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fire-safe sustainable built environment

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ZAVOD ZA GRADBENIŠTVO SLOVENIJE
SLOVENIAN NATIONAL BUILDING AND CIVIL ENGINEERING INSTITUTE

Fire safety of facades: *does testing ensure fire safety?*

Mind the EPBD Harmonization Gap! *New fire risks from electrification and renovation of buildings*
3rd October 2025 – Brussels, Belgium

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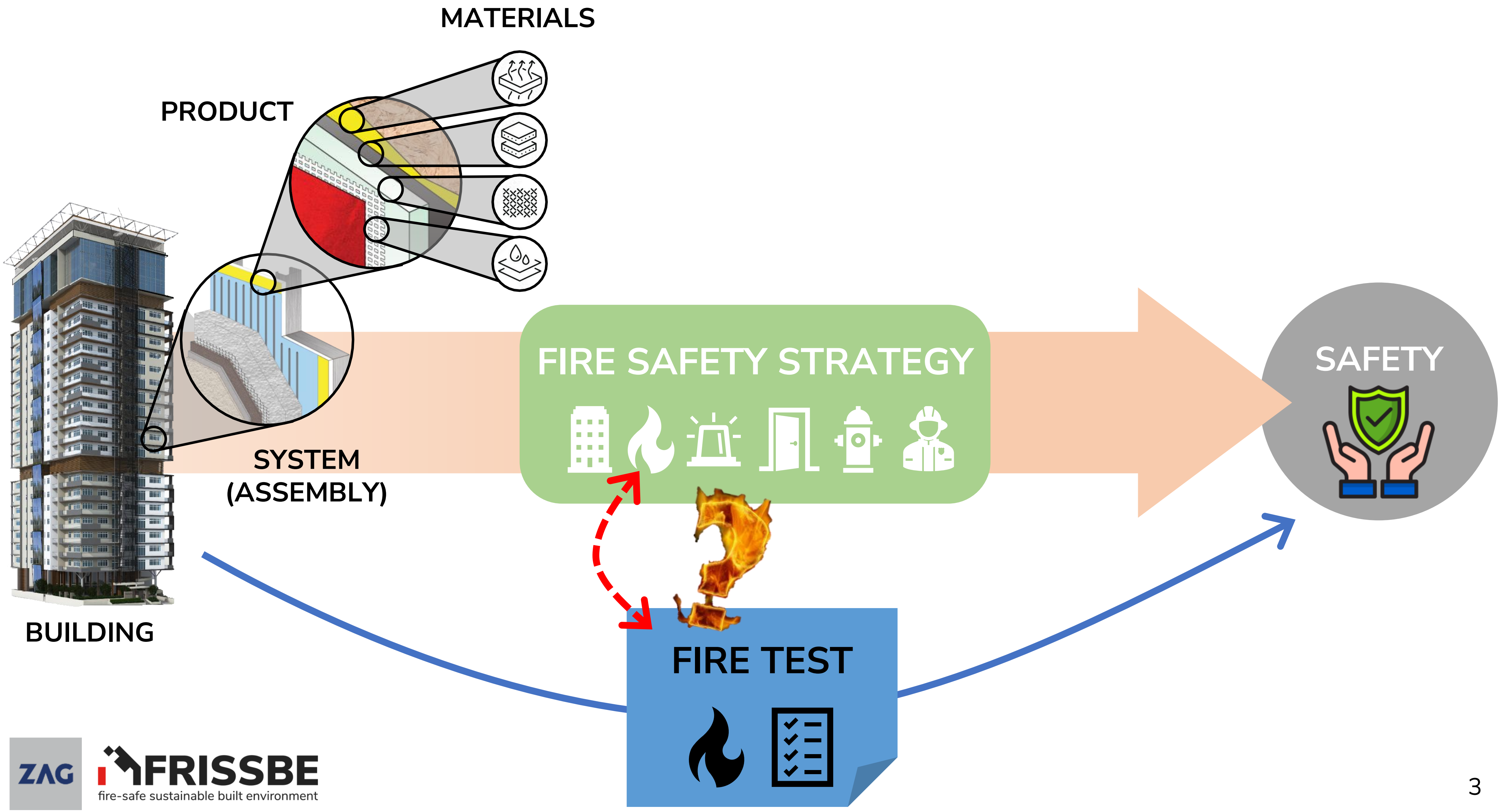
Grenfell Tower, London, UK (14th June 2017)



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Standard fire testing


BS 8414 (UK)

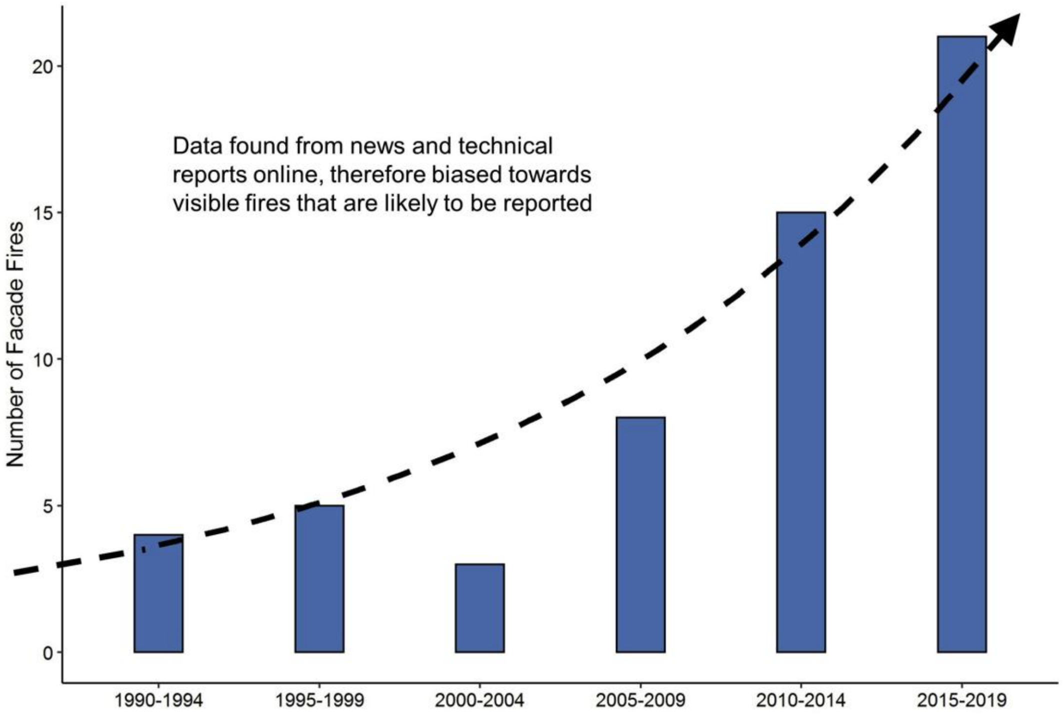
NFPA 285 (USA)


New EU Test (EU)


SP Fire 105 (Sweden)


ISO 13785-2

Still many façade fires



Bonner *et al.* (2020)

London, UK (2009)

Chicago, USA (2015)

Melbourne, Australia (2001)

Dubai, UAE (2015)

Valencia, Spain (2024)

London, UK (2017)

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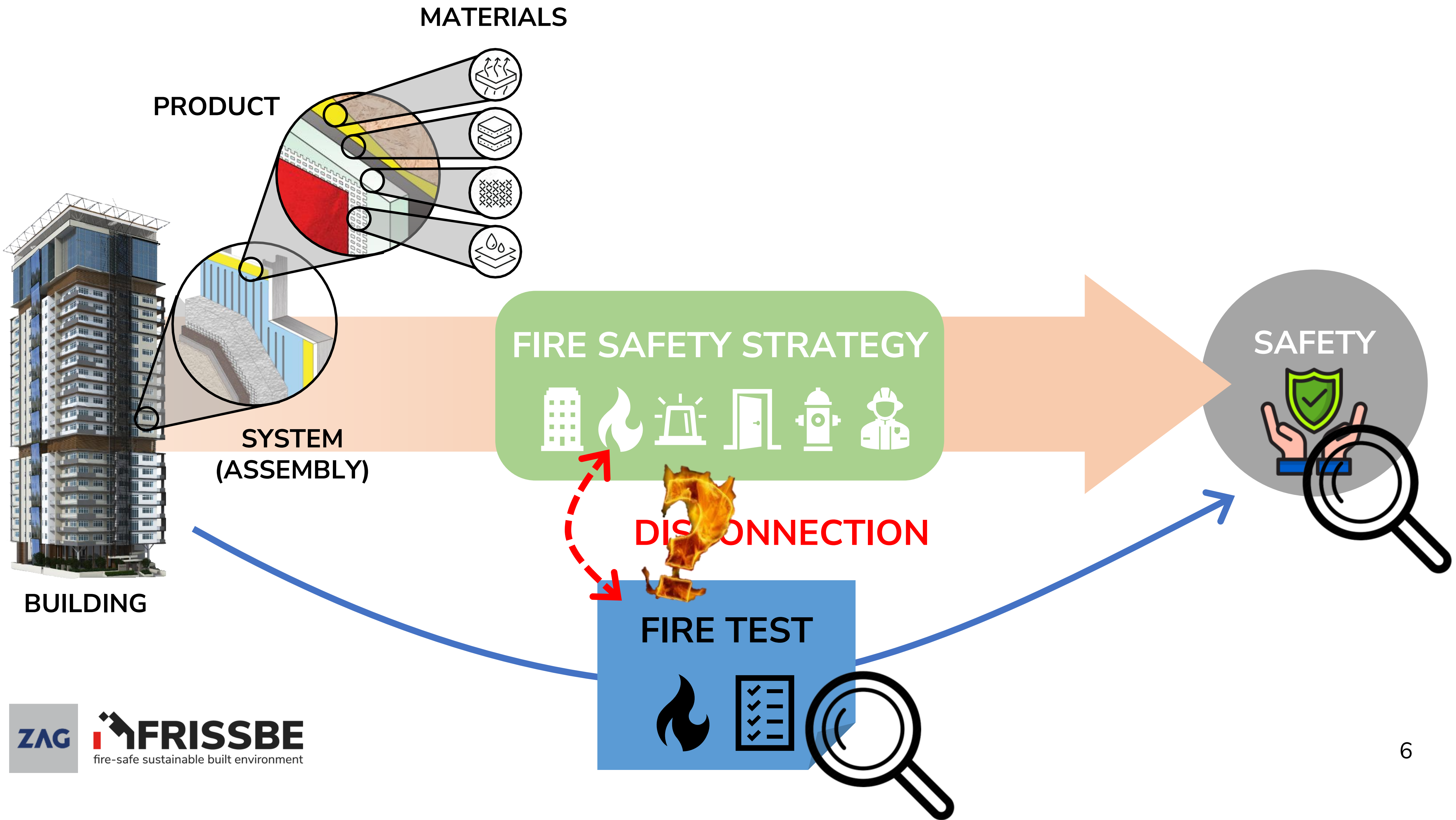

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New EU Approach (large-scale)

Test facts

Fire source: ~ **3 MW**
Main wing size: 3.2 m x 5.5 m (w×h)
Test duration: 60 min
Test outcome: Pass or Fail

ISO 13785-1 (mid-scale)

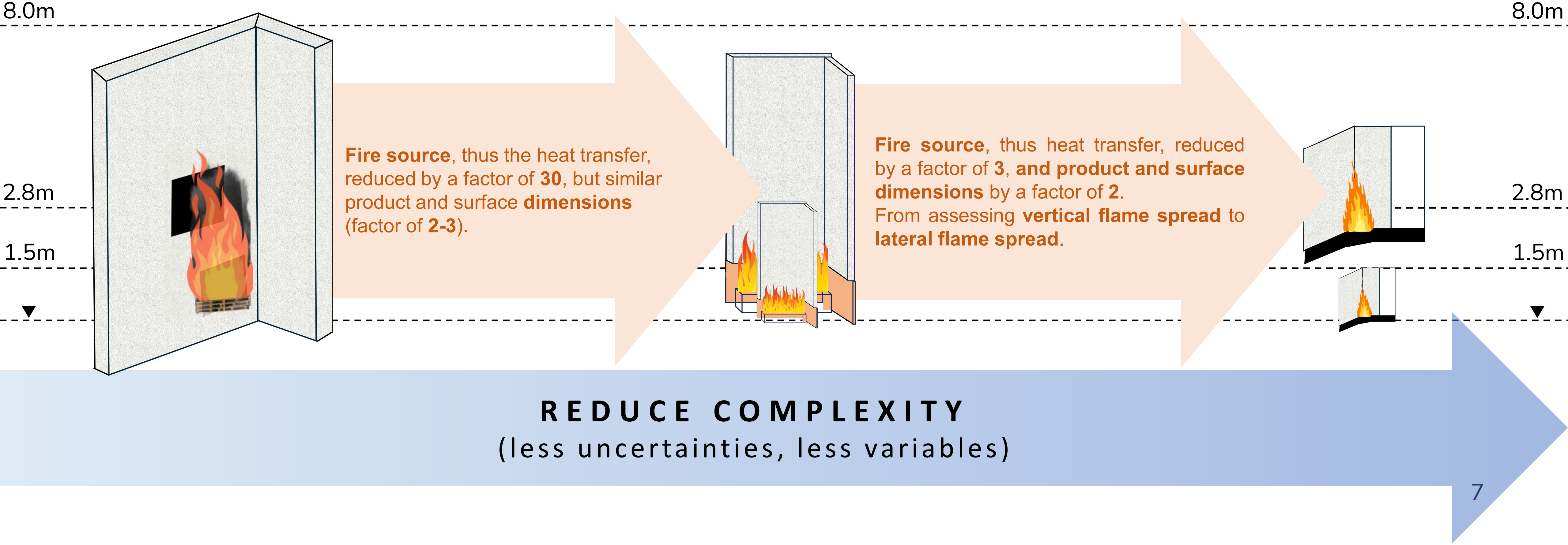
Test facts

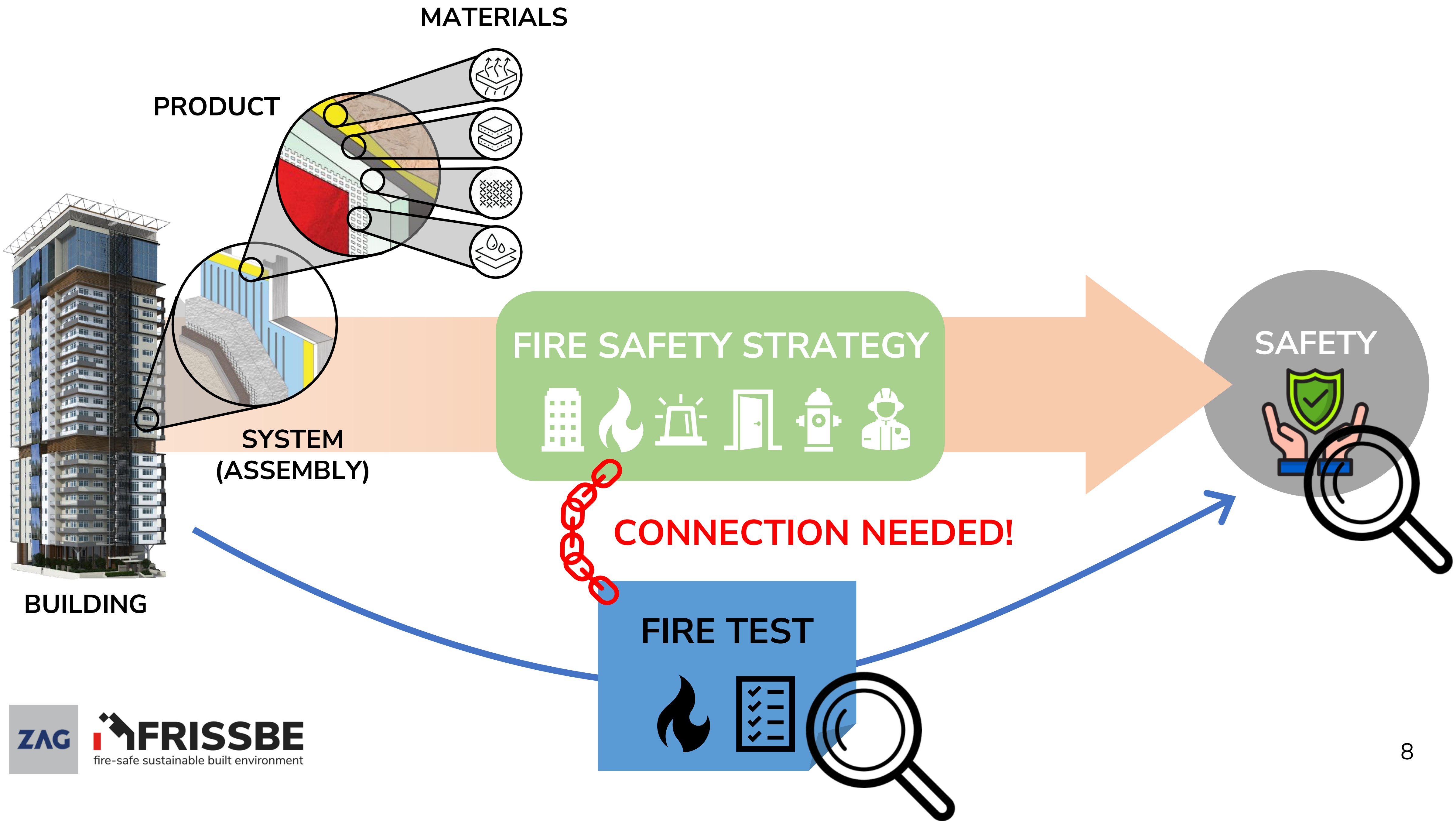
Fire source: **0.1 MW**
Main wing size: 1.2 m x 2.4 m (w×h)
Test duration: 30 min
Test outcome: Pass or Fail

SBI [EN 13823] (bench-scale)

Test facts

Fire source: **0.03 MW**
Main wing size: 1 m × 1.5 m (w×h)
Test duration: 20 min
Test outcome: Classification





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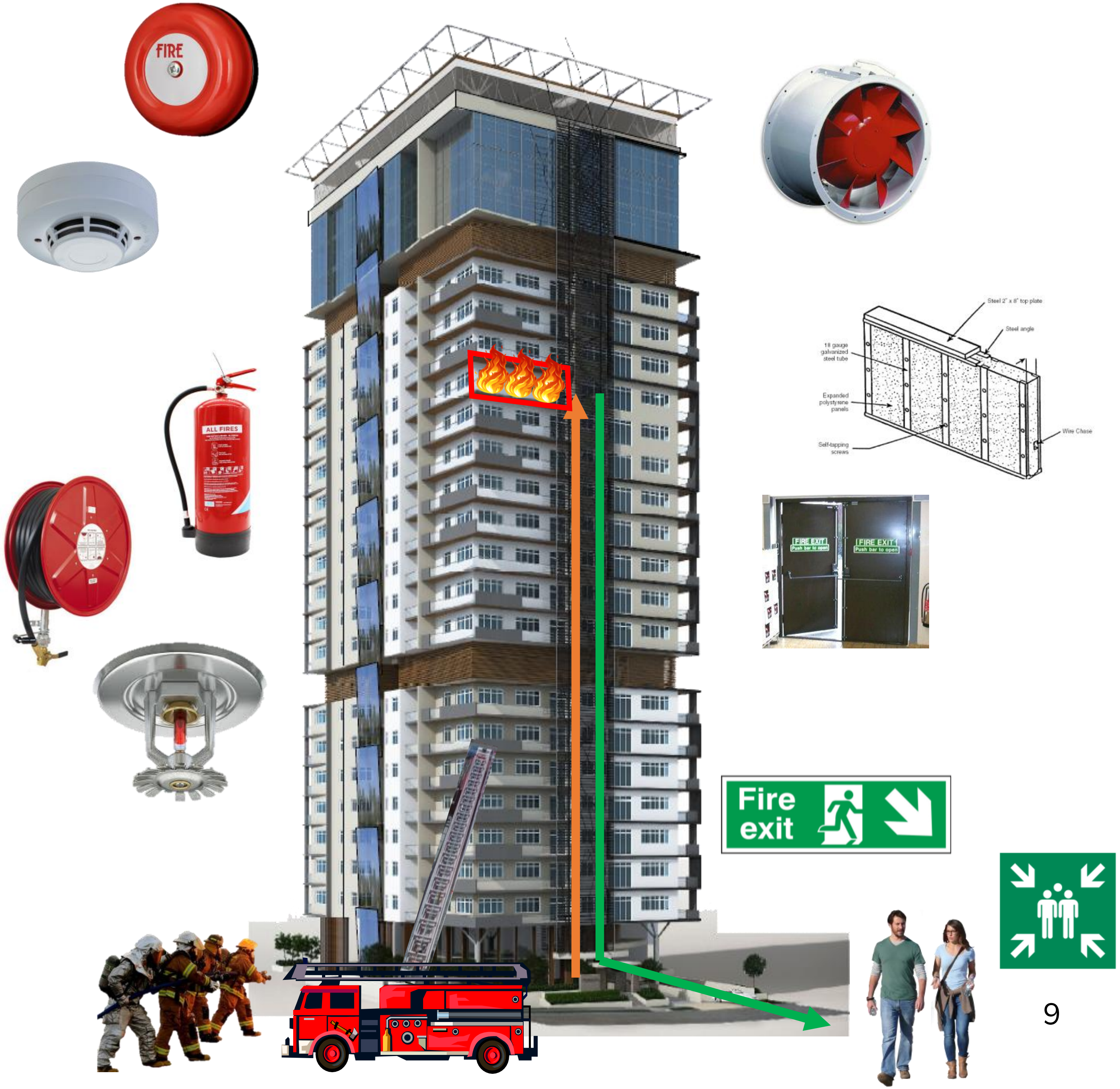
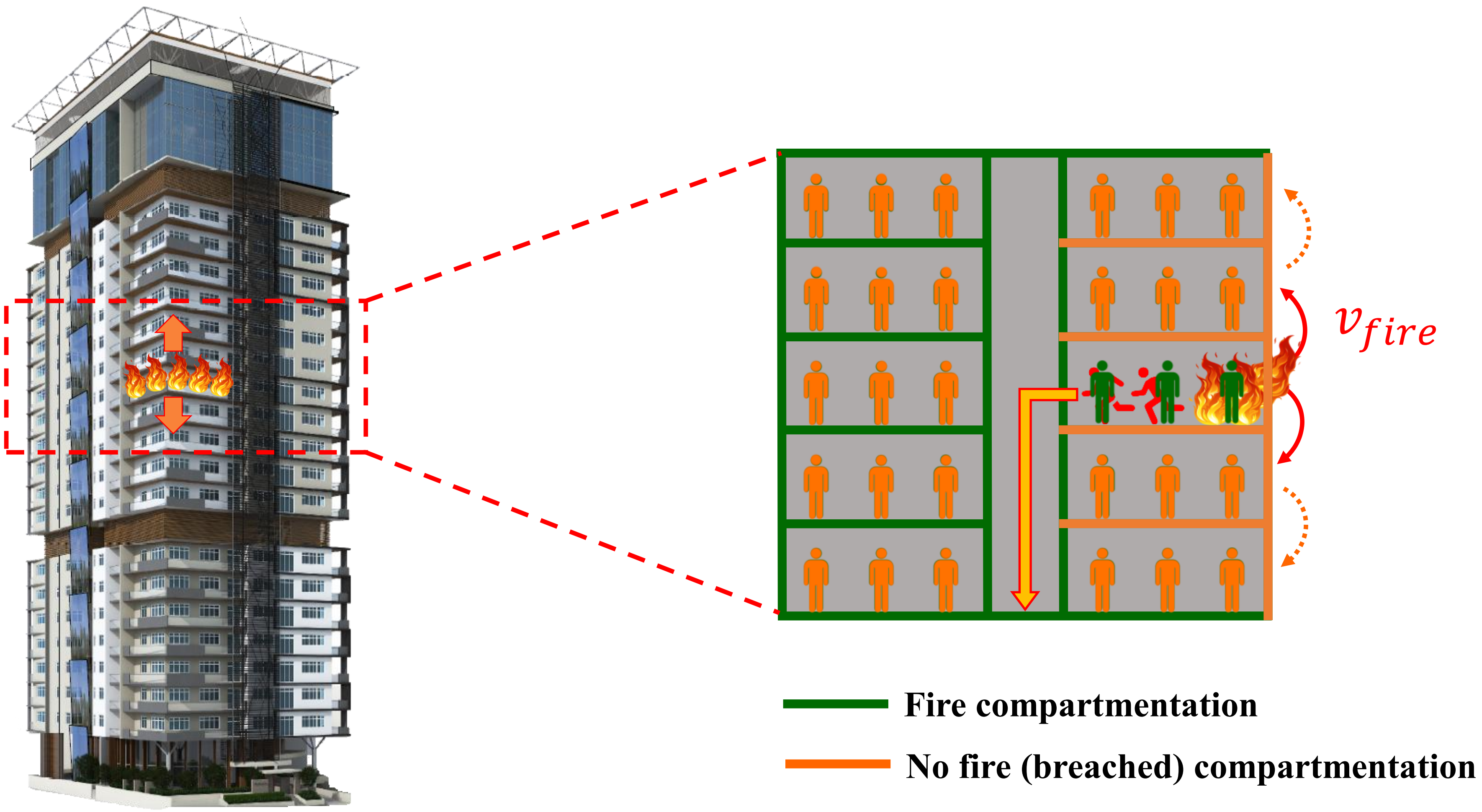
BUILDING
PERFORMANCE!
FIRE SAFETY STRATEGY
PERFORMANCE!
MEASURES
SAFETY


FIRE
ALL FIRES
FIRE EXIT
FIRE EXIT
Fire exit

Fire safety strategies and expected performance



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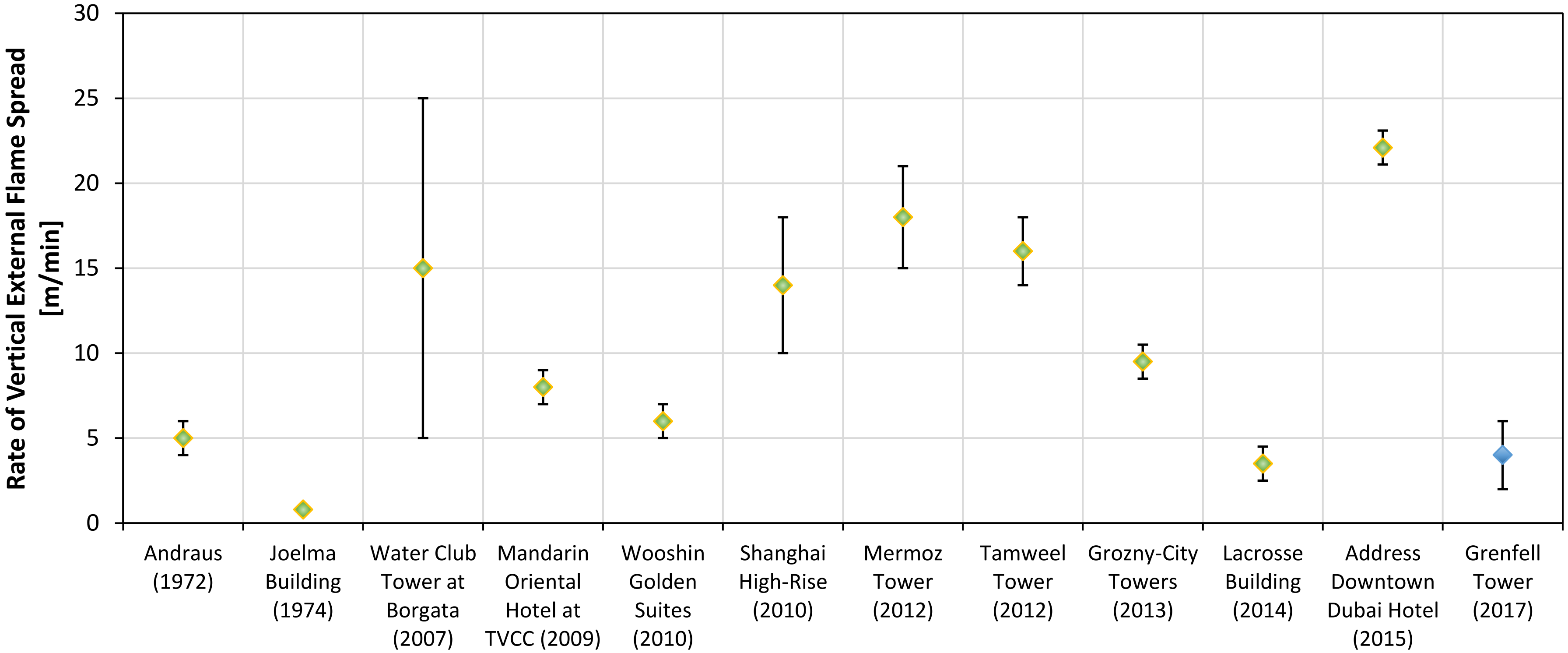
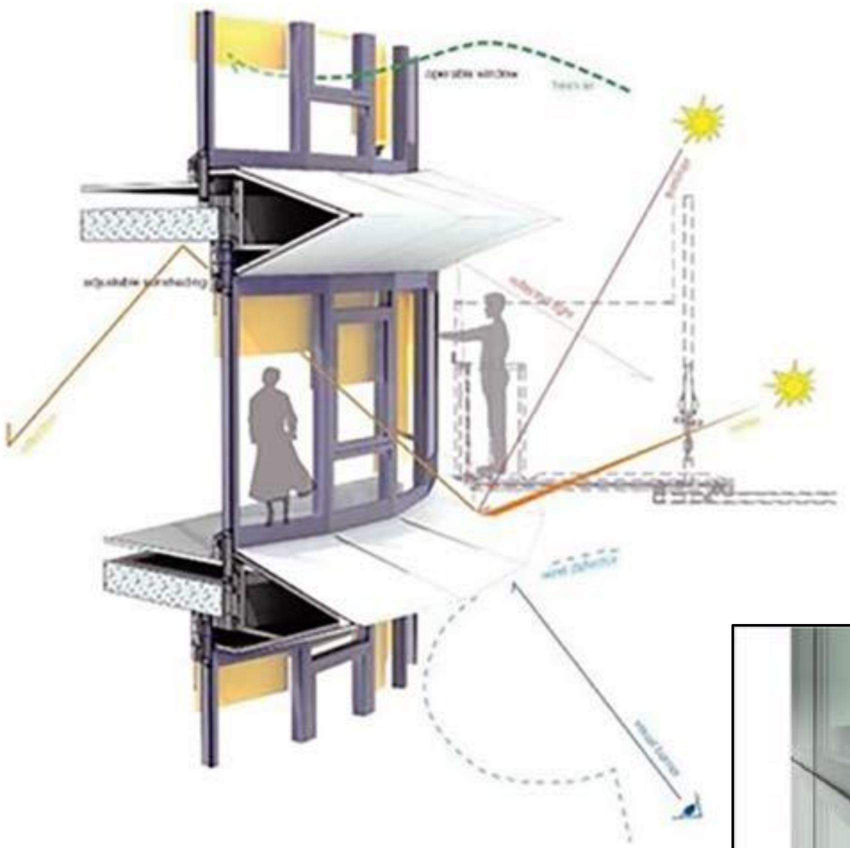


Torero J.L., Grenfell Tower Inquiry Report - Phase I (2018)

Performance quantification?



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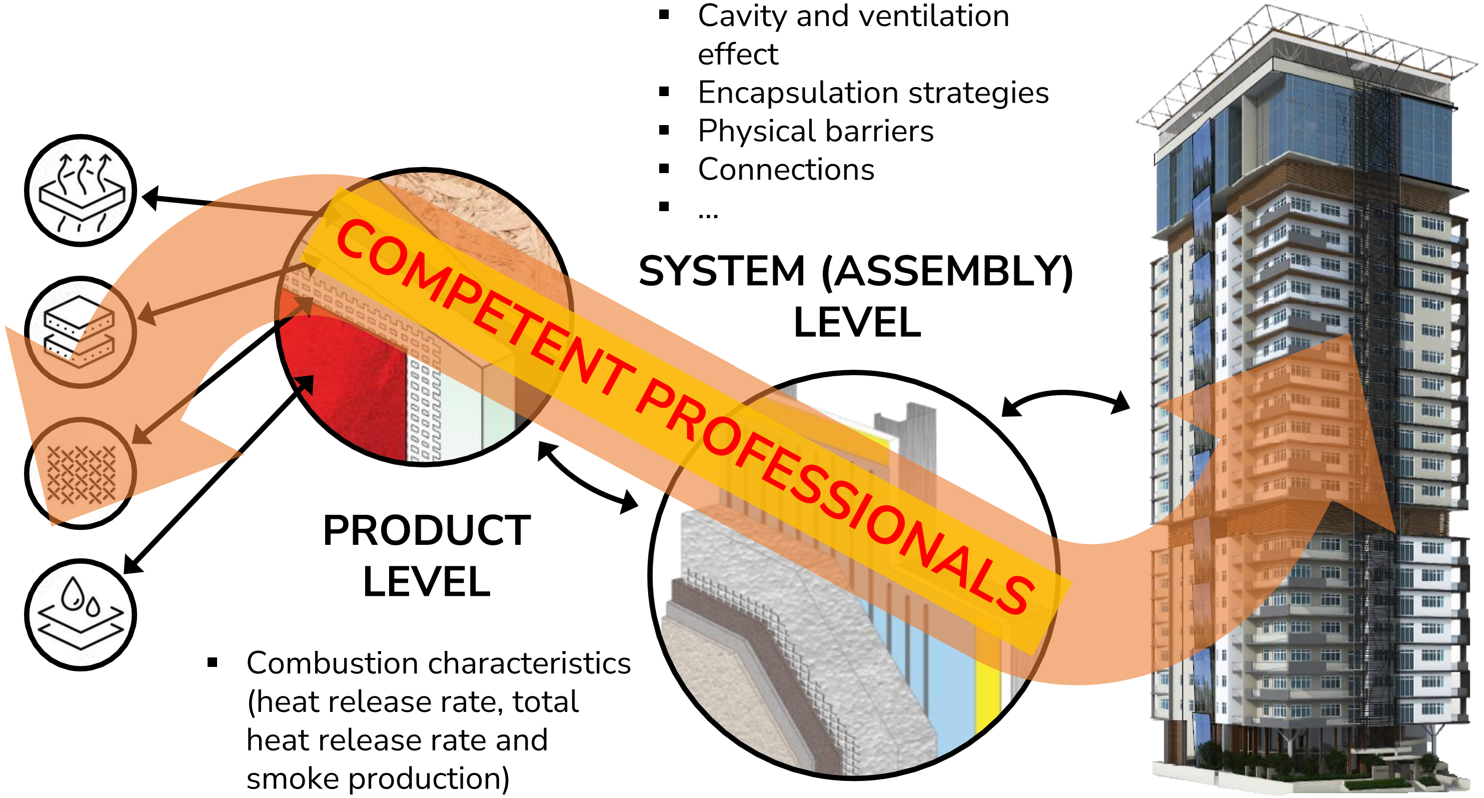
Performance quantification → data!

MATERIAL LEVEL

- Thermal degradation
- Calorific content and phase changes
- Organic and inorganic content
- Combustion behaviour
- Ignition and flammability
- Smoke yield and toxicity
- …



PRODUCT LEVEL

- Combustion characteristics (heat release rate, total heat release rate and smoke production)
- Flammability characteristics
- Mechanical integrity and failure modes
- …

SYSTEM (ASSEMBLY) LEVEL

- Geometric configuration
- Cavity and ventilation effect
- Encapsulation strategies
- Physical barriers
- Connections
- …

BUILDING LEVEL

- Building geometry and façade layout
- Continuities and discontinuities in the building envelope (e.g., balconies, corners)
- Ventilation conditions
- Integration with building services
- …

Concluding remarks

- Modern façades = sustainability vs. fire safety challenge
- Current standardised tests → inadequate for performance assessment

  → disconnection with fire safety strategy and building design
- Fire safety needs building-specific strategies, performance-based solutions

  → measurements, data
- Testing → measurable performance assessments (data)
- Professional competence required for data needs, analysis, and interpretation

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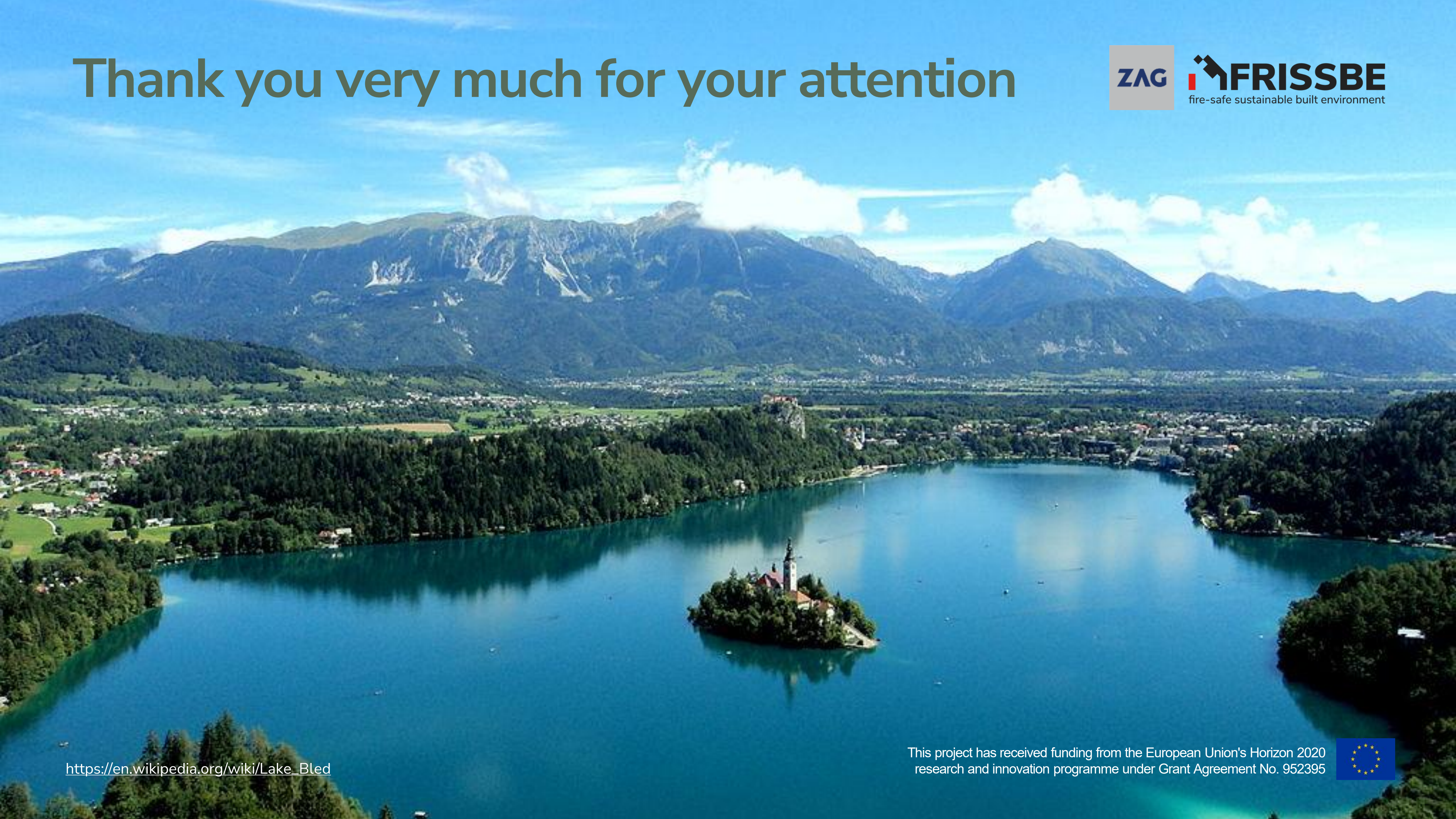
Thank you very much for your attention



https://en.wikipedia.org/wiki/Lake_Bled

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