

Fire Risk of Green Walls

from the point of view of preventive fire protection










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Benefits of Building Greenery

-  **Improving the microclimate**
-  **Energy savings**
-  **Shading / Cooling**
-  **Building preservation**
-  **Health**
-  **Biodiversity**
-  **Modern urban planning**
-  **Aesthetics**
-  **Value enhancement**

Climate Goal 2045

Increasing demand for building greenery



Definition of Protection Goals

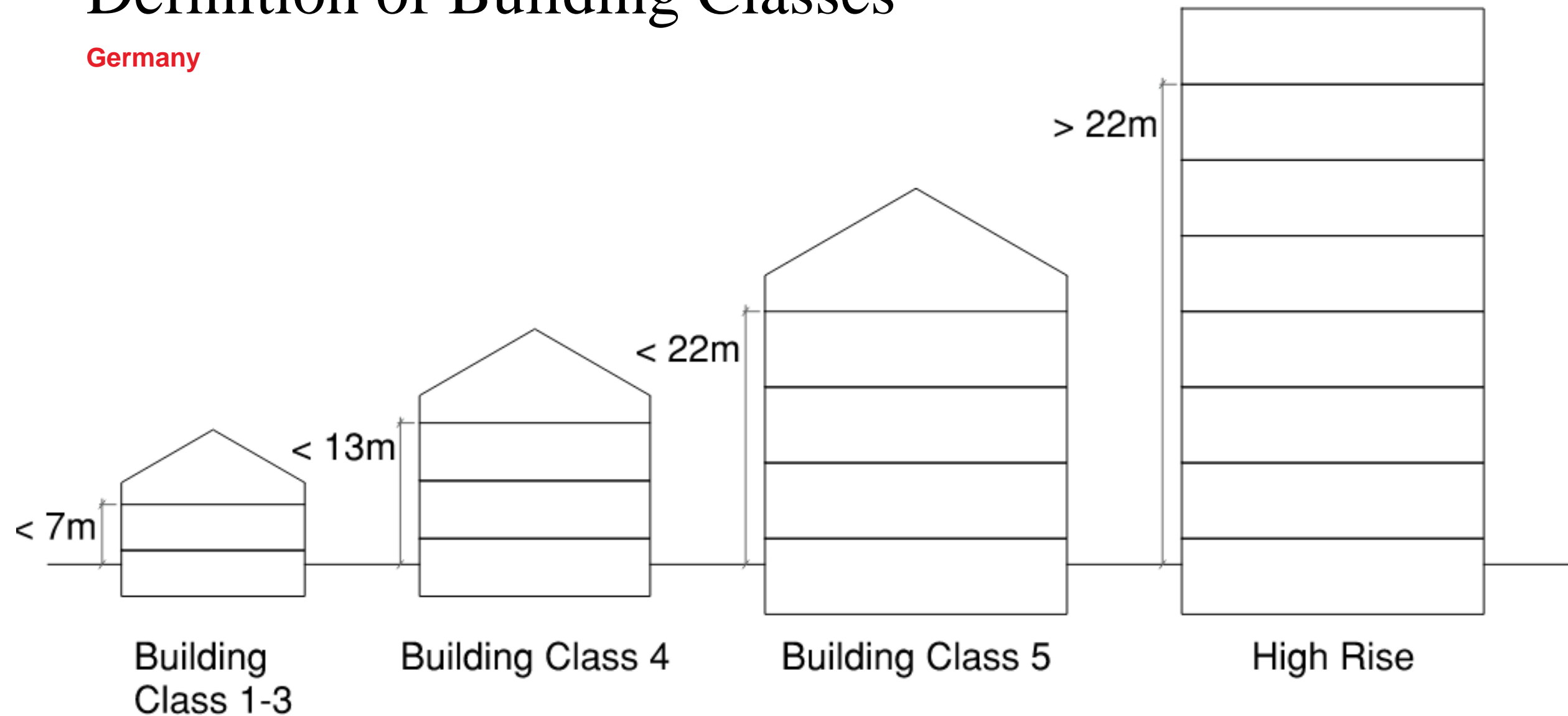
German Building Code § 14

- Prevention of fire development
- Prevention of spread of fire and smoke
- Rescue of people and animals
- Effective fire-fighting and smoke management



Definition of Building Classes

Germany



Requirements for Exterior Walls

German Building Code § 28

Building class 4-5

(Height 7 - 22m)



B1 

Special buildings

(High rise, Assembly buildings...)



Definition of an Exterior Wall Cladding?

- Rain shield
- Mechanical stress
- Thermal insulation
- Design



A green facade is not an exterior wall cladding because plants are not building materials or building products!

Fire Risk of Green Facades

- How hard is it to ignite the organic material?
- What is the probability and speed of fire spread through the organic material?
- What is the probability, speed, and consequences of the fire spreading into the building?

Fire Testing of Façade Greening

In the German-speaking region

Vienna (MA39)

Large-scale fire tests
with soil-bound
climbing plants

2015
-2018

2016
-2017

Vienna

Fire tests in the
muffle furnace

Munich

Fire tests within
the scope of a master
thesis

2019

2020

Vienna (MA39)

Large-scale fire tests
with wall-mounted
and trough-bound
façade greenery

Vienna (MA39)

Large-scale fire tests
with EPS-ETICS and
façade greening

2021

2022

TU Munich

Master thesis by
Linda Zauper and
Thomas Engel
on the interaction of a
greened timber façade

Assessment Principles

DIN 4102-20 + DIN 4102-24

- Vertical and horizontal flame spread
 - Flames at the top edge of the test stand
 - Temperature development
 - Burning dripping and falling
- Moisture level of the plants cannot be generalized!



Test Results

DIN 4102-20 + DIN 4102-24

- All tested plants contribute to vertical fire spread
- No horizontal flame spread
- Critical ignition temperature approx. 500 °C
- No secondary fire hazard due to burning falling parts (> 0,4 sqm or > 5 kg according to ÖNORM B 3800-5)

The greenery must be kept vital and in a well-kept condition at all times!



Test results

- All tested plants contribute to vertical fire spread



Dr Peter Mansi • 2.

Life Member UK at UK Association of Fire Investigators (UK-AFI), IAAI and Capitulo 82 Chile.

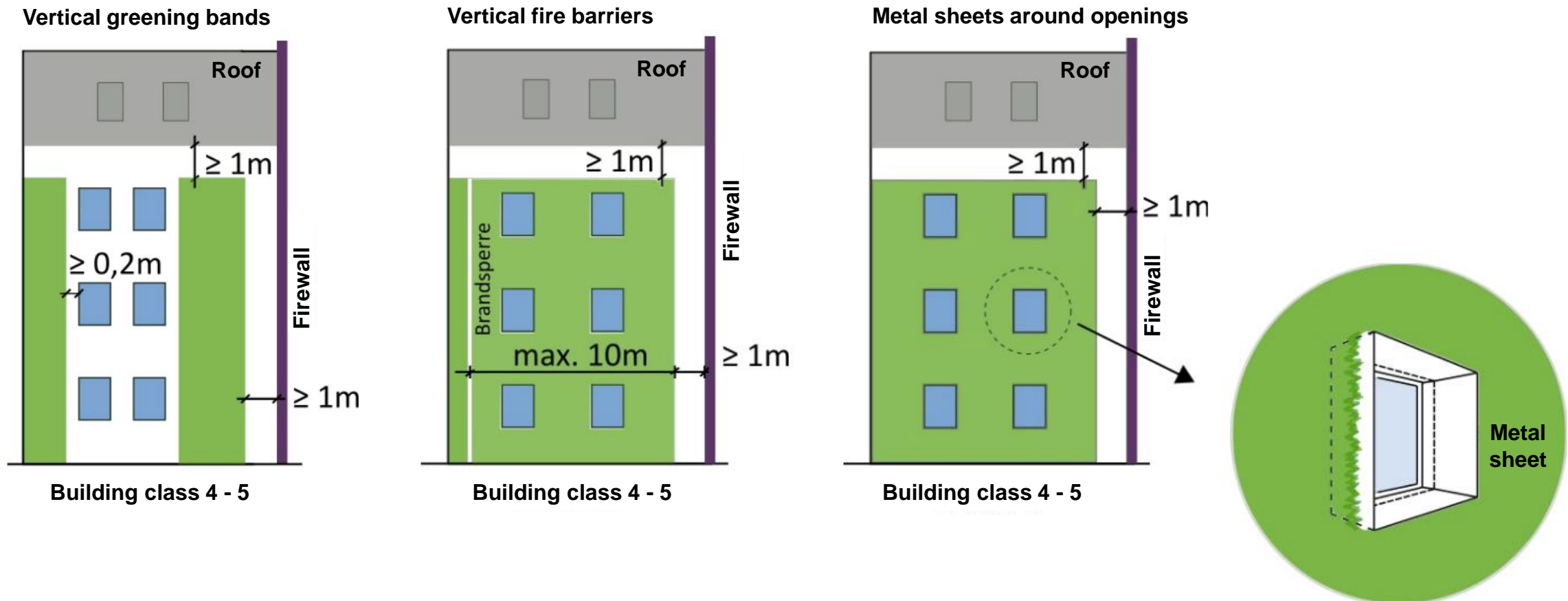
I have the same issue with watered Christmas trees!! They burn!!

The greenery must be kept vital and in a well-kept condition at all times!



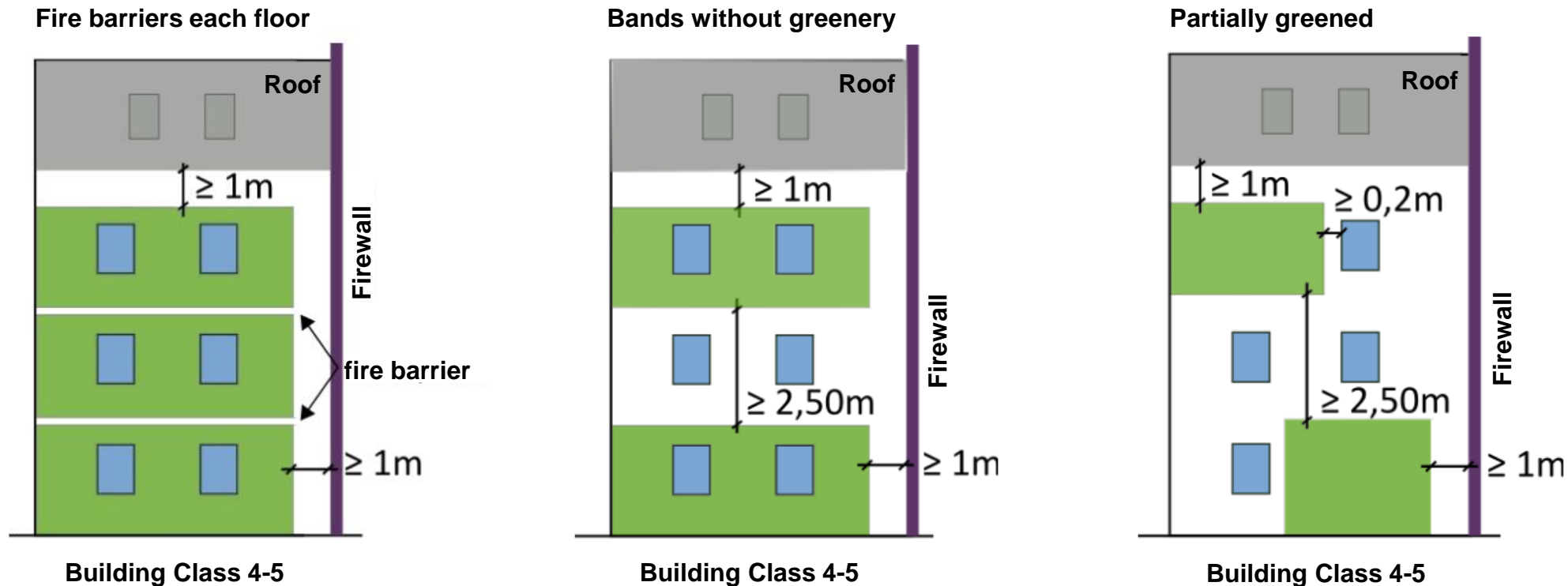
Building Code Regulations for Green Facades

Soil bound greenery



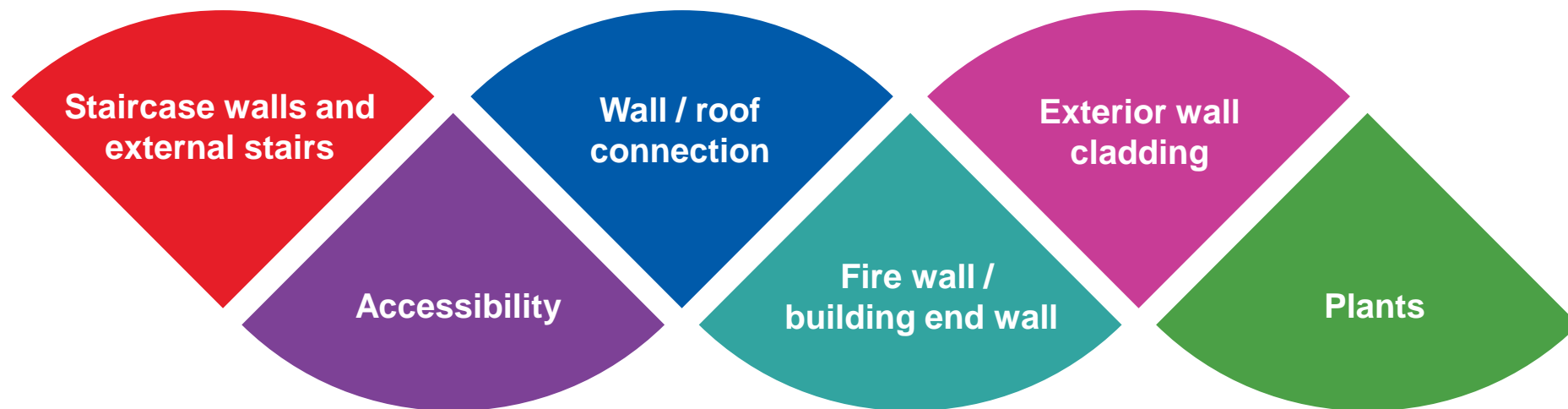
Building Code Regulations for Green Facades

Wall bound greenery



Building Code Regulations for Green Facades

For building class 4 - 5



Recommended Building Documents

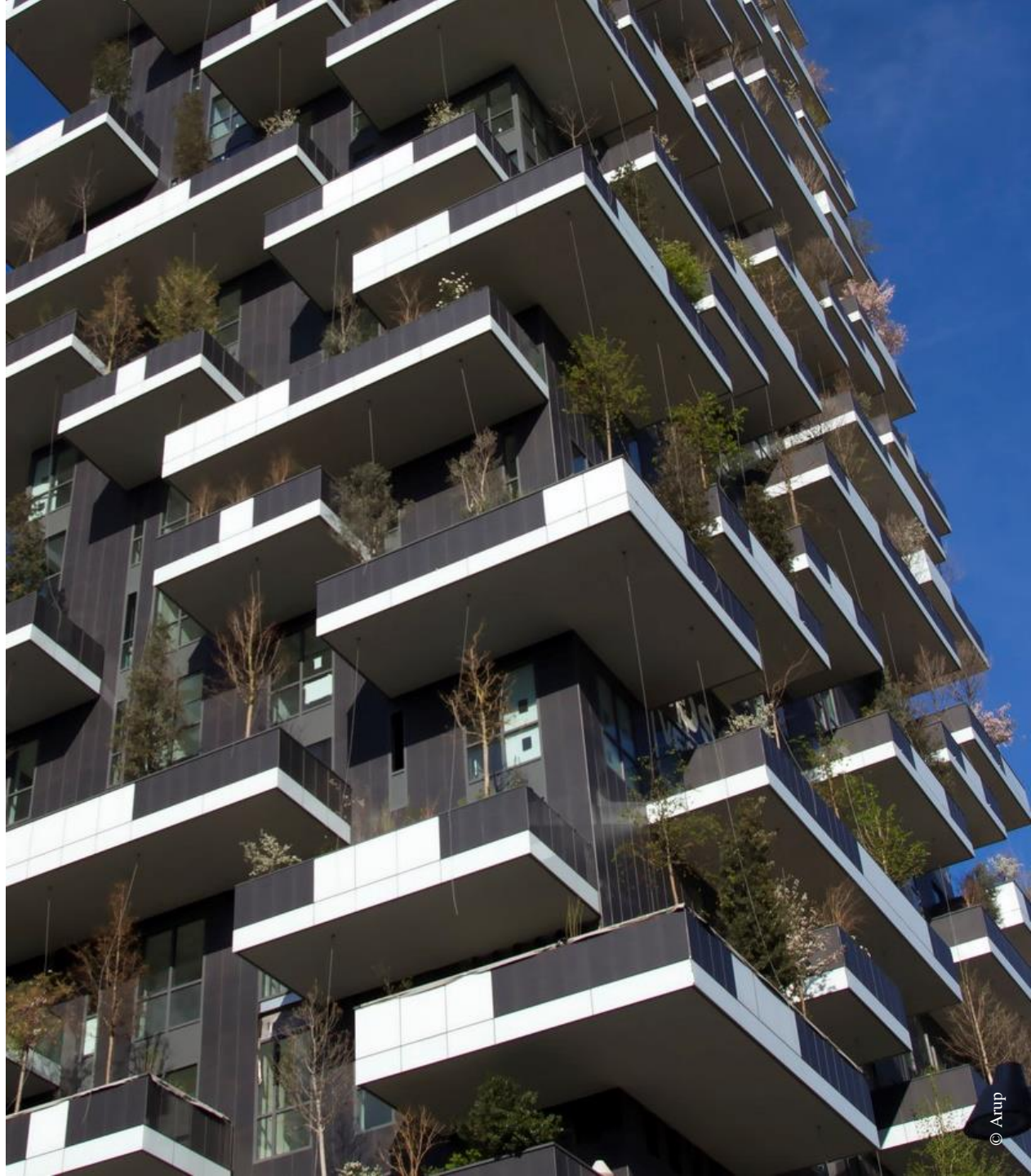
For building class 4 - 5 and special buildings

- Project-related planning, description and fire safety concept
- Care and maintenance concept
- Assessment of the fire risk of the facade and escape routes
- Site plan with set-down areas for the fire brigade

Bosco Verticale

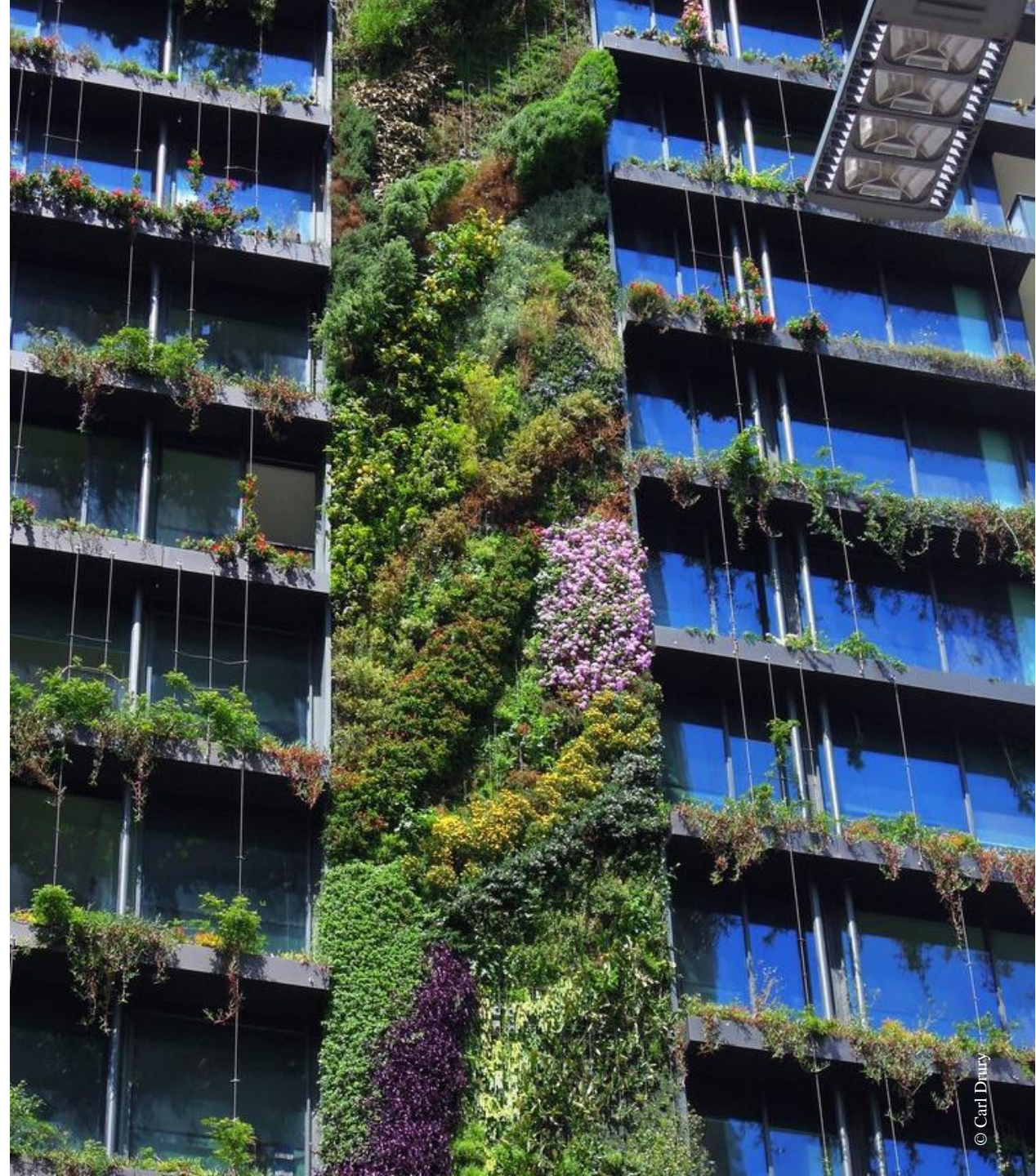
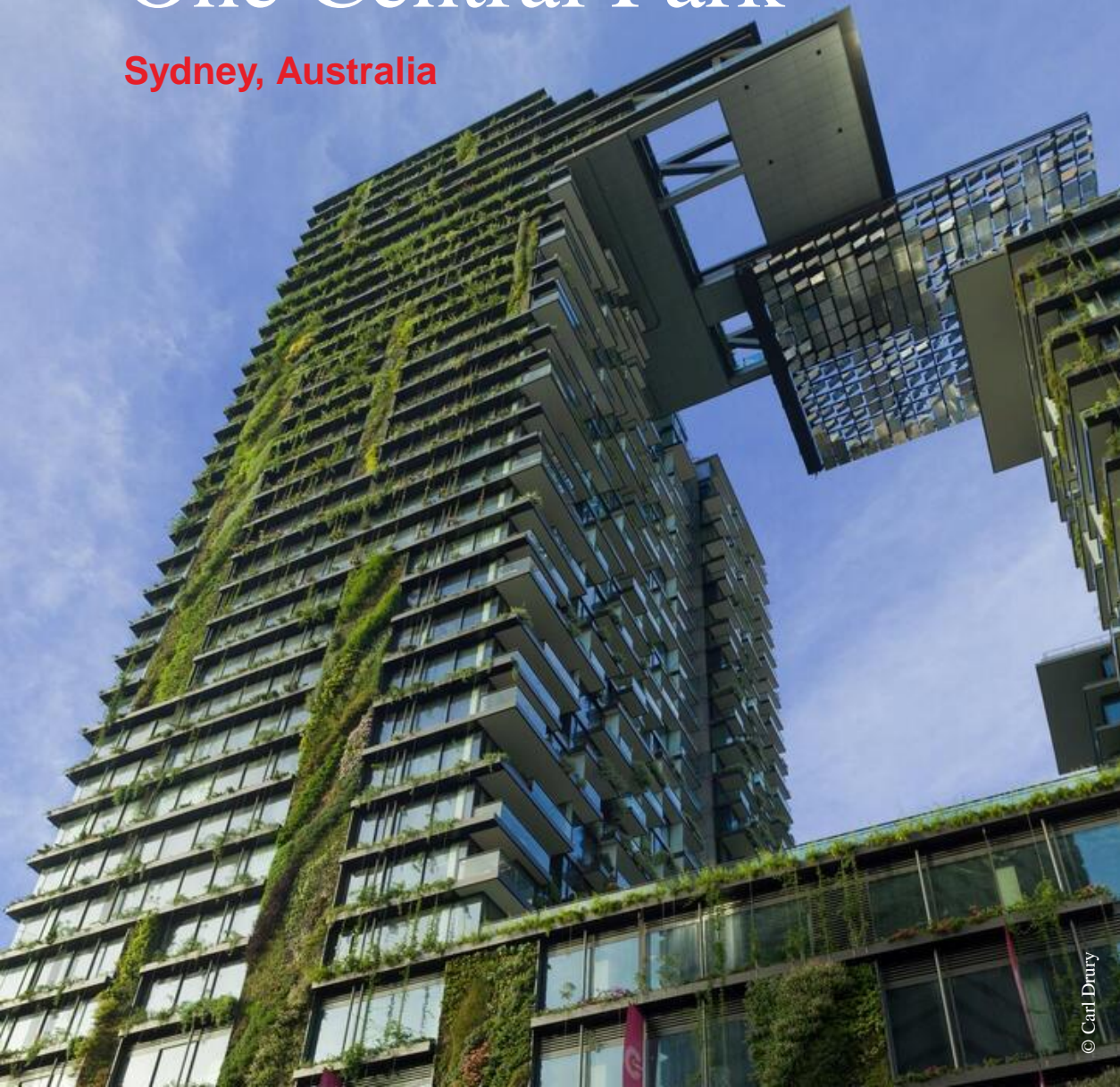
Milan, Italy





One Central Park

Sydney, Australia





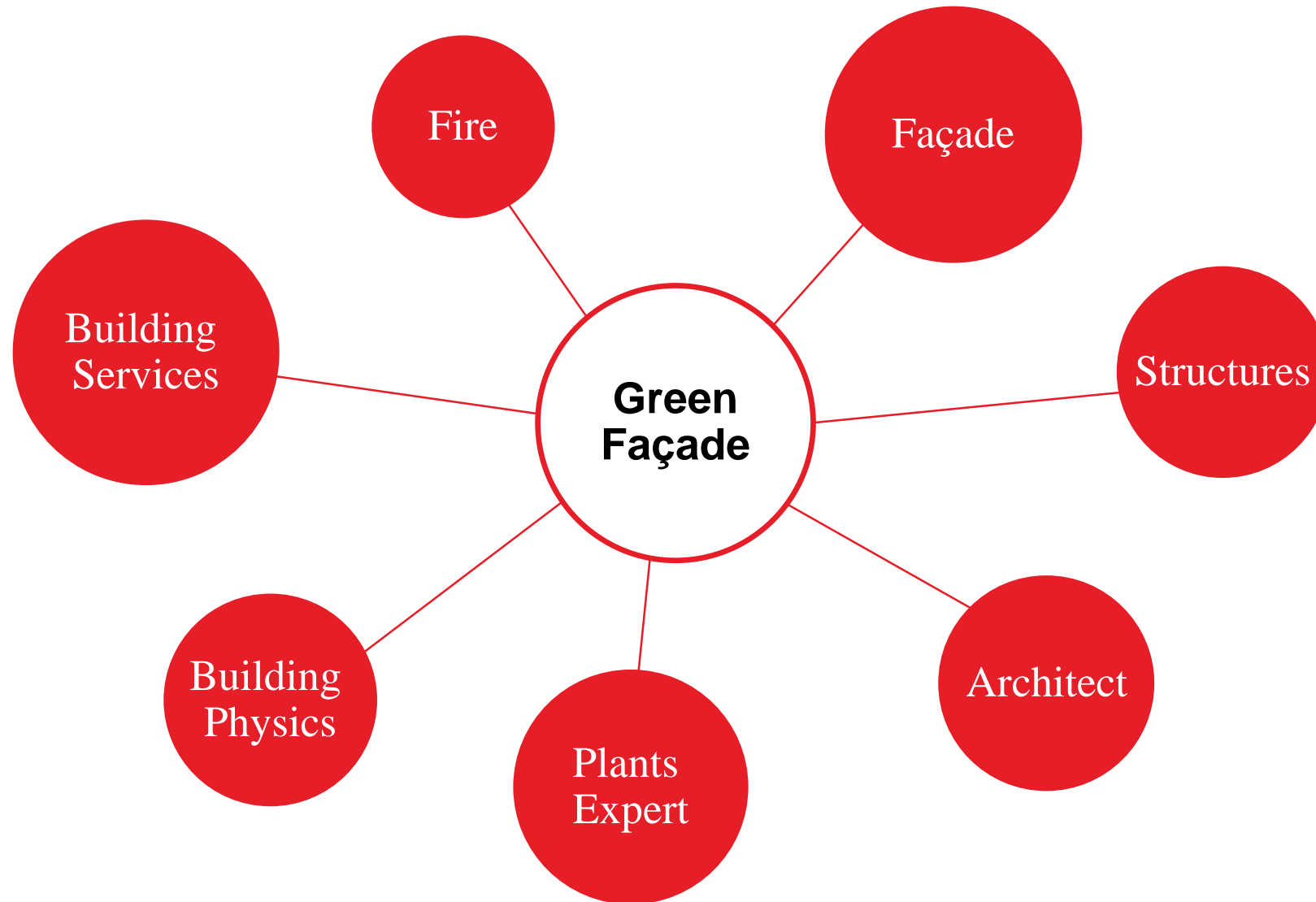
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Holistic Planning





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