



# EARTHEX™ 2020

Emergency All-Sector Response to a Transnational Hazard  
EXercise

**An Overview for the  
National Association of  
Regulatory Utility Commissioners**



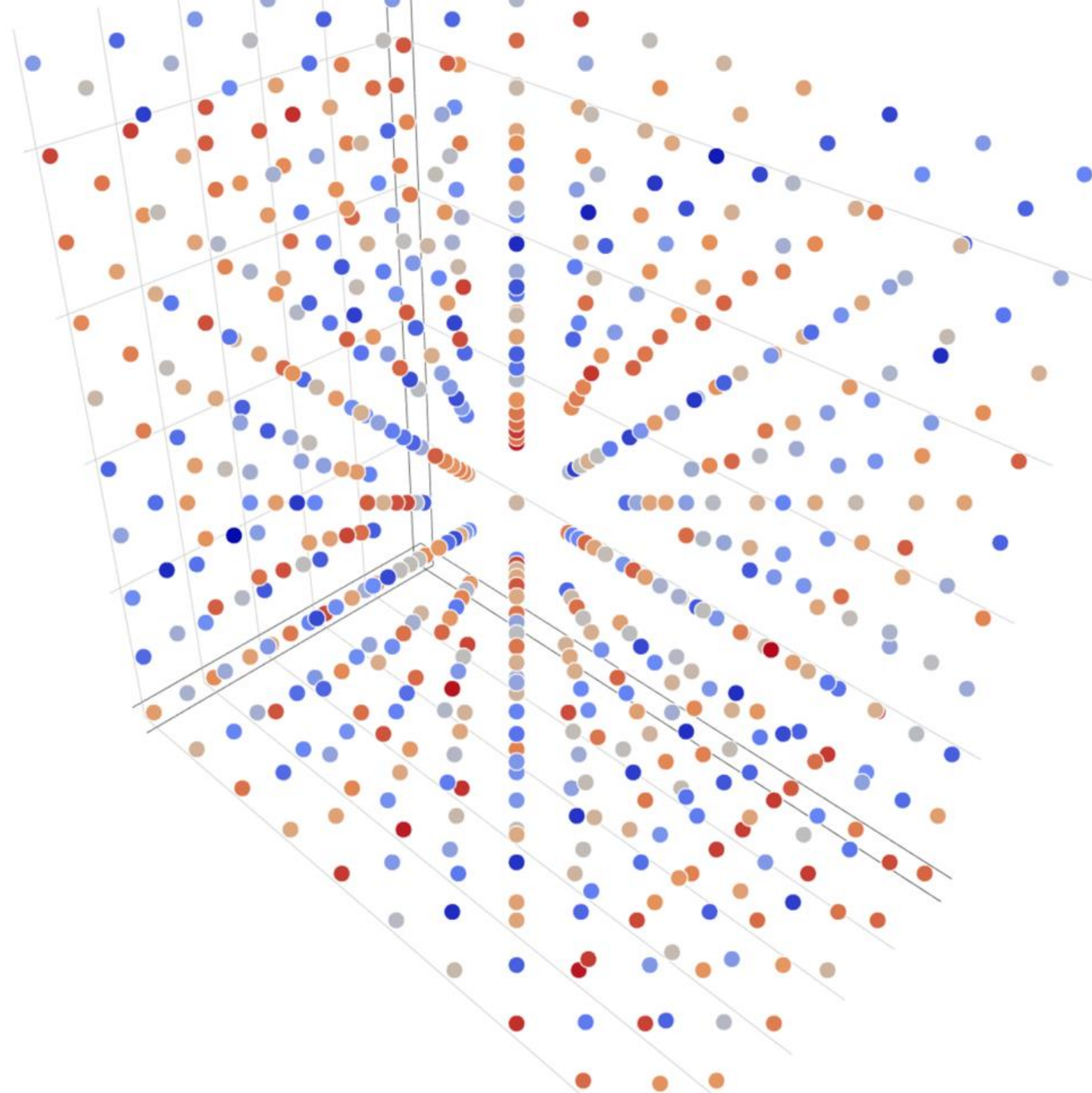
25 June 2020





# The Meta-Grid: The Grid of Grids

- Today's interdependent sectors, service and supply chains are fast-growing, complex and hyper-connected.
- Critical, systemic gaps require new tools designed to self evolve and grow with the meta-grid.
- To be effective, these tools must become important, profitable business tools.





# What is Electro Magnetic Pulse (EMP)?



Source: EMP Commission Executive Report

- Complex electrical and magnetic interaction with the Earth's magnetic field inducing currents in the atmosphere and ground
- How do we know the impacts?
  - Atmospheric nuclear tests by Russia and the US back in the 1960s
    - Starfish project (Johnston Island, Pacific Ocean)
    - Russian Test 184 in central Asia

# Sources of Electro Magnetic Pulse (EMP)

- High altitude nuclear detonation
  - Altitude
  - Energy yield
  - Gamma ray output
  - Impacts are variable due to the Earth's magnetic field

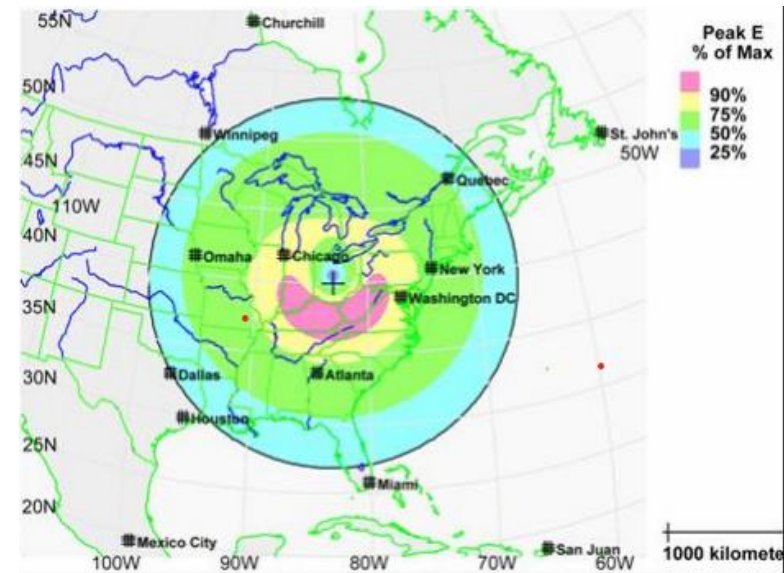
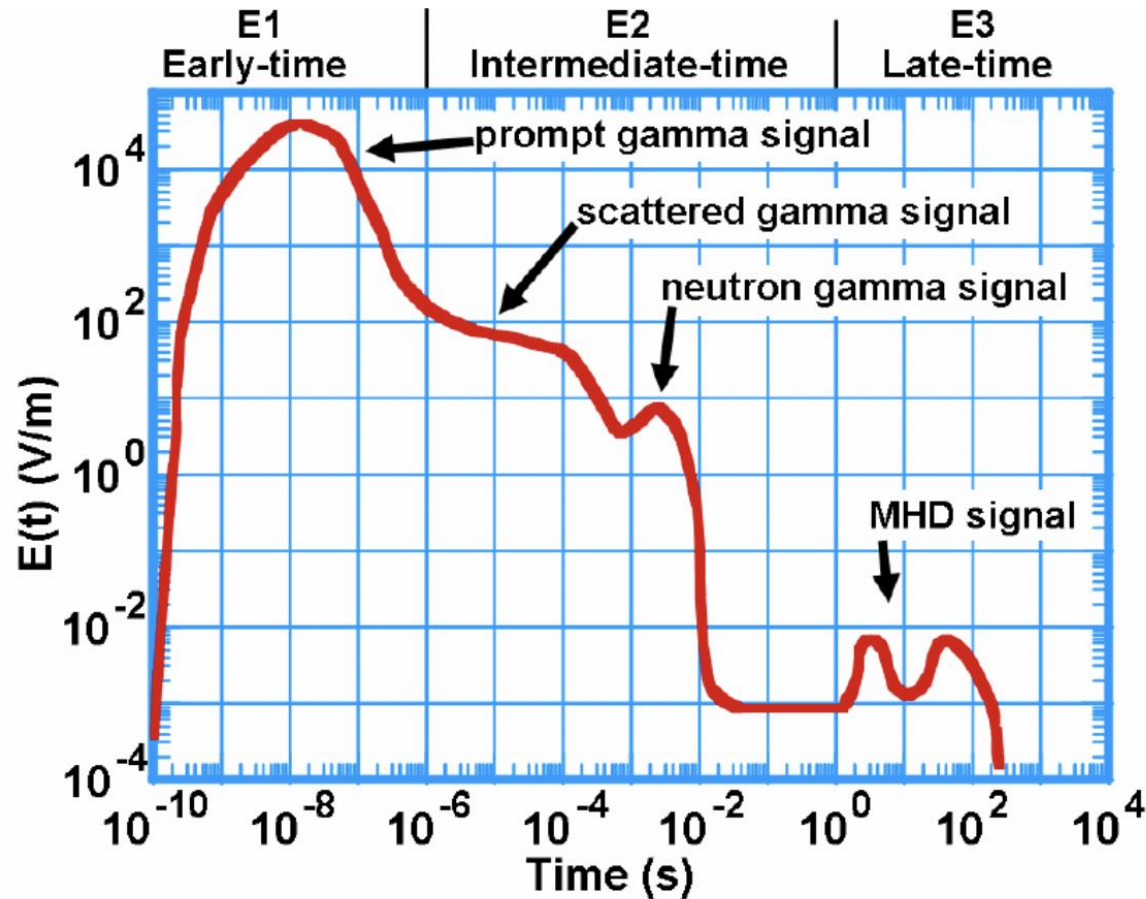


Figure 2. Illustrative EMP Effects – Fast Pulse

- Intentional Electromagnetic Interference (IEMI)



# The EMP Threat



**E1** – ultra fast, narrow pulse, typically achieving extremely high electromagnetic field strengths, threat to digital electronics (one microsecond)

**E2** – slower, lower strength, pulse that is similar to lightning (fractions of a second)

**E3** – even slower, lower strength, pulse that is similar to space weather (seconds to minutes)

Source: Radasky/Savage, "High-Frequency Protection Concepts for the Electric Power Grid, Meta R-324", prepared by Metatech Corporation for Oak Ridge National Laboratory, January 2010, Section 2, Page 2-1

# Impacts to the Power System

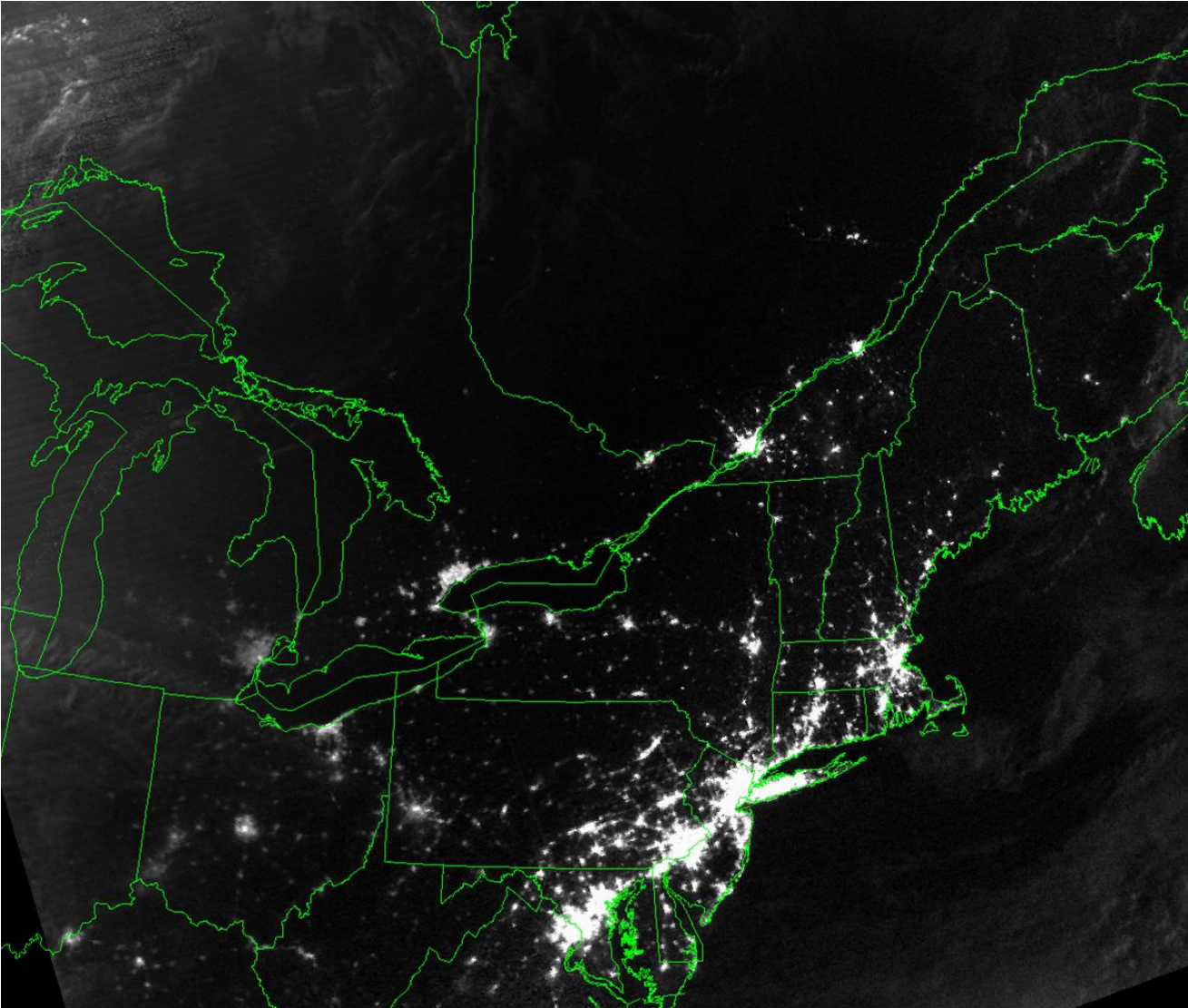


Source: Schweitzer Engineering Laboratories

- **Digital Relays**— solid state devices located all over the power system to provide protection from faults and prevention of overloads and system damage
- Testing to date indicates that a number of these devices can be expected to sustain damage during an EMP event



# Impacts to the Power System



**Relay Mis-operation** –  
induced currents can trigger  
misoperation of relays and  
other protection devices and  
trigger wide scale outages

2003 Northeast Blackout

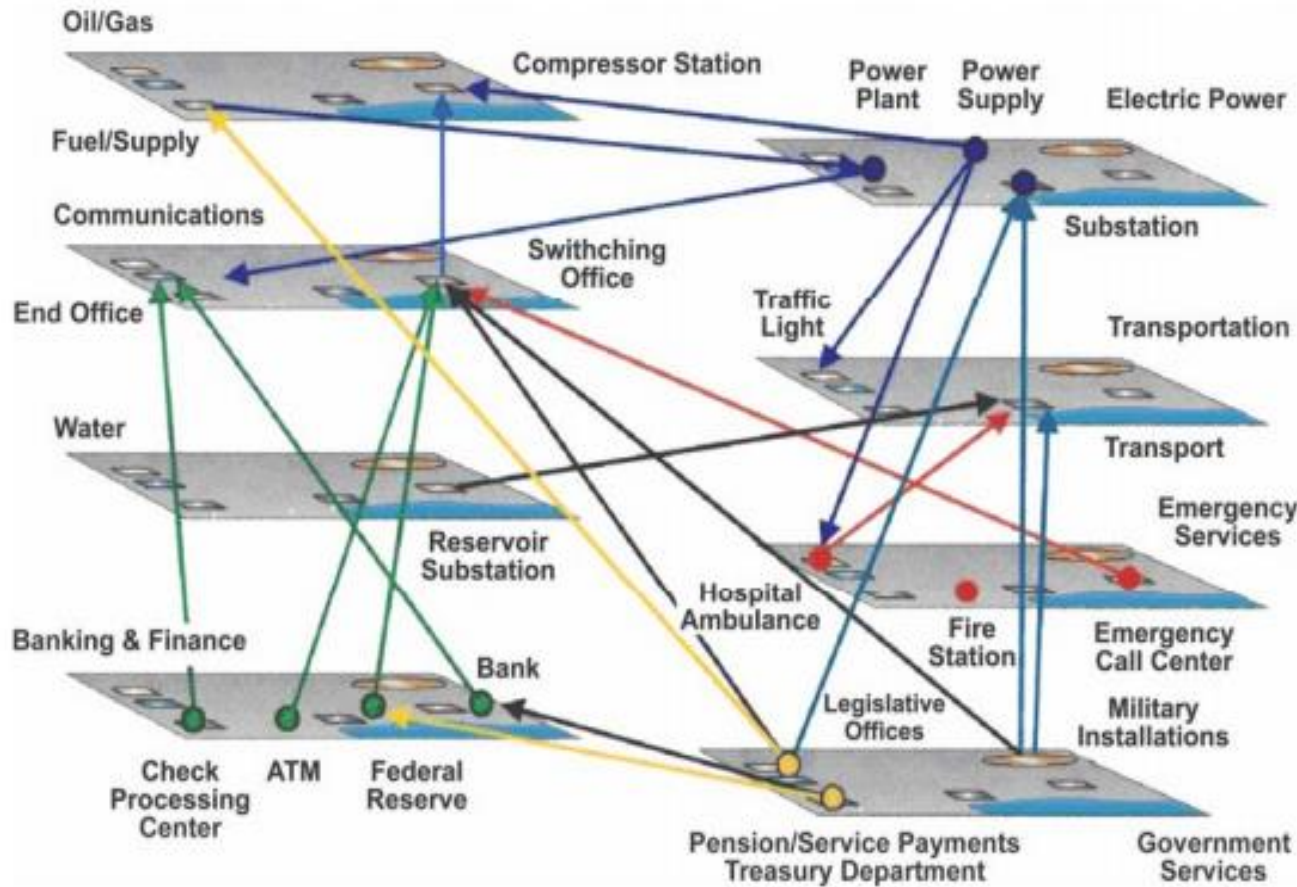


# Impacts to the Power System



- Large Transformers – core heating occurs within large transformers that can lead to failure, if it occurs over a period of time and the transformer has had a “difficult life” (**E3 issue**)

# Cross Sector Impacts from Electrical Outage



## Water and Wastewater Systems

- Pump stations, water treatment, wastewater treatment

## Food Distribution Systems

- Refrigeration, storage facilities

## Healthcare Facilities & Support Supply Chains

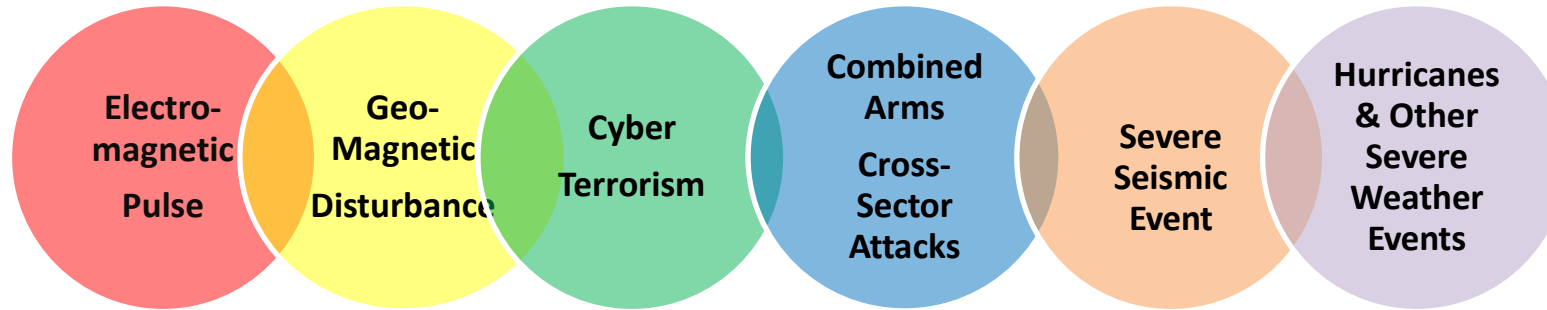
- Hospitals, pharmaceutical facilities

## Fuel Production and Distribution Systems

- Pump stations, pipelines

# The Resilience Matrix

## THREAT



## IMPACT ANALYSIS FOR CRITICAL SECTORS

Chemical	Commercial Facilities	Communications
Manufacturing	Dams	Defense Industrial Base
Emergency Services	Energy	Financial Services
Food & Agriculture	Government Facilities	Healthcare & Public Health
Information Technology	Nuclear Reactors, Materials & Waste	Transportation Systems
	Water & Wastewater Systems	

## RESILIENCE GOALS AND OBJECTIVES

### PREPAREDNESS

- Planning
- Training
- Exercise
- Equipment

### MITIGATION

- Protective Measures
- Security
- Standards & Codes
- System Strengthening

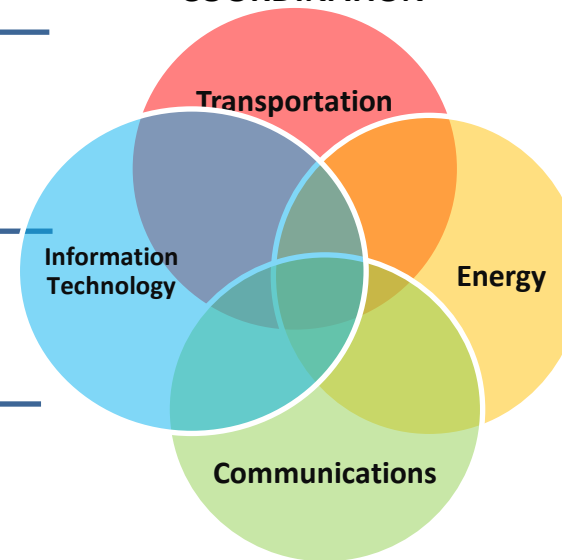
### RESPONSE

- Coordination of Key Elements
- Actions Taken to Save Lives
- Actions Taken to Protect Property
- Event Stabilization

### RECOVERY

- Restoration of Critical Services
- Long-term Recovery Actions
- Return to New Normal

## CROSS-SECTOR DEPENDENCIES & COORDINATION



**RESULTS**



- Regulation
- Leadership
- Risk Policy
- Personnel Preparedness
- Supply Chains
- Supporting Life-line Infrastructures
- Integrated Cross-Sector Planning
- Intelligence / Threat Analysis
- Level of Investment
- Planning Training & Exercising
- Cyber Security
- Communications



# Resilience Considerations

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# EARTH<sup>EX</sup> 2020

1 September – 31 October

EEX 2020 – What If...?



# EARTH EX Concept



- EARTH EX 2020 is a come as you are opportunity for all critical lifeline sectors to review, develop and extend the policies and procedures for responding to a long duration power outage.
- EARTH EX 2020 is a widely distributed exercise event, using new electronic exercise tools, advancing over three phases allowing for an examination of the response, restoration and overall resilience actions all sectors will face during a long duration power outage.
- EARTH EX 2020 supports in-depth discussion on roles, responsibilities, essential decision making, and communications requirements.

**EARTH EX<sup>TM</sup> 2020**







## EARTH EX for the Regulatory Community

### **Opportunities to**

- Develop and test policy considerations
- Consider the practical cybersecurity solutions in the face of ongoing threats within the energy sector
- Consider how to evaluate risks, assess mitigation measures, and select standards,
- Develop essential questions for the stakeholders and the regulated communities
- Discuss and evaluate the need for changes in standards and regulations
- Consider how to best support the response and restoration missions
- Discuss the regulatory role and its impact through the entire disaster process of – preparedness, mitigation, response, and recovery with the added dimension of restoration.
- Step forward and engage in developing key attributes and issues required to meet local, state, national, and international continuity issues.

# EARTH EX Assumptions

- All the information to drive the exercise discussion will be provided
- Access to the Internet is available
- Organizations will apply their own policies and procedures to develop solutions and responses to the exercise problem
- Organization's will select at least 1 person to serve as a facilitator/recorder – training for facilitators will be provided
- Each organization will be internally assessed



**RANSOMWARE:**

**INVESTIGATING THE THREAT**



The Threat Is Real –  
The Threat Is Now!







Responsibility  
Are you ready?

It really is no longer a question of if, but when.



## Select Your Area Of Play

- Individuals and Families ★
- Leaders and Communities
- Government Functions ★
- Medical and Health Care Functions
- Utility Functions ★
- Private Sector and Financial Functions
- Cyber Operations ★
- Over 38 embedded play lanes







# EARTH EX 2020

## New Options on How to Play



- Individual and Family Preparedness Lane
- Organizations
  - Centralized (EOC, Regional Operations Center)
  - Decentralized (Regions)
- Functional Groups
  - Operations
  - Resource Management
  - Others
- Leader and Section Chief Independent Play



# Scheduled Training Webinars

- |  |         |
|--|---------|
| • <del>Strategic Risk Management (Arpi)</del>                      | 13 May  |
| • <del>EMP Awareness</del>   | 21 May  |
| • <del>EMP Resilience – Protection and Hardening</del>             | 11 June |
| • <del>Meta-Grid Resilience – Minimum Core Requirements</del>      | 24 June |
| • EEX for National Association of Regulatory Utility Commissioners | 25 June |
| • Today's Cyber Threat – Cascading Consequences                    | 15 July |
| • Incident Management for Non-EM Organizations/Private Sector      | 22 July |
| • Global Supply Chain Threats Webinar Exercise Event               | 29 July |
| • Global Continuity Issues and Requirements                        | 12 Aug  |
| • Pre-EEX 2020 –World Status Webinar                               | 25 Aug  |

**EARTH EX Video Wall:** <https://www.gotostage.com/channel/a0e039f382e7444d8dc02143723574e6>

# Exercise Training Webinar Dates

- Initial Facilitator Training Session 23 July
- Final Facilitator Training Session 20 August
  - “How to Play EARTH EX”
- Participant Workbook\* 15 August
- Facilitator Guide 15 August
- How to Facilitate EARTH EX 2020
- Pre-Play Material (-5, -4, -3, -2, -1)



# Exercise Goals

- EMP Awareness
- Cyber Threat Awareness
- Continuity Plans
- Contingency Plans
- Elements for a Global Continuity Structure/Architecture





# Learning Objectives

The following elements will be part of each dynamic phase. Phase 3 will focus on reaching a higher resilience capability locally, nationally and globally.

- Develop Situational Awareness
- Understand and Document Mission/Business Essential Internal and External Critical Infrastructure
- Understand the Business Risk/Financial Systems Interdependency
- Developing Courses of Action
- Make and Adjust Decisions
- Understand Critical Restoration Missions
- Develop the internal and external requirements to be part of a community through nation Global Business and Government Continuity Plan





# Resilience Learning Objectives

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- Improved planning for actions in response to a Black Sky Class - Catastrophic Event

2020 – Electromagnetic Pulse (EMP) and a Black Sky Cyber Attack

- Better understanding of the capabilities and tools required
- Understanding and developing a coordinated Global Continuity Plan
- Developing internal and external future training and support requirements





# The Exercise

- State of the art video injects
- Participants Workbook with supplementary material
- Facilitators Guide- Recommendations on playing EARTH EX
- Three Distinct Exercise Phases – 1 Day or Multiple Days\*
- Phase 1 – EMP (Awareness & Preparedness)
- Phase 2 – Directed Cyber Attack (destabilize)
- Phase 3 – Essential Continuity Planning (Local to Global)
- Access and Input into the Lessons Learned Process





# Exercise Flow Phase 1 & 2

Opening Video - Attack

Establishing Situational Awareness

Understanding Risk/Risk Assessment

Developing Courses of Action Discussion

Making a Decision

Advancing the Scenario Video

Refining Decisions Monte Carlo Game

Final Actions

Closing Video



# Establishing Situational Awareness

- Establishing and Reinforcing – Anytime/Anywhere
- Preparedness
- Hardening and Protection



TH EX™ 20

# Understanding Risk\*

- Strategic Risk Management
- Extracting Key Concepts
  - Leadership
  - Qualitative Metrics
- Elements
  - Dependency
  - Assumption
  - Vulnerabilities
  - Exposure
- Cascading Consequences
  - Infrastructure Dependencies
  - Supply Chain Issues







# Courses of Action Options

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# Decision Making

- Course of Action Comparison
- Making the Move
- Priorities and Coordination



## Gaming the System – Playing to Win



### Roll the Dice - Monte Carlo

- Respond to new information
- React to changes in the threat level
- Consider external impact issues
- Customized injects for each lane
- Decision and action plan refinement



# Initial Decision Impacts

- Sense Making – Leaders have the responsibility to look out for the possibility of crises and handle the preparation.
- Decision Making and Coordinating Implementation – Leaders have the responsibility to make final decisions, reach out to the community and gather resources.
- Meaning Making – Leaders to direct the public in the right direction.
- Accounting and Ending – The leader must keep the effected parties on track, achieve closure and move on.
- Learning – Leader must evaluate, comes up with lessons learned.

***The most important aspect of leading in a crisis is through communication.***





# ***TOUGH DECISION AHEAD***

## Refining Your Decision

- Understand your “gut instincts.”
- Make decisions with confidence.
- Understand when to adjust a decision made.
- Know how to delegate.
- Analyze the effects of important decisions.

*“It is important that strong leaders reexamine key metrics and performance after a decision is made to take a particular course of action.”*







**EARTH**EX™ 2020



Global Continuity Framework





# The Resilience Commission

- Three inaugural inclusive webinars
- Global Resilience Framework for Continuity
- Practical Resilience Objectives (12-18 months)
- Open to everyone



# Continuity Areas

- **Leadership**
- **Decision Making**
- **Strategic Risk**
- **Supply Chain Issues**
- **Critical Lifelines**
- **Essential Worker Status**
- **Food Supply**
- **Information Sharing**
- **Recovery Areas for Progress**
- **Alert, Notice and Assessment**
- **Sharing Information**





# Important Dates

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- Pre-EEX 2020 –World Status Webinar 25 Aug
- Advanced Breaking News Reports 26 - 31 Aug



# Second Most Asked Question

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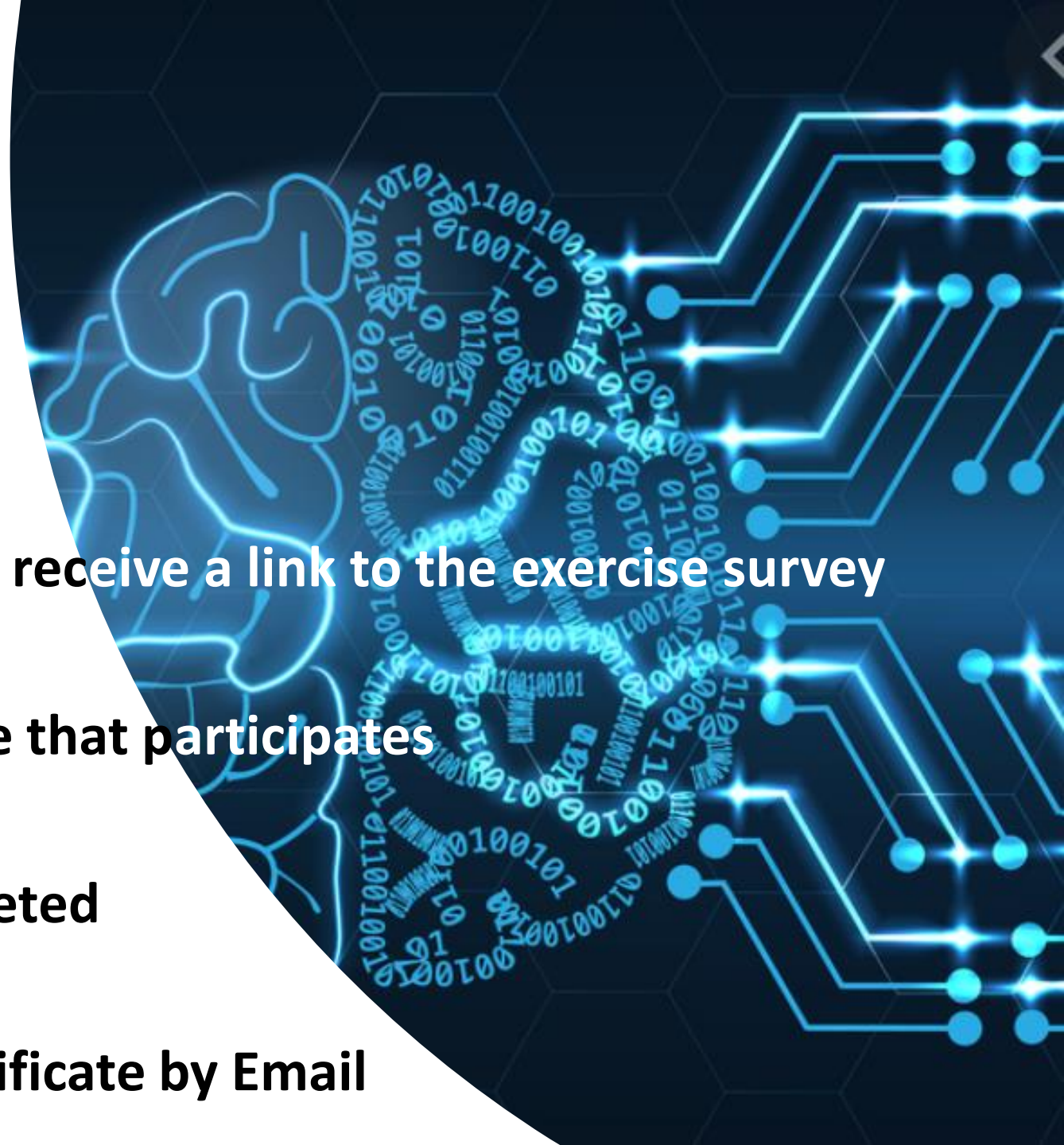
How do I get my certificate.....?

**After Completing Phase 3, You will receive a link to the exercise survey**

**Share the link with everyone that participates**

**Once the survey is completed**

**You will receive a certificate by Email**







# Most Frequently Asked Question

- What time does the exercise start?
- You select your start time and date.





# E-Mail for Questions and Information

**Earthex@eiscouncil.org**

To Register: <https://eiscouncil.org/EARTHEX.aspx>

**Invite your friends, family and those in your professional network.**

**Help them be prepared!**

