

# Rebuilding Utility Infrastructure: Challenges and Opportunities



**Emergency Management in the Energy Sector**  
*Building Resilient Energy Systems,  
Plans and Infrastructure*

**Louisiana State University**  
**Baton Rouge Louisiana**  
**February 21, 2006**



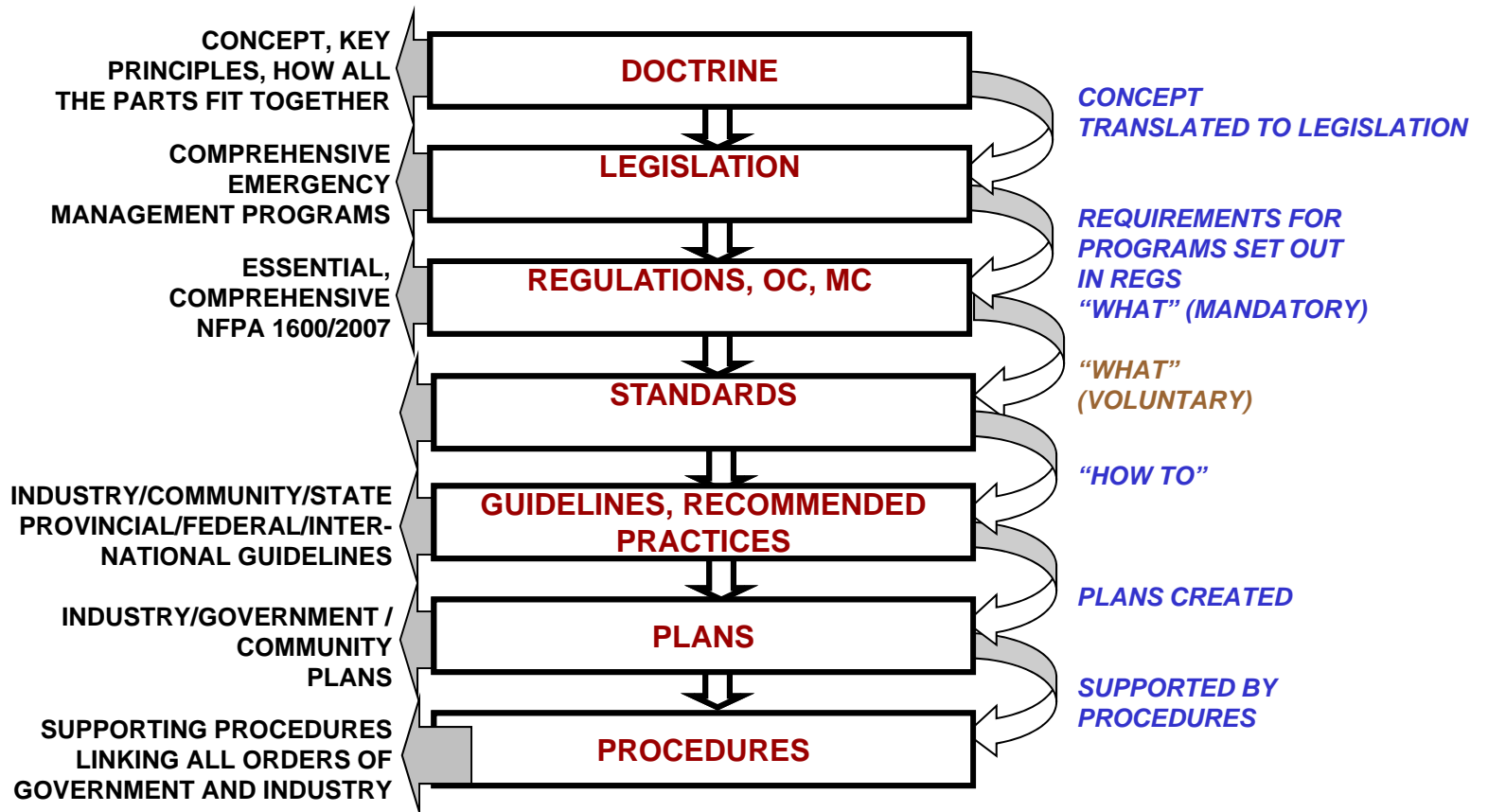
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# Presentation Overview

- **Emergency Management Framework**
- **Energy Infrastructure Assurance Integration and Coordination**
- **Building a Way Ahead Plan and Implementing It**
- **Concluding Remarks**



# North American Energy Infrastructure Protection and Policies



# Emergency Management Framework

- **Hazards**
  - **Natural**
  - **Human Induced**
- **Groupings/Organizations**
  - **Types of Agencies**
  - **Groupings**
- **Functions**
- **Coordinating Activities**
- **Resources**



# The “All Hazards” Approach

## I. Natural Hazards

### Biological

- Human
- Animal
- Plant

### Meteorological/ Elemental

- Drought
- Flood/Storm Surge/Tsunami
- Ice/Snow
- Fire
- Wind-Tornado/Hurricane

### Geological

- Earthquake
- Landslide
- Avalanche

*Resulting from:*  
Acts of God / Mother Nature

## II. Human Induced Hazards

### Non-intentional

- Energy
- Finance
- Information/  
Communication
- Agriculture
- Health
- Environment
- Transport
- Public safety/  
security
- Government  
operations

*Resulting from:*

- Human Error
- System Failure

### Intentional

- Energy
- Finance
- Information/  
Communication
- Agriculture
- Health
- Environment
- Transport
- Public safety/ security
- Government  
operations

*Resulting from:*

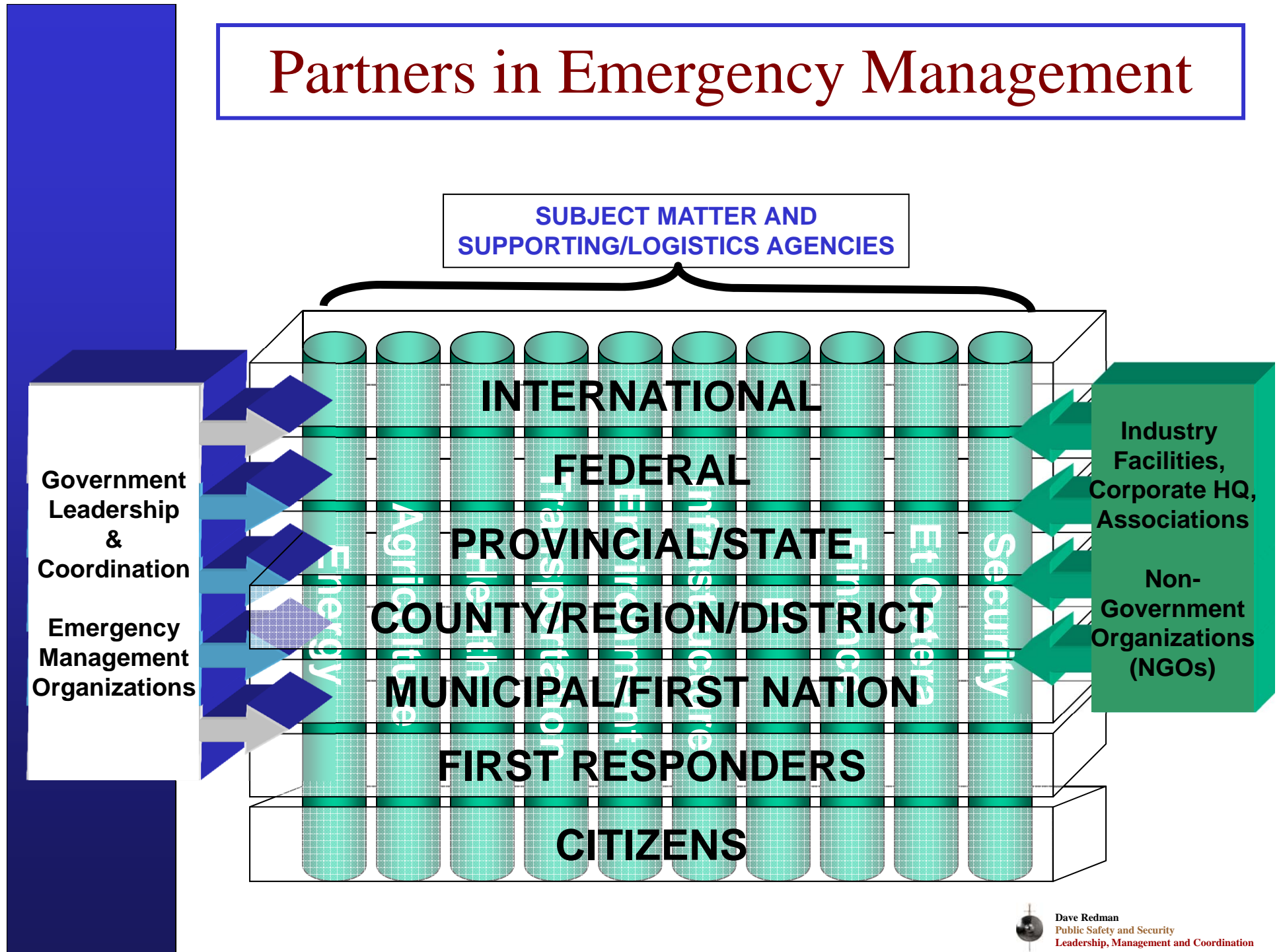
- Civil unrest
- Terrorism
- International Tension
- Criminal Acts
- War

**SAFETY**

**SECURITY**



# Partners in Emergency Management



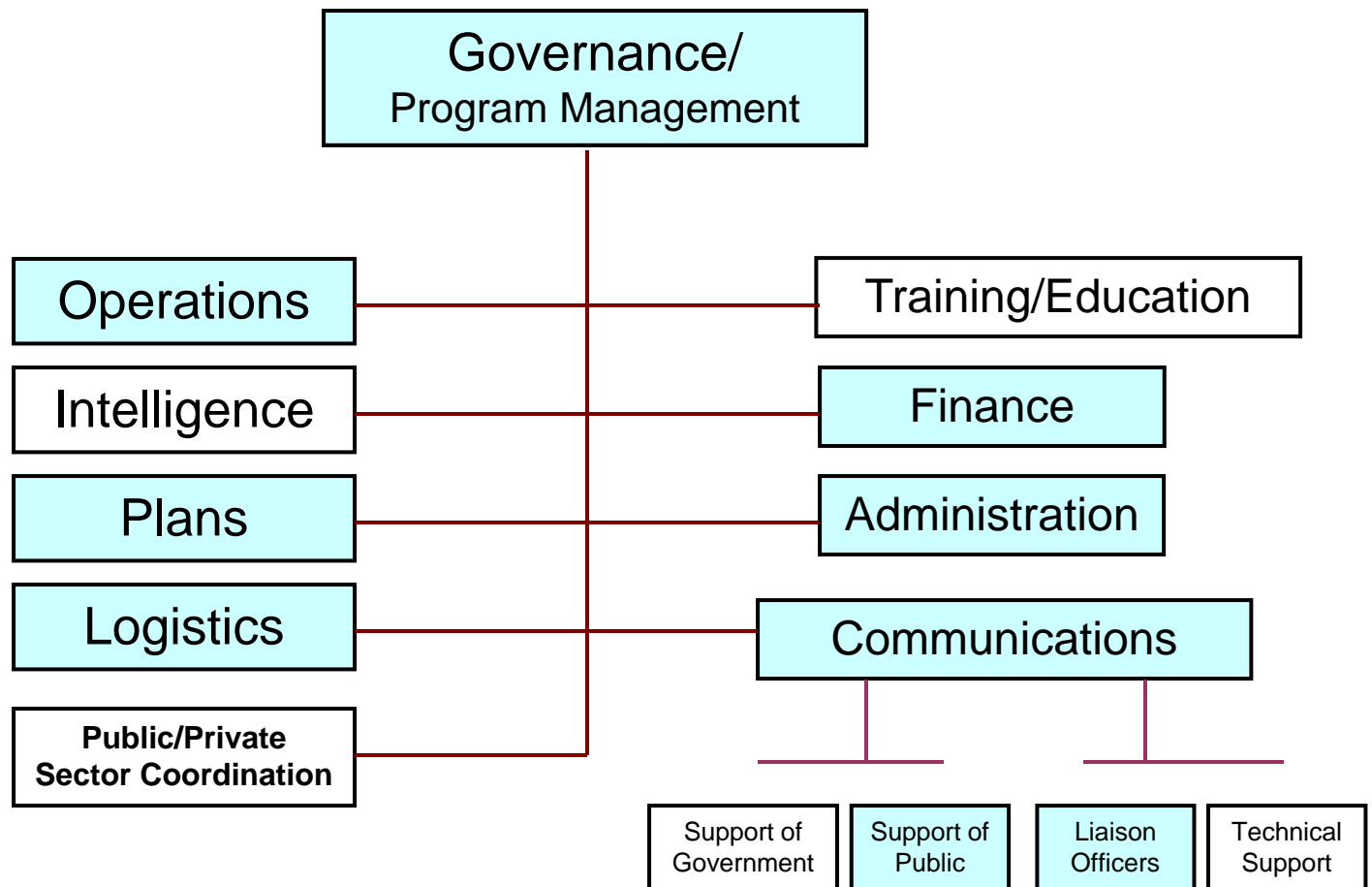


# Functions of Emergency Management

<b>Mitigation/ Prevention</b>	Attempting to maintain a normal state of life by removing/minimizing the items at risk from the effects of hazard(s), or by reducing the effects of the hazard(s) on the items at risk, with an aim to prevent or reduce a disaster impact when it occurs; e.g. building fireguards, river dikes, security measures, legislating building codes.
<b>Preparedness</b>	Recognizing that perfect mitigation is impossible, building capability to effectively and rapidly respond when items at risk are about to be or are affected by hazards. It includes the planning, exercising and education necessary to achieve a state of readiness for incidents, disasters and major emergencies; e.g. plans, simulation exercises, equipment stockpiles
<b>Response</b>	Executing the capability to minimize the losses to items at risk (with an emphasis to prevention of injury/loss of life) when they are effected by hazards.
<b>Recovery</b>	Returning the effected organization/group to a state of normal life, after it has been effected by a hazard. Commences ASAP during Response and runs concurrently.



# Emergency Management Activities



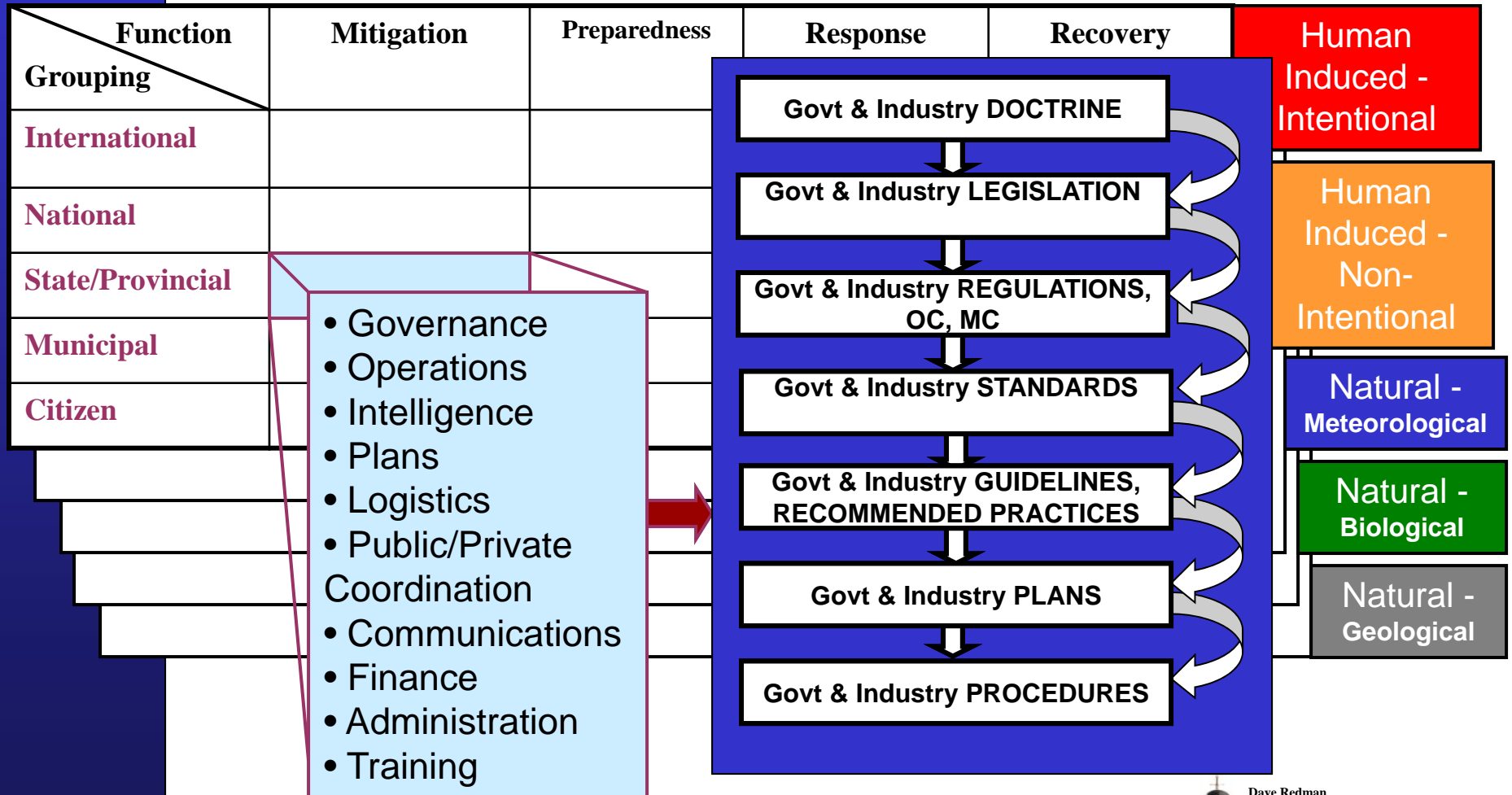


# Standard Resources

- Personnel
- Equipment
- Supplies
- Infrastructure
- Information Communications  
Technology
- Finances
- Publications/Records/Documents



# Integration of the Framework of Emergency Management



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# Energy Infrastructure Security

## Detection/Assurance/Protection through Public & Private Sector coordinated:

1. Knowing/ranking *Critical Infrastructure*
  2. Determining *Threat Level* for area
  3. A Timely *Notification System*
  4. Implementing local *Safety/Security/Assurance Measures*
  5. Directing/coordinating *Integrated Additional Assurance Measures* (Government/Private Sector actions)
- = **Neutralizing/Mitigating the Affects of the Hazard**



# Joint Identification of Critical Infrastructure

Sectors	
1. Energy	<ul style="list-style-type: none"><li>• Electrical</li><li>• Oil</li><li>• Gas</li><li>• Nuclear</li><li>• Etc</li></ul>
2. Environment/Water	
3. Finance	
4. Food	
5. Health Care	
6. Government Infrastructure	
7. Communications & Telecommunications	
8. Manufacturing	
9. Livestock	
10. Transportation	
11. Unique	



# Standardized Scoring of Critical Infrastructure

1. Health/Safety/Environment
  2. Interdependencies
  3. Economic Impact
  4. Strategic Scope
  5. Availability of Substitutes
  6. Restoration Time/Cost
  7. Impact on Public Morale
  8. Political Impact
- 

100%



# Standardized Ranking of Critical Infrastructure

- **Vital**
  - Achieves a value of greater than **65%**
- **Necessary**
  - Achieves a score between **45% to 65%**
- **Significant**
  - Achieves a score between **10% to 45%**



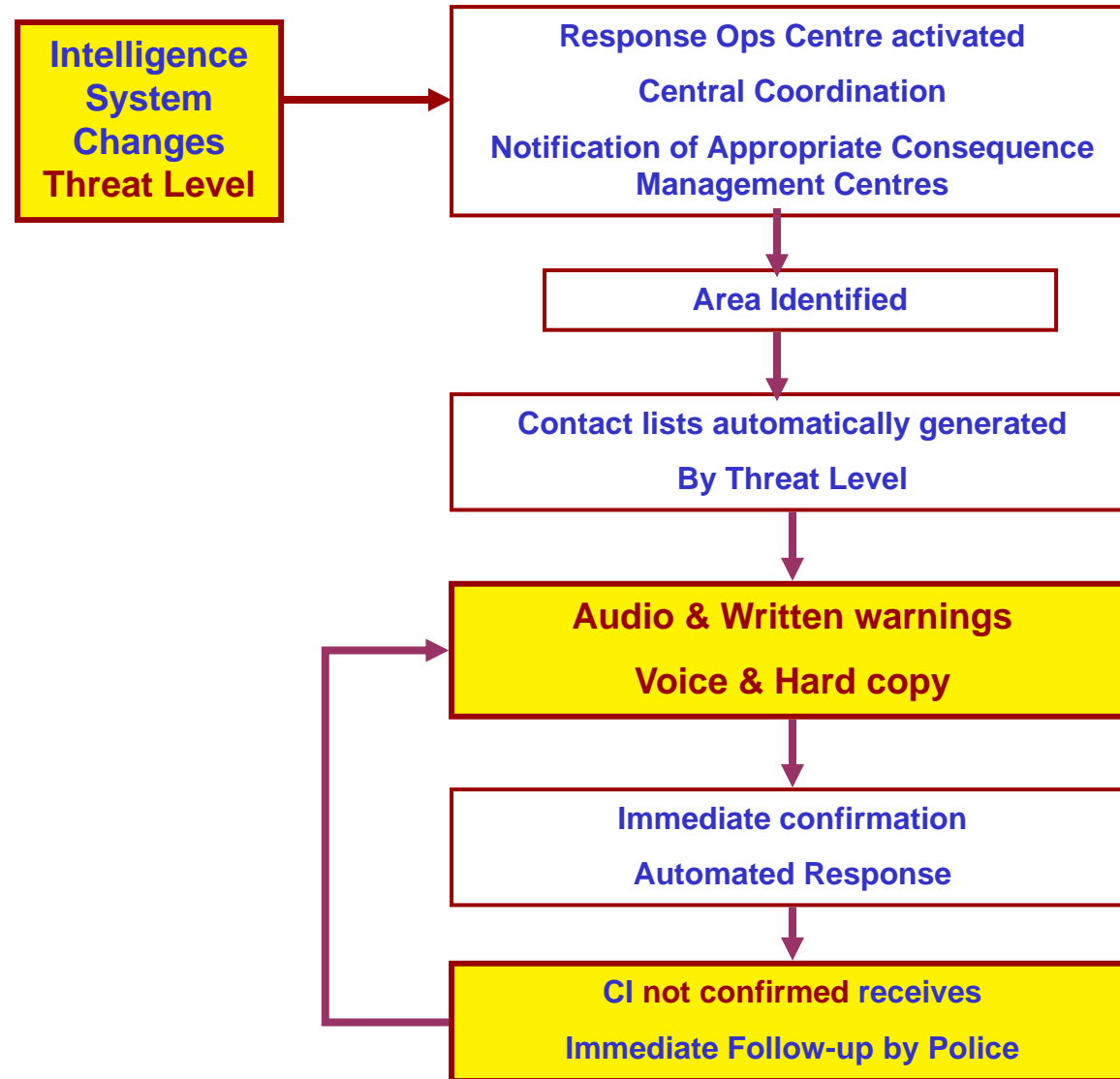


# Standardized Threat Assessment System

<b><u>No Known threat</u></b>	There is no intelligence indicating a threat against <b>your area</b> .
<b><u>LOW</u></b>	Intelligence has identified a Hazard within <b>North America</b> or abroad which is assessed as having either the capability or the intent to perform an act of damage/disruption against <b>your area</b> .
<b><u>MEDIUM</u></b>	Intelligence has identified a Hazard within <b>North America</b> or abroad which is assessed as having the capability and the intent to cause severe damage/disruption against <b>your area</b> . There is no intelligence indicating that an event is forthcoming in the next week.
<b><u>HIGH</u></b>	Intelligence has identified a Hazard within <b>North America</b> or abroad which is assessed as having the capability and the intent to cause severe damage/disruption against <b>your area</b> . Intelligence indicates an event is likely in the next week.
<b><u>IMMINENT</u></b>	Intelligence has identified a Hazard within <b>North America</b> or abroad which is assessed as having the capability and the intent to cause severe damage/disruption against specific infrastructure in <b>your area</b> in the immediate future.



# Integrated Notification System



# Common Assurance Protocols

<p><b><u>A. Preliminary Actions</u></b></p> <ul style="list-style-type: none"><li>• <b>System Information</b><ul style="list-style-type: none"><li>– Description</li><li>– Layout (Spatial)</li></ul></li><li>• <b>Vulnerability Assessment (All Resources)</b><ul style="list-style-type: none"><li>– Physical</li><li>– Cyber</li><li>– Coordination</li></ul></li><li>• <b>Business impact</b></li></ul>	<p><b><u>B. Generation Systems</u></b></p> <ul style="list-style-type: none"><li>• <b>Speed of Repair</b></li><li>• <b>Redundancy</b></li><li>• <b>Hardening</b><ul style="list-style-type: none"><li>– Security</li><li>– Safety</li><li>– Resilience</li></ul></li></ul>
<p><b><u>C. Transmission Systems</u></b></p> <ul style="list-style-type: none"><li>• <b>Speed of Repair</b></li><li>• <b>Redundancy</b></li><li>• <b>Hardening</b><ul style="list-style-type: none"><li>– Security</li><li>– Safety</li><li>– Resilience</li></ul></li></ul>	<p><b><u>D. Distribution Systems</u></b></p> <ul style="list-style-type: none"><li>• <b>Speed of Repair</b></li><li>• <b>Redundancy</b></li><li>• <b>Hardening</b><ul style="list-style-type: none"><li>– Security</li><li>– Safety</li><li>– Resilience</li></ul></li></ul>
<p><b><u>E. Control Systems</u></b></p> <ul style="list-style-type: none"><li>• <b>Speed of Repair</b></li><li>• <b>Redundancy</b></li><li>• <b>Hardening</b><ul style="list-style-type: none"><li>– Security</li><li>– Safety</li><li>– Resilience</li></ul></li></ul>	<p><b><u>F. Plans, Policies &amp; Procedures</u></b></p> <ul style="list-style-type: none"><li>• <b>Assurance policy</b></li><li>• <b>Communications</b></li><li>• <b>Intelligence</b></li><li>• <b>Emergency Plans</b></li><li>• <b>Specific Terrorism</b></li><li>• <b>Training ***</b></li></ul>

# Common Security Assurance Protocols

<b><u>A. Preliminary Actions</u></b> <ul style="list-style-type: none"><li>• Site Information</li><li>• Vulnerability Assessment</li><li>• Business impact</li></ul>	<b><u>B. Outer Perimeter - Security</u></b> <ul style="list-style-type: none"><li>• Grounds</li><li>• Perimeter Barrier</li><li>• Lighting</li><li>• Security Force</li></ul>
<b><u>C. Inner Perimeter - Security</u></b> <ul style="list-style-type: none"><li>• Structures</li><li>• Commodities</li><li>• Equipment</li><li>• Operations</li><li>• Security</li></ul>	<b><u>D. Access Controls</u></b> <ul style="list-style-type: none"><li>• Employees/contractors</li><li>• Visitors/Customers/Deliveries</li><li>• Vehicles/Parking</li><li>• Shipping/Receiving</li><li>• Security</li></ul>
<b><u>E. Information Technology</u></b> <ul style="list-style-type: none"><li>• Computerization</li><li>• Other</li></ul>	<b><u>F. Plans, Policies &amp; Procedures</u></b> <ul style="list-style-type: none"><li>• Security policy</li><li>• Communications</li><li>• Intelligence</li><li>• Emergency Plans</li><li>• Specific Terrorism</li><li>• Training</li></ul>



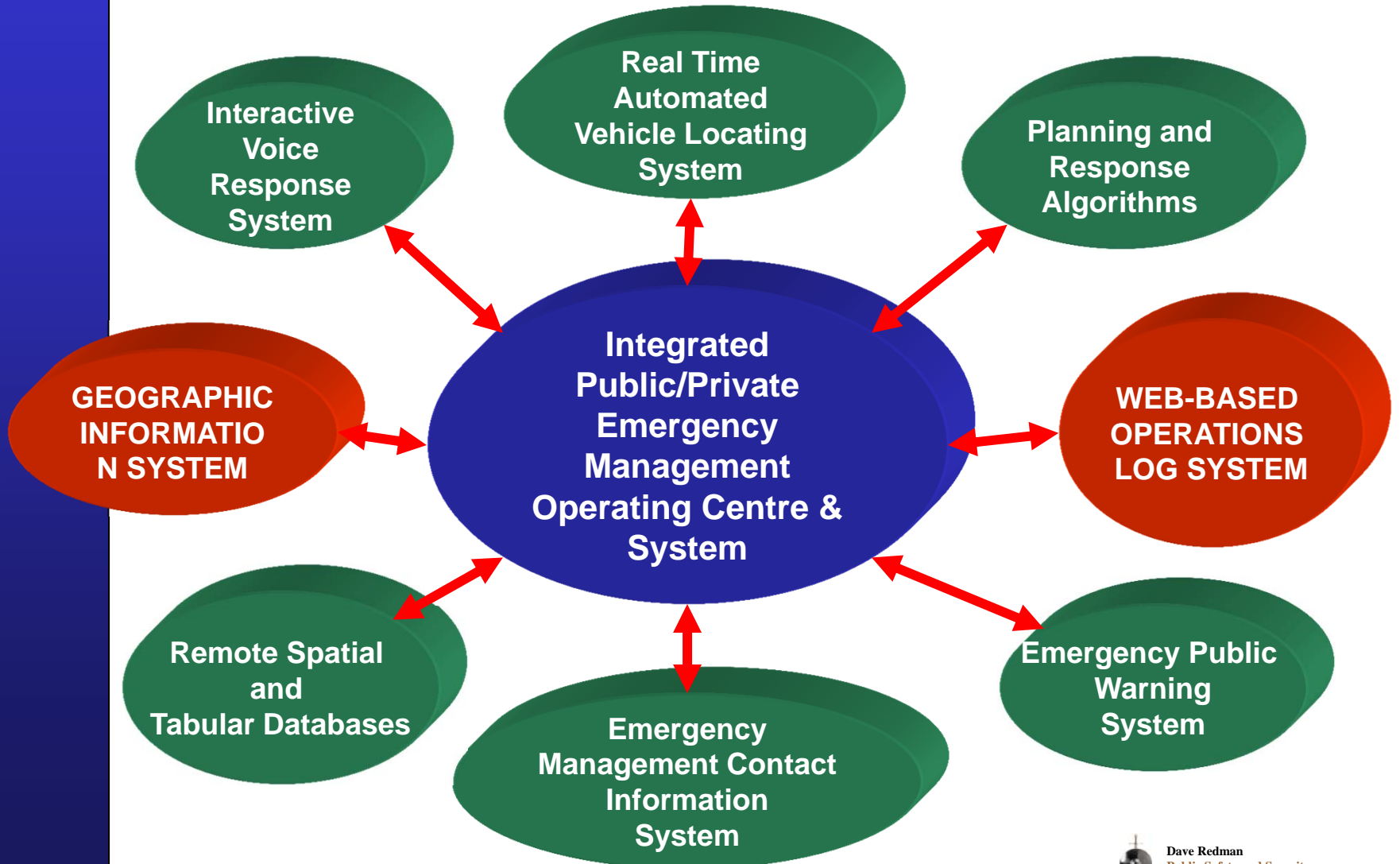
# Coordinated/Integrated Assurance Measures

Threat level Facility Ranking	NO THREAT (Indefinite)	LOW (Long-term)	MEDIUM (Months)	HIGH (Weeks)	IMMINENT (Days)
<b>Vital</b>	Med	Med	High	Max	Max
<b>Necessary</b>	Min	Low	Med	High	Max
<b>Significant</b>	Min	Min	Low	Med	High

<b>Non - CI</b>	Min	Min	Min	Low	Med
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**Assurance Levels - Minimum to Maximum**

# Integrating Additional Assurance Measures



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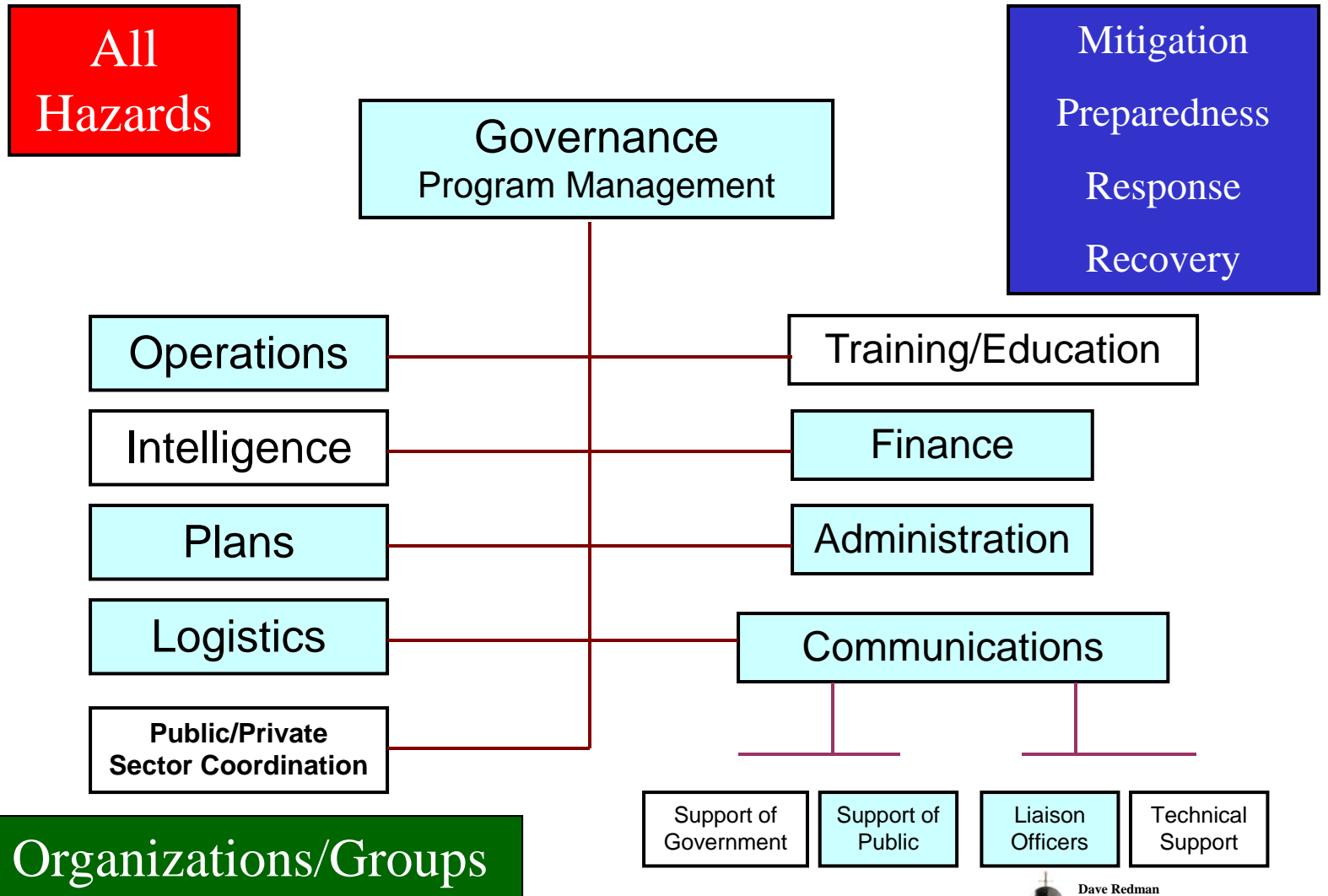
# Resilient Energy Infrastructure

## A Way Ahead Plan

- Analysis
- Design
- Implementation
- Evaluation
- Validation



# Resilient Energy Infrastructure A Way Ahead Plan



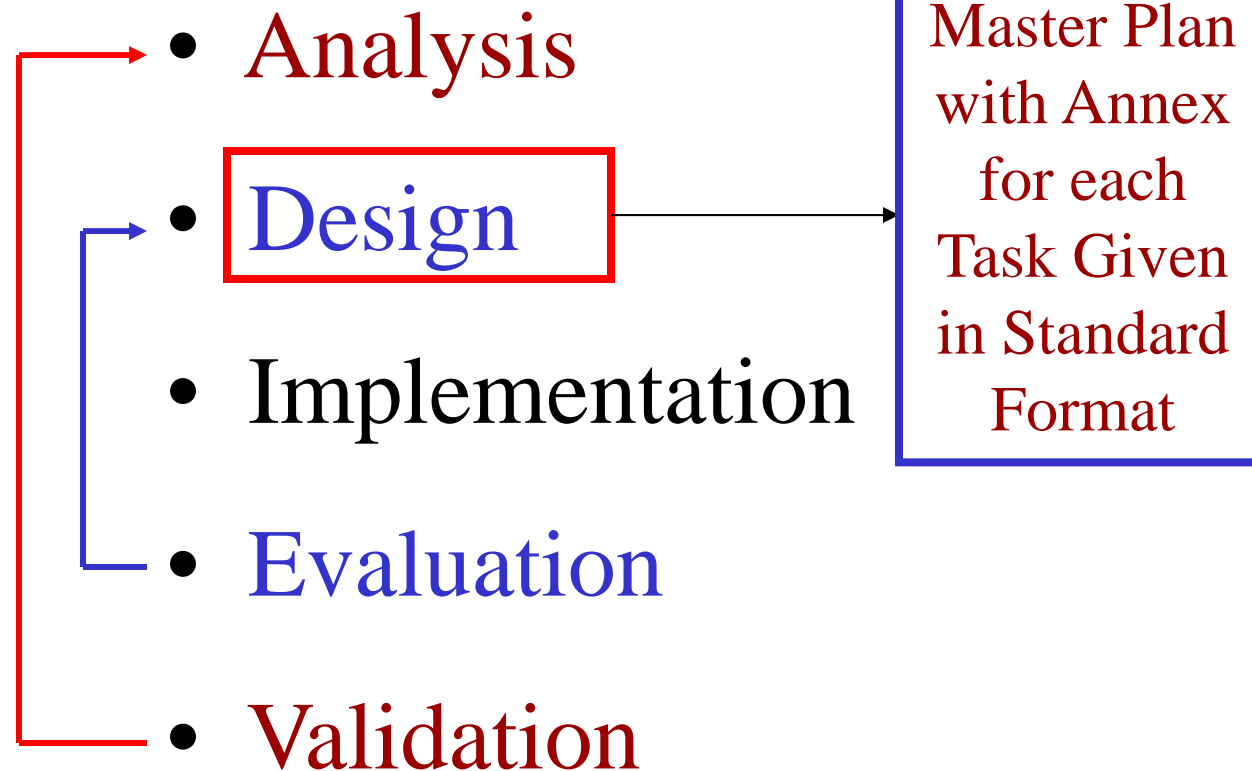
# Mission Analysis

<b>A. Overall Intent - A</b> <b>Resilient Electrical Power System</b>	<b>B. Limitations – Resources, Time &amp; Space</b>
<b>C. Hazards</b>	<b>D. Partners</b>
<b>E. Tasks – Given</b> <ul style="list-style-type: none"> <li>• Resilient Generation</li> <li>• Resilient Transmission</li> <li>• Resilient Distribution</li> <li>• Resilient Control Systems</li> </ul> <div style="border: 1px solid black; background-color: red; color: white; padding: 5px; text-align: center;"> Mitigation  Preparedness  Response  Recovery </div>	<b>F. Tasks – Implied</b> <ul style="list-style-type: none"> <li>• Governance</li> <li>• Operations</li> <li>• Plans</li> <li>• Intelligence</li> <li>• Logistics</li> <li>• Public/Private Sector Coordination</li> <li>• Communications</li> <li>• Finance</li> <li>• Administration</li> <li>• Training</li> </ul>
<b>G. Assumptions</b>	<b>H. Restrictions</b>
<b>I. Working Groups</b>	<b>J. Timeline</b>



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## A Way Ahead Plan



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