LEED Pilot Credits on Resilient Design

A schematic showing the basic structure of the three pilot credits. Graphic: Jessie Woodcock, ZGF
Intent

To ensure that buildings will maintain reasonable functionality, including access to potable water, in the even of an extended power outage of loss of heating fuel.

Requirements

Meet any two of the three options in this credit:

• Option 1 – Thermal Resilience
• Option 2 – Back-Up Power
• Option 3 – Access to Potable Water
Option 1 – Thermal Resilience

- Habitable Area
  - 40 SF per person x full occupant load of building

- Temperature Range
  - 86F SET - 54F SET (Standard Effective Temperature)

- Ventilation
  - 5 cfm per person

- Emergency Operation Plan
Option 1 – Thermal Resilience

- **Habitable Area**
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- **Ventilation**
  - 5 cfm per person

- **Emergency Operation Plan**
IPpc100 • Passive Survivability & Functionality During Emergencies

University Hall, University of Massachusetts Boston
Option 1 – Thermal Resilience

- Habitable Area
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Thermal Resilience Study
USGBC NY chapter: Urban Green

Residential Building Types

Computer models based on six representative residential building categories were used to find indoor temperatures after a blackout. Summer and winter scenarios were defined by recent New York City weather data and model both typical existing and high-performing buildings. The Technical Appendix describes these models in detail.

- Single-Family House
- Row House Apartment
- Brick Low-Rise Apartment
- Pre-2000 Brick High-Rise Apartment
- Post-2000 Brick High-Rise Apartment
- All-Glass High-Rise Apartment
Indoor Temperatures During a Winter Blackout

A typical detached single-family house would fall below freezing on the fourth day. After a week, all the other buildings would be almost as cold, between 32°F and 43°F indoors.
Indoor Temperatures During a Winter Blackout

At the end of the week, there would be an 18°F to 27°F difference between a typical existing building and a high-performing building of the same type. All the high-performing buildings would maintain temperatures above 54°F.
The typical all-glass high-rise apartment and single-family house heat to almost 90°F on the first day. The all-glass apartment climbs above 95°F on the fourth day and peaks over 100°F. The brick buildings, including the row house, low-rise and high-rise apartments, stay cooler throughout the week but still end above 85°F.
High-performing brick buildings, including the row house and brick low- and high-rise apartments, would stay below 80°F for the first half of the week, and never go above 85°F. The high-performing glass building reaches 88°F and the single-family house still rises above 90°F.
Option 1 – Thermal Resilience

- **Habitable Area**
  - 40 SF per person x full occupant load of building

- **Temperature Range**
  - 86F SET - 54F SET (Standard Effective Temperature)

- **Ventilation**
  - 5 cfm per person

- **Emergency Operation Plan**
IPpc100 • Passive Survivability & Functionality During Emergencies

University Hall, UMass Boston
University Hall, UMass Boston
Air Flow Diagram
Option 1 – Thermal Resilience

- **Habitable Area**
  - 40 SF per person x full occupant load of building

- **Temperature Range**
  - 86F SET - 54F SET (Standard Effective Temperature)

- **Ventilation**
  - 5 cfm per person

- **Emergency Operation Plan**
## IPpc100 • Passive Survivability & Functionality During Emergencies

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### Zone VE (El. 19 ft)
- Moderate
- Category B
- Not Applicable
- White/yellow
- Low rise
- Not Applicable
- Yes
- No
- Yes
- No
- Flooding
- Hurricanes
- Tornado / High Wind
- No
- No
- Modifiable

### Zone X
- Moderate
- Category B
- Not Applicable
- White/yellow
- Low rise
- Not Applicable
- Yes
- No
- Yes
- No
- Flooding (localized)
- Hurricanes
- Tornado / High Wind
- No
- No
- Modifiable

### Zone VE (El. 13 ft)
- Moderate
- Category B
- Not Applicable
- White/yellow
- Low rise
- Not Applicable
- Yes
- No
- Yes
- No
- Flooding
- Hurricanes
- Tornado / High Wind
- No
- No
- Modifiable

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*Are You the Weakest Link? Resilient Design 101 • March 9, 2017*
Are You the Weakest Link?

- Will Building to code minimums prepare you for the future?
- How does the current standard of care compare to resilient recommendations?
- What is the cost of not incorporating resilient design?
Questions?

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