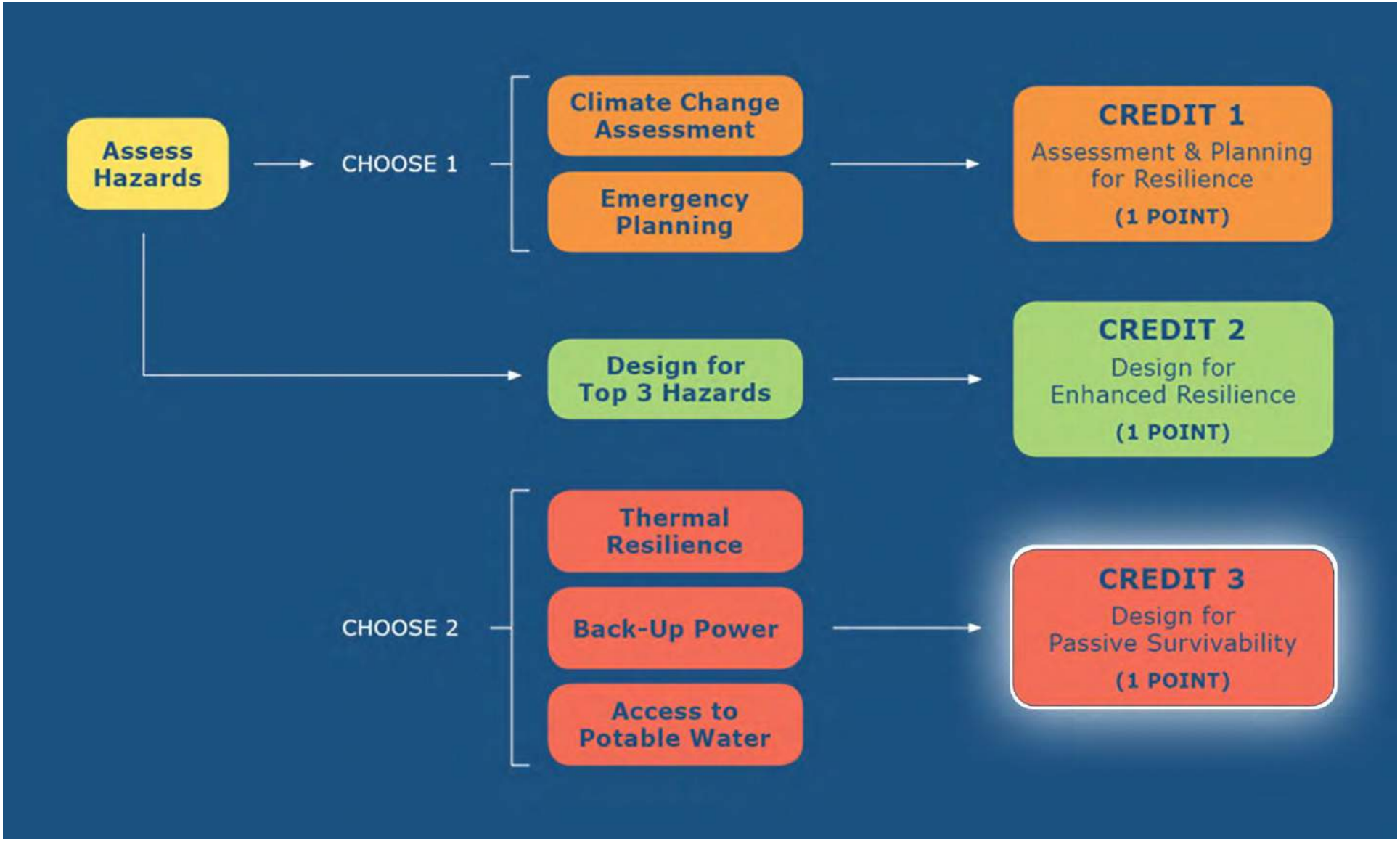
LEED Pilot Credits on Resilient Design

RESILIENT DESIGN
INSTITUTE



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

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University Hall, University of Massachusetts Boston

Level 1

Level 2

Level 3

Level 4

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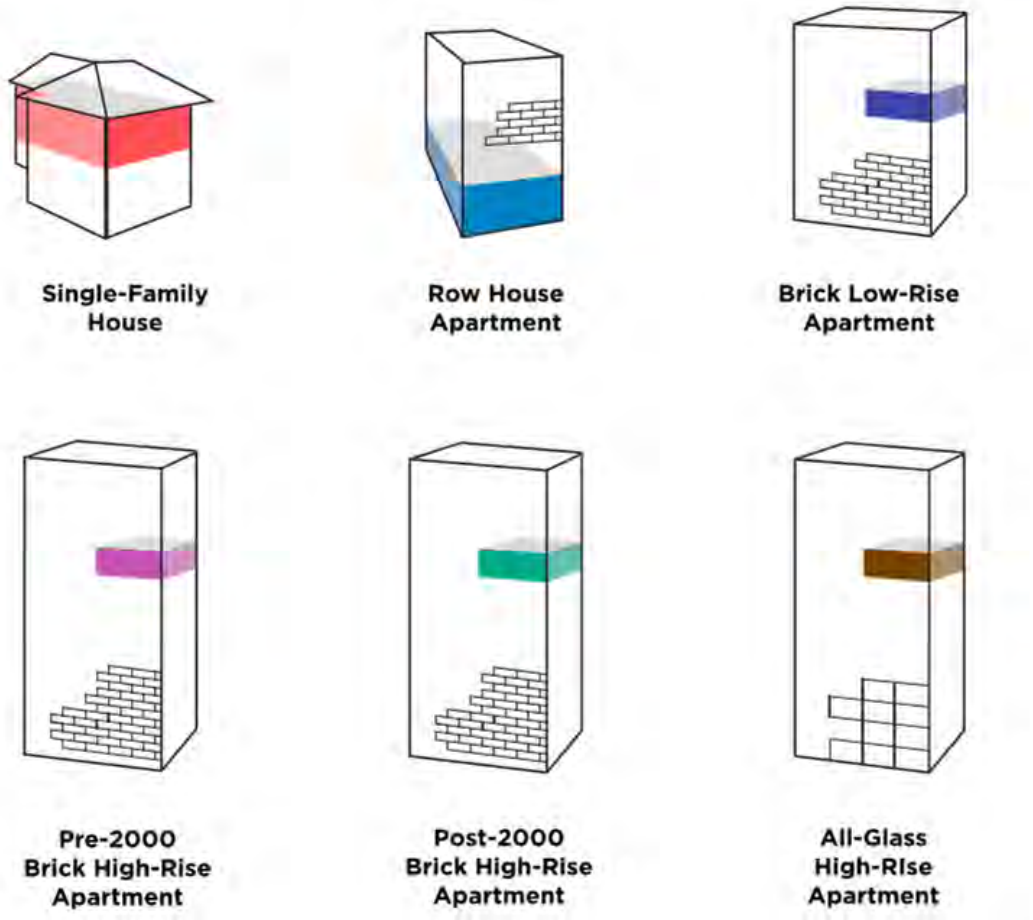
IPpc100 • Passive Survivability & Functionality During Emergencies

Thermal Resilience Study

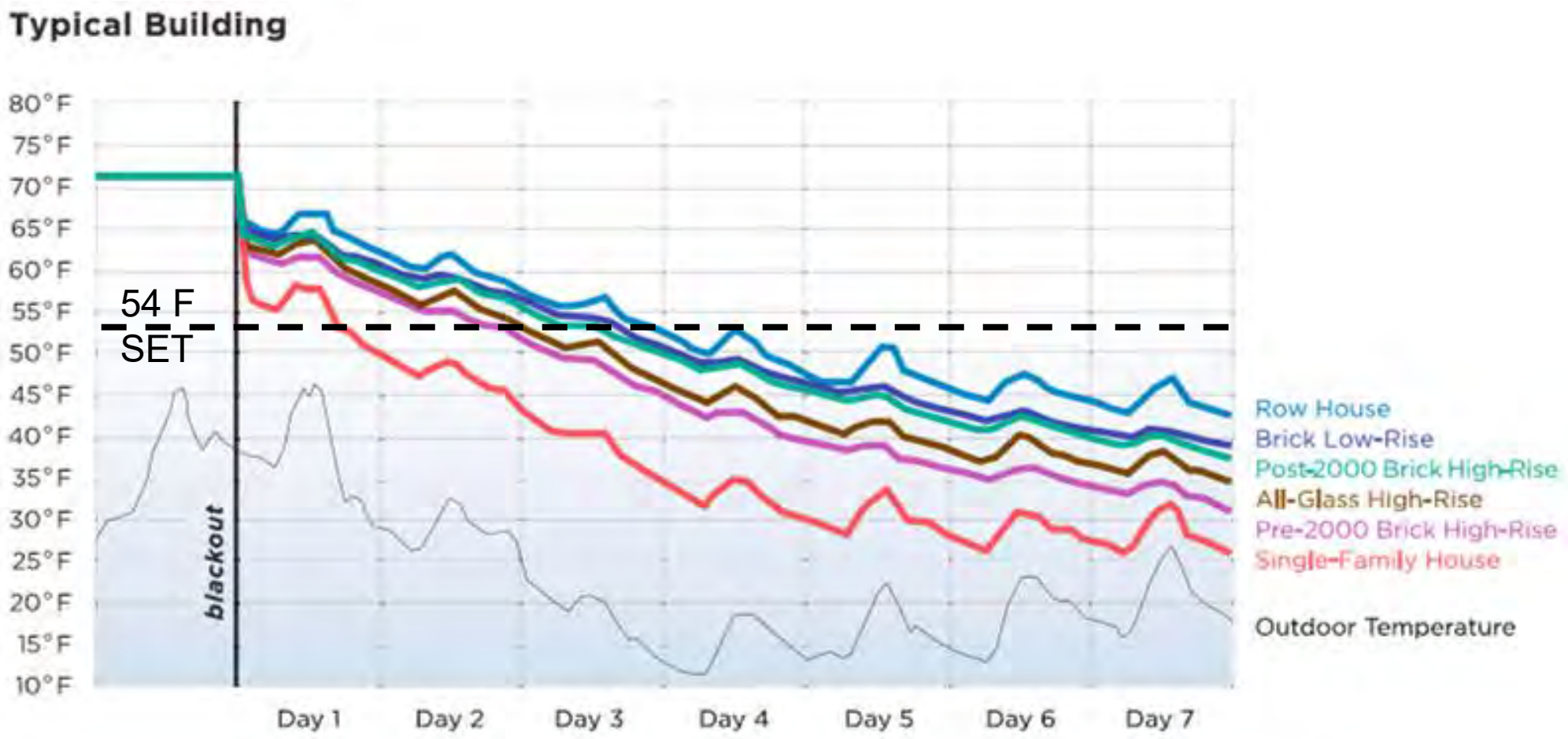
USGBC NY chapter: Urban Green

Residential Building Types

Computer models based on six representative residential[3] building categories were used to find indoor temperatures after a blackout. Summer and winter scenarios were defined by recent New York City weather data[4] and model both typical existing and high-performing buildings.[5] The Technical Appendix describes these models in detail.[6]

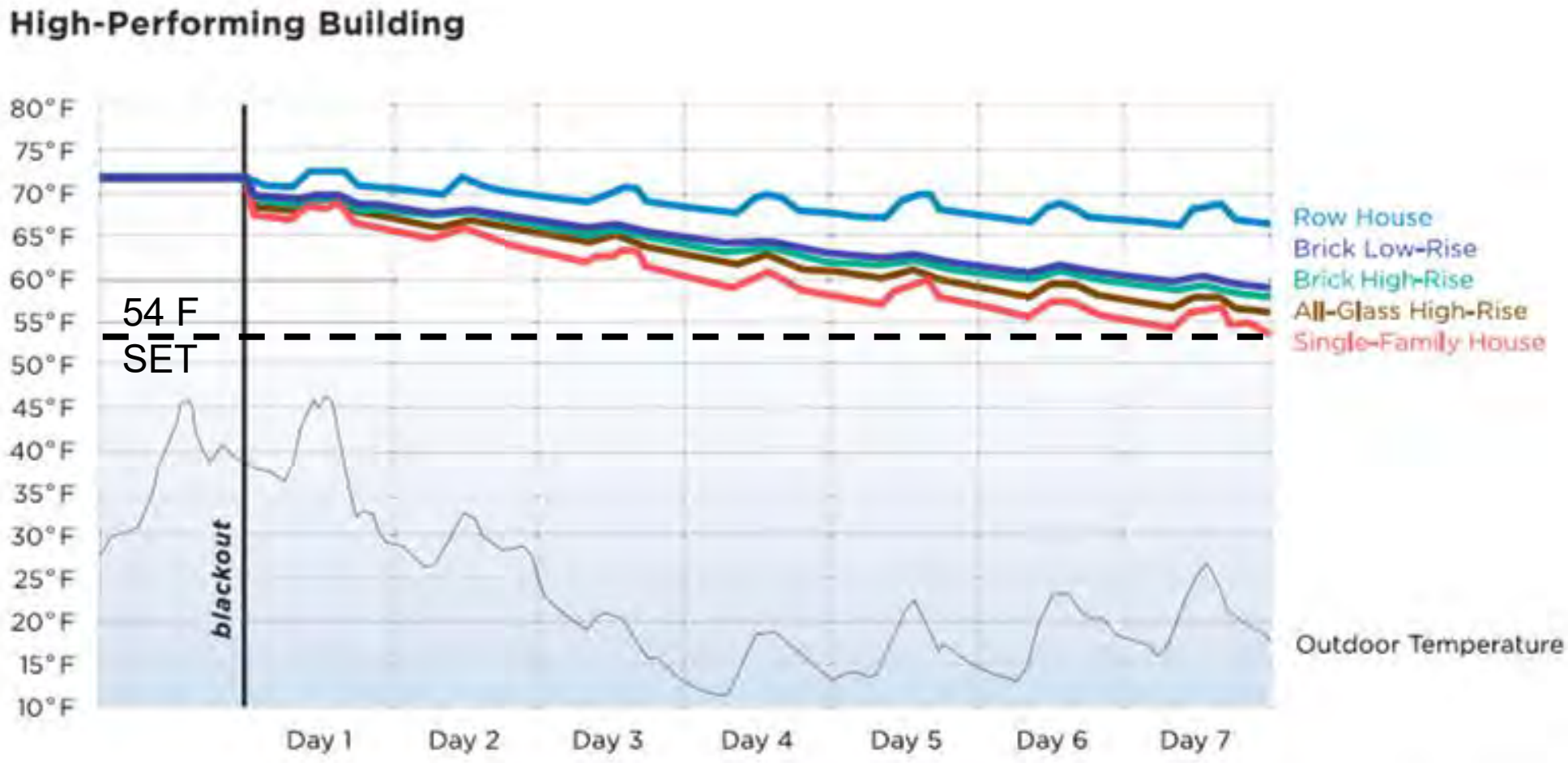


Indoor Temperatures During a Winter Blackout



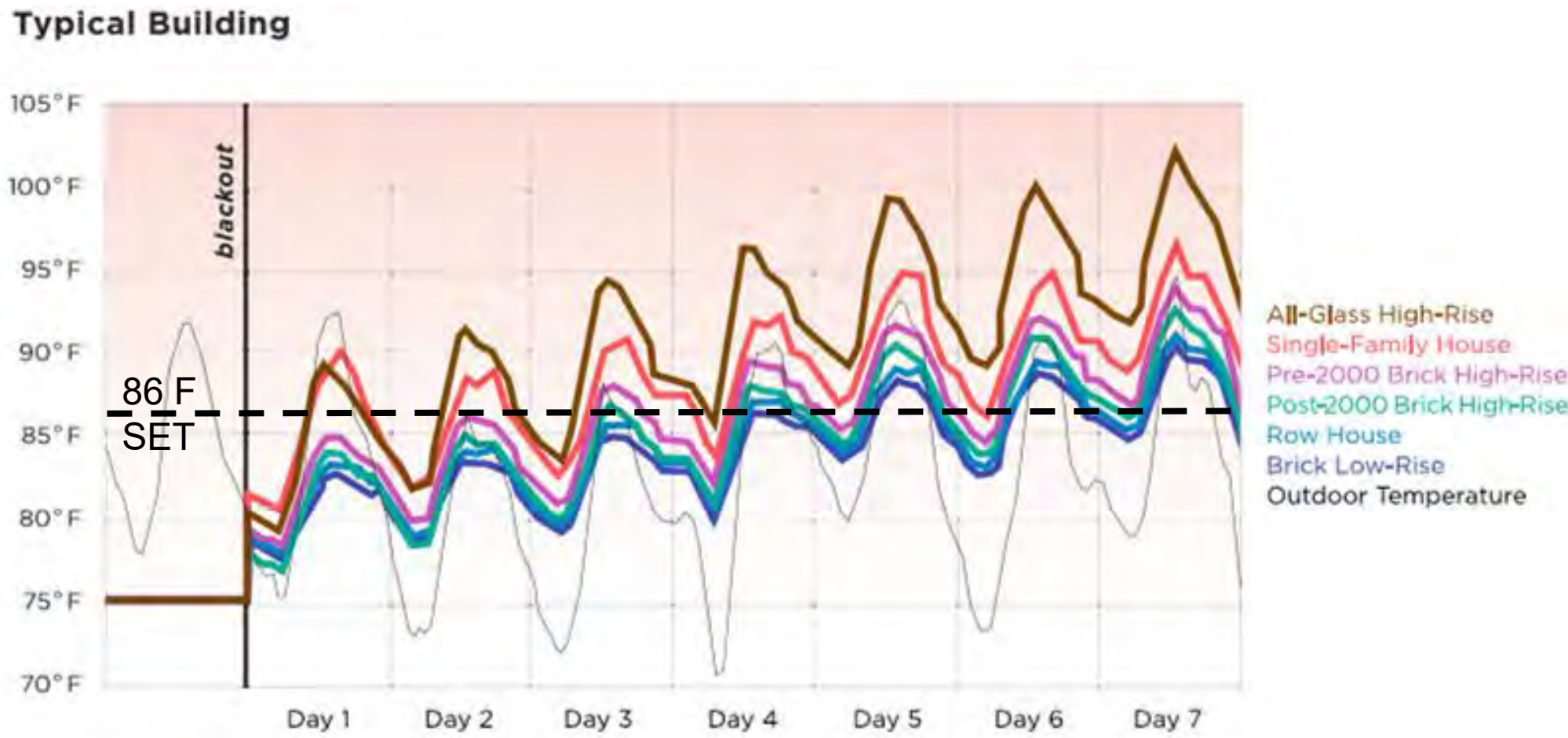
A typical detached single-family house would fall below freezing on the fourth day. After a week, all the other buildings would be almost as cold, between 32°F and 43°F indoors.

Indoor Temperatures During a Winter Blackout



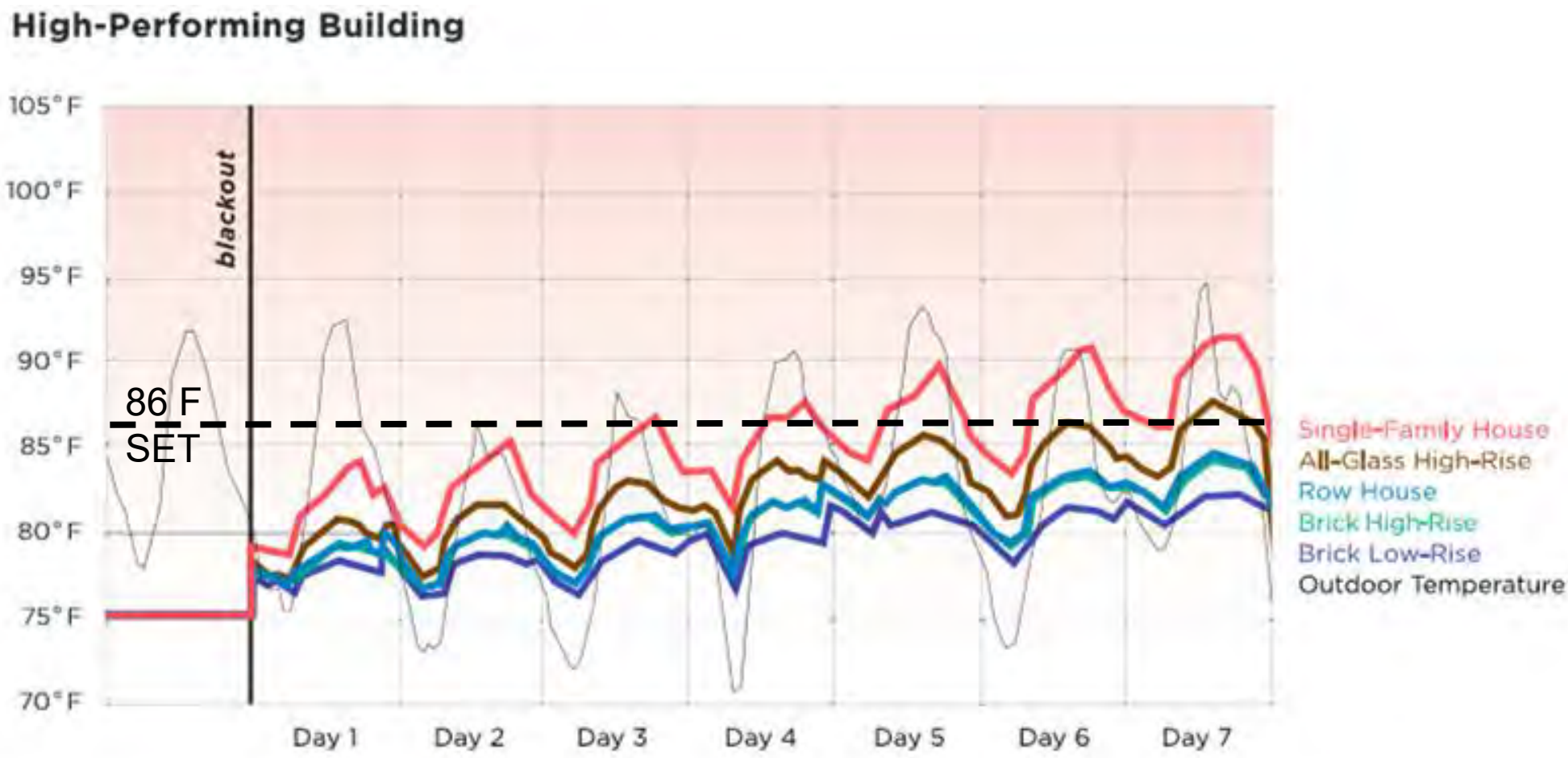
At the end of the week, there would be an 18°F to 27°F difference between a typical existing building and a high-performing building of the same type. All the high-performing buildings would maintain temperatures above 54°F.

Indoor Temperatures During a Summer Blackout



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.

Indoor Temperatures During a Summer Blackout



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.

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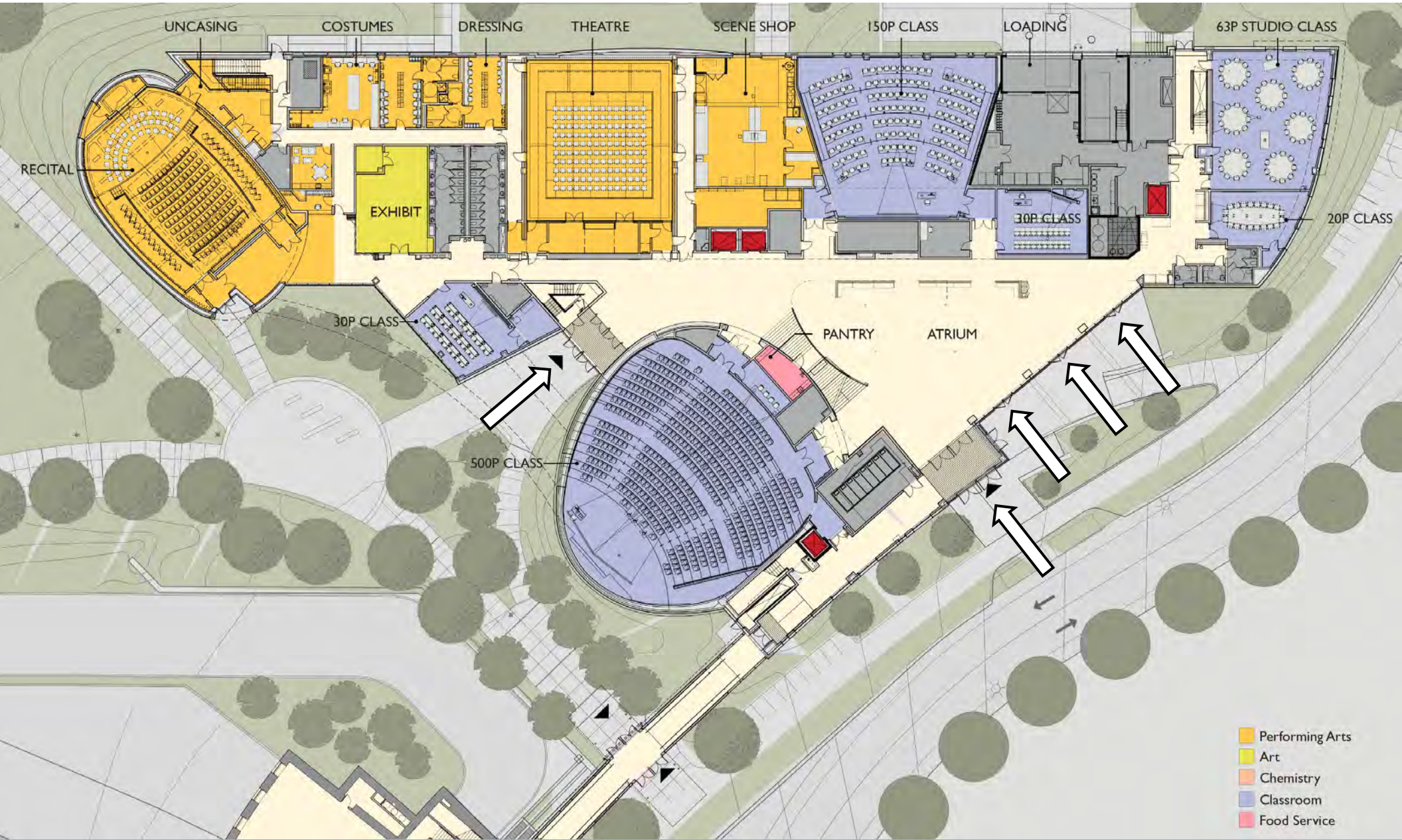

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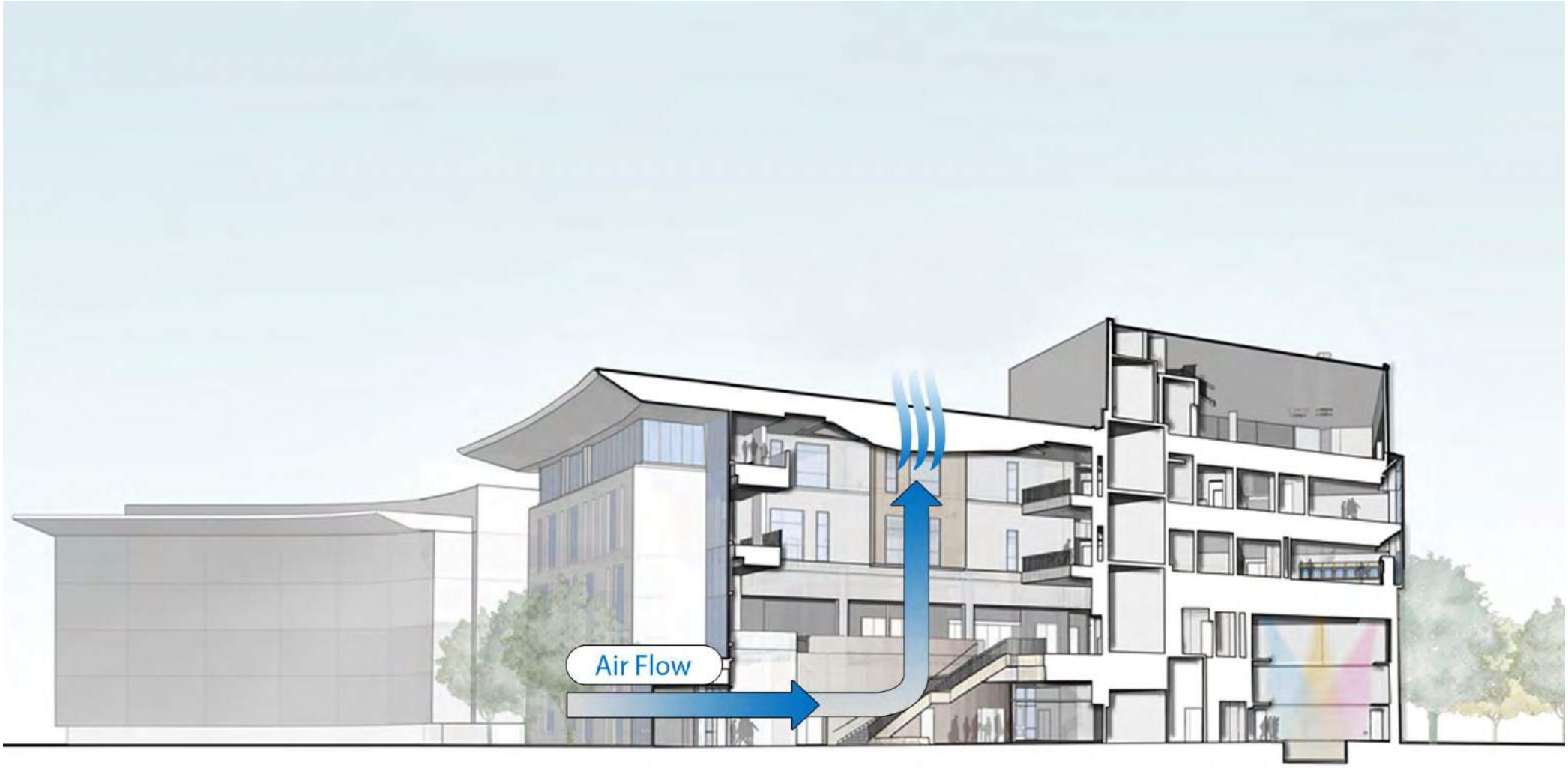
Air Flow Diagram



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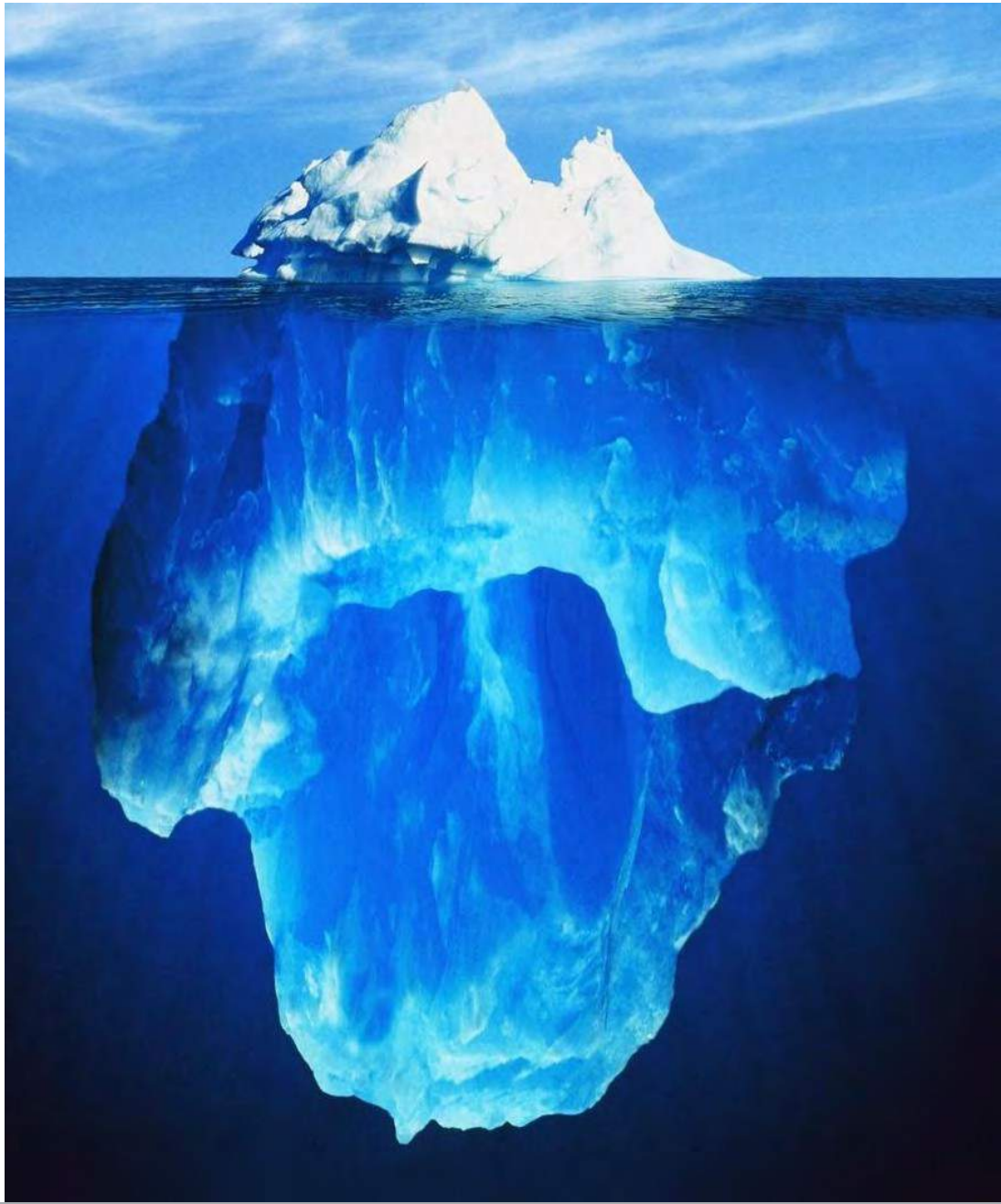
IPpc98														IPpc99			IPpc100		
Prerequisite								Option 1: Step 1											
Flooding	Hurricanes	Tornado/ Wind	Earthquake	Tsunami	Wildfire	Drought	Landslide	Sea Level Rise	River Flooding	Winter Storms	Temp, Rain, Storm	Option 1: Step 2	Option 2: Red Cross	Hazard 1	Hazard 2	Hazard 3	Thermal Resilience	Back up Power	Potable Water
Zone VE (El. 19 ft)	Moderate	Moderate	Category B	Not Applicable	White/yellow	<25%	Low	>7 ft rise	Not Applicable	8-12 per Year;	+5.1F 7.2% 10%	Yes	No	Flooding w/ Waves	Hurricanes	Tornado / High Wind	No	Generator	Modifiable
Zone X	Moderate	Moderate	Category B	Not Applicable	White/yellow	<25%	Low	> 3ft rise	Not Applicable	8-12 per Year	+5.1F 7.2% 10%	Yes	No	Hurricanes	Flooding (localized)	Tornado / High Wind	No	Generator	Modifiable
Zone VE (El. 13 ft)	Moderate	Moderate	Category B	Not Applicable	White/yellow	<25%	Low	<3ft rise	Not Applicable	8-12 per Year	+4.8F 7.2% 10%	Yes	No	Flooding w/ Waves	Hurricanes	Tornado / High Wind	No	No	Modifiable

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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