

Title: **Debating Tall: Tall Buildings as Severe-Weather Shelters?**

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Tall Buildings as Severe-Weather Shelters?

Recent strong weather events and heavy flooding in major coastal cities have prompted debate about where to shelter and what's appropriate to build along coastlines. CTBUH research and academic projects have both focused on the issue recently. For a quick take, we asked two experts, "Are tall buildings appropriate severe-weather shelters?"

YES

Ilana Judah,

Director of Sustainability, FXFOWLE

As we see greater impacts of climate change, the dangers will increase beyond hurricanes and coastal flooding. Depending upon the region, areas could also experience drought, excess precipitation, extreme heat, and forest fires. We should certainly be thinking about where best to build new cities, but the reality is that we are dealing with existing cities – and the millions of people within them.

Density provides multiple inherent benefits. Emergency resources can be distributed much more efficiently, and with greater access to an aggregated population. Tall buildings are typically run by a management company, with building operators that should have an emergency plan, occupant list, fire department connections, and various emergency building systems.

However, many existing tall buildings are currently in need of upgrades, and these are often unique to the specific building. A range of operational upgrades can greatly improve and ensure resiliency. For example, a building may have emergency management plans in case of a fire, but not in an extreme weather event, which may necessitate additional storage for food and water supply, identifying vulnerable populations requiring assistance, a communications plan if the power goes out, etc. If well organized and planned, these low-to-no-cost community protocol

measures can be very effective. There are still many opportunities to improve regulations to mandate these types of measures.

Beyond the operational initiatives, basic retrofitting would require installing physical safeguards, such as temporary floodgates or window protection. The optimal scenario is for new buildings or deep retrofits to provide a range of resiliency measures, from increased insulation to on-site power generation systems and dedicated areas of refuge that enable the building to provide shelter in place.

Within the urban context, the question arises as to the building owner's responsibility to provide resources to the wider community. How far that goes is a conversation between the city and the building owner; perhaps it's a negotiation that could be mutually beneficial.

NO

Luke Leung,

Director, Skidmore, Owings & Merrill

Tall buildings are rarely designed to provide life-saving shelter to their occupants and surrounding community during severe-weather events. Severe weather often triggers utility outages. There are no holistic codes and standards to enforce resiliency in tall buildings. Water supply and drainage are often not on emergency power. Current tall buildings are simply not designed to provide for a prolonged period of thermal refuge without power.

As long as the same hermetically sealed glass box is built worldwide, the building envelope is not optimized for climate-responsive passive designs. This eliminates occupants' basic access to outdoor ventilation air when power is not available. All-glass buildings present obstacles to achieving thermal autonomy, and in some cities, it may be difficult to achieve basic passive survivability during a power outage.

Tall buildings are reliant on electricity to provide the basic conditions necessary for refuge. While generators can meet some of the emergency load, they are not designed to carry thermal loads during severe-weather events. Furthermore, along with most equipment, generators tend to be located in sub-prime space, typically below-grade with few hours' storage, which is difficult to replenish during severe weather situations. On-site renewables are not only unreliable, but require the right infrastructure and storage. They can rarely provide the required load to support all necessary systems, given the small footprint of tall buildings. Most current tall buildings are commercially-driven, and often designed with minimal considerations of renewable energy.

Of the myriad factors driving tall building design, resiliency has only recently begun to make the list (often at or near the bottom). While standards like RELi will help, it is still in its infancy and does not necessarily have a tall building focus. Until the economic and social benefits of more resilient tall buildings are more seriously considered, resiliency will remain near the bottom of a long list of design drivers.

