

Resiliency & Microgrids Working Group

Value of Resiliency

Discussion Forum and Next Steps

Resiliency and Microgrids Team, Energy Division

July 29, 2021



California Public
Utilities Commission

WebEx and Call-In Information

Join by Computer:

<https://cpuc.webex.com/cpuc/onstage/g.php?MTID=e4c2e55bf4871ef5348344f6e564137ef>

Event Password: RMWG (case sensitive)

Meeting Number: 146 726 0287

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Notes:

- Today's presentation will be available in the meeting invite (follow link above) and will be available shortly after the meeting on <https://www.cpuc.ca.gov/resiliencyandmicrogrids>.

WebEx Logistics

- All attendees are muted on entry by default.
- Questions can be asked verbally during Q&A segments using the “raise hand” function.
 - The host will unmute you during Q&A portions [and you will have a maximum of 2 minutes to ask your question].
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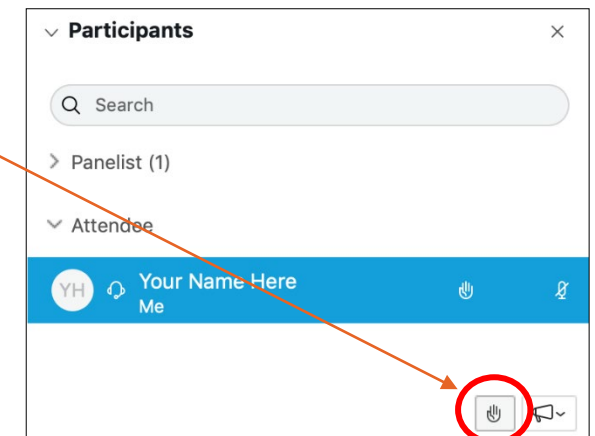
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Access the written Q&A panel here

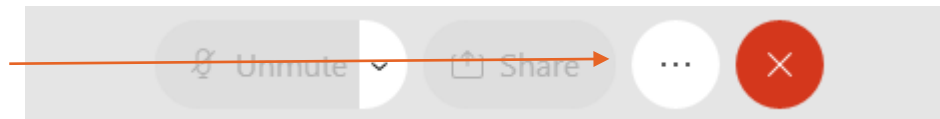


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WebEx Event Materials

Event Information: Resiliency and Microgrids Working Group Meeting


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Event status: Not started ([Register](#))

Date and time: Tuesday, March 2, 2021 9:30 am
Pacific Standard Time (San Francisco, GMT-08:00)
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Duration: 1 hour

Description:



Event material: [RMWG Meeting Material_EXAMPLE.docx](#) (31.7 KB)

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Preliminary Resiliency & Microgrids Working Group Schedule

Month	Resiliency and Microgrids Working Group Topics			
February	Standby Charges	Multi-Property Microgrid Tariff		
March				
April				
May				
June			Value of Resiliency	
July				
August				Microgrid Interconnection
September				
October				
November				
December	Customer-Facing Microgrid Tariff Revisit			
January				
February				

Value of Resiliency: Working group participants to discuss resiliency valuation through an all-hazard approach to disruptions and mitigations by examining metrics, methodologies, and policy applications.

Agenda

I. Introduction (*CPUC Staff*)

- WebEx logistics, agenda review

2:00p – 2:05p

II. Recap of Discussions to Date

2:05p – 2:15p

III. Discussion Forum and Next Steps

2:15p – 3:55p

- Jurisdictional Roles
- Coordination of Roles
- Resiliency Targets
- Planning Processes

IV. Closing Remarks, Adjourn

3:55p – 4:00p

- Provide information on the next meeting

Resiliency and Microgrid Working Group Recap of Discussions To-date

☐ 4 Pillars of Resiliency Valuation

- I. Baseline Assessment
- II. Mitigation Measure Assessment
- III. Resiliency Scorecard
- IV. Resiliency Response Assessment (post-disruption or modeling)

☐ Tools for Resiliency Planning and Assessment

- Interruption Cost Estimate (ICE) Calculator – for localized short duration outages
- Power Outage Economic Tool (POET) -- for widespread, long duration outages
- Resiliency and Reliability Optimization Tool – transmission level
- REPAIR – resiliency and reliability optimization tool at distribution level
- ReNCAT – equity/social burden-based resiliency resource planning tool

☐ Tribal and Local Government Resilience Perspectives

- Paul Cummings, Nevada County Office of Emergency Services
- Will Micklin, Ewiiiaaypaayp Band of Kumeyaay Indians, Alpine, CA
- Josh Simmons, Tribal Gap Analysis Project, Prosper Sustainably

What are the jurisdictional roles of Tribes, Local Governments, Federal, State and Local agencies, and utilities in resiliency planning and investing? **(DRAFT list, not exhaustive or prescriptive and may contain inaccuracies)**

- Tribes and local governments
 - Conduct emergency planning and execute emergency operations
 - Conduct Local Hazard Mitigation Planning (LHMP) for including in State Hazard Mitigation Planning
 - Perform general planning with community input
 - Construct public works
 - Raise funds for investments via bonds, taxes, and grants from federal government
- Federal government
 - Conducts emergency planning and executes emergency operations (FEMA)
 - SHMP – State Hazard and Mitigation Planning, including centralized repository of local government hazard mitigation planning
 - Provides block grants and other funding grants to Tribes, states and/or local governments
 - Oversees transmission rules (FERC)
 - Provides flood insurance
 - Raises funds via income tax
- CBOs – Community Based Organizations
 - Represent specific interests of people that are not effectively represented via other institutions
 - Vary widely in goals, composition, size
 - Raise funds via grants from private philanthropic entities and/or membership

What are the jurisdictional roles of Tribes, Local Governments, Federal, State and Local agencies, and utilities in resiliency planning and investing? **(DRAFT list, not exhaustive or prescriptive and may contain inaccuracies)**

- CCAs – Community Choice Aggregators
 - Sign power and energy contracts
 - Administer energy efficiency and decarbonization programs
 - Receive and respond to community input and interests
 - Coordinate with local governments
 - Advocate on behalf of local interests
 - Raise funds via margins on power and energy contracts
- IOUs
 - Identify and quantify risks and control and mitigations measures
 - Conduct emergency planning and execute emergency operations
 - Undertake construction of utility infrastructure
 - Raise funds for investments via rates, share offerings, corporate bonds
- Private sector developers
 - Conduct market and technology research
 - Identify new, innovative ways delivering energy services that can be profitable
 - Acquire customers
 - Raise funds via private equity, stock, corporate bonds, publicly-funded grants

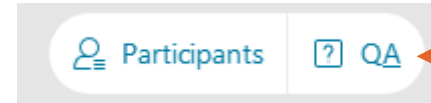
What are the jurisdictional roles of Tribes, Local Governments, Federal, State and Local agencies, and utilities in resiliency planning and investing? **(DRAFT list, not exhaustive or prescriptive and may contain inaccuracies)**

- CPUC
 - Reviews and approves IOU risk assessment methods (RAMP)
 - Reviews and approves rate requests (GRC), pass-through spending (ERRA), capital structure, and return on equity
- CEC – California Energy Commission
 - EPIC program – innovation, research and development
 - IEPR – Energy planning
 - Emergency planning and response - supports emergency response efforts by serving as a central source of credible and timely information on emergency impacts to the state's energy infrastructure.
- OPR – CA Governor's Office of Planning and Research
 - Integrated Climate Adaptation and Resiliency Program (ICARP)
- CARB – California Air Resources Board
 - Establishes rules setting the state's emissions standards for a range of statewide pollution sources including vehicles, fuels and consumer products.
 - APCD/AQMD - Local Air Pollution Control Districts (APCD) and Air Quality Management Districts (AQMD), which are also called air districts.
 - Control air pollution from businesses and stationary sources

Discussion and Q&A

WebEx Tip

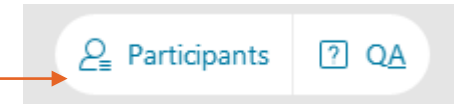
Option 1:



Access the written Q&A panel here

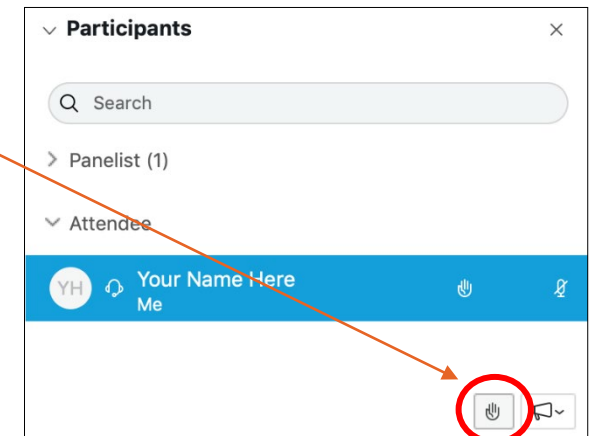
Option 2:

1. Click here to access the attendee list to raise and lower your hand.



2. Raise your hand by clicking the hand icon.

3. Lower it by clicking again.



What is missing?

- Many stakeholders feel that the level of investment in resiliency is below what it should be.
- **Why are the existing roles and activities of our public and private institutions and processes insufficient for meeting the public's resiliency needs? What are the gaps?**
- Hypothetical examples, not meant to be assertions:
 - IOUs:
 - Do not quantify the damages associated with indirect impacts of power outages when proposing and evaluating investments necessary to control and mitigate risk
 - Local governments:
 - Residents may be unwilling/unable to provide adequate funding via taxes and bonds for desired level of local resiliency
 - Lack visibility into what kinds of investments would most efficiently and effectively address power outages
 - CPUC
 - Fully funding all resiliency investments via rates is likely to result in unjust and/or unreasonable rates and exacerbate affordability and equity problems
 - Unregulated private sales and operation of electrical distribution equipment creates legal, safety, worker, and consumer protection risks.

Discussion Questions – Coordination of Roles

- How can we coordinate the various roles of Tribes, Local Governments, Federal, State and local agencies, and utilities in resiliency planning and investing?
- What are ways in which we can enhance data sharing to facilitate better coordination, collaboration and information exchange between utilities, Tribal nations and local governments?

Discussion Questions – Resiliency targets

- Should we be setting a statewide resiliency target (e.g. 100% of critical facilities)?
- How should location-based resiliency targets determined by the local community be integrated into statewide resiliency targets?
- Should we be using a common set of metrics to assess achievement to resiliency goals. If yes, what metrics should be used to measure resiliency goal?
- How can we ensure equitable achievement of resiliency?

Discussion Questions – Planning Processes

- How should utilities prioritize system investments to improve reliability against system investments to improve resiliency?
- Why isn't the Risk Assessment Mitigation Phase (RAMP) + General Rate Case (GRC) an adequate approach to ensure IOUs make sufficient investments in resiliency?
- Should utilities study resiliency needs from an all-hazard perspective?
- Should the utilities be required to undergo a cyclical resiliency planning process using a standardized methodology such as the 4-Pillar process or an equivalent planning process?

Upcoming Meetings

- **NEW** Working Group Topic: Interconnection
 - Thursday, August 12, 2021, 2-4 PM



California Public Utilities Commission

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<https://www.cpuc.ca.gov/resiliencyandmicrogrids/>

Backup Slides

The Problem to Solve: How can we optimize grid investments to maximize resiliency?

4 Pillars of Resiliency Valuation

I. Baseline Assessment

- I. What do we want to protect and where is it?
- II. What threatens it?
- III. How well are we doing now to protect it?

II. Mitigation Measure Assessment

- II. What protection options do we have?
- III. What does the best job at protecting the most?
- IV. What does it cost?

III. Resiliency Scorecard – scoring resiliency configuration characteristics

IV. Resiliency Response Assessment (post-disruption or modeling) –

- II. How well did the investments do in reaching resiliency targets?
- III. Did the investments reduce impacts on the community?

Resiliency Valuation Methodology – 4 Pillars

I. Baseline Assessment:

- 1) Define Geographical area of study
- 2) Define Load Tiers or Consequence Categories (Critical, Priority, Discretionary)
- 3) Identify Resiliency Targets within Load Tiers
- 4) Define Hazards to consider (All-Hazard assessment, analysis, ranking, weighting)
- 5) Conduct assessment of current Resiliency when disrupted from Hazard 1, Hazard 2, Hazard 3 (according to Hazard assessment)
- 6) Results of Resilience Assessment – Identify Resiliency deficits and priorities and Resiliency Metric Reporting of Baseline levels

II. Mitigation Measure Assessment

- 1) Identify potential mitigation measure options
- 2) Assess ability of each mitigation option to reach Resiliency Targets for Hazard 1, Hazard 2, Hazard 3
- 3) Compare costs of each mitigation option to reach Resiliency Targets for Hazard 1, Hazard 2, Hazard 3

Resiliency Valuation Methodology – 4 Pillars

III. Resiliency “Scorecard”

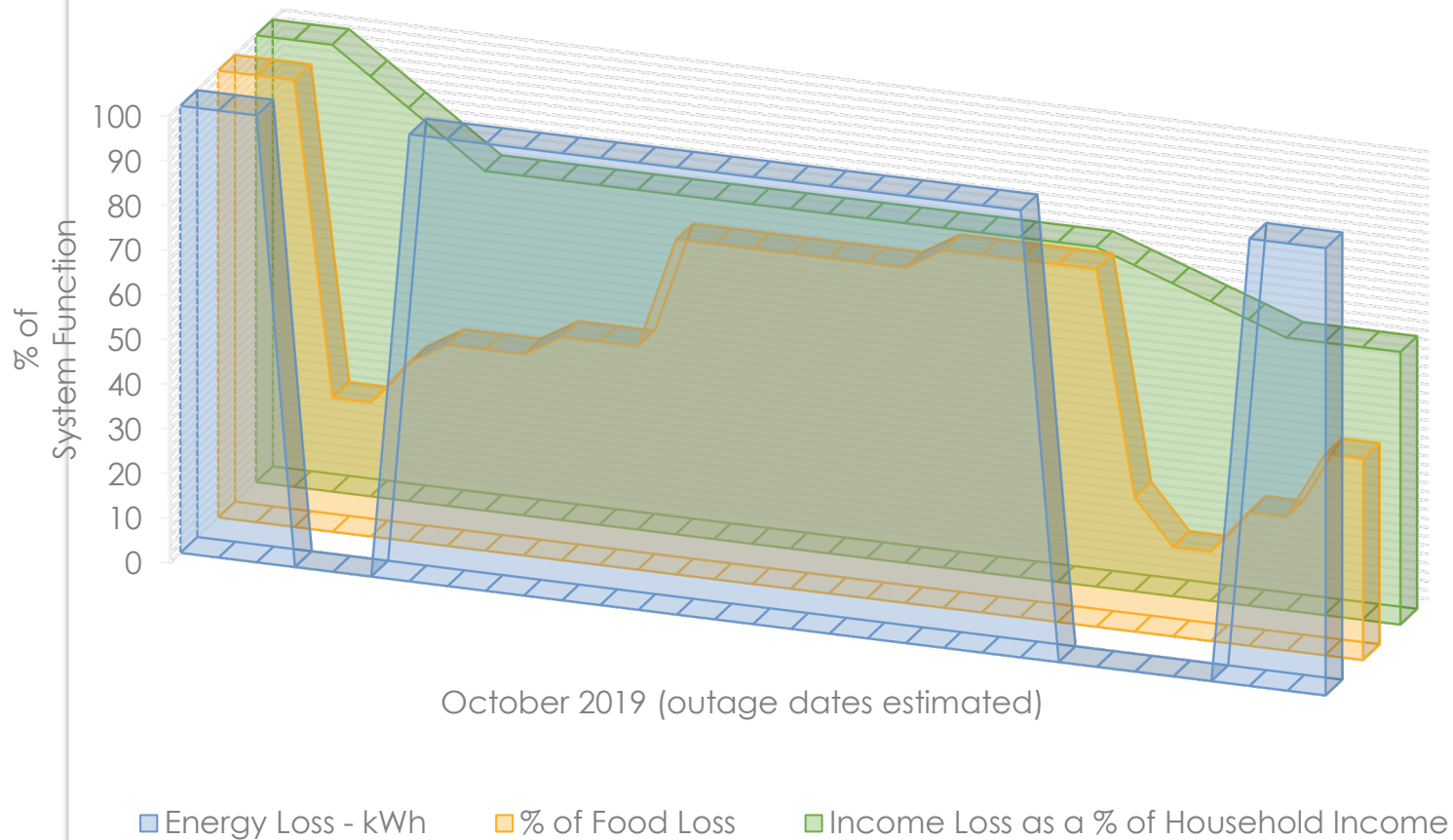
- 1) Resiliency Scorecard is a suggested tool that provides a basic benchmark of achievement but recognizes that more can be done.
- 2) Scoring reflects resiliency configuration characteristics.
- 3) Scoring system provides for different areas of improvement (e.g. 100% resilience targets are met, but configuration uses 70% fossil fuel resources to meet those targets, improvement would be to decrease fossil fuel resources while maintaining targets. Would result in a higher “score.”)

IV. Resiliency Response Assessment (computer modeling or post-disruption approach):

- 1) Conduct Baseline Assessment (1-6).
- 2) After implementation of chosen mitigation measure option, conduct annual data collection of Resiliency Metrics,
- 3) Assess achievement of Resiliency Targets and any changes in Community Impacts

Resiliency Measures to Reflect Accumulated Impacts

Energy loss/Food Loss/Income Loss

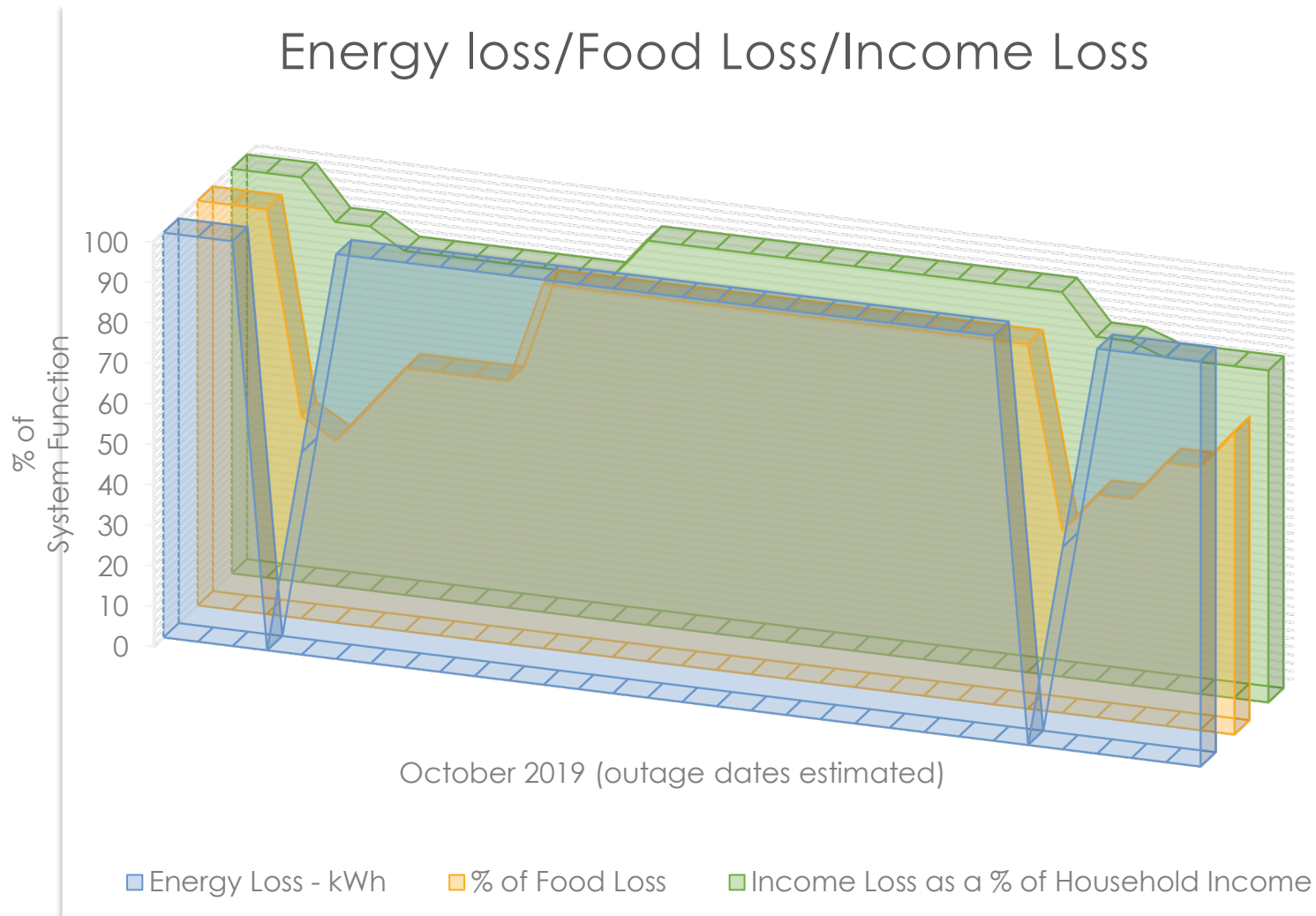


Case study:

- PG&E turned off power to Ana Patricia Rios' neighborhood in Sonoma County for eight days in October -- **three at the beginning of the month and five near the end.**
- She threw out at least **\$500** worth of meat, fruit, vegetables, salsas and other food that would have supplied her family with months of meals.
- Similar losses occurred throughout Rios' wooded, hilly neighborhood, which is mostly home to Hispanic families. Many are **vineyard and hospitality workers, and sometimes several families share a house.**
- Rios family brings in about **\$3,500 each month** -- \$1,000 above the federal poverty level for a family of five.
- Rios **missed eight days of work due to the outages.**
- Her husband **lost four days of work** because of the smoke from the Kincade Fire 40 miles north
- Rios family has **relied heavily on food bank distributions to feed the family since.**

Jackie Botts, CalMatters, <https://www.davisenterprise.com/news/local/state-government/we-need-the-food-that-we-lost/>

Resiliency Measures to Reflect Accumulated Impacts



AFTER Mitigation Measures:

- PG&E implemented Resilience Mitigation Measures that **reduced the duration of the power outage** in their neighborhood and **allowed nearby grocery stores to provide ice** for the community.
- While Ana Patricia Rios' neighborhood still lost power, **it was restored more quickly after 1 ½ days**
- Ana Patricia Rios' **workplace was able to stay powered**, allowing her and her husband to **maintain their income** during the outage.
- While still having to throw out at least **\$250** worth food, maintaining their income meant they could replace their food losses more quickly.
- **A second outage** at the end of the month resulted in again losing some food supplies, but again they were able to **recoup their losses more quickly** because they did not lose work and nearby ice supplies were again available.

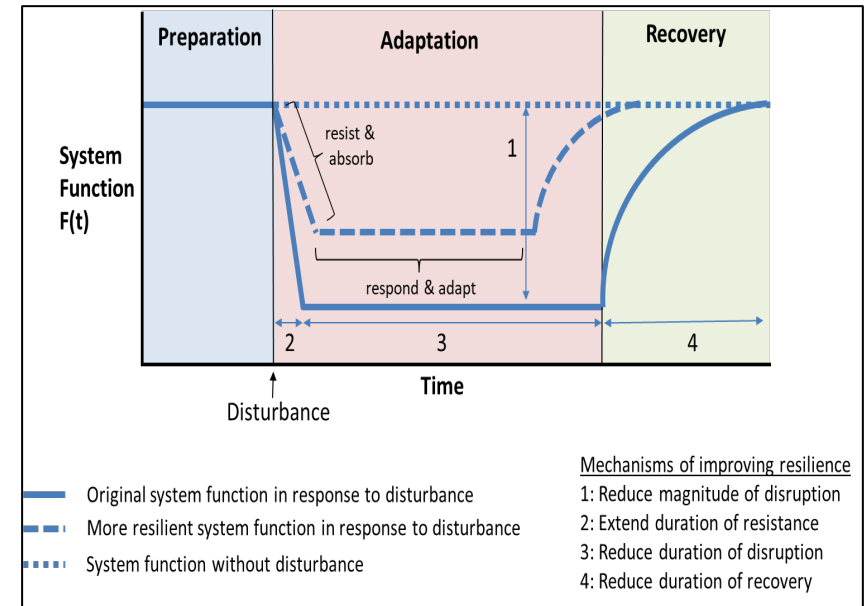
All-Hazard Approach to Assess Resiliency Measures

Mitigation measures to achieve the minimum resilience level for the geographic area defined would be compared in terms of cost, effectiveness (based on the effect on the resiliency trapezoid and/or meeting resiliency targets), and the degree to which the measure would mitigate various hazards (risk-assessment based on weighted all-hazard probability and impact analysis). This type of mitigation measure comparison may reveal vulnerabilities and benefits previously unrealized.

As an example:

- i. Measure A mitigates Hazard Z by taking preparatory measures, which may affect another stage.
- ii. Measure B mitigates Hazard Z & Y increasing preparation and decreasing magnitude.
- iii. Measure C mitigates Hazard X reducing adaptation and recovery stages.
- iv. Measure D mitigates Z, Y & X, but different stages depending on the hazard.
- v. Measure D offers highest level of resilience -- at what cost?
- vi. Compare with costs of either Meas. A + Meas. B. + Meas. C OR Meas B + Meas. C
- vii. Compare with Resilience Measure Characteristics (notification, crossover, duration, fuel type, load capacity, emissions, geographical impact)

Measure	Mitigates Hazard	Ranking	Cost *	Resiliency Trapezoid
A	Z	1	\$40,000	Preparation
B	Z, Y	2	\$100,000	Preparation/Magnitude
C	X	1	\$400,000	Adaptation/Recovery
D	Z, Y, X	3	\$520,000	Preparation (Z, Y), Magnitude (Y), Adaptation (X), Recovery (X)



*Cost figures are arbitrary and for illustration purposes only

Resiliency Valuation Methodology

III. Resiliency Scorecard (draft)

Resiliency Scorecard: Mitigation Measure Characteristics	Points	Score
Duration of backup – with no other inputs		
4 hrs	1	
8 hrs	2	
24 hrs	3	
48 hrs (2 days)	4	
96 hrs (4 days)	5	
Indefinite	6	
Load Capacity (which loads are backed up and how much load (Critical, Priority, Discretionary))		
Critical		
90 - 100%	9	
50 - 90%	8	
0 - 50%	7	
Priority		
90 - 100%	6	
50 - 90%	5	
0 - 50%	4	
Discretionary		
90 - 100%	3	
50 - 90%	2	
0 - 50%	1	

Resiliency Scorecard: Mitigation Measure Characteristics	Points	Score
Fuel Availability		
Onsite, intermittent	3	
Onsite, produced	3	
Piped infrastructure	2	
Wires infrastructure	2	
Transport	1	
Emissions level – GHG and particulates		
Non-GHG emitting	4	
Meets CARB emission standards	3	
GHG emissions < xxx	2	
Cap n Trade	1	

Resiliency Scorecard: Mitigation Measure Characteristics	Points	Score
Start-up/ islanding /isolation/ crossover transition time (intermittent downtime before specified backup is available)		
0 - 1 min	5	
2 - 5 min	4	
5 - 30 min	3	
30 - 120 min	2	
< 120 min	1	
Notification time/Advanced notice needed for backup available at specified load/duration		
0 - 1 min	5	
2 - 5 min	4	
5 - 30 min	3	
30 - 120 min	2	
< 120 min	1	
Blue Sky Services		
Demand Response	2	
Voltage/Frequency	1	
Wholesale participation	1	