Physical damage
- Loss of confidence
- Operational interdependencies
- Interdependencies cascading, etc. (customers/suppliers)

- Infrastructures in flood zones
- Transmission and distribution systems
- Aging infrastructures
- Insufficient advanced warnings
- Insufficient response resources training and exercises
- Failure to regularly run back-up generators
- No remote data back-up

- Drought
- Wildfires
- Hurricanes
- Floods
- Sever Storms
- Tornados
- Ice Storms
- Earthquakes
- Extreme Temperatures
- Solar Flairs

Long-Term Drought Interdependencies



Attributes of Investments in Resiliency

- Investments prevent infrastructure failures or limit the degree of degradation in the face of many different types of hazards and threats (including weather and climate). Also, the time for restoration is minimized when systems do fail.

- Investments can:
  - Include back up generators, redundant systems, and emergency supplies.
  - Contribute to resiliency and, at the same time, enhance energy efficiency and provide other benefits (including environmental) that can reduce costs and provide for a return on the investment.

Investments that Enhance Resiliency, Economic Efficiency, and the Environment

- Net zero energy buildings have greater self sufficiency
- Wind energy is a lower cost than fossil generation (cost saving) and causes no CO_2 emissions
- Well-insulated homes and buildings that hold heat longer in a winter power outage
- Alternative fuel and electric vehicles diversify energy resource usage
- Smart Grids rapidly detect the size of power outages reducing response time
- Combined heat and power can reduce fuel use, improve conversion efficiency, and operate independently of the power grid
- Microgrids can supply highly-reliable power during times of natural disaster
- Energy storage (e.g., batteries, fuel cells, and emergency fuel reserves)

Net Zero Buildings at the National Renewable Energy Laboratory in Golden Colorado

Examples of State Policies and Programs that Support Resiliency

- Adopting renewable portfolio standards that diversify and distribute power generation
- Expanding alternative fuel vehicle use and refueling locations
- Establishing state and regional petroleum product reserves
- Supporting Smart Grid demonstration projects
- Approving cost recovery by Public Utility Commission of prudent security and resiliency investments by electric and gas utilities
- Providing incentives or adopting requirements for installing or pre-wiring retail gas stations for emergency generators
- Promoting cybersecurity in the public and private sectors
- Planning for energy emergencies and conducting exercises and trainings to improve the speed and effectiveness of the response and sustain capabilities

On the microscale, making an up-front investment in safeguards that mitigate risk and consequences is far more cost-effective than paying for response and recovery after a foreseeable hazard. On the macro scale, a society's level of resilience contributes to its global competitiveness."

—Dr. Stephen Flynn

Founding co-director of the George J. Kostas Research Institute for Homeland Security at Northeastern University (Flynn and Burke 2011)

Thank you!

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