

Planning for Resiliency with Data Analytics

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HAWAII STATE
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Applying Analytics for Greater Resiliency

Areas of focus for applying data analysis include:

- To better respond to and recover from low frequency high impact events
- To incorporate resiliency within energy infrastructure investment process

Hawaii specific activities related to infrastructure buildout

- Interdependent Critical Energy Infrastructure (ICE-I) MOU
- HSEO SEP formula fund project to support development of energy system and critical lifeline interdependencies baseline
- Integrated Grid Planning docket (Resiliency Working Group)
- Utility community engagement: Ko'Olaupoko Resiliency Initiative



Critical Infrastructure Defined

Federal Energy Regulatory Commission website (2019)

“Critical infrastructure means existing and proposed systems and assets, whether physical or virtual, the incapacity or destruction of which would negatively affect security, economic security, public health or safety, or any combination of those matters.”

- FERC definition is consistent with resiliency priorities illustrated in FEMA’s 7 lifelines



- A resilient system is one which can minimize the disruption to normal operations despite damage

Creating a Holistic Energy System Common Operating Picture

A common operating picture, measurement of supply chain interdependencies, and backup supply alternatives for community lifeline customers is required to support response and investment prioritization

Holistic COP requires:

- Developing baseline assessment
- Developing an information sharing platform to:
 - characterize infrastructure
 - geographically map infrastructure
 - identify interdependencies of the energy infrastructure through to the community lifelines the infrastructure supports
 - display data in a readily digestible and actionable format
 - manage data security for homeland security (bad actors) and market competitors (trade secrets)
- Defining resiliency metrics



Interdependent Critical Energy Infrastructure (ICE-I) MOU

Parties: U.S. Department of Energy, U.S. Department of Homeland Security, IndoPACOM, Hawaii State Energy Office, Hawaii Office of Homeland Security

Targeted outcomes include:

- Identify comprehensive, integrated critical risk assessment and mitigation strategies
- Institutionalize a framework for persistent collaboration between relevant stakeholders
- Establish an integrated planning, training and exercise program to feed a continuous improvement process for response preparedness and resiliency investment



State Energy Program Formula Funds

HAZARD MITIGATION PLANNING: IDENTIFICATION OF ENERGY SECTOR INTERDEPENDENCIES FOR RESILIENT INVESTMENT

Overall Project Goals:

- Reduce the long-term energy vulnerability of Oahu's people, property and jurisdictions, including state-owned or operated buildings, infrastructure and critical facilities, to natural hazards while conserving the State's natural, historical, and cultural assets
- Provide a framework for holistic hazard mitigation planning for energy and support resilient infrastructure investment strategies in alignment with State and private sector mitigation planning
- Utilize state-of-the-art methods and technology and local knowledge to identify and analyze natural hazards and assess State capabilities to reduce the impact of those hazards on energy systems



DHS: Infrastructure Protection (IP) Gateway

The IP Gateway provides various data collection, analysis, and response tools in one integrated system, streamlining access to IP's tools and datasets by leveraging a single user registration, management, and authentication process.

IP Gateway provides:

- A consolidated library of critical infrastructure information, including assessments, analytical products, and reports
- Integrated data visualization and mapping applications to support complex data analysis
- Access to State, local, tribal, and territorial governments to provide a mechanism for more streamlined cross-government information sharing

To obtain access to the IP Gateway, all users must be Protected Critical Infrastructure Information (PCII) certified and must complete required IP Gateway training.



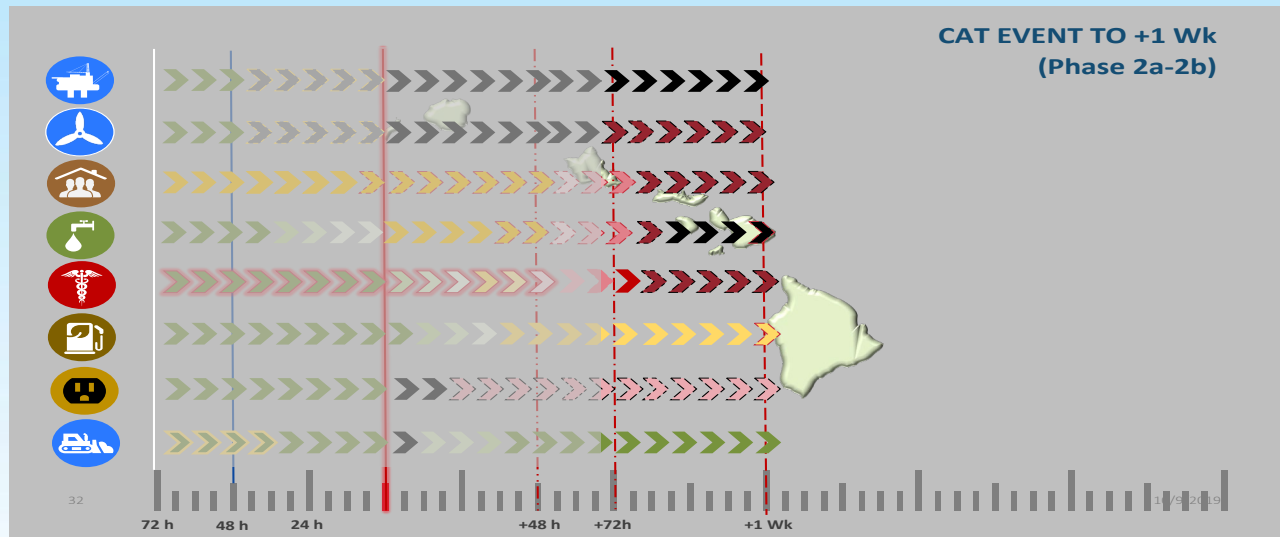
Resiliency Priorities

PRIORITY: Life Saving

EFFORT: Stabilization of Lifelines



A lifeline enables the continuous operation of **government functions** and **critical business** and is essential to **human health** and **safety** or **economic security**.



Integrating Resiliency Analytics into Infrastructure Procurement

Utilities need metrics by which to compare alternative resource portfolios on resiliency

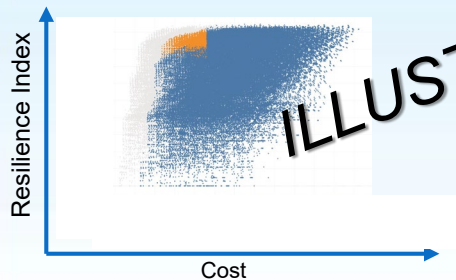
This will require guidance on priority customers and performance expectations

Customer Sector Need vs Capability



Resilience Measures and Composite Index

Resilience index measures how well a resilient grid performs under proposed severe threat scenarios. It is used to make comparisons among various strategies and options. The index is not a utility target or requirement – simply a measuring device to compare how well different solutions perform under severe circumstances.



Resilience Index (Sample Index Weighting Shown)

- Percent of Tier 1 customer sites that lose offsite power day or less (25%)
- Percent of Tier 2 customer sites that lose offsite power 3 days or less (15%)
- Percent of Tier 3 customers that lose offsite power 14 days or less (10%)
- Percent of Tier 1 customer sites restored within 3 days days (25%)
- Percent of Tier 2 customer sites restored within 7 days days (15%)
- Percent of tier 3 customers restored within 28 days (10%)

▪ Cost



Balancing Resiliency with Competing Portfolio Objectives

Energy resource portfolio objectives need to be balanced with additional portfolio objectives

Sample Score Card Summary of Portfolio Options

Criteria		Affordability		Resilience	Sustainability	
Portfolio	2020-2030 Cost NPV (\$Mil)	2020-2040 Levelized Cost (2019 \$/MWh)	Cost Rating Score	Resilience Composite	CO ₂ Changes from (%)	Renewable Generation As % of Load (%)
Status Quo						
Portfolio 1						
Portfolio 2						
Portfolio 3						
Portfolio 4						
Portfolio 5						
Portfolio 6						
Portfolio 7						
Portfolio 8						
Portfolio 9						

ILLUSTRATIVE

Overarching guidance needs to be provided on priority customers, resiliency performance expectations as well as relative importance of resiliency to other objectives



Mahalo

Clean Energy Innovation & Deployment for a Better Hawaii!



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