



*2017 Florida Energy Summit  
Preparing for Tomorrow Through Energy Innovation  
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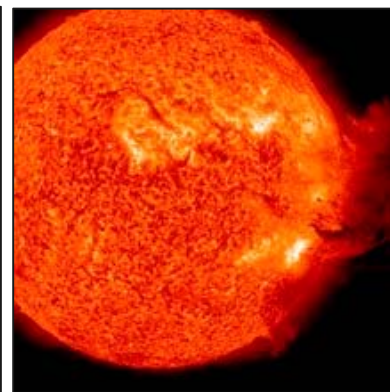


## **Emergency Preparedness and Resiliency in the Energy Sector**

**Jeffrey R. Pillon, Director of Energy Assurance  
National Association of State Energy Officials**

## + Preparedness and Resiliency

- **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 local, state, and federal governments as needed
- **Mitigate Risks** through policies, programs and investments that provide for a more secure and resilient energy infrastructure that also reduces interdependencies impacts
  - *Where risk is a function of consequences, vulnerabilities and threats.*





## Lessons Learned

*We tend to get better with each event and yet often forget lessons learned too quickly*

- After events people are worn out and want to return to business as usual
- Although capturing lessons learned means additional work it is a critical step which should not be ignored
- State leadership should express a strong commitment to identify the following:
  - What worked and what did not work
  - What improvements can and should be made
  - Document actions taken and relevant outcomes
  - Review actions taken in the past to assess the degree to which risks were reduced (consequences, vulnerabilities and threats) and contributed to overall resiliency

# + Energy Assurance Planning Framework

- Executive Summary and Management Guide to the Plan
- Introduction and purpose of the document(s)
- Summary description of the state's energy usage and expenditures
- Description of events that have caused energy shortages, the state's response and the risk of future events
- State agencies and their roles and responsibilities (include organizational charts) and relationship with federal, regional and local authorities
- Linkage and coordination with:
  - Other states and federal response plans
  - Local 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

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*The risk of a disruption due to a cyber attack should be addressed as part of the plan for each energy resource and sector or may be part of a separate planning document*



# + State Energy Assurance Planning

*Responding to energy emergencies and reducing risks to critical energy infrastructure*

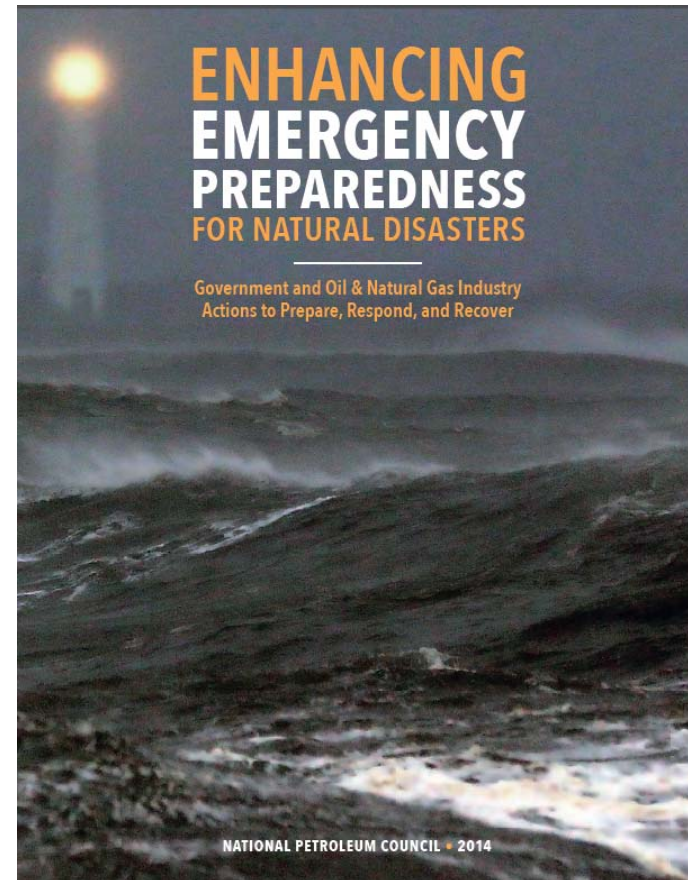
- **Nearly all states, some territories, and 43 local governments developed energy assurance plans to:**
  - Respond to energy supply disruptions, assure the continued operations of essential public services, and mitigate or reduce risks to critical energy infrastructure
  - Create and sustain state level expertise
  - Track energy supply disruptions
  - Prepare workforce development plans and training
  - Conduct energy emergency exercises
  - Revise state policies, procedures, and practices
  
- **Benefits for State 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

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For more information visit: [naseo.org/energyassurance](https://naseo.org/energyassurance)

## + National Petroleum Council Report

- National Petroleum Council (NPC) was asked by the Secretary of Energy for advice about natural gas and oil infrastructure resilience
- Among this report's recommendations was that: "States should increase engagement with the oil and natural gas industry in their energy assurance plans, and industry members should assist the states in such efforts."
- This was further echoed in the NPC Emergency Preparedness – 2016 Implementation Addendum.



See: <http://www.npc.org/reports/epandp.html>

# + Risks to the Petroleum and Liquid Fuels Supply Sector

- **Clear Path IV Exercise in Oregon (April 2016)** – examined the consequences and response to a major earthquake caused by the Cascadia subduction zone and resulting tsunami. This would have catastrophic impacts on petroleum infrastructure in Oregon and Washington.
- **Long-Term Power Outage Workshops (Summer 2016)** – hosted by the Federal Emergency Management Agency in Midwest states to examine the consequences of a power outage that lasted a month or longer. The availability of petroleum supplies for response and recovery was a concern for participants.
- **Western Regional Coordination Workshop in California (September 2016)** – explored contingencies for managing petroleum shortages. The discussions identified the importance of developing plans that could be implemented in a regionally consistent way to facilitate response and implementation.
- **Liberty Eclipse Exercise in Rhode Island (December 2016)** – examined the impact of a cyberattack that caused a large-scale power outage along the East Coast. Under the exercise scenario, the power outage persisted even when steps had been taken that were believed to have restored power under this scenario many refineries in the East Coast shut down and, in areas without power, access to fuel became limited.
- **Clear Path V Exercise in Texas (June 2017)** – explored the impact of a Category 3 Hurricane making land fall near Houston. Under the exercise scenario, all of the refineries in Houston, Galveston and Port Arthur shut down before land fall and 3.8 million customers were without power in Texas and Louisiana.
- **Hurricanes Harvey, Irma, and Maria (September 2017)** – and we know what happened.



# + Petroleum Shortage Response

Gasoline, Diesel Fuel, #2 Heating Oil, Propane, Ethanol, Biodiesel, Other

- **Category One involves the vital first steps in the decision-making process**
  - Assess the consequences, severity and duration of the disruption to determine the appropriate level of response
  - Know location, capacity and throughput of petroleum infrastructure, and points of contact in each company
  - Monitor petroleum supply, demand and prices
  - Make proactive plans in advance of emergencies that can be anticipated (e.g., Hurricanes) this allows time to preposition supplies beforehand
  - Recognize that a number of situations may require ad hoc responses to events and problems from local government, energy consumers, or suppliers. The State Emergency Operations Center and Emergency Support Function – 12 (Energy), if activated, can respond to these types of events “as needed”
  
- **Category Two includes implementation of specific response programs and measures**
  - Assure that essential public safety needs are met working with the petroleum industry
  - Remove regulatory barriers to fuel resupply (waivers)
  - Inform the public on the severity and extent of damage and monitor social media channels to ensure misinformation is not being spread
  - Moderate demand and conserve supply, through public information outreach

# + Petroleum Shortage Response Programs

- Emergency Generators and Transfer Switches for Retail Gas Stations
- Contractual Provisions for Fuel Supplies in an Emergency
- Expand State Fuel Storage and Strategic Reserves
- Use of Alternative Fuel Vehicles
- State Weight Limits Waivers for Petroleum Tanker Trucks
- Retail Gas Station Priorities for Essential Services
- Priorities for Essentials Public Safety Services
- Minimum Purchase and Odd-Even Purchase
- State Set-Aside Program for Bulk Purchasers



# + Petroleum Shortage Response Measures

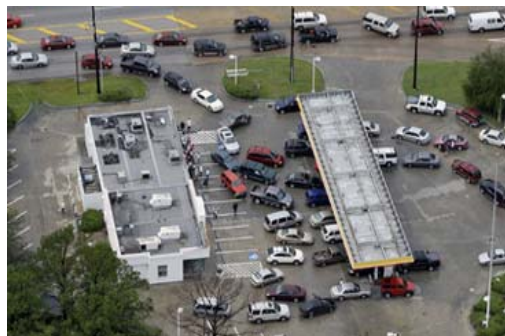
- Waivers of Federal Motor Carrier Safety Regulations (Driver Hours)
- Waivers of State and Federal Environmental Fuel Specifications
- Federal Measures
  - Internal Revenue Service Dyed Diesel Fuel Waiver
  - Jones Act Waivers
  - Federal Energy Regulatory Commission Order Directing Priority Propane Pipeline Shipments
  - Pipeline and Hazardous Materials Safety Administration Special Permits to Modify Regulatory Compliance
  - Federal Petroleum Product Reserves
  - Emergency Fuel from the Defense Logistics Agency



# + Petroleum Shortage Response Plans

## ■ Reducing Demand and Conserving Supply

- Flexible work schedules and telecommuting
- Ridesharing/vanpooling programs
- Increased use of alternative fuel vehicles
- Programs to increase the use of mass transit
- Improved vehicle maintenance
- Public information emergency conservation actions
- Home energy saving recommendations (propane, fuel oil)



# + Energy Emergency Assurance Coordinators

- Points of contact for states, U.S. Department of Energy and industry in the event of an energy emergency
- Provide information sharing of assessments, notifications, news and updates on actions taken and situation reporting
- Primary and secondary contact for each sector (petroleum, electricity, natural gas) from each state
- Established in 1996 and expanded under a February 2016 Memorandum of Understanding signed by the Secretary of Energy, NASEO, the National Association of Regulatory Utility Commissioners, National Governors Association, and National Emergency Management Association

For more information see: [www.naseo.org/eeac](http://www.naseo.org/eeac)







# Framework for Defining Resilience

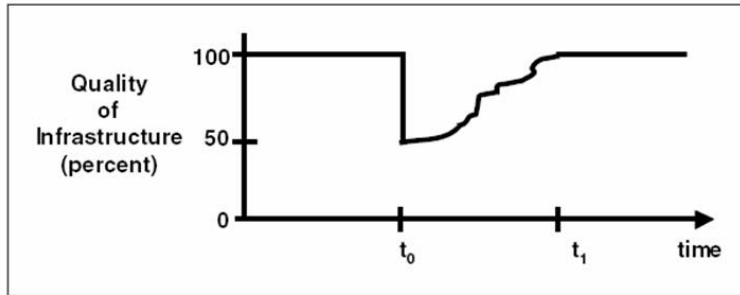


FIGURE 3 Measure of seismic resilience—conceptual definition. Source: Bruneau et al., 2003.

$$R = \int_{t_0}^{t_1} [100 - Q(t)] dt$$

For a community, loss of resilience,  $R$ , can be measured as the expected loss in quality (probability of failure) over the time to recovery,  $t_1 - t_0$ .

Source: Multidisciplinary Center for Earthquake Engineering Research framework for defining resilience (Bruneau and Reinhorn, 2007; Bruneau et al., 2003)

## Resilience results from a sustained commitment to four factors

- **Robustness** -- The ability to operate or stay standing in the face of disaster
- **Resourcefulness** -- Skillfully managing a disaster once it unfolds
- **Rapid Recovery** -- The capacity to get things back to normal as quickly as possible after a disaster
- **Learning Lessons** -- Having the means to absorb the new lessons that can be drawn from a catastrophe

Flynn, S. (2008) America the Resilient: Defying Terrorism and Mitigating Natural Disasters. *Foreign Affairs*, 87 (2), 2-8.



## *Improving Public and Private Sector Resiliency*

- Sustain and improving emergency response capabilities
- Infrastructure hardening
- Replacement of aging infrastructure
- Physical and cyber security
- Removing supply chain choke points
- Shortening supply chains
- Understanding critical interdependencies
- Diversification of supply resources
- Improving efficiency
- Continuity of business/ government operations
- Public-private partnerships
- Supporting investments in infrastructure
- Increase local government resiliency
- Use of alternative fuel vehicles, combined heat and power and distributed generation, and renewable resources
- Back-up generators and fuel for critical public facilities
- Increase multi-state coordination



## In Conclusion:

### *Key Points to Remember*

1. It is important to know the state's critical energy infrastructure and its capacity and throughput.
2. It is important to know energy infrastructure in other regions that are important to your state's energy supply.
3. State agency roles and responsibilities for critical energy infrastructure need to be understood and coordinated.
4. State and industry points of contacts need to be updated annually.
5. States should update their energy assurance plans every 2-3 years or when major organizational changes occur.
6. Conduct regular training and exercises
7. Work with the private sectors on state energy plans that promote resiliency through energy efficiency, renewables energy and smart grid that contribute to a more diverse, reliable and resilient energy infrastructure.



Thank you!

Jeff Pillon, Director, Energy Assurance NASEO

[jpillon@naseo.org](mailto:jpillon@naseo.org)

Phone 517-580-7626





## *References and Further Reading*

- Quadrennial Energy Review (QER) -- Transforming U.S. Energy Infrastructures in a Time of Rapid Change: The First Installment of the QER. See: <http://energy.gov/epsa/quadrennial-energy-review-ger> For a video summary see: <https://www.youtube.com/watch?v=IIXsel0-goY>
- National Petroleum Council (NPC) “Enhancing Emergency Preparedness for Natural Disasters” (December 2014) See: <http://www.npc.org/>
- National Infrastructure Protection Plan 2013, Partnering for Critical Infrastructure Security and Resilience and Supplements – U.S. Department of Homeland Security <http://www.dhs.gov/national-infrastructure-protection-plan>
- Energy Sector Specific Plan 2015: <https://www.dhs.gov/sites/default/files/publications/nipp-ssp-energy-2015-508.pdf>
- State and Regional Energy Risk Profiles The profiles provide a state by state summary of both natural and man-made hazards with the potential to cause disruption of the electric, petroleum, and natural gas infrastructures. <http://www.energy.gov/oe/state-energy-risk-assessment-initiative-state-energy-risk-profiles>





## *References and Further Reading (cont'd)*



- Energy Risk Resources Library provides extensive data, models and studies that address risks. <http://energy-oe.maps.arcgis.com/apps/MapSeries/index.html?appid=ece7b1c390b24177b4361784104cab7d> or Google: “State and Regional Energy Risk Assessment Initiative “.
- The Business Blackout Report Lloyds of London and the University of Cambridge’s Centre for Risk Studies.  
<https://www.lloyds.com/~media/files/news%20and%20insight/risk%20insight/2015/business%20blackout/business%20blackout20150708.pdf>
- Michigan Public Service Commission’s Report on August 14, 2003 Blackout  
[http://www.michigan.gov/mpsc/0,1607,7-159-16370\\_17060-80766--,00.html](http://www.michigan.gov/mpsc/0,1607,7-159-16370_17060-80766--,00.html)
- Emergency Situation Reports by U.S. Department of Energy provides daily updates on the energy sector impacts from emergency events, See:  
[http://www.oe.netl.doe.gov/emergency\\_sit\\_rpt.aspx](http://www.oe.netl.doe.gov/emergency_sit_rpt.aspx)
- Cybersecurity A Primer for State , Utility Regulators Version 3.0. January 2017, National Association of Regulatory Utility Commissioners, see  
<https://pubs.naruc.org/pub/66D17AE4-A46F-B543-58EF-68B04E8B180F>



## ***References and Further Reading*** (cont'd)

### ■ **Understanding Energy Infrastructure and Supply Chains**

- Energy Explained Your Guide to Understanding Energy – Energy Information Administration. See: <http://www.eia.gov/energyexplained/>
  
- Appendix G – Hydrocarbon Liquids Supply Chain, and Appendix H -- Natural Gas and Natural Gas Liquids Supply Chains , NPC Enhancing Emergency Preparedness for Natural Disasters” See: <http://www.npc.org/>
  
- United States Electricity Industry Primer -- Department of Energy, Office of Electricity Delivery and Energy Reliability. See: [www.naseo.org/Data/Sites/1/documents/committees/energysecurity/documents/united-states-electricity-industry-primer.pdf](http://www.naseo.org/Data/Sites/1/documents/committees/energysecurity/documents/united-states-electricity-industry-primer.pdf)
  
- Energy Primer -- a Handbook of Energy Market Basics - Federal Energy Regulatory Commission. See: <http://www.ferc.gov/market-oversight/guide/energy-primer.pdf>

