The State Energy Assurance Planning Workshop

Using the Energy Assurance Guidelines

Camp Dawson, West Virginia

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Agenda

- Overview of Guidelines
- Energy Supply and Impact Assessment
- Crisis Communications and Public Information
- Legal Authorities, Planning, and Response
- Energy Assurance – Protecting Critical Infrastructures and Interdependencies
- Mitigating Risk and Vulnerabilities
- Stakeholder and Organizational Coordination

"God is my witness, the youth of Islam are preparing things that will fill your hearts with terror. They will target key sectors of your economy until you stop your injustice and aggression."

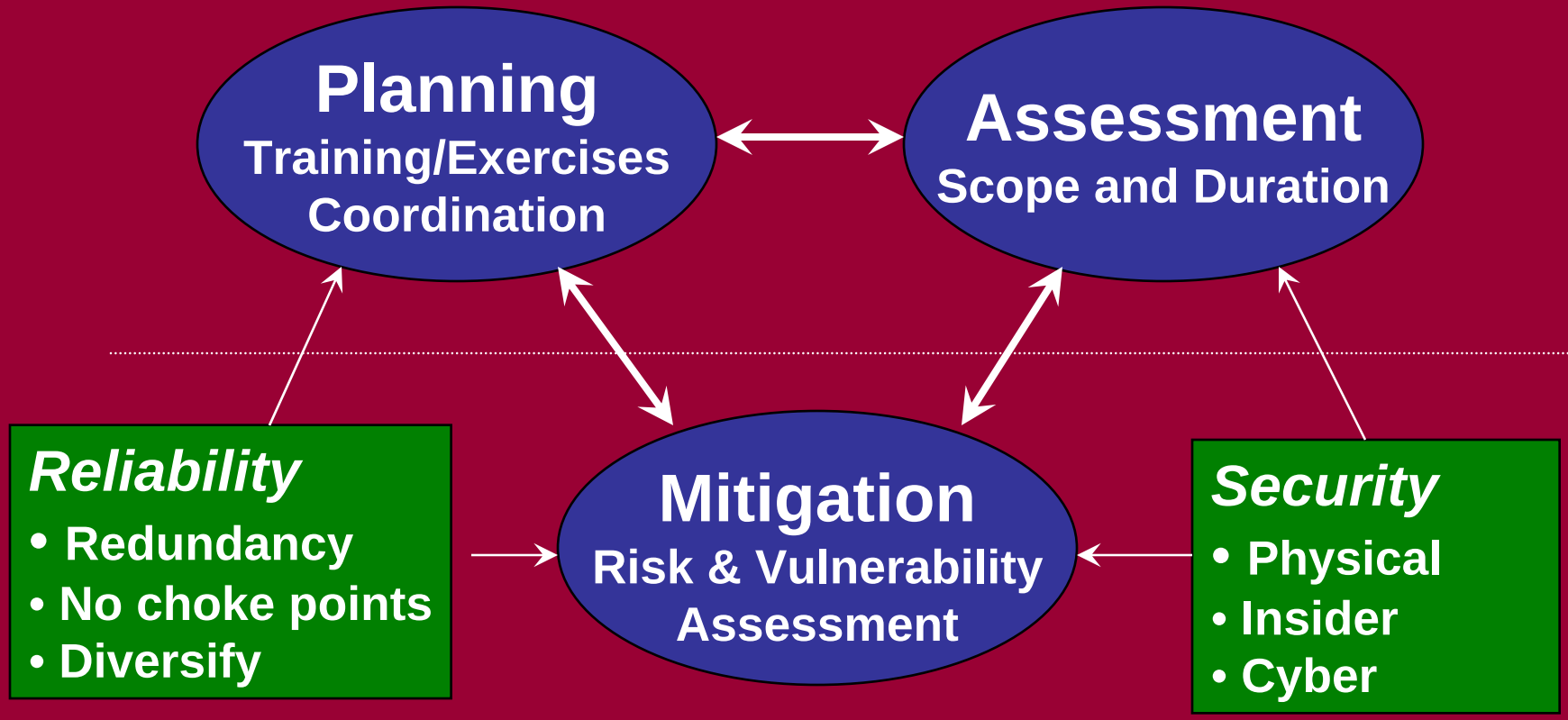
Source: TV channel al-Jazeera October 6, 2002 broadcast of a two-minute recording of what it said was the voice of Bin Laden,

All Hazards Approach

- Sabotage/Terrorism
- Civil Disturbance
- Flooding
- Natural Disasters
- Infrastructure Failures
- Public Health Emergencies

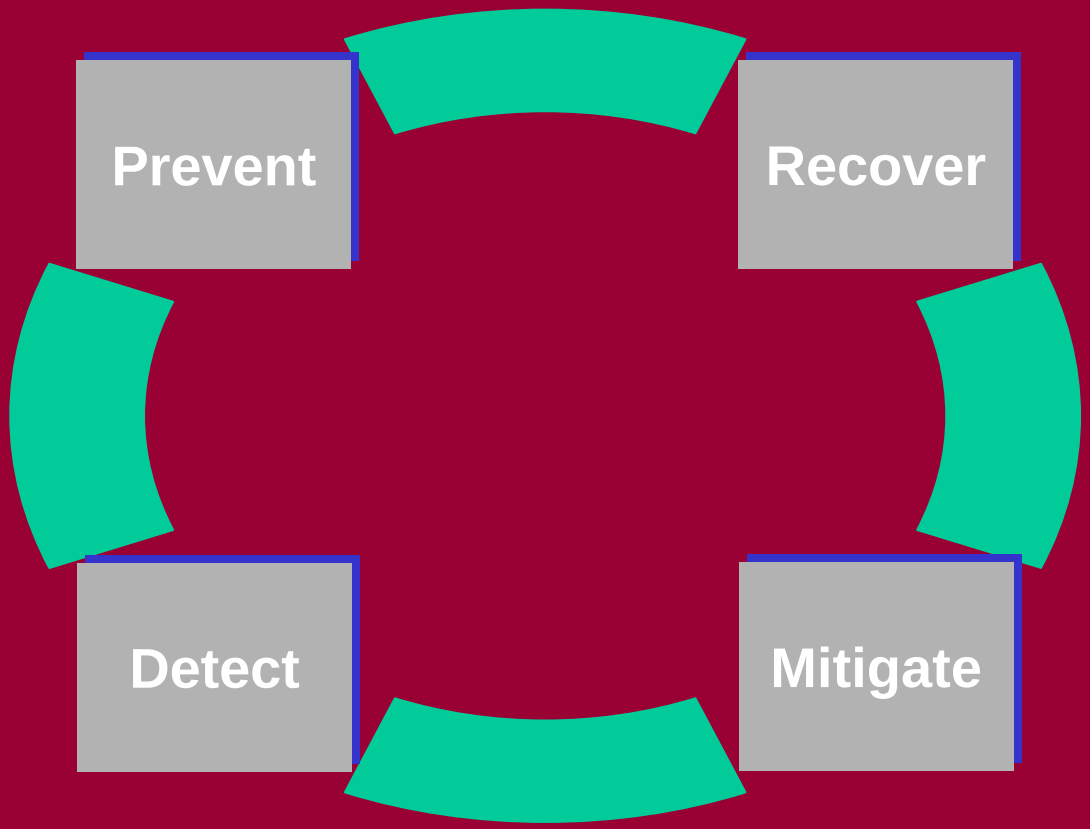
Energy Assurance

Emergency preparedness and response



Protecting Critical Infrastructure

Aspects of Energy Assurance



Introduction and Overview of Guidelines

What is Covered

- Purpose of the Guidelines
  - Questions to Ask about Sufficiency
  - Items to Consider Including in a Plan Update
- Structure of Guidelines
  - How to Use
  - Provoke Long-Range Attention to Energy Emergency Assurance Issues

Purpose of the Guidelines

The purpose of these Guidelines is to provide state energy and emergency officials with tools for understanding and reviewing how their jurisdictions respond to energy outages and how to improve the energy emergency plans that guide this response. These Guidelines are a compilation of information from many state energy and emergency officials who have experienced and responded to energy emergencies.

Structural Items to Cover

- Energy Supply & Impact Assessment
- Crisis Communications and Public Information Programs
- Legal Authorities, Planning, and Response
  - Natural Gas, Petroleum, Electricity
- Energy Assurance and Critical Infrastructure
  - Interdependencies
  - Mitigating Risks and Vulnerabilities
- Stakeholder and Organizational Coordination

The Evolution of Energy Emergency Planning

- The concept of energy assurance has evolved significantly since the early 1970's.
- State Energy Offices principally established to deal with petroleum shortages.
- State Public Utility Commissions addressed electricity and natural gas supply reliability.
- Some states also considered integrating energy efficiency,or assurance,options into their plans.
- Since September 11, 2001, both federal and state governments have emphasized assurance and included within it the need to address energy infrastructure issues.

Key Elements of the Guidelines

- **Describe how organizational relationships and responsibilities within a state should work**
- **Suggest response procedures and planning tasks for states**
- **List state actions that will ease the impacts of short-term energy disruptions**
- **Recommend long-term strategies and options for dealing with sustained disruptions or outages**
- **Identify data states need to know about specific fuels, government and industry contacts, and steps to take with industry in order to minimize and resolve the impacts of an energy supply disruption**
- **Describe public information and crisis communications plans**

What Questions Should an Energy Assurance Planner Ask?

- Is there a shortage and how long might it last?
- What specific energy type is in short supply?
- How short is supply compared to demand?
- Where is the location of the shortage?
- What are the possible consequences of the shortage?
- Who should be contacted and in what order?
- What energy providers should respond - how and how quickly?

How Does a State Proceed from Asking Questions to Providing Answers?

- The Guidelines:
  - Discuss major planning issues
  - Suggest Crisis Management Strategies
  - Help Identify Levels of Shortage
  - Encourage Pre-Crisis Preparation
  - Emphasize Good Data Collection and Analysis
  - Identify Possible Response Actions

Structure of the Guidelines

I. Energy Assurance Considerations

1. Defining Critical Infrastructure
2. Components of Critical Infrastructure Protection
3. Freedom of Information Act
4. Alternative Energy Sources

Structure of the Guidelines

II. Define and Clarify Organizational Relationships and Responsibilities

A. Legal Authority

B. Relationship of Legal Authority to a State's Emergency Plan

C. The Relationship Among Federal, State and Regional Authorities

– Includes ESF - 12 Discussion

Structure of the Guidelines

III. Principal Strategies for Managing Energy Shortage

- A. Finding Information
- B. Stages of an Energy Emergency
- C. Energy Emergency Response Matrix
- D. Severity of an Energy Emergency
- E. Understanding a State's Energy Profile & Vulnerabilities
- F. Important Elements to Consider in Designing Emergency Response Measures

Structure of the Guidelines

IV. Response Measures considering:

A. Electricity

- Generation, Transmission, Local Distribution, Restoration, Mutual Aid Agreements, Restructuring

B. Natural Gas

- Pipelines, Local Distribution Companies, Restoration, Deregulation

C. Petroleum

- Gasoline, Distillate, Propane

Structure of the Guidelines

V. Public Information

- **A. Public Information Programs and Objectives**
- **B. Functions of a Public Information Program**
- **C. Coordination**
- **D. Operational Considerations**
- **E. Data and Information Acquisition and Dissemination**
- **F. Equipment Requirements**

Questions?

Energy Supply
&
Impact Assessment

Energy profile

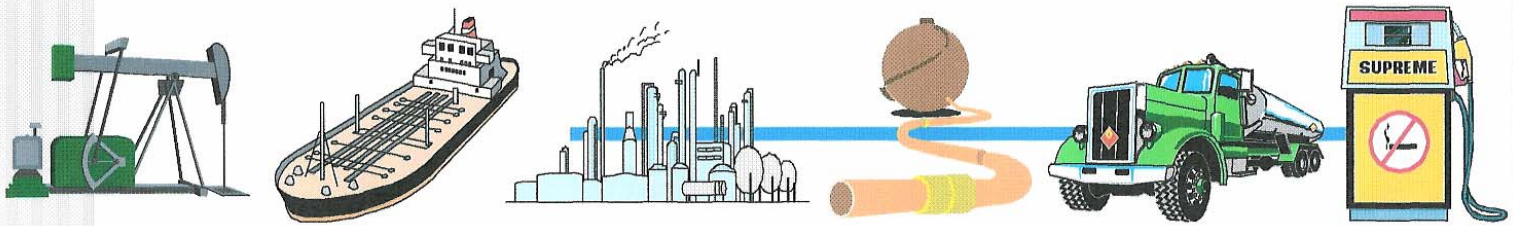
What is Typically Included:

- Electric Industry
- Natural Gas Industry
- Petroleum Industry
  - Motor Gasoline
  - Heating Oil/Kerosene/Diesel Fuel
  - Propane
  - Other Oils
- Renewable Industry

What's New in Petroleum?

- Mature impact of NYMEX plus PC commodity access
- Domestic petroleum delivery system ("Just-In-Time") with reduced dependence on storage
- SPR experience (and politicization)
- Aging refinery structure in the U.S. vs. higher utilization
- Environmental Mandates - cost (real or rhetorical?)
- Non-OPEC oil - wild card or OPEC supporters?
- 21st century demand growth
  - SUV, Trucks, Population, Developing Countries

OIL & NATURAL GAS INTERCONNECTIVITY



Upstream	Inbound	Processing	Outbound	Distribution	Marketing
Exploration	Pipelines	Refining	Pipelines	Terminals	Retail
Data analysis	Trains	Co-generation	Trucks	Trucking	Aviation
Drilling	Shipping	Liquefying	Barge	Distributor	Marine
Producing	Ports	Storage	Trading		Industry
Gathering	Trading				Commercial
Processing					Residential
Storage					Credit card

Power Water Gas Telecommunications Banking Security Transaction systems Transportation routes Computer networks Market Partners Shareholders Suppliers Customers Consumers Contractors Employees Governments

Source: Marty Matheson, General Manager Pipelines, API, NASEO Annual Meeting, September 2002

Electricity and Gas Issues -1

Restructuring

- Implications of open markets
  - Exposure of all market sectors to commodity price effects
    - How does higher price drawing power to one region affect another which is not experiencing high demand?
    - Cheating/manipulation (I.e., Enron - California)
- Infrastructure
  - Transmission and distribution networks
    - Are they adequate to move power as market demands?

Electricity and Gas Issues - 2

- System Reliability
  - Federal Energy Policy
    - Will it make a difference?
  - FERC &. States
    - Regional Transmission Organizations (RTOs)
      - Regions resisting RTOS
      - Do RTOs work?
  - Potential Impact on States
    - Blackouts, brownouts, volatile prices

Electricity and Gas Issues - 3

- **Natural Gas**
  - Growth of use for new plants, supplying peak power
  - Unregulated Merchant Plants
  - Diminishing resource base
  - Increasing price floor
  - Pipeline capacity
  - System vulnerability

Vulnerability Factors

- Transportation links
- Weather patterns/earthquake zones
- Distance from refineries
- Regional energy competition
- National and international issues
- Demographics
  - population, location, economics
- Demand patterns and growth rates
- Downstream impacts

Responding to an Energy Emergency

- Communications and Assessment – who talks to whom, when, and about what?
  - Internal Communications
  - External Communications
- Response -- who does what, and when?

Citgo Refinery in Lemont, Illinois
August 2001

Suggested Levels of Energy Emergency

- **Monitor & Alert**
  - **Watchfulness**
  - **Local price issues**
- **Mild Shortage**
  - **Overall supply down 5 %**
- **Moderate Shortage**
  - **Overall supply down 10-15%**
  - **Imports drop +/- 5%**
- **Severe Shortage**
  - **Overall supply down 15% +**

Questions?

Crisis Communications
and
Public Information Programs

Public Information Needs

- Deliver a clear and consistent message on the nature of the problem and the response.
- Ask: how critical is the message?
  - Define who delivers the message.
- Web sites and e-mail distribution lists are excellent means to quickly distribute information.

Consumer Information

- Keeping consumers informed during an energy emergency is very important.
  - Including how to convey the information
- Early uncertainty surrounding the event that triggered the shortage can cause additional problems.
- First and foremost, States require clear communication channels for analysis and assessment in order to provide thoughtful contingency options for response and recovery.
- Provide consumer do's and don't

Media

- State communications protocols
  - Who speaks for the Governor?
  - When does the Governor speak?
  - Use a Joint Information Center (JIC)!
- The communications loop
- Knowledgeable responses
- Truth in packaging
- Grace under fire
- A person of trust

Public Information Objectives

1. Enable the Governor to communicate effectively with the public about an energy shortage or related problems.
2. Reinforce the ability of the energy emergency management team to handle the shortage with the greatest amount of efficiency and the least amount of public discomfort.
3. Provide accurate and timely information on the scope, nature, severity, and possible duration of a shortage.

Communication Partners - Key Players

The principal players for informing the public include:

1. **The Governor's Press Office or equivalent**
   - Typically provides guidance about state public relations protocols.
2. **Emergency Management Agency (EMA)**
   - Often used by a Governor for all types of emergencies. EMA Public Information Officers (PIOs) usually defer to, or ask for assistance from, other agencies with special expertise.
3. **Other State Agencies**
   - The most efficient way to contact other state agencies is through the state's Emergency Operations Center (SEOC).
4. **Local Governments**
   - Many Governor's Office's require consultation when supplying policy-related information to local governments. Direct emergency information will usually be communicated to official emergency response managers within local government.
5. **Energy Companies**
   - Energy company public relations staff should be consulted as often as necessary to ascertain facts, status updates, and to coordinate information about mitigation measures.

Communication Partners
Additional Players

1. **Federal Agencies and National Organizations**
   - Maintain contact with the U.S. Department of Energy, Office of Energy Assurance (OEA) in order to enhance federal assistance if needed.
     - Each State has a designated Energy Emergency Assurance Coordinator (EEAC) networked to OEA.
2. **The National Association of State Energy Officials**
   - Can help coordinate with other states and answer questions pertaining to the nation, regions and individual states.
3. **Neighboring Jurisdictions**
   - Include neighboring states as well as regional organizations; governmental, quasi-governmental, and private sector entities.

Questions?

Legal Authorities, Planning, & Response

Authorities

- **State Emergency & Energy Response Laws**
  - Specific law/mandate for Emergency Management & Energy Agencies
  - Mandatory measures
- **Public Utility Commission Law and Requirements**
  - Tariffs and other requirements
- **Federal Law**
  - FMEA, Federal Response Plan, DOE - OEA, DHS
- **Regional Agreements**
  - Electric reliability councils
  - Power pools and RTOs

Jurisdictional Complexity

- Federal
  - FEMA
    - Emergency Support Function (ESF) 12
  - DOE
    - Office of Energy Assurance
    - Nuclear Security Admin.
  - Homeland Security
    - Office of Critical Infrastructure
  - FERC
  - DOT
    - Office of Pipeline Safety
  - TVA
- Emergency Management
- Public Service (or Utilities) Commission
- Energy Office
- Department of Agriculture
- Local Emergency Management
- Special Fuels Offices
- Department of Transportation
- Law Enforcement
- State Police
- Municipal Utilities
- Attorney General

Typical State Authority

- Governor's Emergency Powers
- Specific gubernatorial powers pertaining to energy emergencies
  - Typically post-1973
- Regulation by Public Utilities Commissions
- Creation of a State Emergency Management Agency
- Creation of a State Energy Office
- Adoption of State Emergency Operations Plan that includes ESF - 12

Jurisdiction Over Energy Security

(Initial Source, NCSL, 2003, M. Brown)

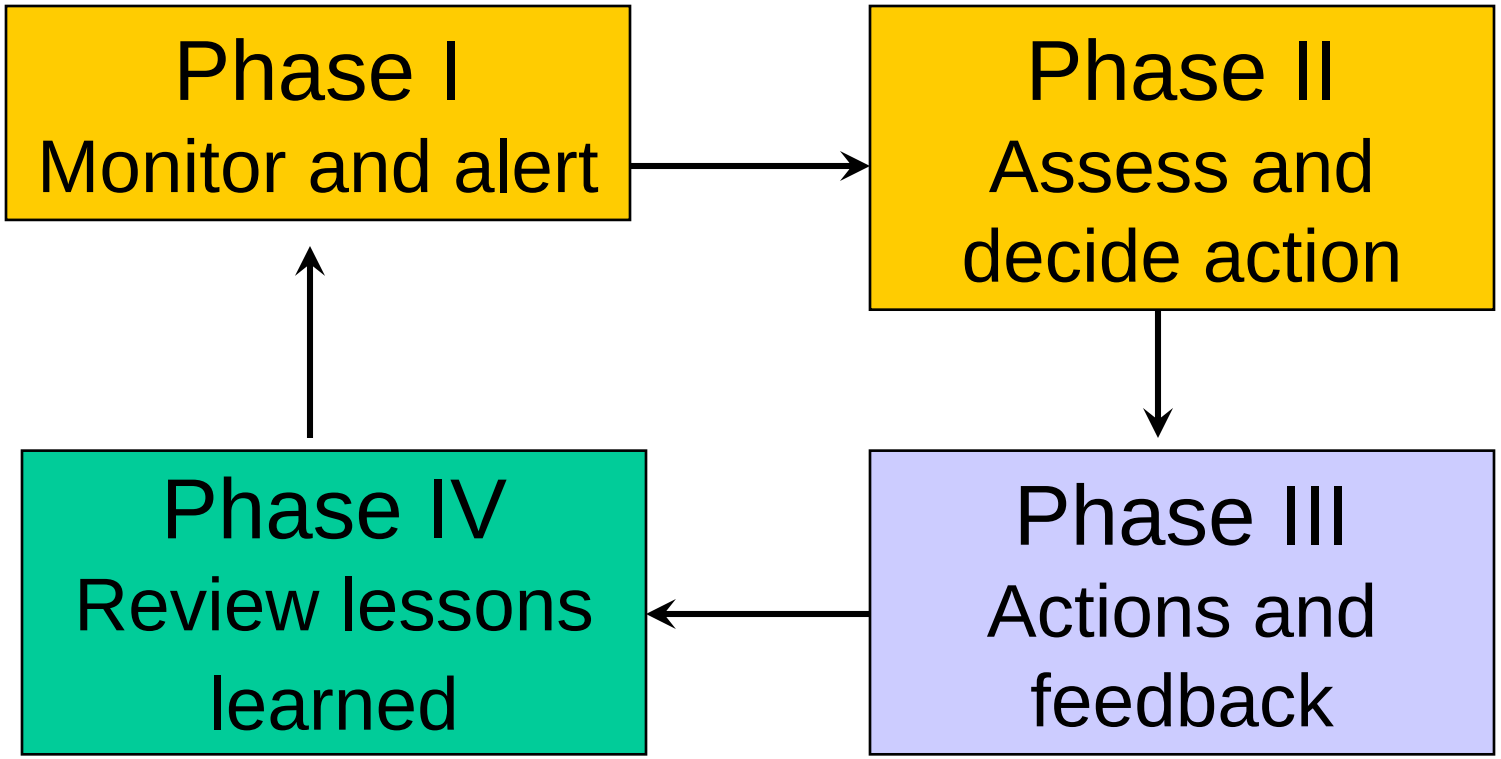
Function	Local	State	Federal	Industry
Nuclear Breach	Police/Fire County EM	Emergency Management	DOE Nuclear Security FERC, EPA,FEMA	Affection IOU
Regional Electric Outage	P/F County EM Local Utilities	EM PSC Local Utilities	FERC FEMA	Affectied IOU & Related Cos. RTO Affected EMC & Muni
Gas Pipeline Interruption	If in jurisdiction, P/F County EM	PSC EM State-wide LDC	DOT DOE FEMA	Affected LDC and Munis National PL Companies
Refinery Outages	None	EM State Energy Offices	DOE DOT Regional Office	Affected National Petroleum Cos Local jobbers 7 retail.
Petroleum Pipeline	None unless within jurisdiction then P/F County EM	EM If in state, Environment Transportation	DOE DOT FEMA	Interstate PL Cos. National and local industry
Regional Fuel Shortage	County Health & Welfare	EM SEO Weights & Measures agency Attorney General	DOE DOT	National and local industry
International Embargo	Local H & W	EM SEO H & W Attorney General	DOE FEMA DOT Homeland Security	National Petroleum Companies
Terror Induced Outage	If within jurisdiction P/F County EM H & W.	EM If in jurisdiction State Police PSC SEO National Guard	HES FEMA DOE DOJ CIA DOT	Impacted Industry and associated downstream subunits
Local Fuel Shortage Heating Oil Propane Electricity Natural Gas	If long enough in duration, H & W	PSC SEO EM	DOE DOT	Local industry plus regional help as needed

What is Next?

Example:

- You Know You Have a Problem.
- You Know What Energy Form is at Risk.
- You Know Where the Problem is Located.
- What is Next? The Guidelines Help.

The Four Phases of an Energy Emergencies



Phase I -- Monitor and Alert

- Mechanisms need to be in place to monitor and make assessments:
  - What is the nature/cause of the problem?
  - How big is the problem?
  - How long might it last?
  - Who is effected, where, and how?
  - Who needs to be informed?

Phase II -- Assessment and Action

- Inform Policymakers
- Identify Options
- Determine if and when actions might be appropriate and needed
  - Actions behind the scenes and at the industry level
  - Public Actions

Phase III -- Actions and Feedback

- How quickly can actions be implemented?
- What is the appropriate legal authority?
  - What are the limitations?
- **"Voluntary conservation should be preferred to mandatory measures whenever possible. Any mandatory response should be phased in, beginning with the least stringent measures, with rationing reserved for only the most severe shortage." (NGA)**
- Remember, sometimes no action is the preferred action to take.

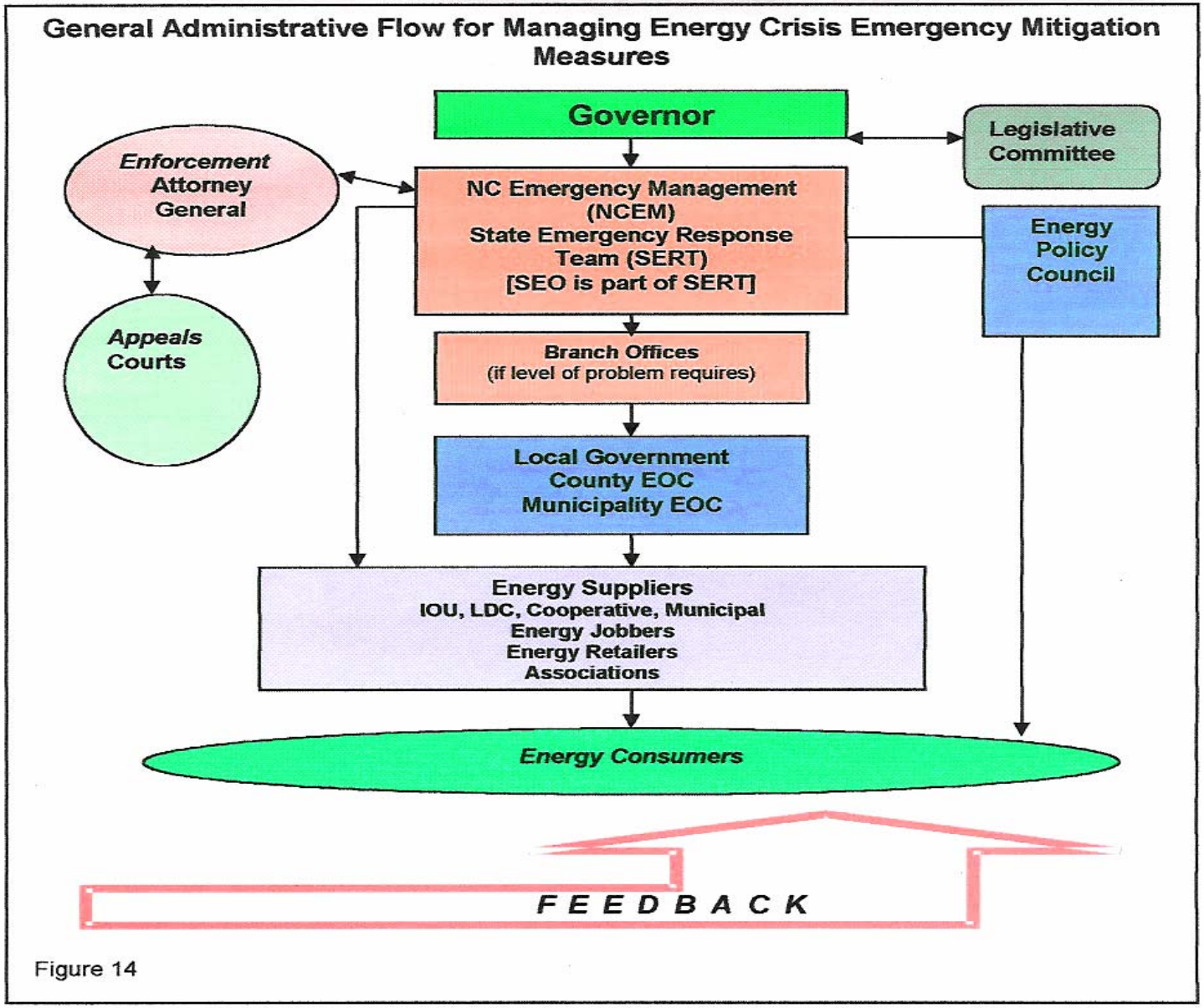

General Administrative Flow for Managing Energy Crisis Emergency Mitigation Measures
Governor
Legislative Committee
Enforcement Attorney General
NC Emergency Management (NCEM) State Emergency Response Team (SERT) [SEO is part of SERT]
Energy Policy Council
Appeals Courts
Branch Offices (if level of problem requires)
Local Government County EOC Municipality EOC
Energy Suppliers IOU, LDC, Cooperative, Municipal Energy Jobbers Energy Retailers Associations
Energy Consumers
FEEDBACK

Figure 14

Energy Emergency
Planning/Preparedness Goals

- **Monitor the energy supply system to detect "unusual" imbalances**
  - Advise appropriate officials
  - Make recommendation on appropriate actions to respond
- **Emergency Contingency Plans**
  - Develop, administer, coordinate, train
- **Communicate**
  - Focal point for stakeholders
- **Energy Provider Industry**
  - Maintain liaison

Energy Emergency Planning
Getting Ready

- Update contingency plans and responses.
- Assure material is reviewed regularly.
- Provide for periodic training/exercises.
- Assure internal state government coordination and communication.
- Assure external coordination and communication with energy industry,federal, and local governments.

Recommended Actions
Voluntary

- **Monitor Supply (no shortage)**
  - Attention to rumors, reports, national and regional events
  - Monitor, alert, coordinate
  - Issue public advisories as needed
- **Moderate shortage**
  - Seek input from stakeholders regarding potential mandatory actions
  - Give special attention to supporting private sector recovery efforts
  - **Coordinate with advisory committees, other stakeholders**
    - Conduct risk analysis, notify Governor of impending energy emergency

Recommended Actions
Mandatory

- Severe Shortages
  - **Recommend mandatory actions under state energy emergency or state disaster statutes**
  - **State of Disaster**
    - Responsibility usually falls to state & local emergency management agencies (EMA). Many states focus on the Public Utility Commission (PUC) as well.
  - **Declaration of Energy Emergency**
    - SEO or PUC should coordinate with EMA as well as federal agencies as appropriate:
      - » DOE, FEMA, DOT
      - » (e.g., pipelines and driver hour waivers)

What Happens?
Natural Gas Emergency

- Local Distribution Companies (LDC)
  - Initiate PUC-approved gas service curtailment plans to protect essential human services.
- PUC
  - Monitors supply and infrastructure status.
- Random Outages
  - LDCs handle random pipeline cuts due to contractor digging and similar events.
  - Reports made to PUC.

What Happens?
Electric Emergency

- PUC
  - Monitors for outages and emergencies
  - Examples:
    - Storm, transmission and distribution, generation capability,interconnections, equipment failure
- Utilities
  - Institute “Emergency Electrical Procedures”
  - Know what should be exempt from rotating blackouts
  - Coordinate with area Reliability Council (e.g., ECAR)
  - Restoration, reports

What Happens?
Petroleum Emergency

- SEO/PUC
  - Monitors area prices and other factors for signs for shortage.
  - Receives informal reports from associations regarding product allocations.
  - Evaluates and makes recommendations to governor.
  - Coordinates with industry.
  - Convenes advisory committee and stakeholders as needed
    - Develop recommended mandatory actions.
    - Implement, administer, and monitor.
- Industry
  - Attempts supply enhancement.
  - Repairs and restoration as needed.

What Happened?
Petroleum Disruption Scenario

- Supply Management
  - Increase supply
    - EPA waivers
    - Increase petroleum imports
    - Driver hour waivers
    - Jones Act waivers
    - Use of SPR
  - Manage limited supply
    - Only if supplies are allocated
      - Priority end users
      - State set asides

What Happened?
Petroleum Disruption Scenario

- Demand Restraint
  - **Voluntary first, followed by mandatory actions, as needed**
  - **Public information programs to reduce use**
    - Ridesharing
    - Carpool parking lots
    - Vehicle maintenance (e.g., oil change, tire pressure, etc.)
    - Telecommuting
  - **Mandatory programs**
    - Alternate date purchases
    - Extended date purchases
    - Lower speed limits
    - Fuel switching

What Happens?

Major Problems

- Emergency Management Department
  - Central focal point for widespread disaster management
  - Coordinates with both local and federal agencies
  - Coordinates state and private sector stakeholders at State Emergency Operation Center (SEOC)
  - Coordinates relief activities as needed
  - Coordinates, facilitates on-site relief and restoration cooperation

What Happens?
Homeland Security Coordination

- **Homeland Security - *Example:***
  - **Michigan** Homeland Protection Board and Homeland Security Advisory Council coordinates with appropriate state and federal agencies including:
    - Emergency Management, National Guard, Environmental Quality, Agriculture, Natural Resources, Community Health, U.S. DOD, EPA, Public Health, FBI, DHS

- **Regional Coordination - Emergency Response, Security and Critical Infrastructure Protection**
  - NASEO
  - NARUC
  - DOE (OEA and Energy Information Administration)
  - ECAR
  - DOE Regional Energy Offices
  - Pipelines

Emergency Measures

Voluntary Measures

"Go To" Measures

- *Based on the premise that the Energy Sector addresses shortages first and generally does it best.*
- *Government can help first with:*
  - *Timely, accurate information.*
  - *Helpful advice.*
  - *Coordination among stakeholders.*

Emergency Measures

Mandatory Measures

- ***Government requires these***
  - ***Needs authority to implement***
  - ***Carried out in coordination with industry***
  - ***Should be aimed at specific sectors for efficient implementation***
- ***Two Types***
  - ***Curtail amount of energy consumed***
  - ***Spread the pain***

Questions?

Energy Assurance - Protecting Critical Infrastructure Interdependencies

Integrating Critical Energy Infrastructure Protection and Emergency Response Plans into an

Energy Assurance Plan

Key Definitions

Critical Infrastructure

Physical assets related to:

1. The generation, transmission of electricity
2. The exploration, production, processing, storage, and delivery of natural gas
3. The exploration, production, refining, storage and delivery of petroleum products

Energy Assurance

1. Reducing the vulnerability of critical infrastructure from all types of risk
2. Hastening post-shortage recovery through:
   - multiple energy sources
   - redundant delivery and consumption systems

Integrating Response and Infrastructure

Can you protect Infrastructure without a response plan?

<u>If you do, then you may have</u>:

1. **Downstream conflicts.**
2. **No way to relate the level of threat to the level of risk.**
3. **No way to mitigate the impact of shortage.**

Can you develop a response plan without attention to infrastructure?

<u>If you do, then you may:</u>

1. **Overlook essential shortage impacts.**
2. **Incorrectly assess vulnerability.**
3. **Recommend inadequate response measures.**

How Do the Guidelines Address this Dilemma?

U.S. Department of Commerce, Office of Critical Infrastructure Protection, "DOE's Critical Infrastructure Protection Activities," and "Critical Infrastructure Protection Research and Development Program," June 2000

1. **Identification of critical assets**
2. **Threat environment**
3. **Policies and procedures**
4. **Physical Security**
5. **Operations Security**
6. **Information system network architecture & penetration testing**
7. **Consequence Analysis**
8. **Risk Characterization**

I. Identification of Critical Assets

1. Ordinarily, state governments do not own or control physical assets.
2. Opinions vary about what level of detail government needs to know about physical assets.
3. For emergency planning:
   - **Knowledge of major assets, location, and impact on the delivery of energy abets preparedness and the state's ability to respond.**

II. Threat Environment

Threat has many meanings in emergency preparedness.

Natural Disaster

- Vulnerability to severe weather can increase attention to at-risk geographical areas. States can pre-determine restoration and re-supply opportunities.

Terrorist Threat

- Assessment of the most likely places for a terrorist strike can help planners identify vulnerable energy infrastructure, pre-positioning relief fuel, and identify vendors who can re-supply on short notice.

Severe Run-Up in Fuel Price

- Preparation for accelerated, severe price increases may lead to insistence on sound advance data gathering and analysis leading to improved seasonal energy reserves.

III. Policies and Procedures

1. Traditional components of energy planning:

- Refining policies
- Understanding procedures
- Providing training
- Making post-action assessments

2. All viable energy emergency plans should be updated regularly to:

- Assure that contemporary policies are included.
- Acquaint all responders with how response and mitigation systems are designed to work.

IV. Physical Security

Lack of Physical Security Increases Risk

What Can Government Do?

1. **Work with energy providers to understand the extent of need, constraints to improvement, and costs of adequate protection.**

2. **Use existing natural gas pipeline safety rules.**
   - Continue to work with the industry to assure that these rules are followed**.**

3. **Use rules pertaining to the reliable delivery of electricity.**

4. **Knowledge of petroleum structure enhances the ability to respond and provides effective mitigation:**
   - Pipelines
   - Storage
   - Loading terminal location
   - Preferred highway delivery routes
   - Nature and location of retail outlets

V. Operations Security

1. **State program developers are unlikely to need extensive knowledge of energy company operations security**.
   - It is good to know that this security is in place and that energy companies train personnel in its implementation.
   - The role of government might best be to ask questions and insist on site specific security measures.
   - Public Utility Commissions may include operational security requirements in a Certificate of Convenience and Necessity, or other rules, for those energy entities regulated by the state.
2. **Industry can assist state emergency responders by increasing their knowledge about operations security process and practice**.

VI. Information System Network Architecture and Penetration Testing

1. **Critical infrastructure computerized support systems may be based on vulnerable, and sometimes unstable, operating systems.**
   - Popular, mass market operating systems have higher risk.
   - Fortunately, many utilities, petroleum production, and local delivery companies use proprietary systems that are less vulnerable than off-the-shelf systems.

2. **States may wish to have their own information technology specialists work with the energy industry and the federal government to improve such systems, thus increasing energy assurance**.
   - Policy makers and planners will benefit by having up-to-date knowledge of information networks and their operating characteristics (architecture).
   - PUC may wish to consider rules for improved information system architecture and adequate penetration testing.

VII. Consequence Analysis

1. **Consequence analysis means understanding downstream effects of an energy disruption.**
   - Impacts on related energy systems
   - Costs of societal impacts
   - Costs to state and local government and loss of business income
2. **Wide-spread energy outages, such as the power failure in the Midwest and Northeast during the summer of 2003, show need to consider consequences.**
   - Energy disruptions
   - Actions taken to alleviate them
3. **Plans should contain sufficient information about energy infrastructure and operations to project possible shortage impacts**.
   - Planners should assess operational characteristics of downstream critical infrastructure and account for these when responding to an emergency.
   - Undertake this in close coordination with large power and energy providers whose emergency response actions can lead to devastating downstream system failure.

Consequence Analysis
Downstream Impacts

1. **Failure of natural gas pumping facilities when electric power is interrupted**
2. **Failure of petroleum supply infrastructure to function when electric power is interrupted**
3. **Failure of water supply and purification systems to operate when power is lost**
   - Secondary utility system time-to-failure when back-up storage is exhausted
   - Loss of energy to critical air handling or environmental equipment
   - Loss of power to refineries and gas processing plants due to electric or natural gas failure
   - Failure of information system networks

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Consequence Analysis
Downstream Impacts

The response to downstream impacts

1. Alter operational and emergency procedures
   - Provide alerts and warnings where none have been given in the past.
2. Provide alerts and warnings
   - Seek to assure that automatic alternatives and backup are understood and acquired.

Questions?

Practical Considerations

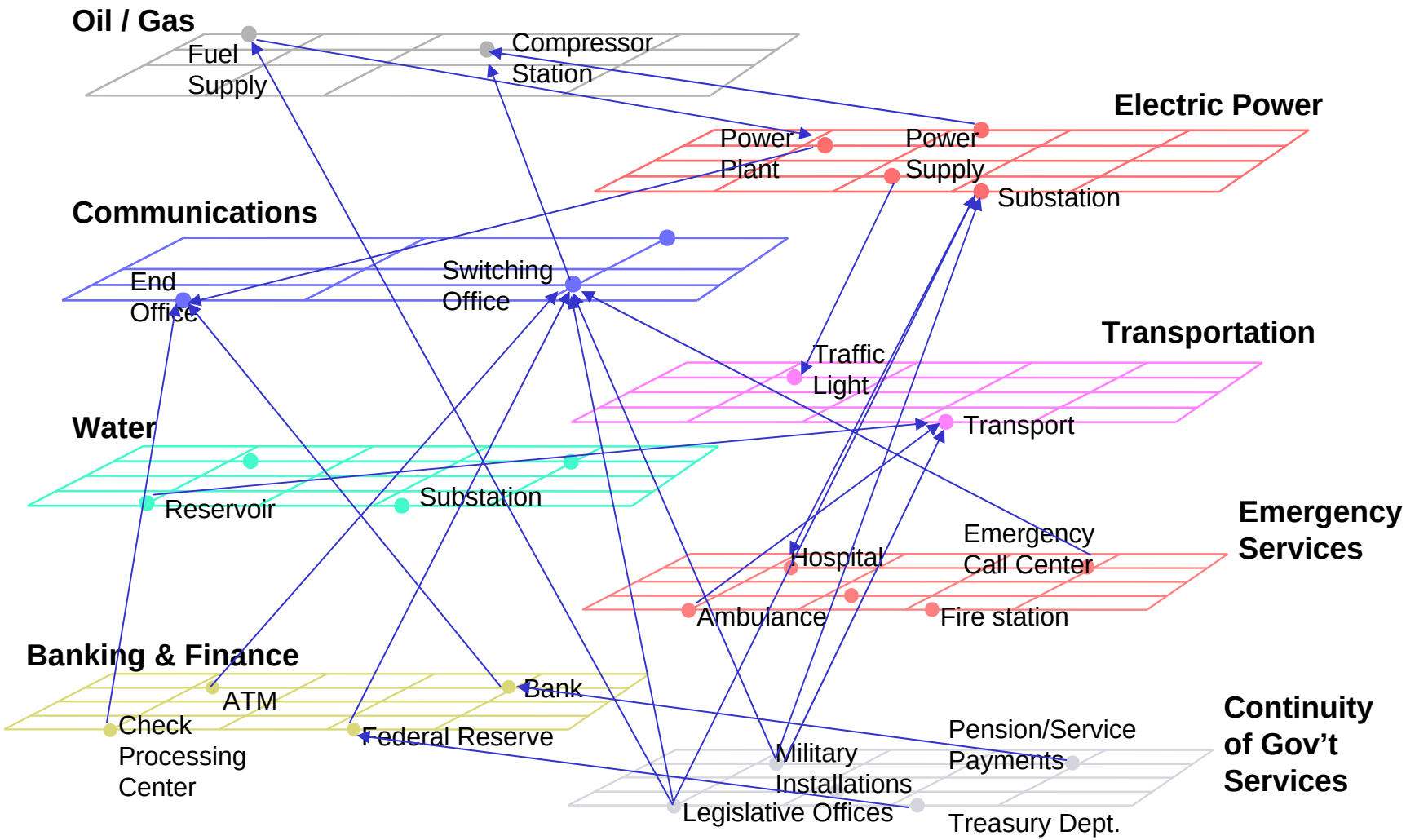
Energy Assurance – Protecting Critical Infrastructure & Understanding Interdependencies in the State Planning Process

Some Ideas to Consider

Interdependencies

- Examine in-state industry interdependencies.
- Look at state level and interstate interdependencies.
- Focus on regional interdependencies.
- Round out with national connections.

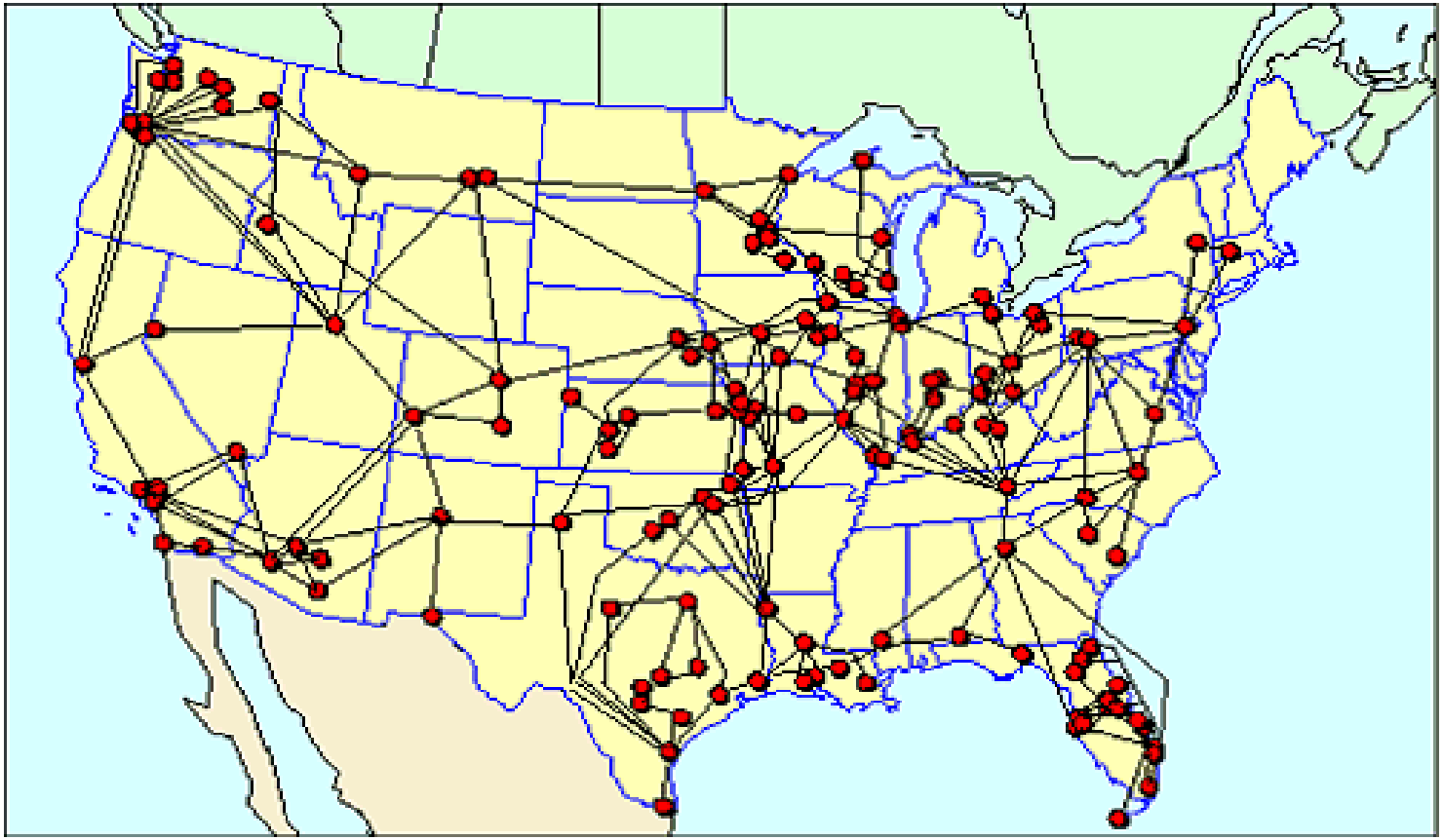
Interdependent Infrastructures



Typical State Electric Industry

- **Investor-Owned**
  - Large holding groups concentrated in South and West
  - Bulk of nation's **generation**
- **Electric Membership Cooperatives**
  - Mostly rural and highly organized
- **Municipal Utilities**
  - Well organized, outside of PUC authority
- **Transmission & Distribution -** intrastate & interstate

EIA - National Electric Interconnections - 1998

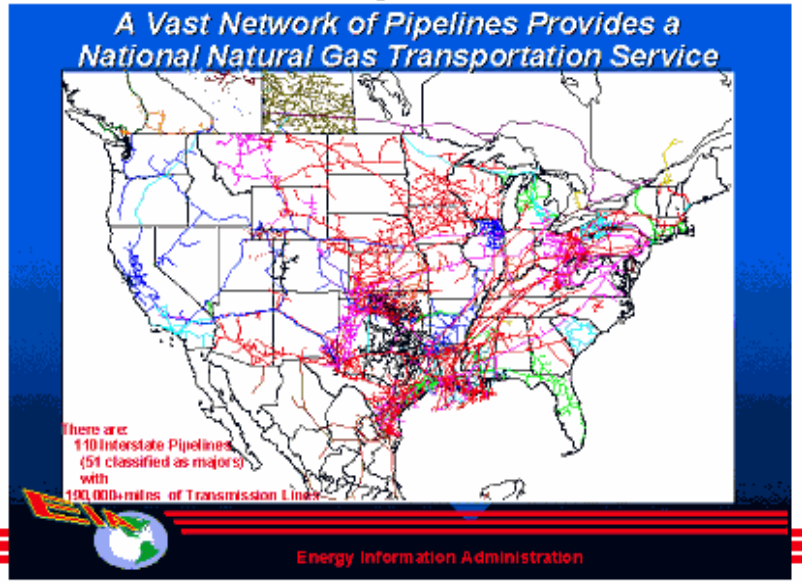


State Natural Gas Industry

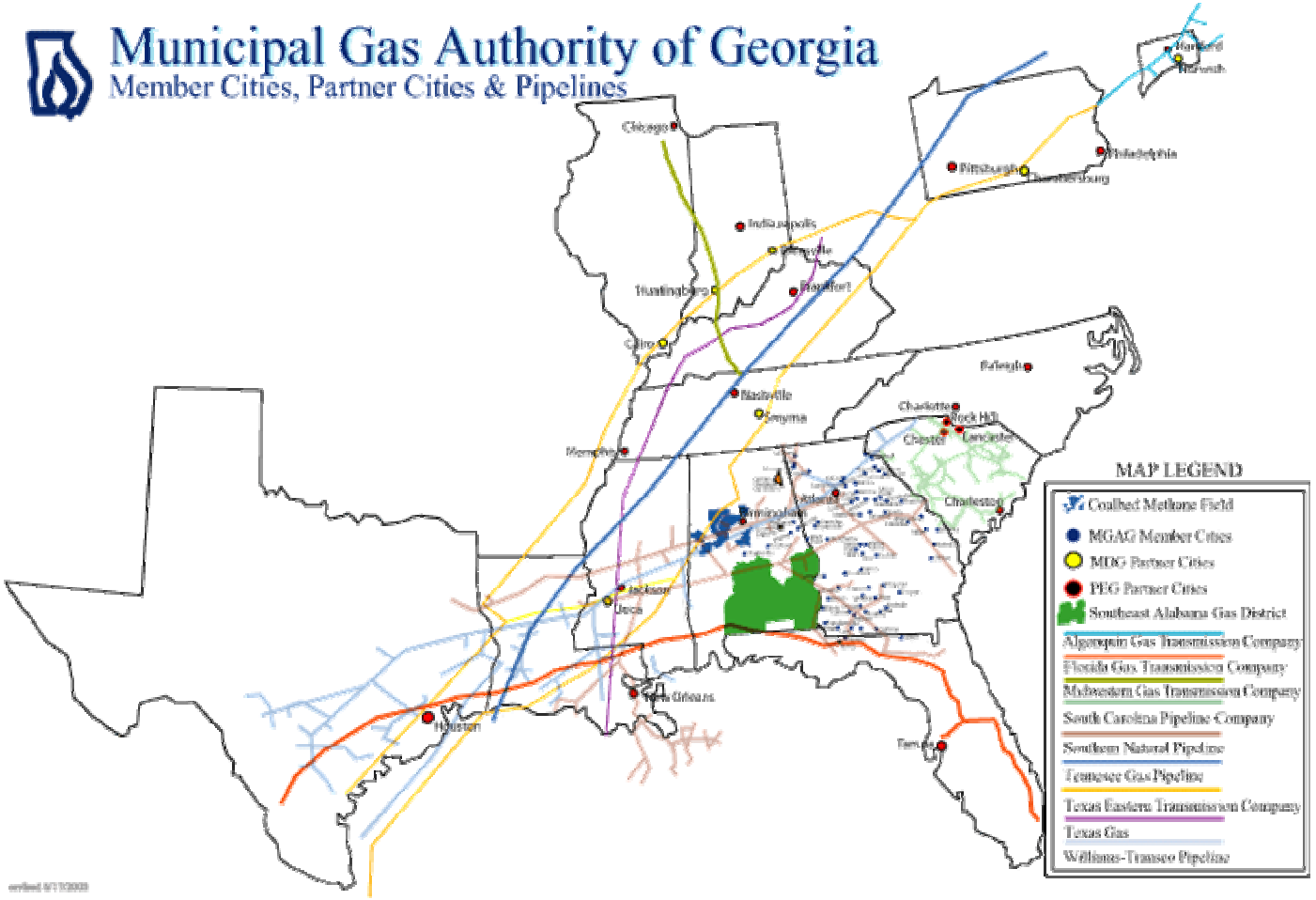
- **Local Distribution Companies**
  - Nominations
  - Safety and restoration
  - Rates
- **Pipelines**
  - Capacity
- **Municipal**
  - May operate multiple utilities
- **Other Issues**
  - Electric generation vs. space conditioning

Natural Gas Pipelines

Figure 7.



Example: Regional Interdependencies

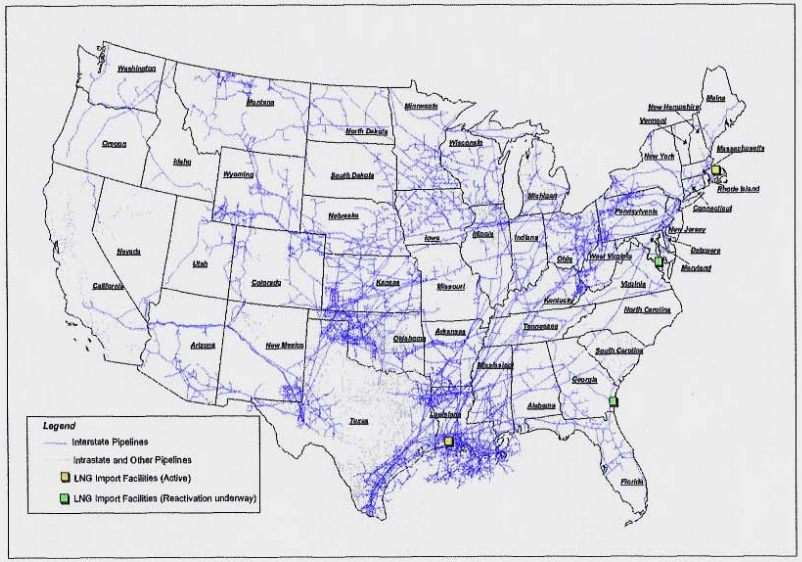


DOE Office of Energy Assurance
Basic Data - 2003

The Scale and Complexity of the US Energy Infrastructure

- 157,810 Miles of Electrical Transmission lines
- 5,000 Power Plants; 800,000 Megawatts
- 2,000,000 Miles of Oil Pipelines
- 1,300,000 Miles of Gas Pipelines
- 2,000 Petroleum Terminals
- ~1,000,000 Wells
- Extensive Ports, Refineries, Transportation, and LNG Facilities

Active Refinery Locations, Crude and Product Pipelines



Source: Energy Information Administration, Office of Oil & Gas

Models for Interstate Coordination 1

- **DOE Office of Energy Assurance**
  - Lead federal agency for energy response
  - Principal Coordinator for State and DHS on energy issues
  - **Functions**
    - Energy emergencies support & management duties
    - Encourages partnerships
    - Works with states directly and through DOE Regional Support Offices
    - Assesses critical assets
    - Provides technical expertise
    - Provides leadership for policy and analysis
    - SHOPP (with NASEO)

Models for Interstate Coordination - 2

- **NASEO**
  - **Works with member states**
    - Energy plans
    - Regional coordination
    - Technical assistance during shortage
    - Energy emergency issues covered at national meetings
  - **Coordinates with federal, national and regional groups**
- **NARUC**
  - **Ad Hoc Committee on Critical Infrastructure**
    - Focus on electric, natural gas, telecommunications and water
    - Concerned with security
    - Encourages up-to-date plans
    - Encourages commissions to be integrated in plans
    - Technical Issues, such as Smart Grid

Questions?

Mitigating Risks
and
Vulnerabilities

Five Step Risk Assessment Model

1) Asset Assessment
2) Threat Assessment
3) Vulnerability Assessment
4) Risk Assessment
5) Identification of Protective Measures

Step 1 - Asset Assessment

- Tangible and intangible assets important to the organization's mission or operation
- For each asset:
  - Identify undesirable events.
  - Rate the effect that the event would have on the organization.
- Rule of thumb:
  - The more severe the impact of loss, damage, or destruction to the organization, the more valuable the asset.

Asset Assessment

- To determine the criticality of facilities or asset, ask about:
  - Mass casualty risk
  - Economic impact
  - Symbolic impact
  - Support for essential emergency response function
  - Level of interdependency
  - Continuity of government
  - Key cyber or communication node (911)

Step 2 - Threat Assessment

There are four different types of attacks or threats:

1. Deliberate attacks caused by people

   (e.g. terrorists, criminals, hackers, delinquents, employees)
2. Natural attacks caused by nature

   (e.g., hurricanes, tornadoes, floods, wildfires, earthquake)
3. Accidental attacks caused by technological failure (e.g., pipeline rupture, chemical spills, nuclear, or biological contamination)
4. Systemic threats caused by physical inability of energy delivery system to meet demand

Step 3 - Vulnerability Assessment

- Identify and characterize vulnerabilities related to specific assets or events.
- Look for exploitable situations and consider actions that could be taken by insiders.
- Level of vulnerability may depend on existing countermeasures or preparedness.

Step 4 - Risk Assessment

- **Asset, threat, and vulnerability assessments are combined and evaluated**
  - Give a complete picture of the risks
  - Assess risks to each asset
- **Risk = Consequence x Threat x Vulnerability**

  (step 1) (step 2) (step 3)
  - C = damage level - loss of life, physical, economic
  - T = likelihood of attack
  - V = probability of a successful attack
- **Approximates the probability of an unwanted event**

Step 5 - Protective Measures

- **Constant monitoring of changes in assets, threats, and vulnerabilities promotes:**
  - More effective management of new risks.
  - Timely response.
  - Longer period of uninterrupted operation.
  - Risk-aware culture.
  - Identity of actions for different alert levels.
  - Foreknowledge of recommended industry standards.

Questions?

Stakeholders
and
Organizational Coordination

For Example

- You Know You Need Help:

»Who you gonna call?

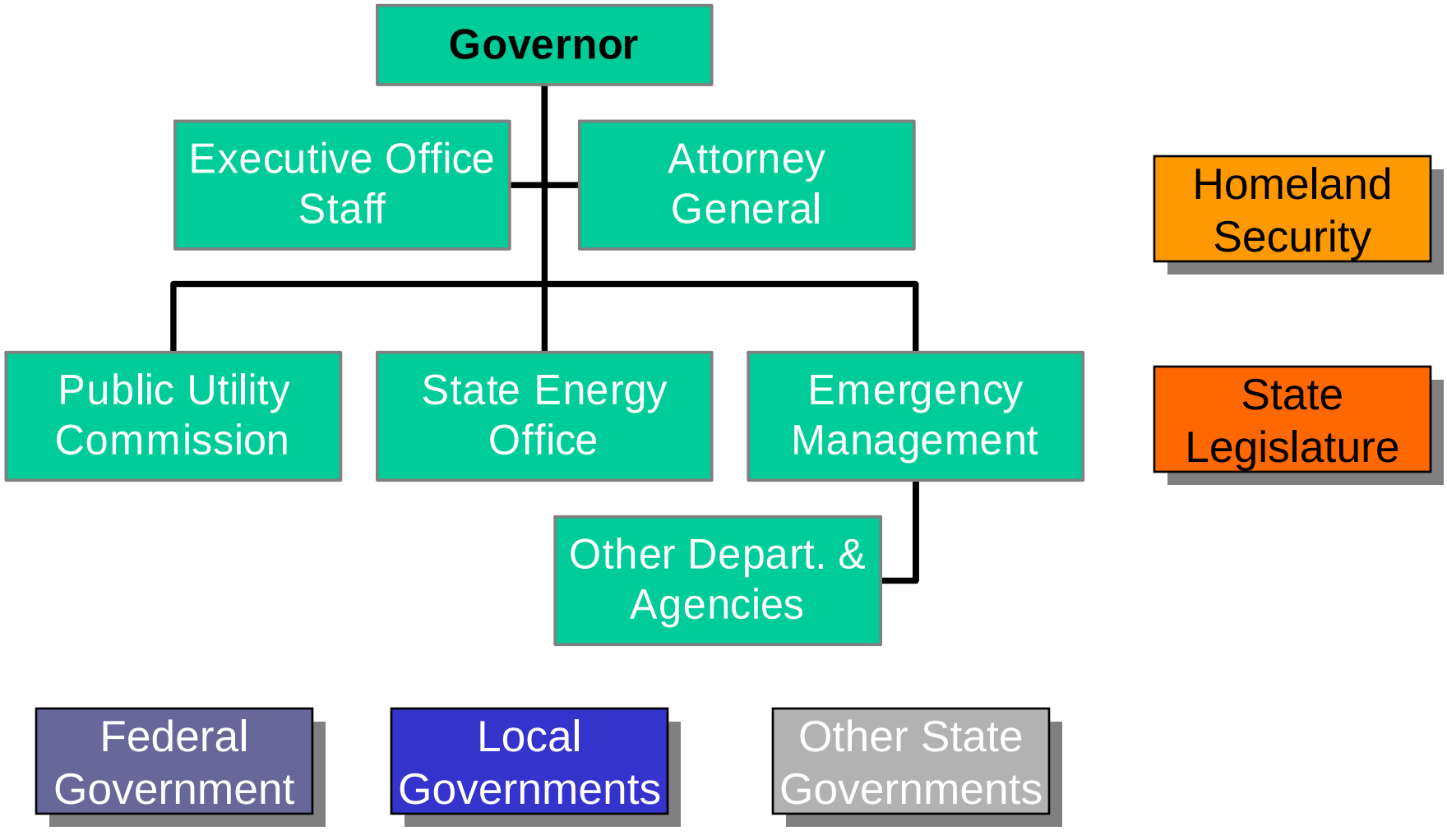

GHOSTBUSTERS

Noooo…

Look for *Stakeholders*

- **Guidelines encourage asking "Who is involved?"**
  - *What do they do?*
  - *Where are they located?*
  - *When can they respond?*
  - *How can they help?*

State Energy Emergency Organizations



Energy Shortage Triage for States
Who Takes Action

Stage	Report	Mild Shortage	Moderate Shortage	Severe Shortage
Assessment	**No damage**	**5 – 10% short**	**10 – 15% short**	**15% plus short**
Action	Monitor	Alert/PR	Public Advise Restorative Actions	Actions from moderate Mitigation Measures
SEO	Yes	Yes	Yes	Yes
Emergency	Maybe	Yes	Yes	Yes
DOE	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Local Govn't	No	Maybe	Yes	Yes
PSC	Maybe	Maybe	Yes	Yes
RTO	Maybe	Yes	Yes	Yes
DOTs	No	No	Maybe	Likely
Agriculture	No	No	Maybe	Likely
DHS	No	Maybe	Likely	Yes

Who are the Stakeholders?

- **Energy user sector profile**
  - **Residential**
  - **Commercial**
  - **Industrial**
  - **Transportation**
- **State agencies**
- **Federal agencies**
- **Regional organizations**
- **Energy providers**
  - **Utility, LDC, Heating Oil, Propane, Service Stations, and their associations**
- **Non-profit aid and others**

Sample List of Energy Provider Stakeholders

- **Electricity Industry**
  - Independently Owned Utilities
  - Electric Membership Cooperatives and Municipal Utilities
  - Independent Generation Companies
  - Transmission
  - Regional organizations
- **Natural Gas Industry**
  - Local Distribution Companies / Utilities
  - Natural Gas Pipelines
- **Petroleum Industry**
  - Refineries
  - Pipeline
  - Gas Processing
  - Distribution Facilities
  - Jobbers/Retail
    - Motor gasoline, fuel oil, heating oil, propane, aviation products, lubrication
- **Coal Mining Industry**
  - Railroads
- **Ports**
- **Chemical Industry**

Most Common Coordination Among Stakeholders Simplified

- SEO alerts:
  - EMD
  - Advisory councils, if any
  - Governor's Office
- Coordination:
  - SEO and PSC with EMD
  - Others as needed
- DOE - SEO:
  - Communicate and coordinate
- EMD, PSC, and SEO:
  - Coordinate with energy providers
  - Suggest mitigation measures
  - Inform local government
- Legislature:
  - Kept informed
  - Approval may be needed if mitigation measures are required

Questions?

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