# Integrated Grid Planning

## Stakeholder Council Meeting

February 20, 2019

# Agenda

- Welcome (8:30am – 8:40am)
- Status: Stakeholder Council and Workgroups (8:40am – 9:00am)
- Activity:  Resilience Part 1 (9:00am – 10:00am)

  **Break (10:00am – 10:15am)**
- Activity:  Resilience Part 2 (10:15am – 11:15am)
- Feedback (11:15am – 11:45am)
- Next Steps and Closing (11:45am – Noon)

# Status of Workgroups

- Working groups are being formed
- The Standardized Contract Working Group will have its 3rd meeting on Feb. 22, 2019
- First joint meeting of the Distribution Planning and Grid Services working group will be on Feb. 27, 2019
  - The topic of discussion will be the IGP Soft Launch

# How You Contribute to the Success of the IGP

*Through the lens of our stakeholders and industry partners*

Using your perspective and experience

1. Serve as a sounding board for integrated grid planning process as it integrates market-based solutions, incorporates planning analysis, and demonstrates progress

2. If subject matter expert in a working group: address a specific topic with two-way dialogue and applicable information

3. Connect our IGP team to opportunities in your industry and communities that we can share information about IGP

4. Partner with our company in outreach opportunities you refer to us

# How We Work Together

Hawaiian Electric Companies
**Integrated Grid Planning Process**

Input & Feedback
Education & Information

| Public Engagement | Stakeholder Council | 7 Working Groups | Technical Advisory Panel |
|---|---|---|---|

# IGP – Integrated Grid Planning

## A planning process that will

- ✓ appraise the total needs of the system
- ✓ consider all alternatives from customers, independent providers and the utility
- ✓ integrate market-based solutions
- ✓ determine the best resource and grid options for customers
- ✓ be inclusive through stakeholder review and input
- ✓ synchronize and unify resource, transmission, and distribution planning processes
- ✓ streamline process that will optimize energy portfolio

# Renewable Energy Planning Principles

1. Renewable energy is the first option
2. The energy transformation must include everyone
3. Today's decisions must not crowd out tomorrow's breakthroughs
4. The power grid needs to be modernized
5. The lights have to stay on
6. Our plans must address climate change
7. There's no perfect choice

# TOPIC: RESILIENCY

# Three Pillars of Resiliency

## Community Preparedness

- Personal responsibility
- Awareness and knowledge of vulnerabilities
- Shelters, supplies, resources
- Plans
- Connectedness

## Critical Infrastructure/ Government Preparedness

- Awareness and knowledge of vulnerabilities
- Supplies, financial resources
- Plans, response training
- Mutual aid agreements
- Command, control and communications
- Cross-sector and regional coordination, data sharing

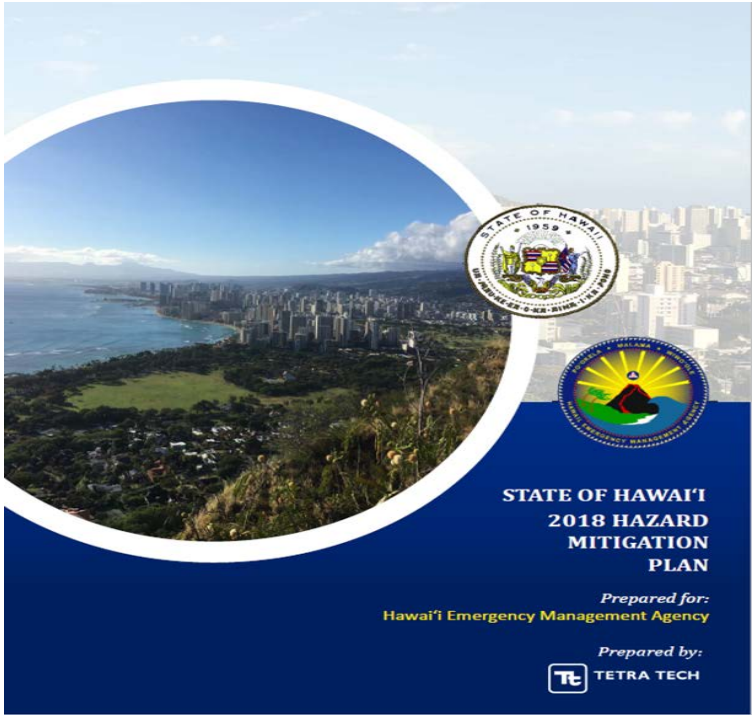
## Critical Infrastructure Risk Reduction

- Vulnerability assessments
- Funding mechanisms
- Facility hardening
- Relocation, reconfiguration
- Resource redundancy, diversity
- Hazard removal

# Process Overview

1. **Impact of Hazards**
   *From the perspective of critical infrastructure owners, emergency management, and health and safety experts*
2. **Identify Community Vulnerabilities & Strengths**
3. **Identify & Prioritize Critical Facilities**
4. **Determine Resilience Requirements**
5. **Put it All Together (IGP)**

# 2018 Hazard Mitigation Plan (HMP)




https://dod.hawaii.gov/hiema/files/2018/11/State-of-Hawaii-2018-Mitigation-Plan.pdf

# 2018 HMP: Hazard Ranking

*Table 4.16-6. 2018 HMP Update Hazard Ranking Results*

| Hazard Rank | Hazard | Probability | Category: Impact: Population | Category: Impact: Assets/ Economy | Category: Impact: Environmental Resources/ Cultural Assets | Spatial Extent | Warning Time | Duration | Adaptive Capacity | Changing Future Conditions | Relative Risk Factor |
|---|---|---|---|---|---|---|---|---|---|---|---|
| High | Climate Change and Sea Level Rise | 3 | 1 | 3 | 2 | 2 | 0 | 3 | 2 | 3 | 4.6 |
| High | Hurricane | 2 | 2 | 2 | 1 | 3 | 0 | 3 | 2 | 3 | 4.5 |
| High | Tsunami | 1 | 2 | 2 | 1 | 2 | 3 | 3 | 2 | 3 | 4.3 |
| High | Earthquake | 1 | 2 | 2 | 1 | 3 | 3 | 3 | 2 | 1 | 4.2 |
| Medium | Volcanic (Lava flow; vog) | 2 | 1 | 2 | 3 | 2 | 1 | 3 | 2 | 1 | 4.0 |
| Medium | Wildfire | 2 | 2 | 1 | 1 | 2 | 1 | 2 | 2 | 3 | 3.8 |
| Medium | Landslide and Rockfall | 2 | 1 | 1 | 3 | 2 | 3 | 3 | 2 | 3 | 3.8 |
| Medium | Health Risks | 1 | 3 | 0 | 0 | 3 | 3 | 3 | 2 | 0 | 3.6 |
| Medium | Event-Based Flood | 1 | 1 | 2 | 1 | 2 | 1 | 3 | 2 | 3 | 3.4 |
| Medium | Chronic Coastal Flood | 3 | 1 | 1 | 1 | 2 | 0 | 3 | 2 | 3 | 3.4 |
| Medium | Drought | 2 | 1 | 1 | 1 | 3 | 0 | 3 | 2 | 3 | 3.3 |
| Medium | High Wind Storm | 2 | 1 | 1 | 1 | 3 | 0 | 3 | 2 | 2 | 3.2 |
| Low | Dam Failure | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 2 | 2 | 2.9 |
| Low | Hazardous Materials | 2 | 1 | 1 | 1 | 1 | 3 | 1 | 2 | 0 | 2.6 |

*Note: Relative Risk Factor Scores - High: > 4.0; Medium: 3.0 to 4.0; Low < 3.0*

# 2018 HMP: "High" Hazard Ranking Details

| Hazard | Category | | | | Certainty Factor |
|---|---|---|---|---|---|
| | Hazard Scenario/ Area Evaluated | Estimated Statewide Impacts | | | |
| | | Population | State Assets | Environment Resources/ Cultural Assets | |
| Climate Change and Sea Level Rise | SLR-XA-3.2 and 1%CFZ-3.2 | SLR-XA-3.2: 19,830 people displaced<br>1%CFZ-3.2: 145,948 people exposed | SLR-XA-3.2: 55 State buildings ($55.8M), 39.2 miles of State roads and 33 critical facilities ($675M) lost;<br>1%CFZ-3.2: 642 State buildings ($2.2B), 101.1 miles of State roads and 229 critical facilities exposed | SLR-XA-3.2: 79.3 sq.mi. of environmental resource areas and 1.1 sq.mi. of HHL lost;<br>1%CFZ-3.2: 105.7 sq.mi. of environmental resource areas and 3.8 sq.mi. HHL exposed | High |
| Hurricane | Category 4 storm surge (SLOSH) | 155,426 people exposed to storm surge (Category 4); all exposed to wind | 654 State buildings ($3B); 77.4 miles of State roads; 217 critical facilities ($4.4B) exposed | 28.1 sq.mi. environmental resource areas and 2.4 sq.mi. HHL exposed | High |
| Tsunami | Great Aleutian Tsunami | 236,357 people exposed | 1,175 State buildings ($4.4B); 183 miles of State roads; 388 critical facilities ($7.8B) exposed | 46.6 sq.mi. environmental resources areas and 6.7 sq.mi. HHL exposed | High |
| Earthquake | 100-Year Mean Return Period Event | Entire population exposed; 1,737 displaced households; 1,158 people need shortterm sheltering | $754M State building damages; $517M critical facility damages | Impacts to environment from hazardous materials release; induced flooding/landslides; poor water quality | High |

# Hazards

- Different degrees for each hazard
- Not all hazards are related to the power system

| Hazard | Hazard Level? |
|---|---|
| Climate change and sea level rise | 3.2 ft. |
| Hurricane | Category 4 |
| Tsunami | < 25 ft. above sea level |
| Earthquake | 100- Year Event , “strong”, “very strong” |

# 2018 HMP: Critical Facilities Number

| Facility Core Category | Total Number of Critical Facilities |
|---|---|
| Commercial Facilities | 60 |
| Communications | 142 |
| Emergency Services | 149 |
| Energy | 91 |
| Food & Agriculture | 39 |
| Government Facilities | 103 |
| Healthcare & Public Health | 193 |
| Mass Care Support Services | 353 |
| Transportation Services | 61 |

# 2018 HMP: Critical Facilities

| Facility Core | Category Facility Type | |
|---|---|---|
| Commercial Facilities | ▪ Banking and Credit<br>▪ Chemical and Hazardous Materials | ▪ Home Improvement Store<br>▪ Other Commercial Facility |
| Communications | ▪ 911 Call Center<br>▪ Communications Hub<br>▪ Communications Site<br>▪ Emergency Services Communication Facility (Dispatch Center)<br>▪ Fire & Emergency Services Communication Facility | ▪ Information Services (Broadcasting – TV, Radio, Cable)<br>▪ Information Technology Center<br>▪ Internet<br>▪ Other Communication Facility<br>▪ Satellite Communication<br>▪ Wired Communication<br>▪ Wireless Communication |
| Emergency Services | ▪ Ambulance Service Providers<br>▪ Department Operations Center<br>▪ Emergency Operations Center<br>▪ Fire & Emergency Services Operational Facility | ▪ Law Enforcement Operational Facility<br>▪ Other Emergency Services Facility |
| Energy | ▪ Biodiesel Distribution Facility<br>▪ Liquified Natural Gas Satellite Storage<br>▪ Liquid Petroleum Gas Dealer<br>▪ Motor Vehicle Fueling Station<br>▪ Natural Gas Distribution Pipeline Network<br>▪ Natural Gas Production from another Source<br>▪ Natural Gas Transmission Pipeline Compressor Station | ▪ Non-military End-User Petroleum Product Storage<br>▪ Petroleum Product Bulk Plant<br>▪ Petroleum Product Land-based Bulk Terminal<br>▪ Petroleum Product Marine Bulk Terminal<br>▪ Petroleum Product Pipeline<br>▪ Propane Peak Shaving Facility<br>▪ Tanker Truck Loading Rack |
| Food & Agriculture | ▪ Food Bank<br>▪ Agriculture and Food Product Storage and Distribution Warehouse<br>▪ Food and Beverage Store<br>▪ Food Processing Facility<br>▪ Food Services and Drinking Place | ▪ Food Storage Facility<br>▪ General Merchandise Store<br>▪ Grocery and Related Product Wholesaler<br>▪ Grocery Store/ Supermarket<br>▪ Ice Distributor |
| Government Facilities | ▪ Armory<br>▪ Base Yard<br>▪ Correctional Facility/Jail/Prison<br>▪ Fire & Emergency Services Administrative Offices/Headquarters<br>▪ Government Buildings (designated as essential)<br>▪ Law Enforcement Administrative Office/ Headquarters | ▪ Logistics Lay Down Area<br>▪ Logistics Staging Area<br>▪ Maintenance Repair Facility<br>▪ Public Works Administration Office/ Headquarters<br>▪ Public Works Operational Facility<br>▪ Warehouse |



State of Hawaii Hazard Mitigation Plan 2018; Table F.1-1

# 2018 HMP: Critical Facilities (cont.)

| Facility Core | Category Facility Type | |
|---|---|---|
| Healthcare & Public Health | ▪ Ambulatory Healthcare Facility | ▪ Kidney Dialysis Center |
| | ▪ Blood, Organ, or Tissue Facility | ▪ Mental Health Treatment Facility |
| | ▪ Cancer Center | ▪ Nursing Care Facility |
| | ▪ Commercial Pharmaceutical Storage for Wholesale Distribution | ▪ Other Medical and Diagnostic Laboratory |
| | ▪ Community Healthcare Center | ▪ Pharmacy |
| | ▪ Extended Care Facility | ▪ Public Health Agency |
| | ▪ Facility/ Mortuary Facility | ▪ Public Health Laboratory |
| | ▪ Hospice | ▪ Residential Care Facility |
| | ▪ Hospital | ▪ Urgent Care Center |
| Mass Care Support Services | ▪ Animal Shelter | ▪ Hotel/ Motel |
| | ▪ Church | ▪ Neighborhood Center |
| | ▪ Civic Center | ▪ Park |
| | ▪ College | ▪ Recreational Facility |
| | ▪ Community Center | ▪ Religious Facility |
| | ▪ Conference Center | ▪ School |
| | ▪ Day Care Center | ▪ Senior Citizen Facility |
| | ▪ Gym | ▪ Shelter |
| Transportation Services | ▪ Airport | ▪ Maritime Supporting Facility |
| | ▪ Air Traffic Control or Navigation Facility | ▪ Operations Support Facility |
| | ▪ Airport Terminal | ▪ Pier |
| | ▪ Cargo Terminal | ▪ Transit Bus Garage |
| | | ▪ Transit Bus Terminal |
| Water, Waste, & Wastewater Systems | ▪ Incinerator | ▪ Wastewater Treatment Plant |
| | ▪ Landfill/ Solid Waste | ▪ Water Distribution Control Center |
| | ▪ Lift/ Pump Station | ▪ Water Distribution Pumping Station |
| | ▪ Sewer | ▪ Water Pipeline Pumping Station |
| | ▪ Wastewater Collection System | ▪ Water Treatment Facility |
| | ▪ Wastewater Facility | ▪ Water Well |
| | ▪ Wastewater Pump Station | |



State of Hawaii Hazard Mitigation Plan 2018; Table F.1-1

# Critical Facilities

- Not all need power
- Power requirements are different

# Critical Facility Power Requirements

- Size (MW)
- Location
- Operate without grid power
- Restoration time
  - Hours
  - Days (10?)
  - Month (30 days)

# Next Steps

- Next meeting – May 2019
- Any follow-up questions
  - Email:  IGP@hawaiianelectric.com
  - Colton Ching @ 543-7986 or Lisa Giang @ 543-7982