



Integrated Grid Planning



Resilience Working Group Meeting

August 29, 2019

WELCOME AND OPENING REMARKS

Housekeeping

- Restrooms
- Emergency exits
- Parking validation
- Draft Non-Disclosure Agreement

Recap of Previous Meeting

Help the Companies to develop the resilience planning criteria that will be used by the Companies to develop the plans for the system

PURPOSE



LESSONS LEARNED

- Future is not the past
- Can't use traditional planning – need to plan for high-impact, low-probability events

1. Raise awareness
2. Define resilience
3. Define priorities
4. Identify potential impacts
5. Identify/assess options
6. Put it all together

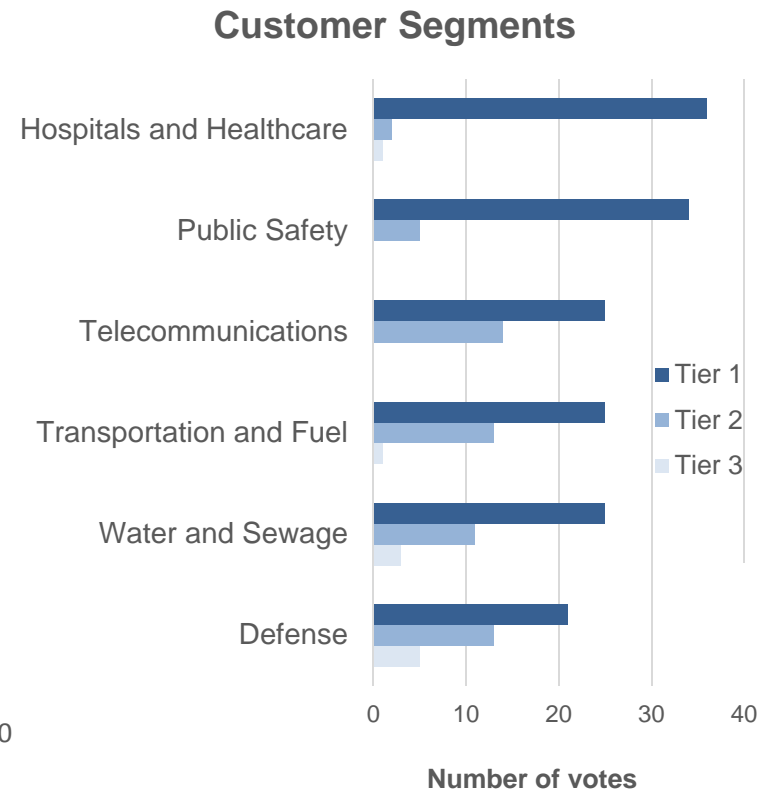
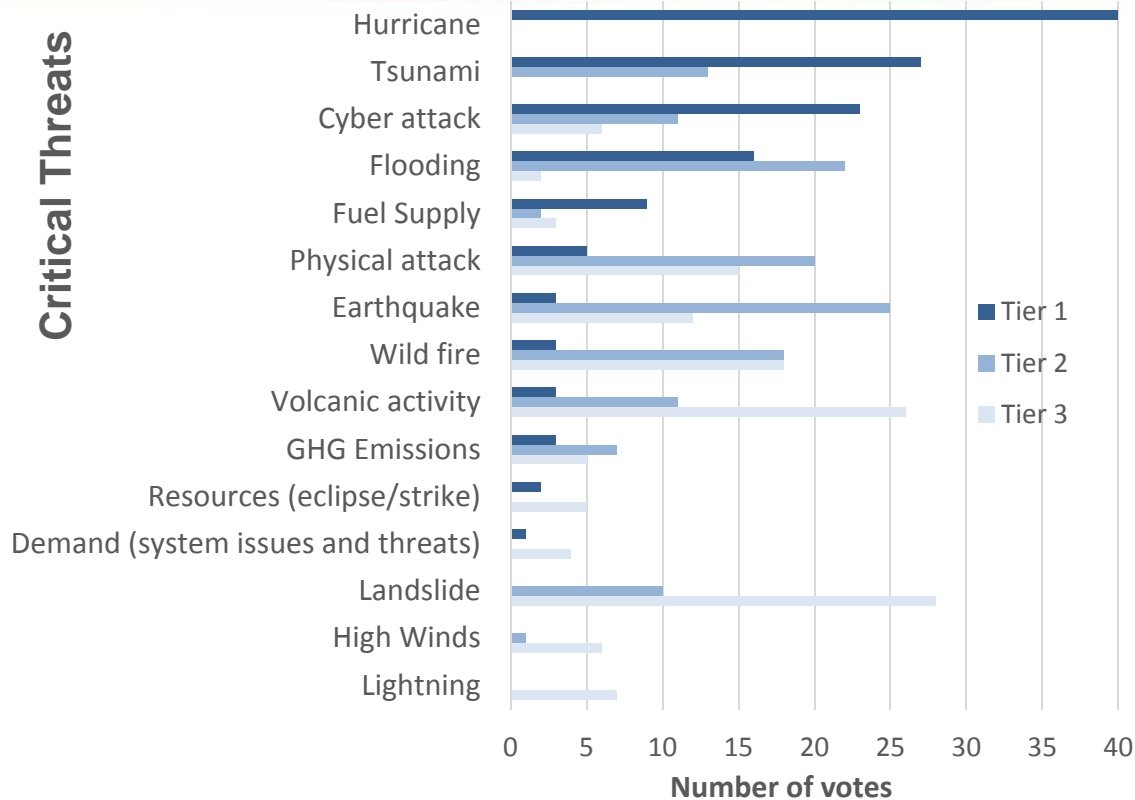
PROCESS OVERVIEW



BREAKOUT SESSIONS

1. What threats should be considered and in what priority order?
2. Prioritize customer segments with regard to grid resilience needs
3. What kinds of mitigating actions should be taken to address grid resilience needs? By Hawaiian Electric Companies? By customer/communities/others?

Recap of Previous Meeting (cont.)



OVERVIEW AND PLAN FOR THE DAY



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Meeting Objectives

1

Get preliminary consensus on resilience process

- Definition
- Priority threats

2

Review needs and existing capabilities of critical infrastructure/customer segments under a severe hurricane scenario

Handouts

- Agenda/Ground Rules
- List of Integrated Grid Planning Resilience Working Group Members
- Resilience Working Group Process
- Schedule of Resilience Working Group Meetings
- Draft Non-disclosure Agreement (NDA)
- Exercise 1 worksheets (2 count)
- Exercise 2 worksheets (2 count)
- Contact information
- Evaluation Form

Meeting Agenda





RESILIENCE WORKING GROUP PROCESS

DEFINITIONS AND THREAT PRIORITIES

IGP RWG Process Overview

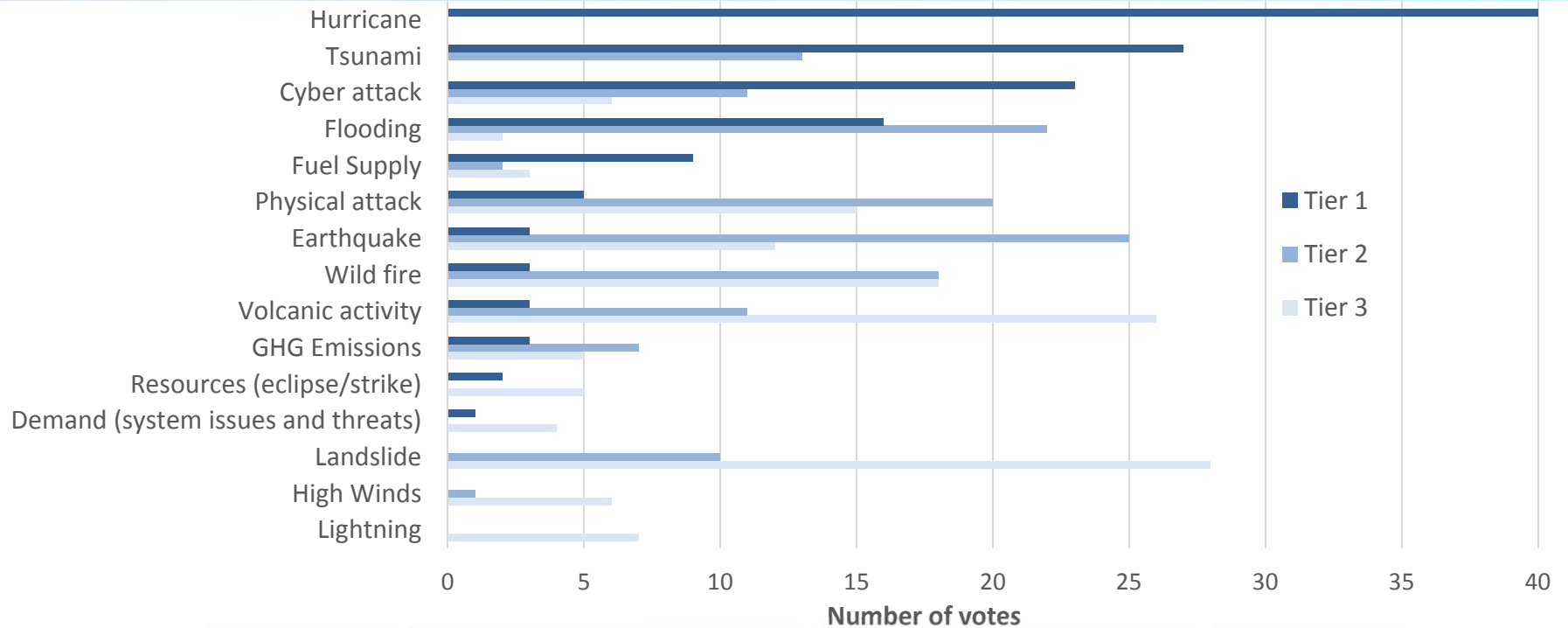


Defining Grid Resilience

“Resilience is the ability of a system or its components to adapt to changing conditions and withstand and rapidly recover from disruptions.” – PUC Staff, PBR Docket



Critical Threats



Number of votes

Raise
awareness

Define
resilience

Define
priorities

Identify/
map
potential
impacts

Identify/
assess/
discuss
options

Put it all
together

SIFT.LY



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BREAK



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RESILIENCE EXERCISE (PART 1)

Objectives and Ground Rules for Exercise

Objectives

- Identify key customer/sector capabilities and needs following a severe event and extended loss of power
- Prioritize key customer sectors for recovery
- Provide stakeholder inputs to RWG report on key customer sector grid resilience needs

Ground Rules

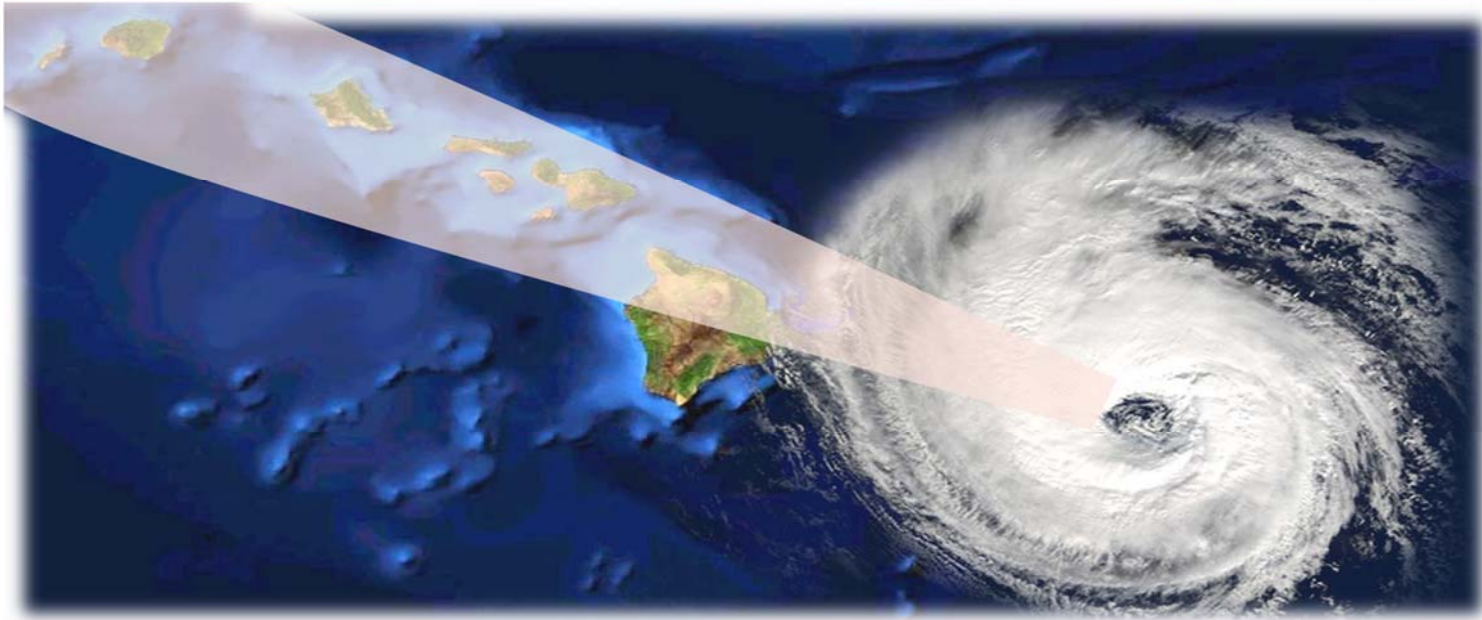
- Suspend disbelief – go with the scenario
- Category 4 hurricane was selected for wide impact across all sectors; it is not final criterion for report
- Offer as much input and ideas as possible; be inclusive
- If you feel information is missing, state assumptions and provide inputs based on those assumptions
- Focus is on role of the grid and power supply, not overall recovery from the emergency

Tropical Storm Darcy Now a Hurricane (D-3)

- Tropical storm Darcy has increased in strength and is now a Category 1 hurricane with winds reaching 75 mph
- Darcy is located 860 miles ESE of the Hawai'i and is moving WNW at 12 mph
- Current forecasts show Darcy strengthening to Category 3 as it approaches the islands
- Hurricane watches have been issued for all islands
- Governor Ige has declared a state of emergency to allow release of emergency resources across the state to prepare for the storm's impacts and allow federal assistance



Hurricane Darcy Approach (D-1)



- As Darcy approaches , it has strengthened to Category 3 with sustained winds in excess of 115 mph
- The storm is expected to further intensify overnight and make landfall after daybreak on the northeast coast of Hawai'i Island as a Category 4 with winds reaching 130 mph
- The path of the storm is expected to continue WNW with high winds, storm surges and 8-10 inches of rain in some locations resulting in local flooding and beach erosion

Hurricane Darcy Path Through Impact (D-0)



- Hurricane Darcy made initial landfall on the eastern edge of Hawai'i Island with sustained winds of 145 mph, decreasing to 130 mph as it crosses the northern edge of Hawaii island
- Once over open water, wind speeds increase to 140 mph as the eyewall grazes the southern shore of Maui, passes over Lanai, and continues to make a third landfall in the southeast corner of O'ahu
- The slow moving storm leaves rain totals across Hawai'i Island, Maui, and O'ahu at 12-18 inches in some locations. Storm surges reach 15-25 feet in coastal areas
- The storm begins to lose energy as it crosses O'ahu on the southern side of the island and continues to lose more energy as it turns northward after leaving O'ahu, with tropical force winds reaching Kauai

Darcy Damage Assessment (D+2)



- Wind damage to structures, property and power lines
- Coastal flooding; river flooding; road washouts; mudslides
- Trees and debris blocking roadways and access to structures

Utility power remains out on all islands on second day as situation assessment continues

Darcy Situation Assessment (D+7)



Infrastructure Status (D+7)

- Airports and ports closed due to structural damage and lack of offsite power
- Major and minor roads closed due to washouts
- Shortages of gasoline (long lines), diesel and HFO; no backup power at most gas stations
- Cell service and radio stations restored; television limited
- Water supplies possibly contaminated and limited availability
- Sewage overflows and contamination being assessed
- Tourist travel ban for all islands
- Emergency shelters remain at 125% of capacity
- Utility power remains out across all islands – limited availability of power in local areas with utility and customer generators

Breakout Session 1 – Questions

During days 2 – 7

- What backup power supplies are in use in your sector?
- How long can your facility/sector function on backup power?
- What essential emergency services and recovery support can be performed?
- What essential emergency services and recovery support are degraded without Utility power in the first week?
- What are the downstream impacts if your sector cannot operate effectively in the first 7 days without power?
- Are there any unique aspects to a particular island(s)?

REPORT ON BREAKOUT SESSION



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RESILIENCE EXERCISE (PART 2)



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Darcy Situation Assessment (W+3)

Overall Recovery Status

- Airports and ports beginning to reopen at three weeks
- Major and minor roads remain closed due to washouts
- Shortages of gasoline, diesel and HFO
- Shortages of food and goods, medical supplies, blood
- Telecom, cell service restored
- Television, radio restored, with limited programming
- Water supplies restored
- Contamination remains in populated areas and waterways from sewage overflows
- Tourist travel into islands remains restricted
- Air travel restricted to recovery and emergency efforts
- Emergency shelters remain at 100% of capacity
- Utility power restored to major hospitals and critical health care facilities
- Utility power restored to military facilities

Electric System Status

- Wide power outages remain on all five islands; 28% of customers have power
- 100% restoration of all customers estimated to take 6-8 more weeks

Breakout Session 2 – Questions

At three weeks and beyond with power supply conditions as described in the scenario

- What has changed since Day 7 regarding backup power supplies? Has your sector been able to obtain more backup resources and fuel?
- What essential emergency services and recovery support can be performed under these conditions? What has changed since Day 7?
- What essential emergency services and recovery support are degraded without Utility power in the third week? What has changed since Day 7?
- What are the downstream impacts if your sector cannot operate effectively after three weeks under the conditions described in the scenario?
- Are there any unique aspects to a particular island(s)?

REPORT ON BREAKOUT SESSION



NEXT STEPS AND CLOSING REMARKS

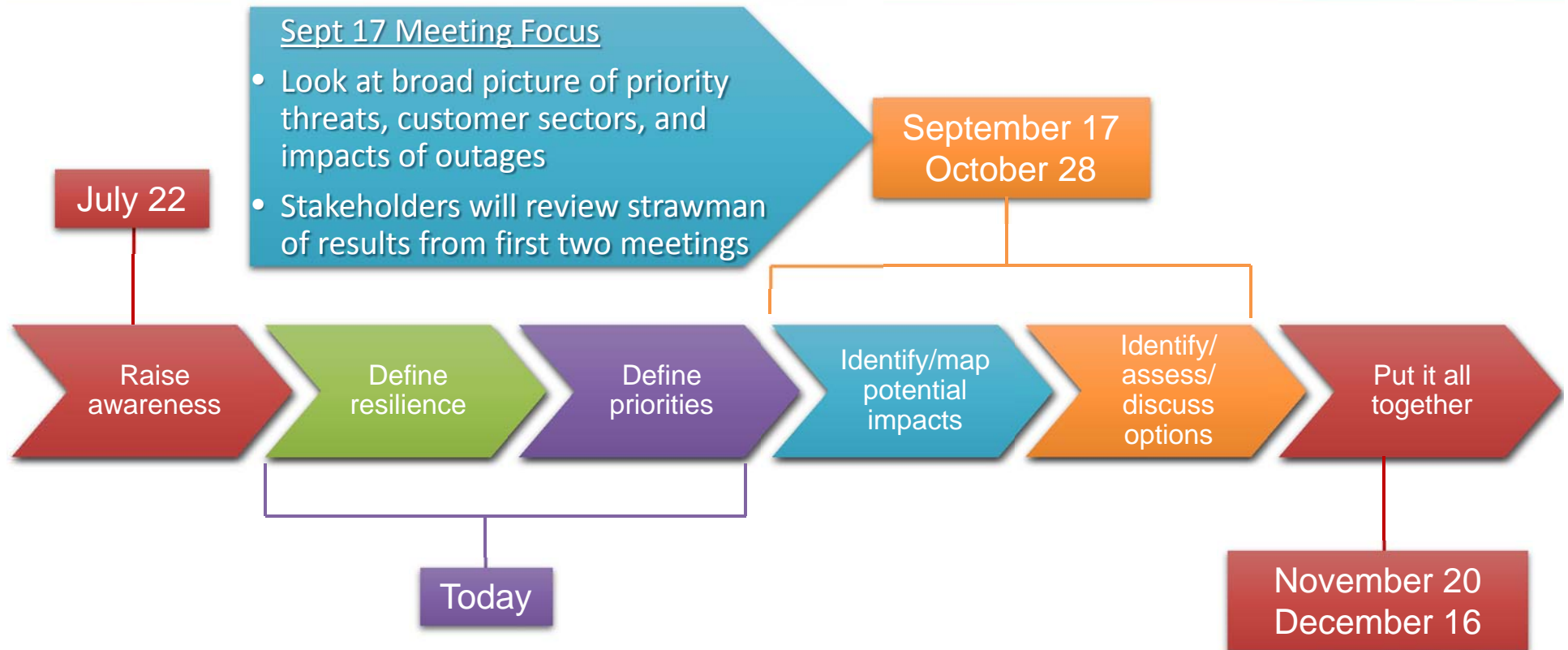
Next Steps

- Meeting presentation and summary will be emailed to you and made available on the IGP website

<https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-engagement/working-groups/resilience-documents>

- Contact information
- Evaluation form

IGP RWG Process Overview



Mahalo!

