

Can We Walk and Chew Bubblegum at the Same Time?

*Climate resilience-building in Building Performance Standards:
opportunities to align mitigation and adaptation*

Prepared for: ACEEE Summer Study

Prepared by: Kathleen Bryan (2050 Partners), Randall Higa (SCE), Brittany Moffett and Hayley Powers (Arup), Sean Denniston (NBI)

Project background and team



SOUTHERN CALIFORNIA
EDISON

An *EDISON INTERNATIONAL* Company

2050 PARTNERS

nbi new buildings
institute

ARUP



Agenda for today

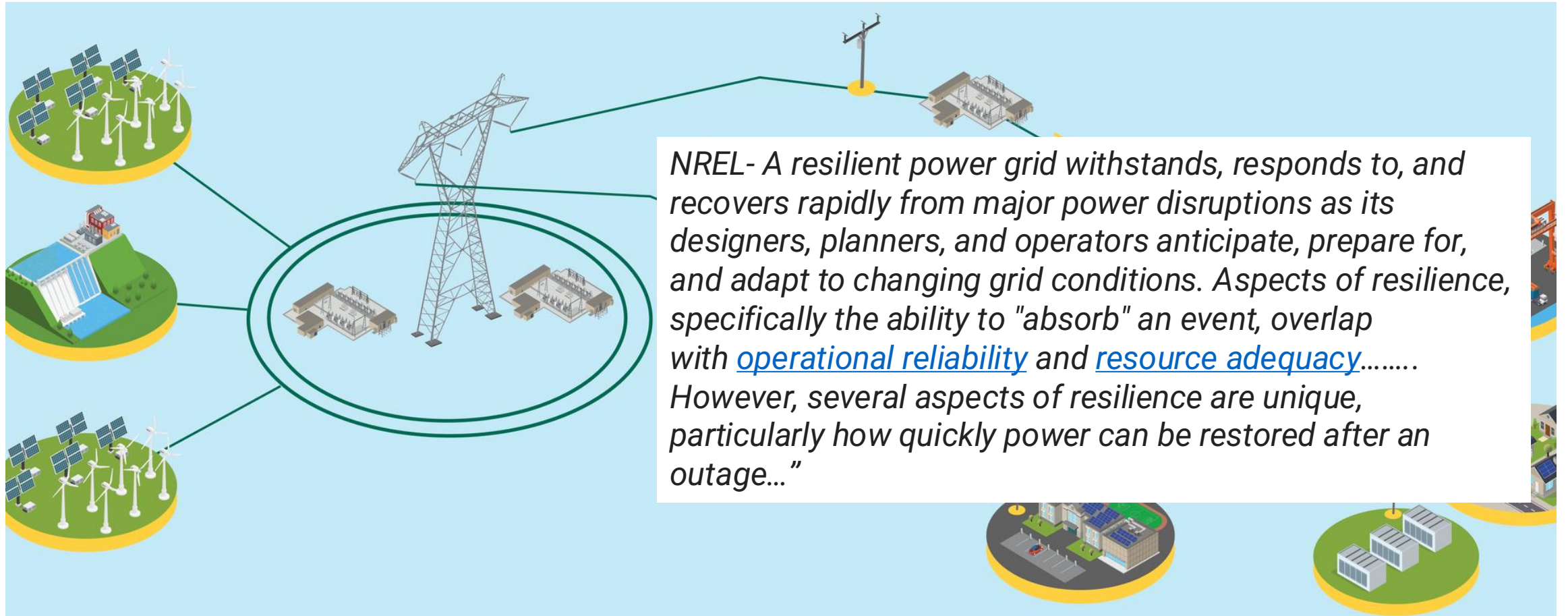
- What is resilience?
- Why are resilience and equity important in the context of BPS?
- Guiding principles of resilience in BPS
- 5 key takeaways for including resilience in a BPS
- Does it ALL belong in a BPS?



Global



Grid



Grocery



Why resilience now?



- 1- <https://imt.org/news/building-performance-standards-beyond-the-meter/> - :text=As of March 2023, there and twenty-four million people
- 2- https://dc.beam-portal.org/api/v3/media/helpdesk/attachments/kb/BEPS/79/BEPS_Cost-Benefit_Study.pdf

Resilience guiding principles



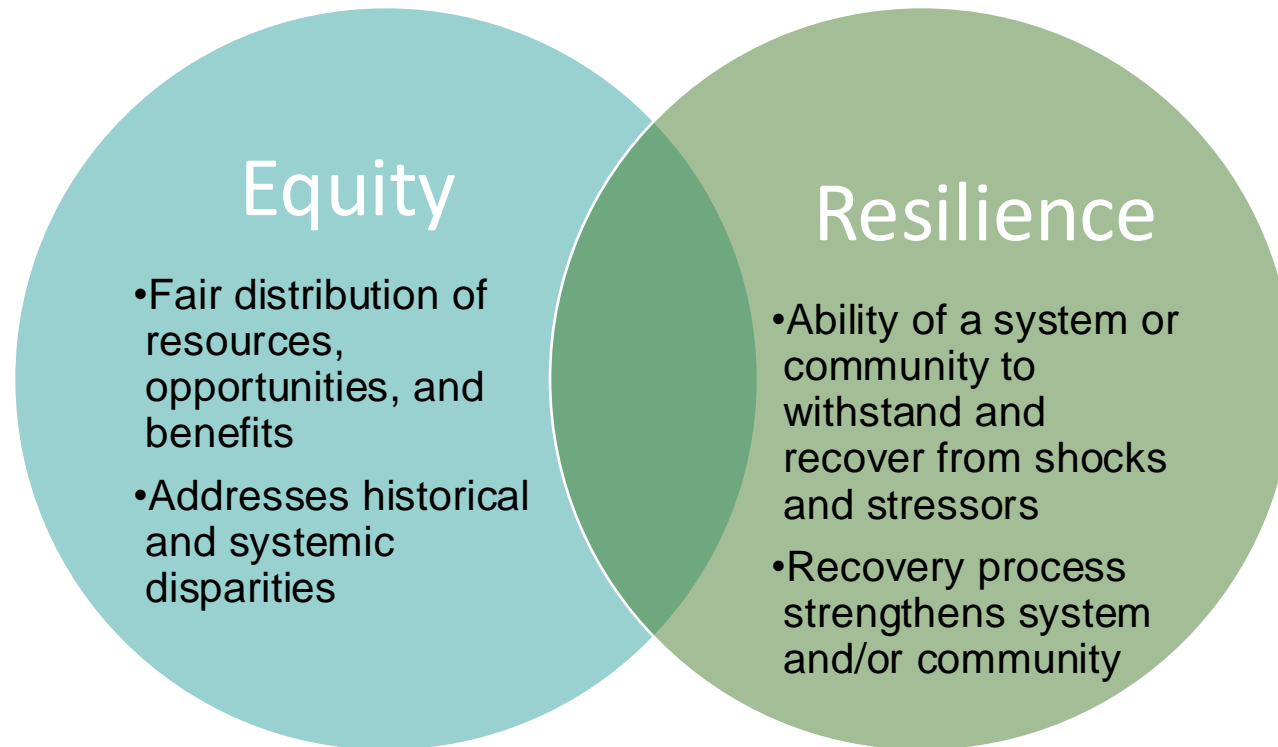
Improve resilience (energy or resilience more broadly) of buildings







Improve energy resilience of the grid (i.e., make buildings more grid-supportive)



How equity and resilience are inextricably linked







Resilience evaluation categories

Categories	Examples
 Supports building energy resilience	<ul style="list-style-type: none">• Energy supply redundancy• Back-up power• Building features to support passive survivability (e.g., insulation, natural ventilation, cool roofs)
 Makes buildings more grid supportive	<ul style="list-style-type: none">• Demand flexibility as a metric• Demand response protocols required• Demand response programs mentioned• On-site renewables• Grid-enabled energy storage
 Both supports building energy resilience and grid resilience	<ul style="list-style-type: none">• On-site renewables paired with back-up power• Weatherization that supports passive survivability and reduces energy demand
 Includes other hazard considerations , unrelated to power outages alone	<ul style="list-style-type: none">• Intersections with other retrofit needs• Boosts building resilience to hazards like heat, extreme cold, and wildfire smoke







General, passive survivability

Categories	Examples
 Supports building energy resilience	<ul style="list-style-type: none"> • Energy supply redundancy • Back-up power • Building features to support passive survivability (e.g., insulation, natural ventilation, cool roofs)
 Makes buildings more grid supportive	<ul style="list-style-type: none"> • Demand flexibility as a metric • Demand response protocols required • Demand response programs mentioned • On-site renewables • Grid-enabled energy storage
 Both supports building energy resilience and grid resilience	<ul style="list-style-type: none"> • On-site renewables paired with back-up power • Weatherization that supports passive survivability and reduces energy demand
 Includes other hazard considerations, unrelated to power outages alone	<ul style="list-style-type: none"> • Intersections with other retrofit needs • Boosts building resilience to hazards like heat, extreme cold, and wildfire smoke

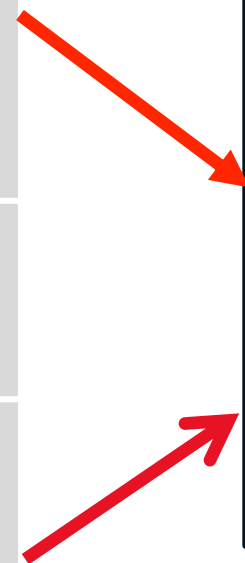
All EE measures reduce building load, supporting grid resiliency and minimizing back-up power needs.

Chula Vista, New York City, Reno have prescriptive pathways with weatherization, helping to withstand extreme heat, cold, and wildfire smoke events.





Grid support, other hazard considerations

Categories	Examples
 Supports building energy resilience	<ul style="list-style-type: none"> • Energy supply redundancy • Back-up power • Building features to support passive survivability (e.g., insulation, natural ventilation, cool roofs)
 Makes buildings more grid supportive	<ul style="list-style-type: none"> • Demand flexibility as a metric • Demand response protocols required • Demand response programs mentioned • On-site renewables • Grid-enabled energy storage
 Both supports building energy resilience and grid resilience	<ul style="list-style-type: none"> • On-site renewables paired with back-up power • Weatherization that supports passive survivability and reduces energy demand
 Includes other hazard considerations , unrelated to power outages alone	<ul style="list-style-type: none"> • Intersections with other retrofit needs • Boosts building resilience to hazards like heat, extreme cold, and wildfire smoke

Energize Denver will require natural gas water and space heating be replaced with heat pumps, which will add in cooling to better manage escalating extreme heat days. Requires connectivity of electric storage water heaters.



On-Site renewables

Categories	Examples
 Supports building energy resilience	<ul style="list-style-type: none"> • Energy supply redundancy • Back-up power • Building features to support passive survivability (e.g., insulation, natural ventilation, cool roofs)
 Makes buildings more grid supportive	<ul style="list-style-type: none"> • Demand flexibility as a metric • Demand response protocols required • Demand response programs mentioned • On-site renewables • Grid-enabled energy storage
 Both supports building energy resilience and grid resilience	<ul style="list-style-type: none"> • On-site renewables paired with back-up power • Weatherization that supports passive survivability and reduces energy demand
 Includes other hazard considerations , unrelated to power outages alone	<ul style="list-style-type: none"> • Intersections with other retrofit needs • Boosts building resilience to hazards like heat, extreme cold, and wildfire smoke

Maryland's Climate Catalytic Capital Fund's purpose includes DER deployment

5 takeaways

01

Encourage energy efficiency measures that also safeguard thermal health.

02

Ensure representation to help distribute benefits and reduce harm.

03

Encourage demand response, conceiving grid support as community support.

04

Ensure DERs provide grid benefit, community benefit, and address medical necessities.

05

Provide funding and supportive programs to reduce burden on building owners (prioritizing disadvantaged communities).



EE needs to do more

- While all BPS reviewed implicitly encourage energy efficiency, some explicitly call out weatherization.
- No wasted energy- even if it's clean.
- Wasted electricity “clogs” a stressed power grid.
- Think beyond meter (or carbon savings)- how will the building perform offline?



Include ALL stakeholders to increase success

- Maryland's Senate Bill 528, the Climate Solutions Now Act of 2022, details the creation and membership of working groups.
- Washington, D.C.'s BPS Task Force and St. Louis's Building Energy Improvement Board must include affordable housing representation.
- NYC's advisory board must include one environmental justice organization representative, one environmental advocacy representative, and one not for profit organization representative.
- Montgomery County's legislation provides specific groups be represented on the Building Performance Improvement Board.



Layer in grid-responsiveness

- Require communication protocols that facilitate demand response performance.
- Washington, D.C.'s policy notes that utilities “may apply to the Commission to offer energy efficiency and demand reduction programs in the District that the company...”.
- Maryland’s Senate Bill 528 : “require each electric company to implement a cost–effective demand response program in the electric company’s service territory...”.
- Montgomery County’s requirement that utilities implement DR programs.



Storage is power

- Self-utilization of onsite renewable energy generation can:
 - minimize energy export when the grid is congested with excess renewable energy
 - minimize demand when grid demand is high
- The ability to island from the grid in times of high grid stress, extreme weather, and/or natural disasters ensures the welfare of a building's tenants/residents and continuous access to the electricity needed to power lifesaving medical devices.
- Ordinances could allow for battery back-up demand to be partially deducted from total energy use to encourage use in BPS compliance or otherwise value the contribution by on-site renewables and storage.



This is going to cost A LOT



What would it look like if resilience was front and center?

- Energy efficient
- Well-maintained
- Well-weatherized
- Grid responsive
- On-site renewables (& island-capable)
- Benefits are equitably distributed



Does this all fit into one policy?

Inherent to BPS

- Reducing load minimizes on-site power or back-up needs.
- Weatherization measures improve passive survivability and decreases heating and cooling loads on the grid during peak.
- Renewable power contributes to grid resilience.
- Electrification via heat pumps may add cooling.

“Bolt-on”

- Require the ability to island with on-site power.
- Support non-EE improvements to building that improve general performance and resilience to extreme weather.
- Require participation in demand response programs.
- Require connectivity to enable DR from loads.



Thank you
