

Resilience Working Group (RWG) Meeting Notes

September 17, 2019

8:30am – 12:30 pm

American Bank Savings Tower, 8th Floor, Training Room 2

Attendees

| Name | Organization | In Person | WebEx |
|-------------------|--|-----------|-------|
| Chris Yunker | Hawai'i State Department of Business, Economic Development and Tourism, Energy Office | X | |
| Mark Want | Hawai'i State Department of Business, Economic Development and Tourism, Energy Office | X | |
| Dean Nishina | Hawai'i State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy | | X |
| Marcey Chang | Hawai'i State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy | | X |
| Jay-Paul Lenker | State of Hawai'i Public Utilities Commission | X | |
| Samantha Ruiz | State of Hawai'i Public Utilities Commission | X | |
| Gina Yi | State of Hawai'i Public Utilities Commission | X | |
| Thomas Travis | Hawai'i State Department of Defense, Hawai'i Emergency Management Agency | X | |
| Gary Yokoyama | Hawai'i State Department of Transportation, Airports Division | X | |
| Judy Kern | Hawai'i State Department of Health, Office of Public Health Preparedness | X | |
| Jennifer Walter | City and County of Honolulu, Department of Emergency Management | X | |
| Chris Cunningham | City and County of Honolulu, Office of Climate Change, Sustainability and Resiliency | X | |
| Kevin Ihu | Honolulu Board of Water Supply | X | |
| Jeffrey Pearson | County of Maui, Department of Water Supply | X | |
| Keith Yamanaka | United States Army | X | |
| Casey Ann Hiraiwa | United States Army | X | |
| Shereen Wachi | United States Navy | X | |
| Sonny Rasay | United States Marine Corps | X | |

| Name | Organization | In Person | WebEx |
|---------------------|---|-----------|-------|
| John Bravender | United States Department of Commerce, National Oceanic and Atmospheric Administration | X | |
| Janet Yocum | United States Department of Homeland Security, Federal Emergency Management Agency | X | |
| Lt. Col. Paul Agena | Hawai'i National Guard | X | |
| Aaron Lau | Hawai'i National Guard | X | |
| Jonathan Choi | Par Hawai'i | X | |
| Francis Alueta | Hawaiian Telcom | X | |
| Corey Shaffer | Verizon Wireless | X | |
| Dan Kouchi | Chamber of Commerce | X | |
| Tony Moiso | Hawai'i Society of Healthcare Engineers | X | |
| Henry Curtis | Life of the Land | X | |
| Noelani Kalipi | Progression Hawai'i Offshore Wind, LLC | X | |
| Will Rolston | Energy Island | | X |

Hawaiian Electric Companies Attendees

| | | |
|--------------------------|----------------------|-------------------|
| Karina Abenoja | Keith Asato | Collin Au |
| Colton Ching | Stewart Chong | Edine Clemente |
| Kaanoi Clemente | Brandi Crabbe | Ronald Cox |
| Lisa Dangelmaier (WebEx) | Lisa Giang | Christy Kaneshiro |
| Christopher Kinoshita | Sorapong Khongnawang | Christopher Lau |
| Henry Lee | Tracy Lum | Todd Mayeshiro |
| Lydia Mertyris | Nick Paslay (WebEx) | Rick Pinkerton |
| Kimberly Seto | Christine Shigetomi | Vladimir Shvets |
| Donna Stinefelt | Charise Suzuki | Troy Uyehara |
| Amanda Yano | Lena Young | |

Meeting Facilitators

| | | |
|--------------|---------------|---------------|
| Gerry Cauley | Linda Colburn | Nicole Brodie |
|--------------|---------------|---------------|

Presentation Highlights

Opening Remarks

- Recap of previous meeting
 - Group prioritized threats by island
 - Critical issues were identified through the Breakout Sessions

Meeting Objectives

- Develop preliminary threat scenarios for integrated grid planning
 - a) Discuss characteristics and vulnerabilities of existing electric systems
 - b) Prioritize and consolidate threats into scenarios
- Get preliminary consensus on:
 - Priority list of customers/sectors and their capabilities
 - Potential customer/sector mitigation strategies

Threat Scenarios for Integrated Grid Planning

- Henry Lee, Director – Hawaiian Electric System Operation, provided an overview of the O’ahu electric system.
 - Most of the generation is on the west side while most of the load is on the east (i.e., Honolulu)
 - Transmission system mostly linear to bring power from the west to the east
 - Although most of the power plants are along the coast, flooding may not be as much of a threat as tsunamis since the generating units are built raised from the ground
 - There are logistical challenges in repairing transmission lines due to topography
 - Transmission lines to the Windward side go over large ridges that sometimes require helicopters that may not be available on island
 - Some specific work efforts may also require additional crews from the mainland
- Lisa Dangelmaier, Director – Hawai’i Electric Light & Maui Electric System Operation, provided an overview of the Hawai’i island, Maui, Moloka’i, and Lana’i electric systems.
 - Hawai’i
 - Transmission system is different from O’ahu because it has a ring of transmission lines around and across the island
 - Generation is also distributed around the island
 - Earthquakes and volcanic activity pose some threats
 - Maui

- Currently, there are two major power plants, but Kahului Power Plant will be retired in the near future
- Part of the major infrastructure is in the inundation zone and could be affected by flooding
- Wildfires have been an issue this year
- Molokaʻi
 - Simple system with one power plant
 - Wind and flooding are main risks similar to the other islands
- Lanaʻi
 - Similar to Molokaʻi with one power plant
 - Wind and flooding are main risks similar to the other islands
- Gerry Cauley of Siemens provided insights on potential factors and mitigations strategies that affect recovery times from a severe event.
 - A question was raised asking what considerations are given to distributed solar. Gerry explained that currently distributed solar inverters will shut down in an event. There are requirements that could be instituted for solar to be grid-forming and that will be discussed more in the next meeting.
 - Another question asked what about the concept of microgrids? This will also be discussed further at the next meeting.
- Gerry Cauley reviewed the critical threat results for each island from the last meeting.
 - The goal is to consolidate the critical threat results into a manageable number of scenarios that have a significant impact to the island grid. The scenarios for each island will be incorporated into the integrated grid planning process.
 - 15 critical threats were identified at the last meeting (slide 22 of presentation)
 - Proposed combining Flooding and Wind with Hurricane, and Earthquake with Tsunami
 - For each island, the following were the top three concerns for each:
 - Oʻahu – Hurricane, tsunami, flooding (slide 23 of presentation)
 - Hawaiʻi – Hurricane, volcanic activity, tsunami (slide 24 of presentation)
 - Maui – Hurricane, tsunami, wild fire (slide 25 of presentation)
 - Molokaʻi – Hurricane, tsunami, flooding (slide 26 of presentation)
 - Lanaʻi – Hurricane, tsunami, high winds (slide 27 of presentation)
 - The initial set of scenarios was discussed (slide 28 of the presentation).
 - Hurricane, Tsunami, and Fuel Disruption scenarios are common to all the islands
 - Other scenarios vary by island
 - Some comments from the group were:
 - Combine Hurricane and Tsunami scenarios.

- Do not combine Hurricane and Tsunami scenarios because the timeframe to respond are different for the two scenarios.
- Rain bombs are very sudden/very intense rainfall that could occur which is not necessarily tied to hurricanes.
- Why is “Demand” not part of the scenarios? The demand system issues lead to brownouts and regular concerns for customers.
 - It was explained that, from the utility perspective, the demand issues are a reliability aspect instead of resilience.

Stakeholders used the MeetingSift tool to rate their agreement that the threat scenarios appear reasonable and sufficient for assessing grid resilience for each of the islands. The number of votes for each level of agreement is shown below.

MeetingSift Results

O’ahu's threat scenarios appear reasonable and sufficient for assessing grid resilience.

| | | | | |
|---------------------|-------------|--------------|---------------|------------------------|
| Strongly agree 9 | Agree 14 | Neutral 0 | Disagree 1 | Strongly disagree 3 |
|---------------------|-------------|--------------|---------------|------------------------|

O’ahu Brainstorm Comments:

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|--|
| Flooding, rain bombs |
| No comments |
| Keep tsunami and hurricane separate |
| How do you plan for simultaneous impacts? |
| Reconsider fuel supply |
| Combine physical and cyber |
| Including cyber may be outside IGP |
| Fuel is not a major issue due to onsite reserves |
| Refinery damaged |
| Would remove fuel disruption |
| Remove physical attack |

Hawai’i’s threat scenarios appear reasonable and sufficient for assessing grid resilience.

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|---------------------|-------------|--------------|---------------|------------------------|
| Strongly agree 3 | Agree 16 | Neutral 3 | Disagree 0 | Strongly disagree 2 |
|---------------------|-------------|--------------|---------------|------------------------|

Hawai’i Brainstorm comments:

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|-------------------------------------|
| Keep tsunami and hurricane separate |
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|---|
| No comments. Change to strongly agree. Sorry |
| Fuel disruptions is covered by other hazards and no need to evaluate separately |
| Accidentally hit strongly disagree when I meant to enter strongly agree |
| Cyber attack is bounded by geography |
| Consider Cyber Attack as a threat on Big Island given Military presence there. |
| Single point failures here mean some point disruptions should be considered |
| Hawai'i island may want to include cyber and physical attack |
| Fuel disruption addressed by other hazards |
| Cyber attack is not bounded by geography |

Maui's threat scenarios appear reasonable and sufficient for assessing grid resilience.

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|---------------------|-------------|--------------|---------------|------------------------|
| Strongly agree 6 | Agree 16 | Neutral 1 | Disagree 2 | Strongly disagree 0 |
|---------------------|-------------|--------------|---------------|------------------------|

Maui Brainstorm comments:

| |
|---|
| Keep tsunami and hurricane separate |
| Neutral - not familiar enough |
| Not sure why cyber there |
| Don't agree with cyber attack |
| No need Cyber Attack |
| Add demand due to wind and solar |
| Maui island may want to include physical attack |
| Wasn't sure about cyber attack item |
| Maybe physical attack should be included; typical for all islands |
| Remove cyber and fuel disruption. Fuel shortages covered by other hazards consequences |
| Wildfire is a threat now. Someday, if lands are planted and irrigated, the threat may be reduced. |

Moloka'i's threat scenarios appear reasonable and sufficient for assessing grid resilience.

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| Strongly agree 5 | Agree 15 | Neutral 2 | Disagree 3 | Strongly disagree 0 |
|---------------------|-------------|--------------|---------------|------------------------|

Moloka'i Brainstorm comments:

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|--|
| Neutral - not familiar enough |
| Keep tsunami and hurricane separate |
| Moloka'i is resilient |
| Remove wildfire. Consider fuel disruption in other hazards |
| Not aware of wildfires there, but ok with me |
| Add demand due to variable renewables |
| Assuming supply disruption scenario would differ by island |
| Molokai may want to look into both cyber and physical attack |

Lana'i's threat scenarios appear reasonable and sufficient for assessing grid resilience.

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|---------------------|-------------|--------------|---------------|------------------------|
| Strongly agree 4 | Agree 15 | Neutral 2 | Disagree 3 | Strongly disagree 0 |
|---------------------|-------------|--------------|---------------|------------------------|

Lana'i Brainstorm comments:

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|---|
| Keep tsunami and hurricane separate |
| Neutral - not familiar enough |
| Remove wildfire. Consider fuel disruption as part of other hazards |
| Hurricane and tsunami are population center threats |
| Lanai may want to look into cyber and physical attack |
| Add demand |
| Will fuel disruption take into account renewable? Long period month of overcast |

Breakout Sessions

Breakout sessions were conducted, and the groups reported on results as summarized below. Raw results of group discussions are attached as a separate file.

Breakout Session #1 Reports

- The Working Group was broken into eight (8) groups, each representing a specific sector. Each group had a facilitator and a scribe for the discussions.
- The groups were tasked to answer four questions for the exercise on presentation slide 37.
- Each group shared highlights from their discussion which are summarized below.

Transportation Sector

- Okay with being listed in Tier 2.
- It was difficult to answer all the questions because not all representatives were present.

Defense Sector 1

- Agree with being in Tier 1. However, it depends on what the event is. For example, in the event of an attack, we need priority. But if it's a natural disaster, we can function on our own without electrical service for a while and would be okay with being relegated to priority 2.
- Water and waste water is more critical than electric service since we have backup power.
- FAA is not shown in the tiers, and we need them operational to keep the air space clear for military and commercial operations.

Defense Sector 2

- Agree with being in Tier 1.
- We do have a MOU with the State and Coast Guard to support the island.

Communications Sector

- Agree with being in Tier 1.
- There are some areas like data centers that are critical for any customer.
- Our operation is critical for providing communication within and between the islands.

Hospitality / Tourism Sector

- No hospitality representatives were present.
- Noted that there is a big difference between a Tsunami event vs. a hurricane event because of the ability/time they have to prepare and evacuate.

Water Sector

- Agree with being in Tier 1.
- We provide a necessary resource.

Emergency Management Sector

- Didn't agree with time criteria in different columns. What felt most important was "do this first," "do this second."

- Sectors within the tiers are sometimes tiered themselves. For example, when we prioritized generators, not all police stations are created equal. Some only have 2 officers, so they are not prioritized the same way as the other larger stations. This representation felt like an oversimplification.
- We didn't see energy broken out.
- Shelter sites need to be considered in the priorities.
- Radio stations need to be considered better as well.
- This didn't consider how Emergency Response priorities at the time of the incident affect these priorities. What county and state leaders identify as the priorities will factor into how things operate on the ground.

Health Care Sector

- We had the same thoughts as emergency response. Prioritize within the tier differently.

Breakout Session #2 Reports

- The same eight (8) sector groups were tasked to answer what their sector depends on most from the other sectors. Question was slightly reworded during the exercise from what is shown on slide 42.
- Each group shared highlights from their discussion which are summarized below.

Emergency Management Sector

- Two things are our biggest priorities: transportation and communications (1-way communication (radio) and 2-way). We need to be able to get around and communicate in order to provide services.
- Currently, there is no agreement or arrangement with hotels to provide shelter to anyone who is not a paying guest. One of the major decisions that the mayor of O'ahu has to make is to stop bus service, and once that decision is made, it stops worker flow in and out of the hotels in Waikiki.

Health Care Sector

- Water and wastewater was the thing we need restored as soon as possible. Most hospitals don't have any backup water supply. They cannot sterilize instruments, no AC for cooling tower, no hand-washing and toilet flushing capability. It's the most critical and the one we're least prepared for. We have generators so electricity is a lower priority for us than water.

Transportation Sector

- The airport is fuel- and communication-dependent more than anything for continuous operation.

Defense Sector 1

- Electricity is the number one priority for active bases. Transportation is number one for National Guard. Transportation and electricity are number one and number two for both.

Defense Sector 2

- Some military branches are dependent on Board of Water supply for water. Some branches produce their own water and also have their own wastewater plant. Some branches need to send their effluent to the City and County. We need electricity to operate. Transportation and access is our 3rd priority in order for us to deploy.

Communications Sector

- We need utility poles for our fiber optics. We need roads to access all the sites and for refueling. We need water for personnel. We need fuel and banking to keep services running. Utility poles are at the top of the list.
- For NOAA, communications is the top priority.

Hospitality / Tourism Sector

- No hospitality representatives were present.
- Water is #1, electricity is #2, lodging & healthcare is #3, telecom is #4, banking is #5, and transportation is #6.

Water Sector

- Electricity is most important
- Transportation is the next most important, so that we can get to the sites to keep them operating - pumping stations.
- We have our own emergency communications, so telecom is not a priority.
- We do not see that banking and finance need to be on this list.

Breakout Session #3 Reports

- The same eight (8) sector groups were tasked to answer the question on presentation slide 44 regarding what mitigation strategies your sector can do to improve resilience.
- Each group shared highlights from their discussion which is summarized below.

Communications Sector

- We want to be better at sheltering our employees and their families.
- We want to conduct drills to simulate disasters and reduction in force. We need to be better at having critical spares; we don't have spares on island for major events.
- We need water to cool our equipment.
- We need route diversity terrestrially or undersea.

Defense Sector 2

- We already have backup electric generation assets within the base. We need a more comprehensive maintenance strategy for these assets.
- Having a comprehensive maintenance strategy will require manpower and money.

Defense Sector 1

- We are dependent on people for our ability to recover. Inside and outside the fence line, we need people resources. We have 4 people who work on our electrical system in the fence line. When we outsource our utility system, it puts us at risk.
- A soldier is a rugged professional, but his/her family is not.
- A communications center could be stood back up in about 8 hours.
- We would like to be less reliant on our fixed assets to function.

Transportation Sector

- We need larger fuel storage.
- We need debris management on runways. We also need to be able to dredge or clear out harbors to make accessible and usable.
- Highway (no representative), we assume they need to identify alternate routes.
- We need larger water storage.

Health Care Sector

- We need a larger backup water supply.
- A microgrid could provide additional resilience.
- We need more critical health care to prioritize needs.
- We think it is important to move resources to less vulnerable sites.

Emergency Response Sector

- There are grant programs to support mitigation projects for public infrastructure. We could look for opportunities to include utilities and PUC in these grant funding efforts.
- Conduct outreach to educate key sectors to have plans and supplies to ensure their critical functions.
- Expectation management - many people expect that we'll be providing them with generators without realizing that they may be 50th on our list of priorities. Important that we better manage those expectations.
- Regulations will drive investments rather than humanitarian considerations.

Water Sector

- We need hazard mitigation. Permanently reduce risk from natural hazards by doing larger things such as relocating key infrastructure that is at risk from floods and disasters.
- Importance of relationships within and without other sectors.

Hospitality / Tourism Sector

- Review the hazard mitigation plan. Updating it for anything that would be required.

- Look into some agreement where they can shelter people who aren't guests.

Next Steps

- Participants were asked to fill out an evaluation form and to turn in their worksheets. The information on the worksheets will be used to inform the next meeting.
- Next meeting is scheduled for October 28.