

Resilient Buildings

DESIGNING BUILDINGS TO LAST

Resilient design is a series of guidelines for practical, on-the-ground solutions for the built environment. In a building, resiliency can offer functionality in the face of hardships such as equipment failure, grid off-time, or seismic events, and can elevate wellness with improved indoor air quality. Addressing these issues ensures that our designs will continue to contribute to sustainable goals and strong communities.

THE FOUR R'S IN RESILIENCE

CLICK TO EXPLORE

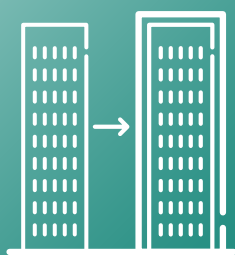
CREATING A BETTER ENVIRONMENT

ROBUSTNESS

RAPID RECOVERY

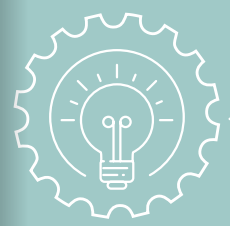
RESOURCEFUL

REDUNDANCY



Robustness

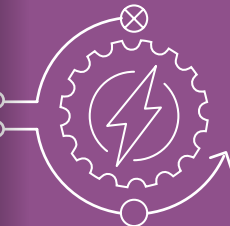
Robustness is the ability to maintain critical operations and functions in the face of crisis. MEP building design examples include operable windows, ability to increase filtration level in AHU's, uptime and islanding via micro-grid (PV, battery storage, generator, and grid interactive controls), power over ethernet lighting, and increased seismic design for MEP equipment and infrastructure (usually by matching the building structure seismic design).



RESOURCEFUL



RAPID RECOVERY



REDUNDANCY



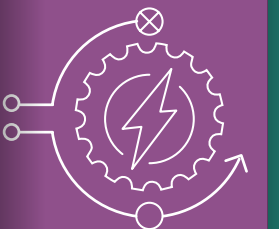


Resourcefulness

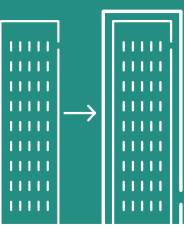
Resourcefulness is the ability to skillfully prepare for, respond to and manage a crisis or disruption as it unfolds. MEP building design examples include building facility staff training to be able to monitor automatic switch-overs (via building controls) or force manual system switch-overs of MEP systems, ability to disconnect from the grid and operate buildings when “islanded,” and having supply chain agreements in place to refuel diesel generator to prolong building operations.



RAPID RECOVERY

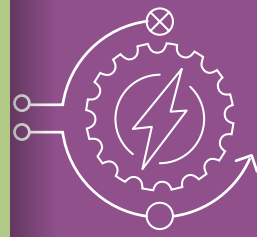


REDUNDANCY

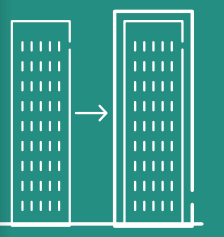


ROBUSTNESS





REDUNDANCY



ROBUSTNESS

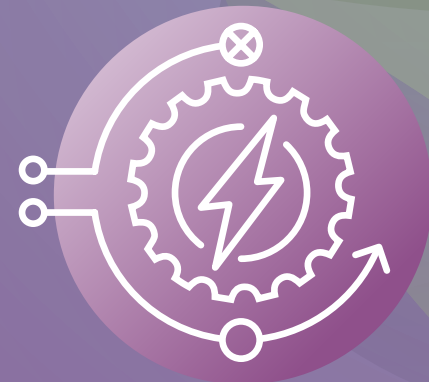


RESOURCEFUL



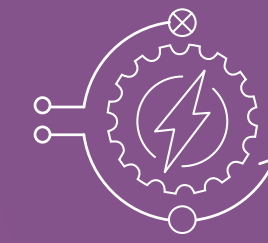
Rapid Recovery

Rapid Recovery the ability to return to and/or reconstitute normal operations as quickly and efficiently as possible after a disruption. MEP building design examples include having an operational plan of action for critical staff to be able to reach the building, having an operational plan of how to operate the building when certain failures happen, have facility staff store enough building repair components to recover from critical failures within a reasonable time, and have a supply chain recovery plan for equipment that cannot be stored onsite.

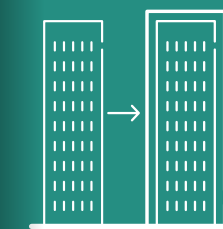


Redundancy

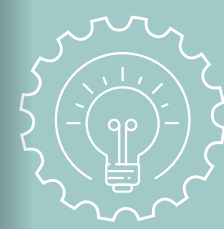
Redundancy is comprised of back-up resources to support the original resilience features in case of failure. MEP building design examples include N+1, 2N, or other redundancy design levels for MEP system components, to ensure any critical equipment or infrastructure failure can be backed-up or replaced to keep the building operational. For example, having one extra (N+1) chilled water pump, chillers, boilers, electrical utility connection, and generator are prevalent in data centers, hospitals, laboratories, and emergency operation center projects.



REDUNDANCY



ROBUSTNESS



RESOURCEFUL



RAPID RECOVERY

