

# Sustainability and Fire Safety

Conflict or complement?

# Policy , Code, and Regulation Trends

Times are changing

**NFPA:** Adapting fire codes to address risks from sustainable building practices.

**SFPE:** Advocating for integrated, holistic design that balances sustainability and fire resilience.

**IBC:** Embedding sustainability through complementary codes like the IgCC, while maintaining strict fire safety standards

**UK** built environment = 25% greenhouse gas, goal to reach net zero by 2050

**Australia NCC** – 30-40% fire safety, 10-15% sustainability

# Introduction

## Sustainability in buildings



# Some examples

- 2003: The Station Nightclub Fire, USA — polyurethane foam contributed to 100 deaths.
- 2013: Dietz & Watson Warehouse Fire, NJ — fire spread due to PV panels.
- 2015: Barcelona Green Roof Fire — dry summer conditions led to ignition.
- 2017: Grenfell Tower Fire, London — ACP cladding with polyethylene core, 72 fatalities.
- 2019: Surprise, Arizona — explosion in energy storage system injured 8 firefighters.
- 2025: at least 35 Li-Ion battery fires in NSW by February.

# Sustainability innovation

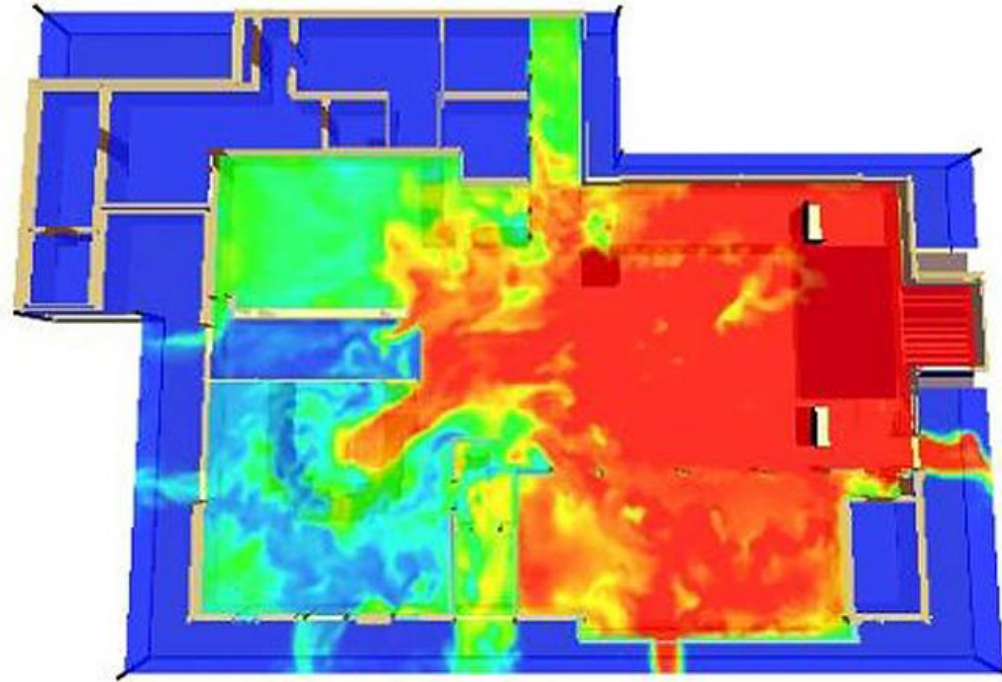
ACPs



# Sustainability innovation

## Foam Insulation

NIST



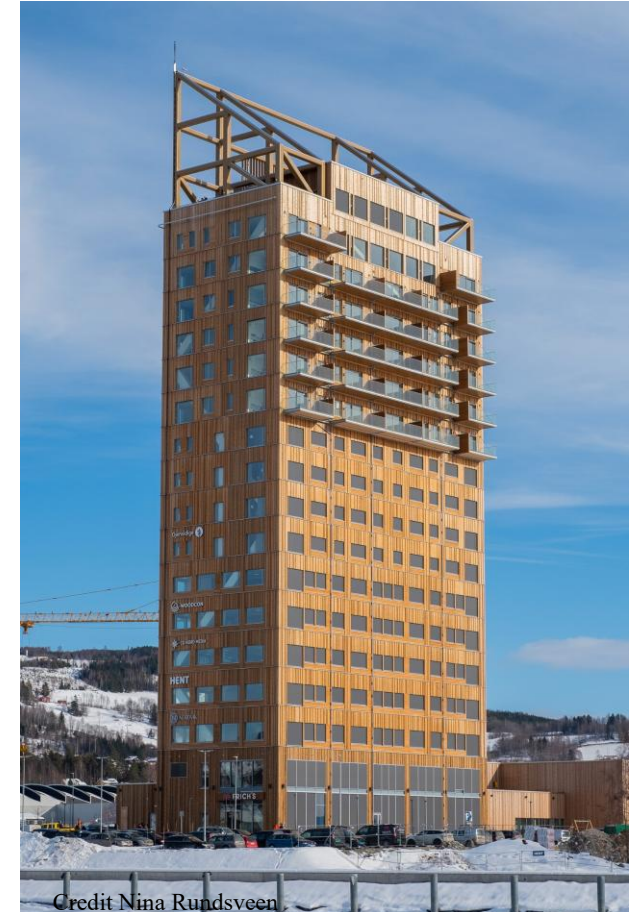
# Sustainability innovation

PVs



# Sustainability innovation

## Timber Buildings



# Sustainability innovation

## Green Roofs and Living Walls

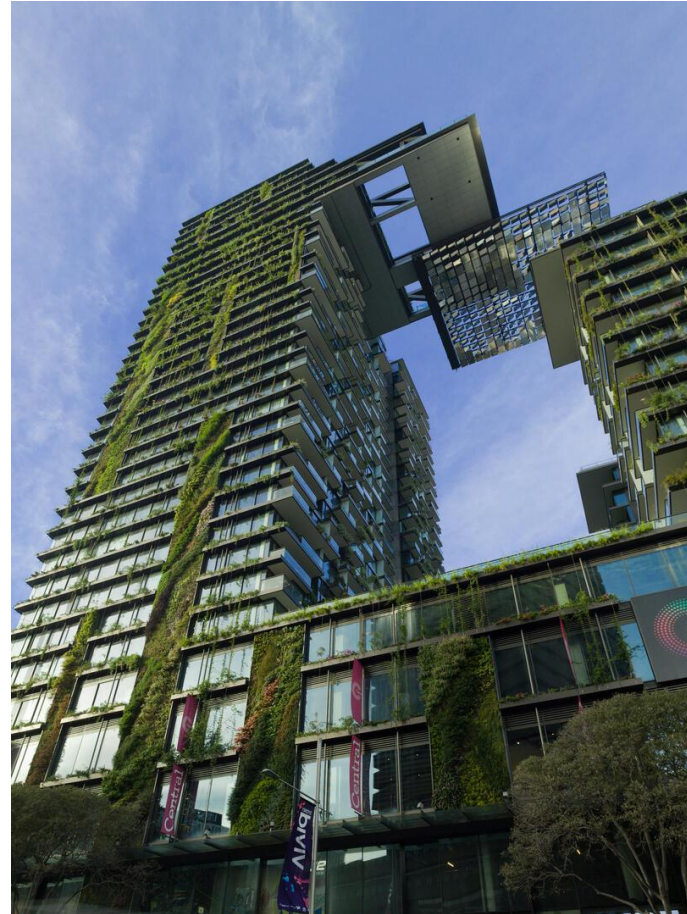


Image by Carl Drury

# Sustainability innovation

**BESS**



# Sustainability innovation: EVs and LEVs

EVs and LEVs



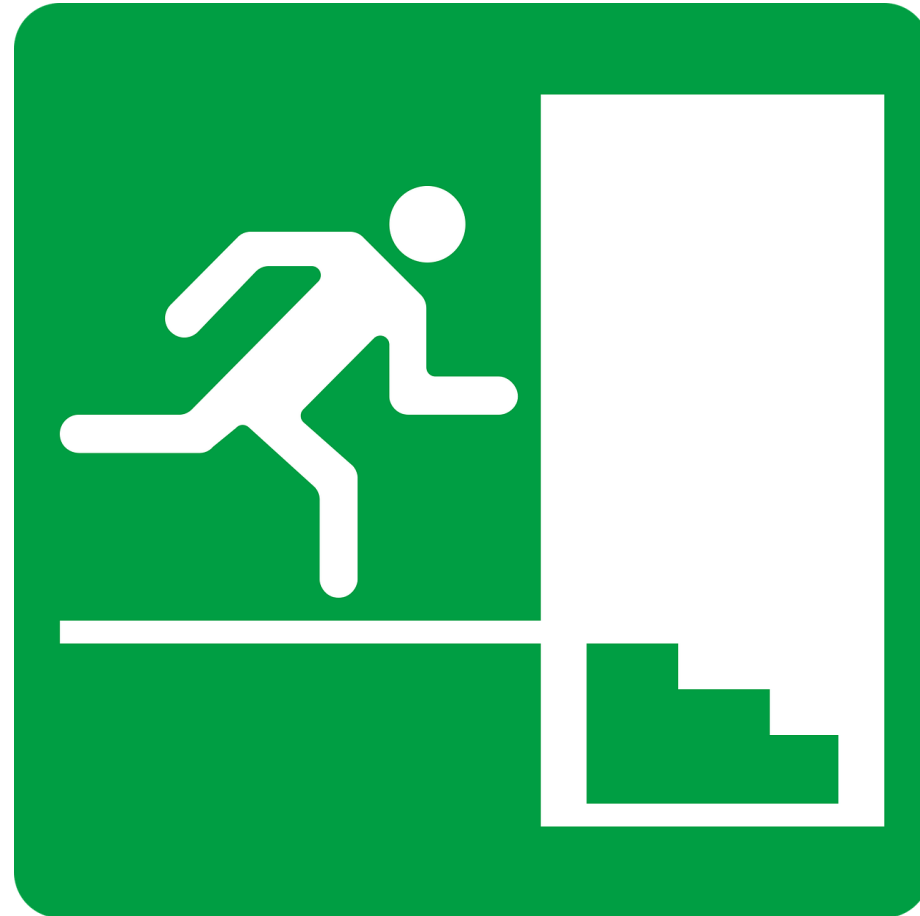
# Sustainability innovation

## Reducing Use



# Social Sustainability vs. Fire Safety

Universal access



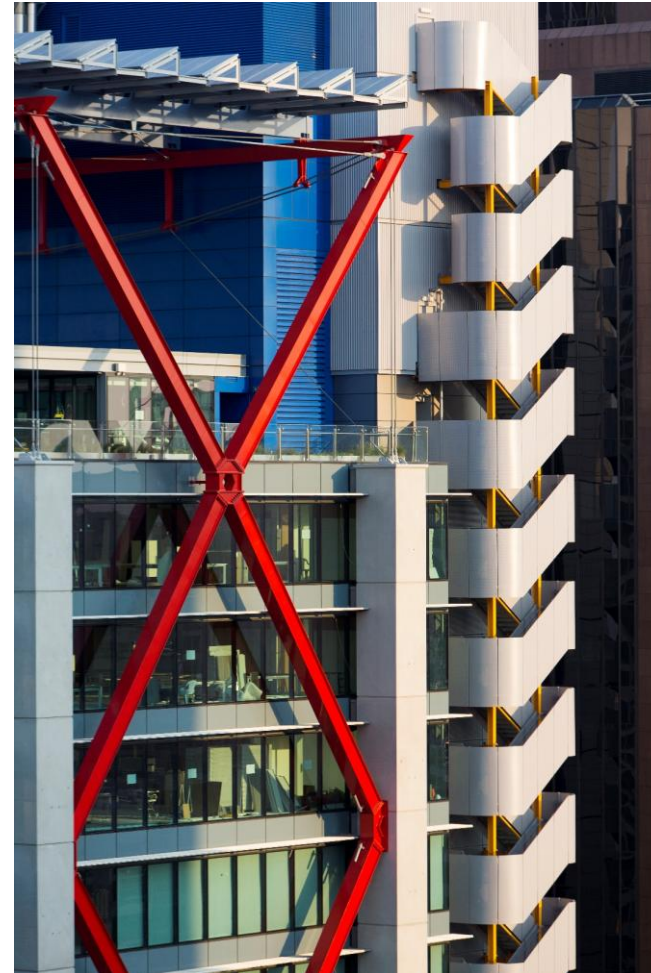
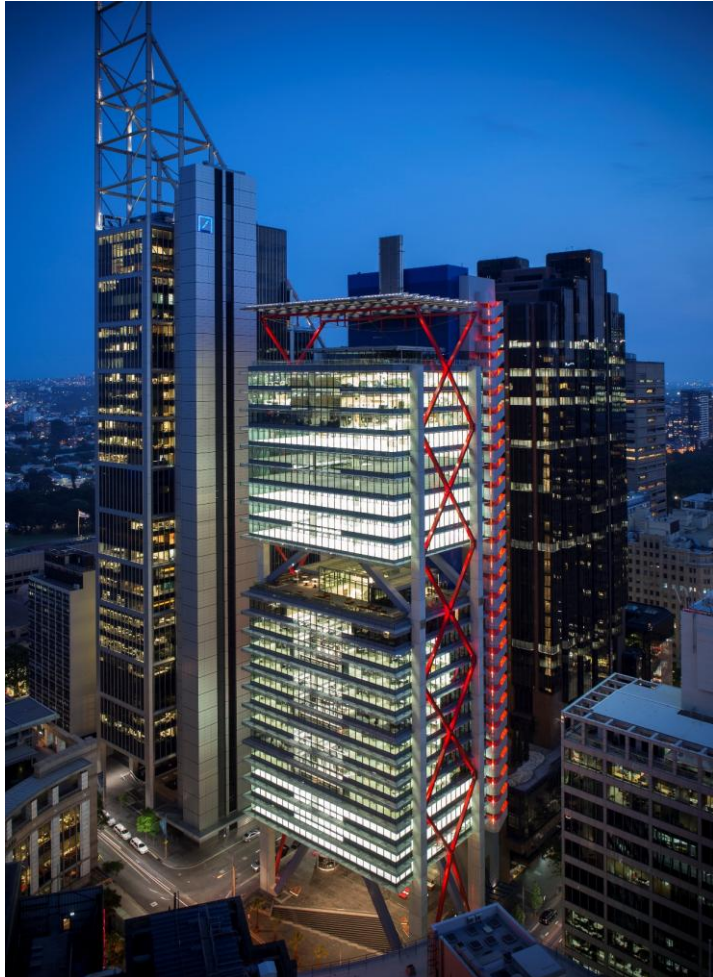
# Social Sustainability

## Emerging Solutions



# Emerging Trends

## Passive Design Strategies



# Emerging Trends: Existing Buildings

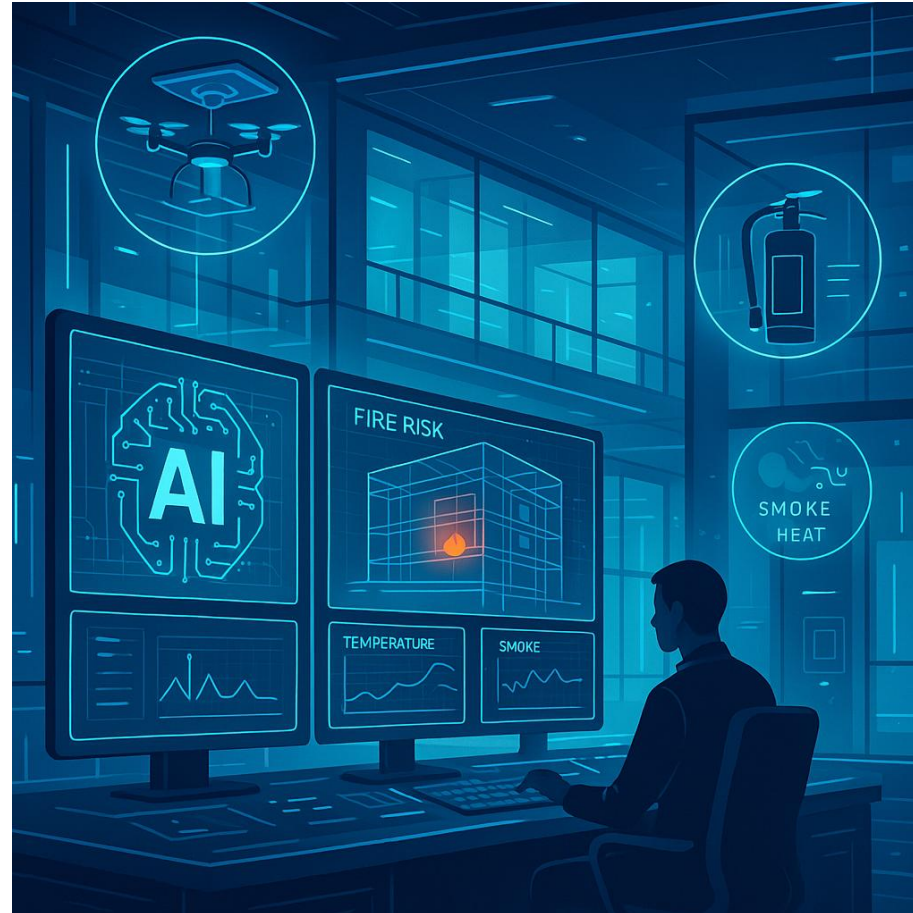
## Building Reuse and Retrofit



Image by James Harmer

# Emerging Trends: Technology

IoT, AI, data science



# Emerging Trends: Materials

**Fire Resistant v Sustainable Materials**



# Emerging Trends: Construction Methodology

## Modular and Prefabricated Construction



Image by Ute Friesen



Freepik

# Emerging Trends: Building Complexity

Need for higher rise and mixed use



# Emerging Trends: Resilience

Adaptive and resilient design



# Toward SAFR Buildings

## An approach



SAFR = Sustainable and Fire Resilient



Integrate fire safety in early design.



Use performance-based codes.



Embrace inclusive, adaptive design.

# Conclusion

## The balance



Sustainability and fire safety are not mutually exclusive.



Conflicts arise from poor integration, not inherent incompatibility.



A truly sustainable building is also safe, inclusive, and resilient.

ARUP