U.S. DEPARTMENT OF ENERGY | *Office of* Cybersecurity, Energy Security, and Emergency Response

Energy Emergencies 101

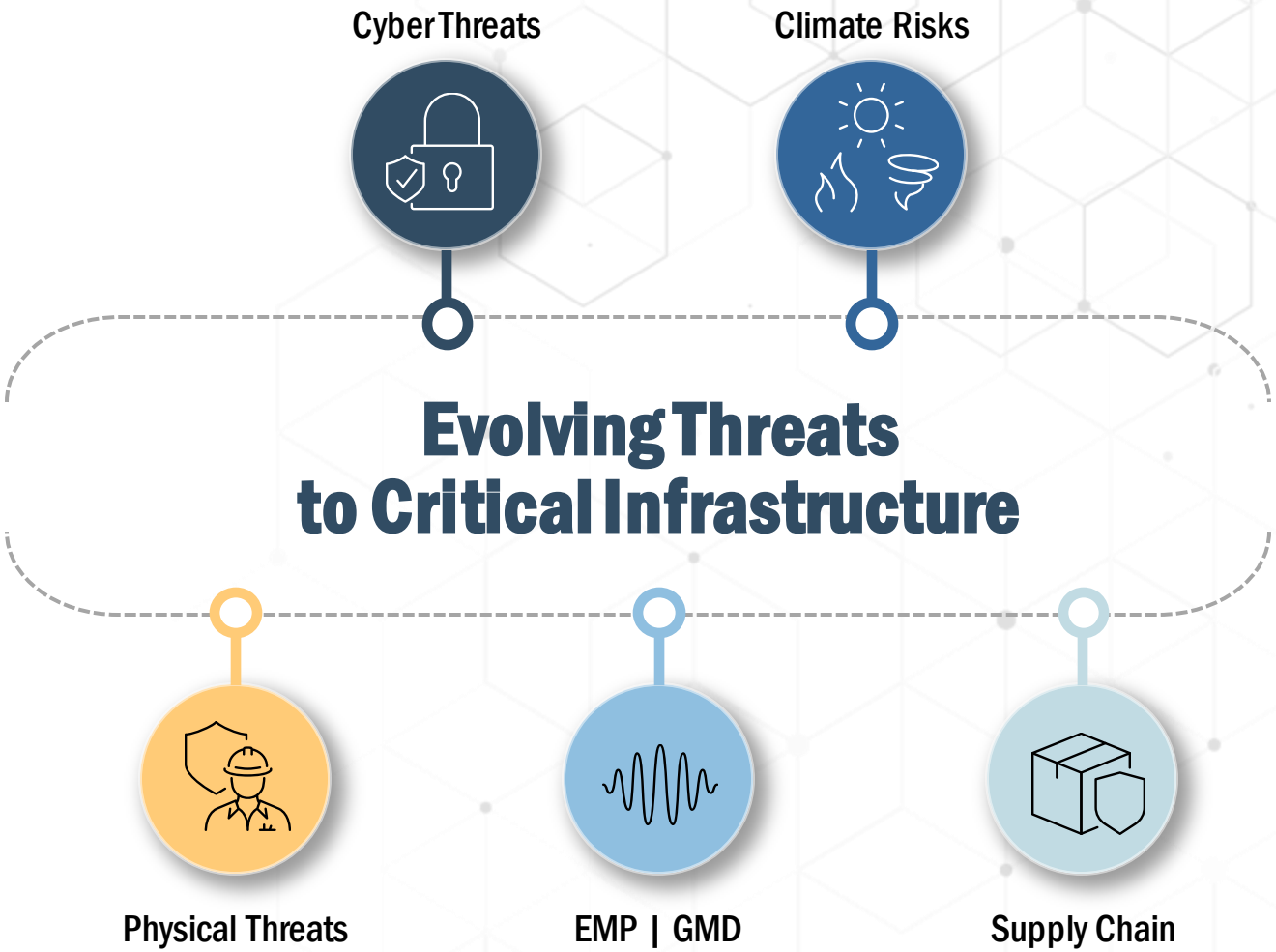
Megan Levy, Project Manager, State, Local, Tribal, and Territorial Program

Kevin DeCorla-Souza, Senior Director, Energy Markets, ICF

April 5, 2023

CESER Mission & Energy Threat Landscape

To enhance the security of U.S. critical energy infrastructure from all hazards, mitigate the impacts of disruptive events and risk to the sector overall through preparedness and innovation, and respond to and facilitate recovery from energy disruptions in collaboration with other Federal agencies, the private sector, and State, local, tribal, and territory governments.



Collaboration and Coordination is Essential

State, Local, Tribal, and Territorial (SLTT) Governments

NASEO
National Association of State Energy Officials

National Association of Regulatory Utility Commissioners

American Public Power Association

NCSL

NEMA™

National Governors Association

Energy Government Coordinating Council (EGCC)

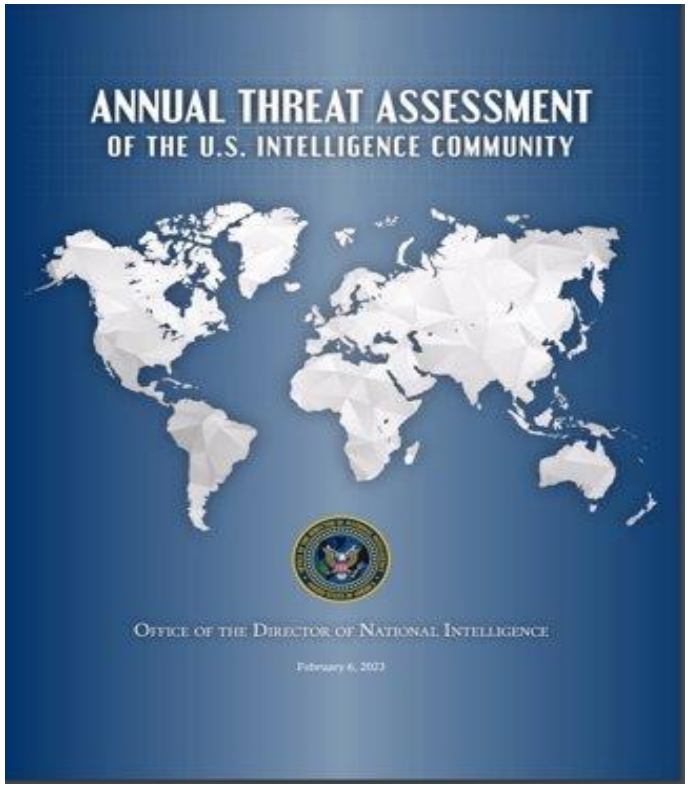
NASEO NARUC NGA

Industry Councils

ESCC
Electricity Subsector Coordinating Council

Oil and Natural Gas Subsector Coordinating Council

Cybersecurity Threats



Bloomberg.com

Russian Hackers Tried Damaging Power Equipment, Ukraine ...

... military intelligence agency launched a cyberattack on Ukrainian energy facilities, according to Ukrainian cybersecurity officials.

The New York Times

Cyberattack Forces a Shutdown of a Top U.S. Pipeline

The operator, Colonial Pipeline, said it had halted systems for its 5,500 miles of pipeline after being hit by a ransomware attack.

May 13, 2021

Physical Security Threats

- Rogue actors and domestic violent extremists are targeting critical energy infrastructure
- Of the physical security incidents shared with E-ISAC between 2020-2022, 3% resulted in outages or other grid impacts.
- Notable increase in repeat and clustered incidents

CNN

[A vulnerable power grid is in the crosshairs of domestic extremist groups]

... fired at two power substations in Moore County, North Carolina, ... In 2022 there were 25 “actual physical attacks” reported on power...

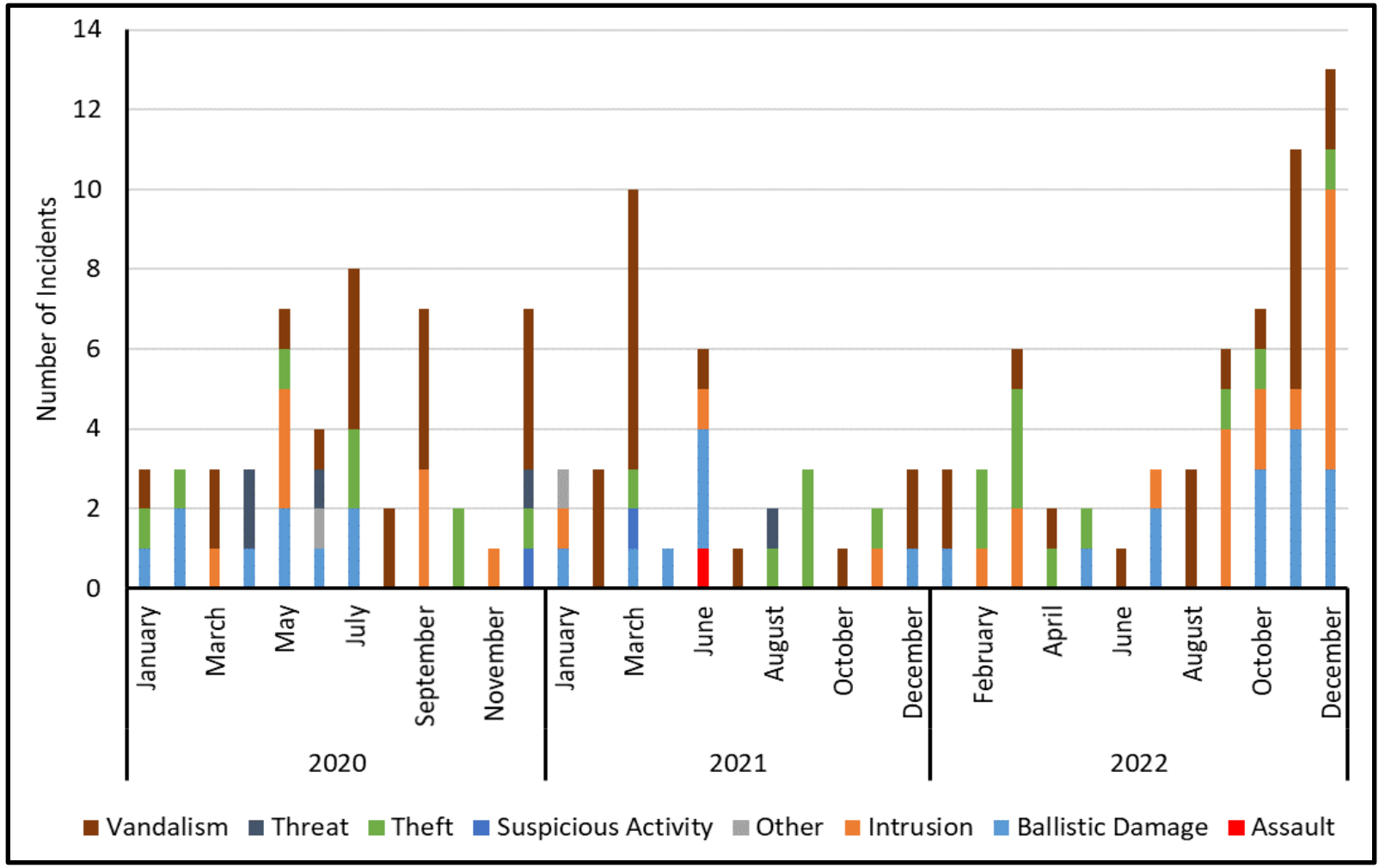
The New York Times

[Pair Charged With Plotting to Attack Baltimore Electrical Grid]

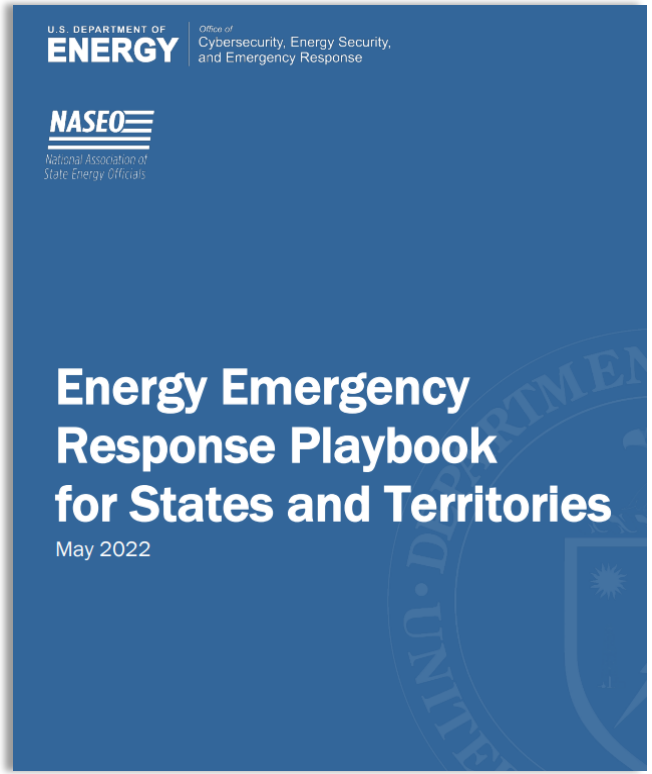
WASHINGTON — Federal law enforcement officials have arrested two ... the plot to jarring details of her personal and physical travails.

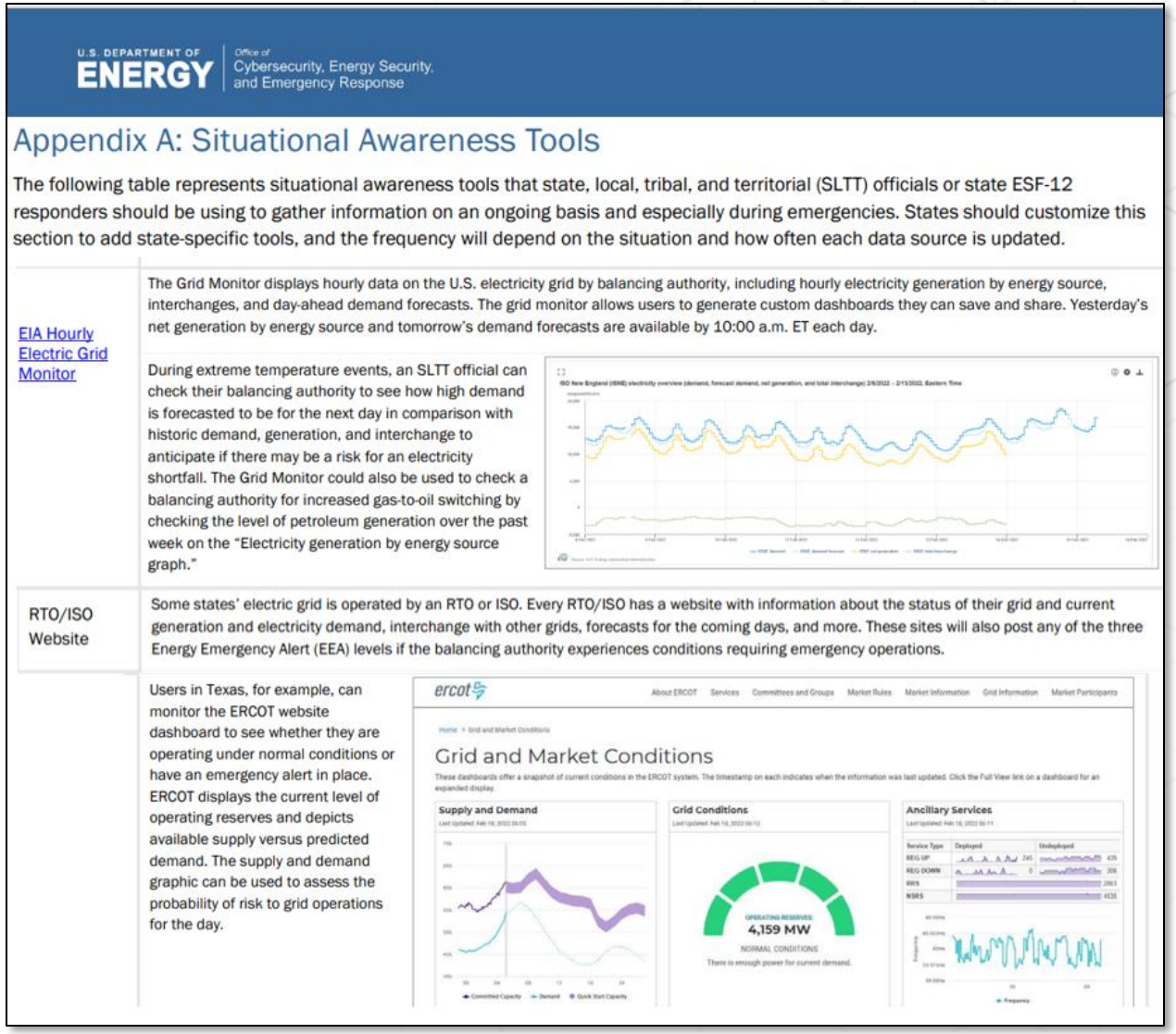
Information provided by E-ISAC

Incident Summary



Customizable Energy Emergency Response Playbook





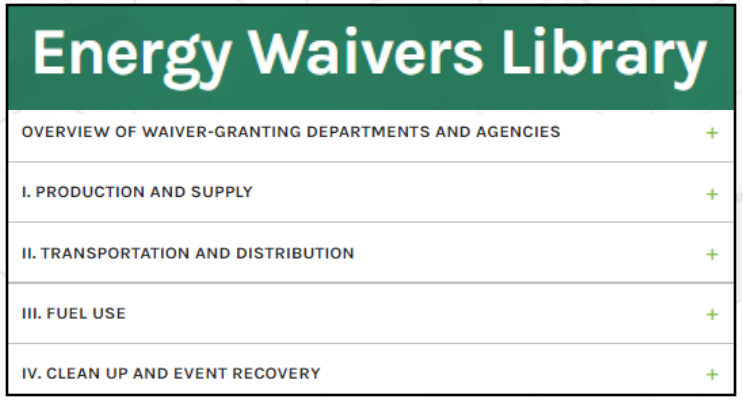
State Emergency Preparedness Checklist

✓Monitoring Functions

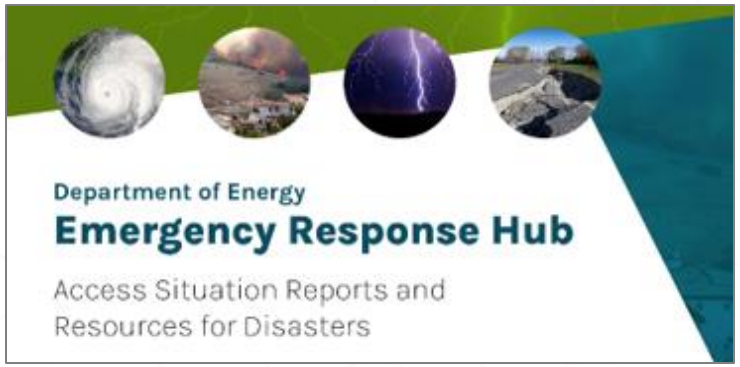
- Assign lead(s) to monitor situational awareness tools including I-SACs
- Regularly coordinate with private sector
- Define process / triggers of when threats or alerts need to be escalated
- Practice information sharing in exercises

✓Emergency Response Logistics

- Create EAGLE-I Account: https://eagle-i.doe.gov/login/accountRequest
- Check EEAC contacts in ISERNet: https://www.oe.netl.doe.gov/ISERNET/login.aspx
- Know your DOE ESF-12 Regional Coordinator: Email energyresponsecenter@hq.doe.gov for contact information.
- Bookmark Energy Waivers Library & Emergency Response Hub



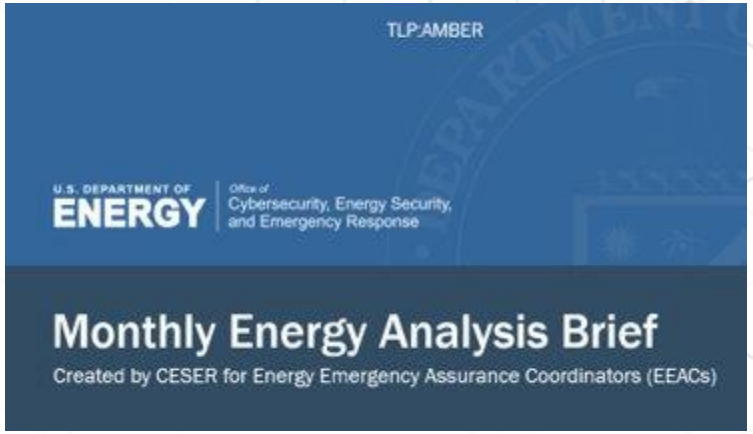
Energy Waiver Library



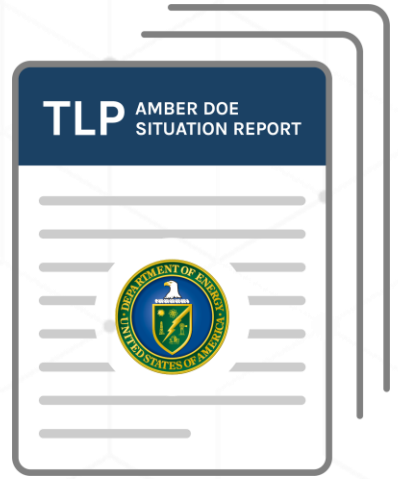
Emergency Response Hub

Energy Emergency Assurance Coordinators (EEACs)

- The EEAC Program is a cooperative effort between CESER, NASEO, NARUC, NGA and NEMA to enable information sharing leading up to and during an energy disruption or emergency
- Goal is to improve information-sharing and communication and lower response times.
- States designate primary and secondary contacts
- Provides credible, accurate, and timely source of information and updates on actions taken.
- CESER's SLTT Program sends states a monthly brief with analysis of past disruptions via the EEAC listserv



Energy Emergency Assurance Coordinators (EEAC) Program



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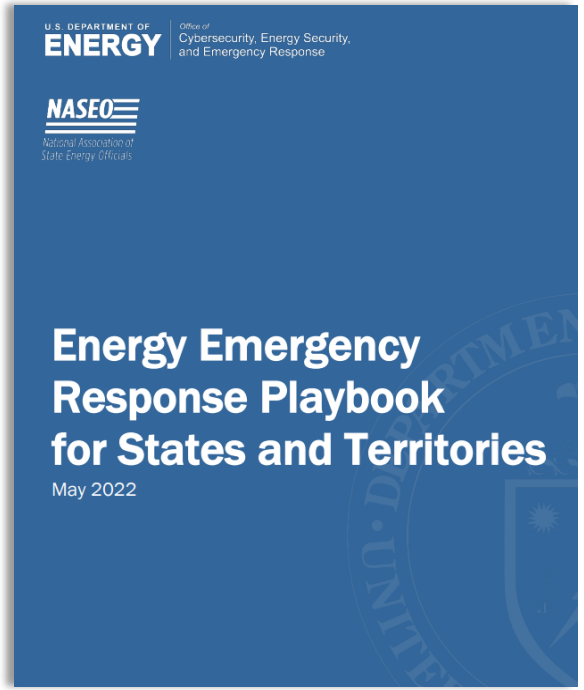

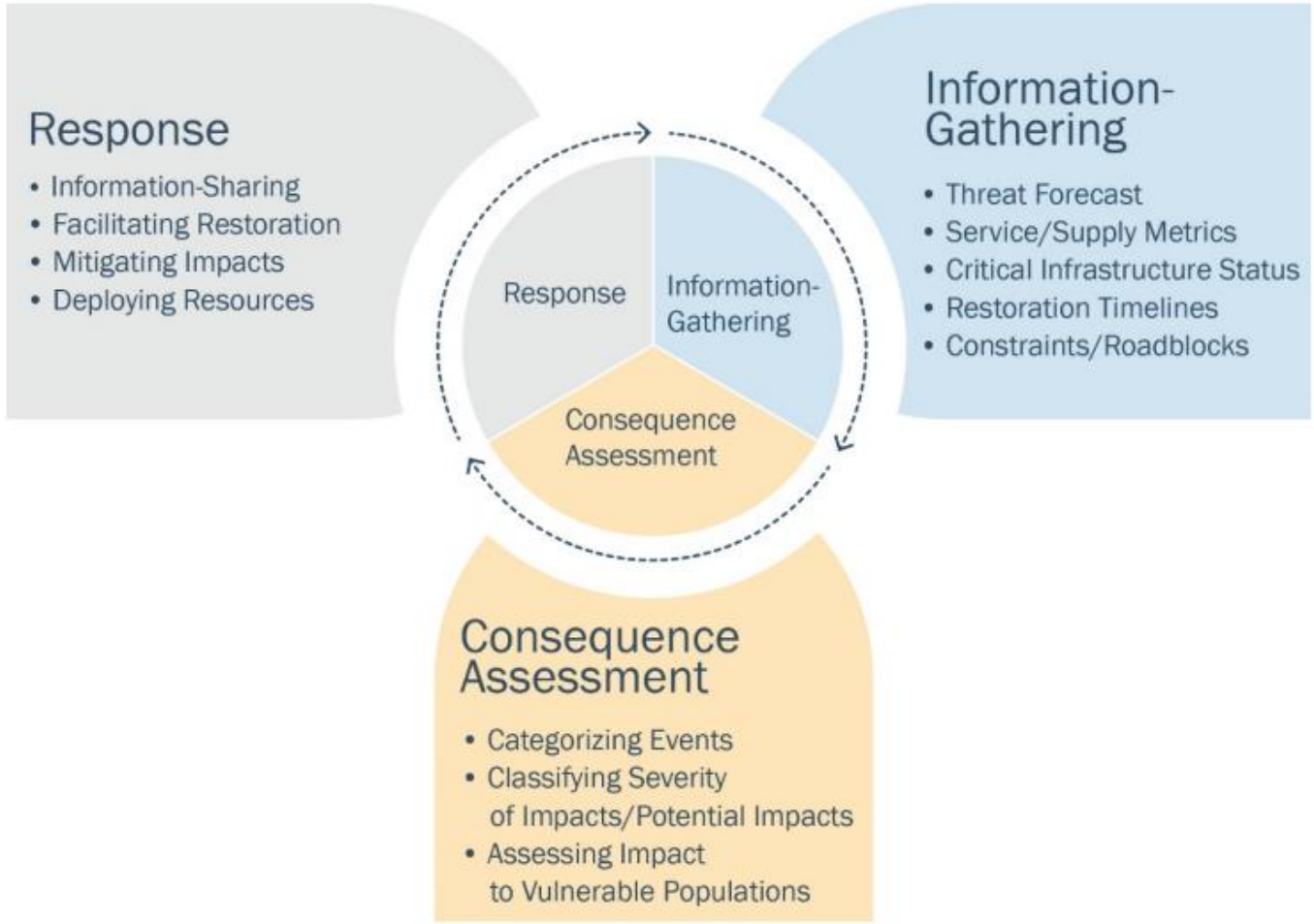

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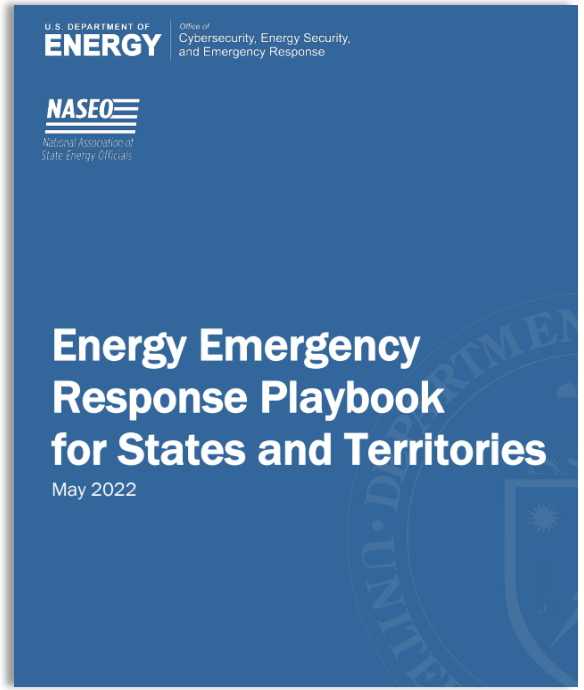


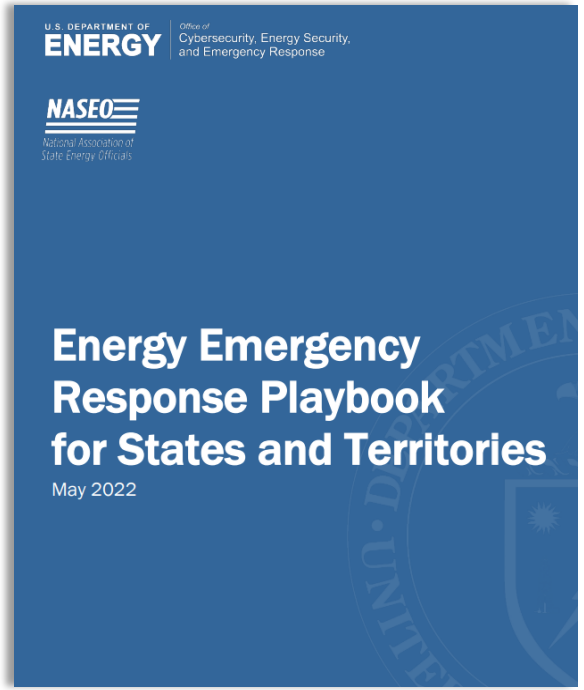
SITUATIONAL AWARENESS TOOLS

Key: Data type

Geospatial	Inventory	Production/ Generation	Transport/ Transmission/ Distribution	Consumer Outages	Pricing

Tool	Power	Liquid Fuels	Natural Gas
U.S. Department of Energy (DOE) Tools			
DOE Emergency Situation Reports	Customer outages and summaries of electric system damage and estimate restoration timelines. Level of resources committed for restoration	Refinery status, capacity, and output, petroleum terminal status, regional product inventories, offshore crude oil production impacts	Natural gas pipeline status, gas utility customer outages, onshore and offshore natural gas production impacts
DOE EAGLE-I	Power outages by utility and by county in near real time	Refinery process unit status alerts	Natural gas pipelines critical notices
DOE Estimated Customer Power Outages	Predicted customer outages based on strength and track of hurricane or major storms	Can be used to identify the critical petroleum infrastructure that may be impacted by the storm or by power outages	Predict the degree that electrically powered compressors, if used, may be affected

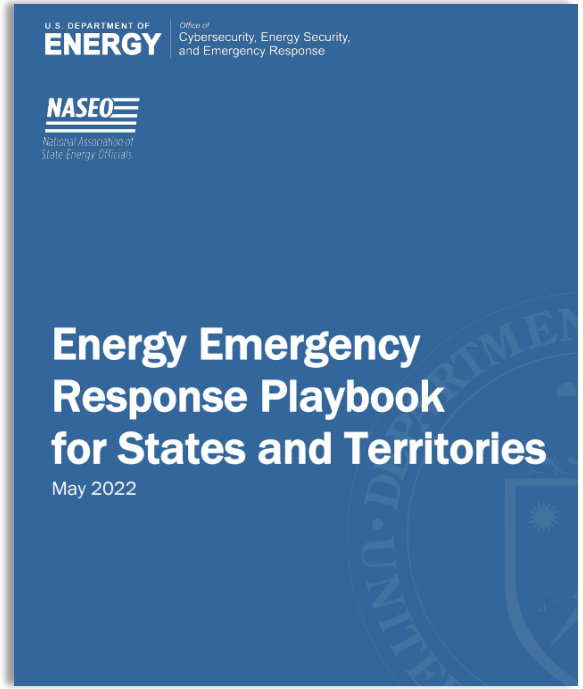
Customizable Energy Emergency Response Playbook



POWER OUTAGE/ELECTRICITY SHORTAGE EVENT Electricity emergencies generally fall into two categories: (1) service disruptions caused by damage to the transmission and distribution (T&D) grid (e.g., from adverse weather events), or (2) electricity supply shortages due to generation or transmission outages during periods of high demand, which can result in rolling blackouts or grid collapse if not properly managed. Electric utilities are generally well-equipped to deal with common T&D-level outages through internal resources and mutual-aid agreements with other utilities.

Tier	Consequences Indicators	Examples
Tier 3: Enhanced Watch	• **Service Disruption:** Localized power outages with short (less than 48 hours) restoration timelines • Restoration work largely involves repairing fallen or damaged distribution lines and poles. • Lifeline sectors largely maintained with backup generators.	• Common thunderstorms • Common winter and ice storms • Public Safety Power Shutoffs (PSPS) to prevent wildfires
	• **Electricity Shortage:** Imbalance between supply and demand and elevated prices in some load areas. Grid operators issue lower-level communications (e.g., operating condition notices, conservation alerts, control room advisories)	• Heat waves or cold snaps that drive high electricity demands
Tier 2: Significant Event	• **Service Disruption:** Widespread power outages with longer (more than 48 hours) restoration timelines. • Restoration work involves repairing damaged utility wires and structures across T&D systems. • Lifeline sectors experience temporary or intermittent disruptions as backup generator fuel is exhausted and awaits replenishment. • Vulnerable groups that rely on electricity moved to shelters or provided backup generators as needed.	• Hurricane Dorian (2019) • Puerto Rico Magnitude 6.4 earthquake (2020) • Dixie Fire in California (2021)
	• **Electricity Shortage:** Grid operators issue emergency alerts for critical conservation and to maximize generation and transmission resource availability. Sharp price spikes across balancing areas.	• California drought and hydroelectric shortfall (2021)
Tier 1: Major Event	• **Service Disruption:** Widespread power outages with extended or indefinite restoration timelines (a week or longer). • Extensive damage to T&D systems, including damage to substations and other system components that require longer repairs. • Lifeline sectors, including Emergency Response, experience severe impacts from difficulty refueling vehicles and backup generators due to impact of power outages on liquid fuels supply chains.	• Hurricane Sandy (2012) • Hurricane Maria (2017) • Hurricane Laura (2020) • Hurricane Ida (2021)
	• **Electricity Shortage:** Grid operators initiate rolling blackouts to preserve grid stability. Typically associated with large-scale loss of generation resources due to power plant operational outages or power plant fuel shortages.	• Texas extreme cold weather event (2021)

Customizable Energy Emergency Response Playbook



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Power Outages/Electricity Shortages

ESF-12: STATE ENERGY OFFICE, PUBLIC UTILITIES COMMISSION

	Pre-Event	Response
Tier 3: Enhanced Watch	• **Situational Awareness and Information-Sharing:** Monitor threat forecasts and predictive outage modeling • **Situational Awareness and Information-Sharing:** Identify risk factors that could exacerbate or prolong energy impacts or cause impacts to cascade into other sectors • **Situational Awareness and Information-Sharing:** Report outages or other operational issues to DOE as required • **Situational Awareness and Information-Sharing**: Understand current demand for electricity within the state, including use by critical users, and how demand may change during event • _____ • _____	• **Situational Awareness and Information-Sharing:** Leverage monitoring tools and stakeholder contacts to gather information on outage impacts and duration • **Situational Awareness and Information-Sharing:** Identify cascading impacts or interdependencies, including potential impacts to petroleum and natural gas systems • **Situational Awareness and Information-Sharing:** For cyber events[1], engage with the MS-ISAC to receive information about the incident and any additional cyber threats • **Situational Awareness and Information-Sharing:** For cyber events, coordinate with state Chief Information Officer or other state cyber office on messaging, response, and whether there are any threats to state systems • **Resource Management:** Assess staffing capabilities and resource adequacy of state to respond to the event • _____
Tier 2: Significant Event	• **Situational Awareness and Information-Sharing:** Participate in internal and external situational awareness activities (e.g., regional calls, federal calls, briefing state leadership, etc.) • **Situational Awareness and Information-Sharing:** Communicate information on predicted power outages to state ESF-12 stakeholders • **Resource Management:** Coordinate with emergency managers to inventory available state resources (e.g., generators, etc.) and identify any resource shortages or limitations that could affect event response • **Situational Awareness and Information-Sharing:** For pre-event evacuations, monitor the status of electric vehicle charging station status along evacuation routes	• **Situational Awareness and Information-Sharing:** Develop situation reports and share with stakeholders, including information on the extent and duration of power outages • **Situational Awareness and Information-Sharing:** Participate in internal and external situational awareness activities (e.g., state calls, regional calls, federal calls, state leadership briefs, etc.) • **Situational Awareness and Information-Sharing:** Coordinate response actions and implementation with other states in the impacted region as conditions warrant • **Resource Management:** Coordinate with industry and state partners to address access issues, including prioritizing road clearing for power restoration, emergency shelters, etc.

[1] A cyberattack that results in a physical consequence (i.e., a no-notice power outage) would likely immediately be categorized as a Major Event. Depending on the event and scale, traditional communications may not be available. ESF-12 officials should review the state's cyber incident response plan and know the state and utility partners' back-up communication methods. The matrices should be updated to reflect duties for no-notice events.

Liquid Fuels Shortage Risk Rubric

STATE/REGIONAL LIQUIDS FUELS RISK RUBRIC

	GASOLINE	ULSD	JET FUEL	KEROSENE	PROPANE
A. NEW ENGLAND INVENTORIES as of 11/18/22					
Inventories (mn bbls)	3.156	3.802	8.414*	0.039**	0.711
5-Year Average (mn bbls)	4.226	8.645	8.909*	0.301**	0.613
% Difference vs. 5-yr Avg.	-25%	-56%	-6%	-87%	+16%
Severity Points	2	3	0	3	0
B. PRICING – LOCAL PREMIUM VS. BENCHMARK ($/gallon) as of 11/22/22					
Local Rack Price	2.674 (Boston)	3.784 (Boston)	3.536 (NYH)	3.558 (NYH)***	1.133 (Selkirk)
Benchmark	2.437 (NYMEX)	3.375 (NYMEX)	2.929 (Gulf Coast)	2.931 (Gulf Coast)***	0.838 (Mt. Belvieu)
Difference	0.237	0.409	0.607	0.626	0.295
Severity Points	1	2	2	2	0
C. FUEL AVAILABILITY					
Status	No issues	No issues	No issues	Spot outages; widespread allocation	No issues
Severity Points	0	0	0	2	0
D. KEY INFRASTRUCTURE STATUS					
Fuels Infrastructure					
Terminals	No issues				
New England Ports	No issues				
Irving Oil St. John Refinery	No issues				
New York Harbor	No issues				
Railways	Potential Strike (Ethanol)				Potential Strike
Roadways	No issues				
Interdependent Infrastructure					
Algonquin Pipeline		No issues			
M&N Pipeline		No issues			
Everett LNG		No issues			
ISO-New England		No issues			
Severity Points	1	0	0	0	1
SEVERITY INDEX (A + B + C + D)					
Total Severity Points	4	5	2	8	0
Severity Level	Tier 3: Enhanced Watch	Tier 3: Enhanced Watch	Normal	Tier 2: Significant Event	Normal

*East Coast inventories; **As of August 31, 2022; ***Kerosene with 400 ppm sulfur limit

SEVERITY THRESHOLDS AND INDEX SCORING

1. For each fuel separately, assess the severity along the four key assessment areas using the following criteria.

Assessment Area	Severity Index	Criteria	Time Element
Inventories	Tier 1	50%+ below 5-year average	For 1+ weeks
	Tier 2	25-49.9% below 5-year average	
	Tier 3	10-24.9% below 5-year average	
Pricing (Gasoline, ULSD, Jet Fuel, Kerosene)	Tier 1	$1.00/gallon+ above benchmark	For 5+ days
	Tier 2	$0.25-0.99/gallon+ above benchmark	
	Tier 3	$0.10-0.24/gallon+ above benchmark	
Pricing (Propane)	Tier 1	$1.00/gallon+ above benchmark	
	Tier 2	$0.50-0.99/gallon+ above benchmark	
	Tier 3	$0.30-0.50/gallon+ above benchmark	
Availability	Tier 1	Widespread Outages	For 1+ weeks
	Tier 2	Spot Outages, Widespread Allocation	
	Tier 3	Spot Allocation	
Infrastructure	Tier 1	Long outage to one or more key assets	For 1+ weeks
	Tier 2	Short outage to one or more key assets	For <1 week
	Tier 3	Allocation or curtailment of customers to one or more key assets	For 1+ weeks

CESER SLTT Contact Information

Brandi Martin
SLTT Program Manager
Brandi.Martin@hq.doe.gov
202-586-7983

Megan Levy
SLTT Project Manager
Megan.levy@hq.doe.gov
202-209-3184

Juan Gomez
Energy Sector Specialist
Juan.gomez@hq.doe.gov

Website: energy.gov/ceser

@DOE_CESER

CESER LinkedIn

@DOE_CESER

linkedin.com/company/office-of-cybersecurity-energy-security-and-emergency-response

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