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Sustainable Energy Connectivity in Central Asia

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International Conference

Sustainable Energy for Environmental Protection. Reviewing International Best Practice

Mary, 28 November 2024

Green building certification – decarbonisation of building stock and creating healthy built environment

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Stantec | intec | ACTED | European University Institute | FSR ENERGY Florence School of Regulation

ABOUT ME

Head of the Board Latvian Sustainable building council

Board member CMB LTD

Master’s Degree in Engineering Sciences in Heat, Gas, and Water Technology
Certified BREEAM Assessor
Certified LEED Green Associate
Certified Passive House Designer

Over 10 years of international professional experience
Managed diverse building design processes
Provided consultancy on sustainable solutions

Trainer on sustainable construction

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ABOUT LATVIAN SUSTAINABLE BUILDING COUNCIL

Funded in 2010

Members 27 companies

Collaboration partners in industry

- Passive House Latvia
- Ministry of Economics
- Riga technical university
- Latvian Construction association

Main focus

- Education
- Knowledge transfer
- Consultations for policy makers
- Consultations of building certification

LATVIAN SUSTAINABLE BUILDING COUNCIL

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RECENT INCENTIVES

Tax reduction for certified green buildings in Riga

50% reduction for 10 years

Supporting governments in developing renovation strategies

13 EU countries

First BREEAM certified publicly funded building

Ogre central public library

Green public procurement regulation development

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ABOUT GREEN BUILDING CERTIFICATION

ONE GOAL – DIFFERENT APPROACH

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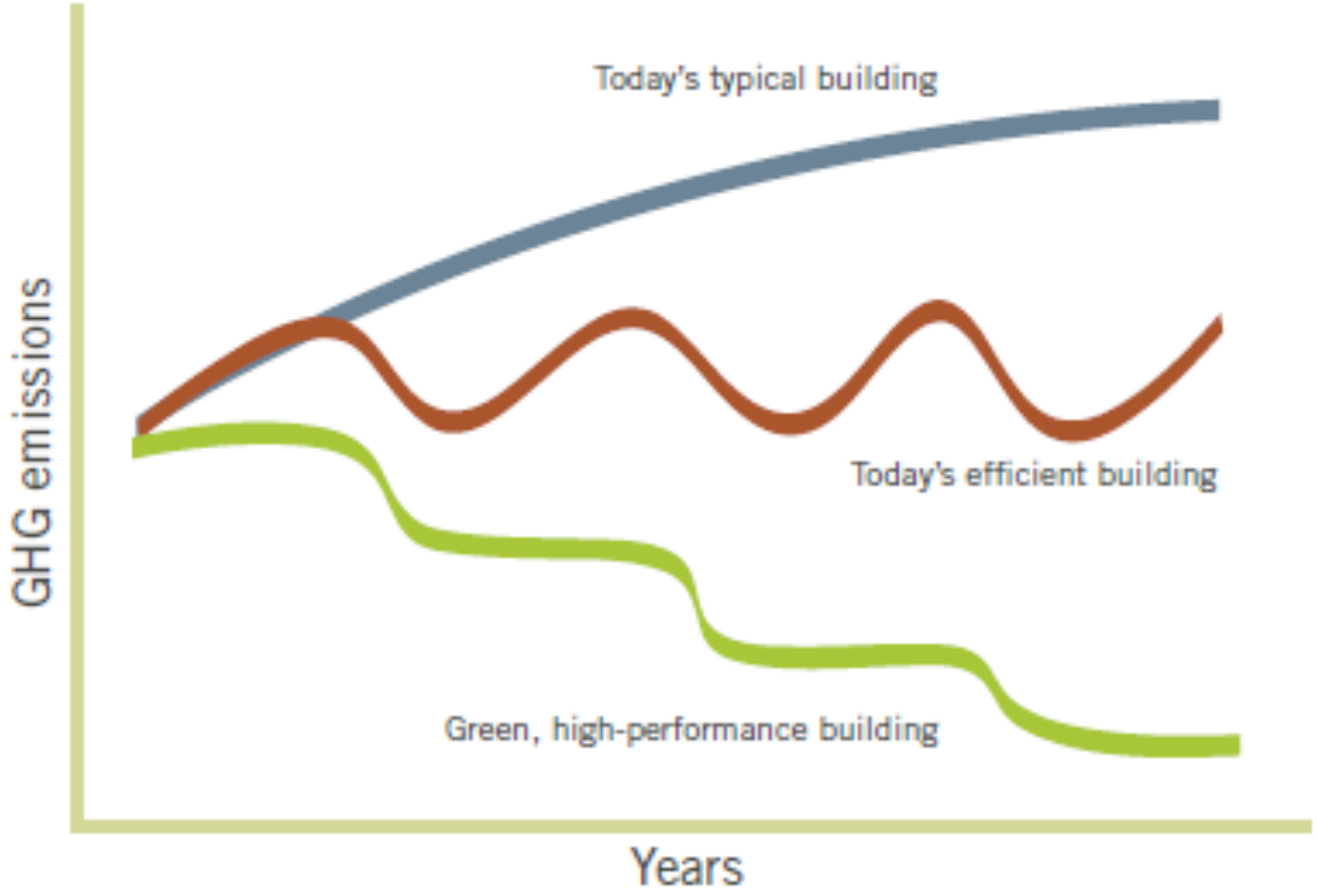
ABOUT GREEN BUILDING CERTIFICATION



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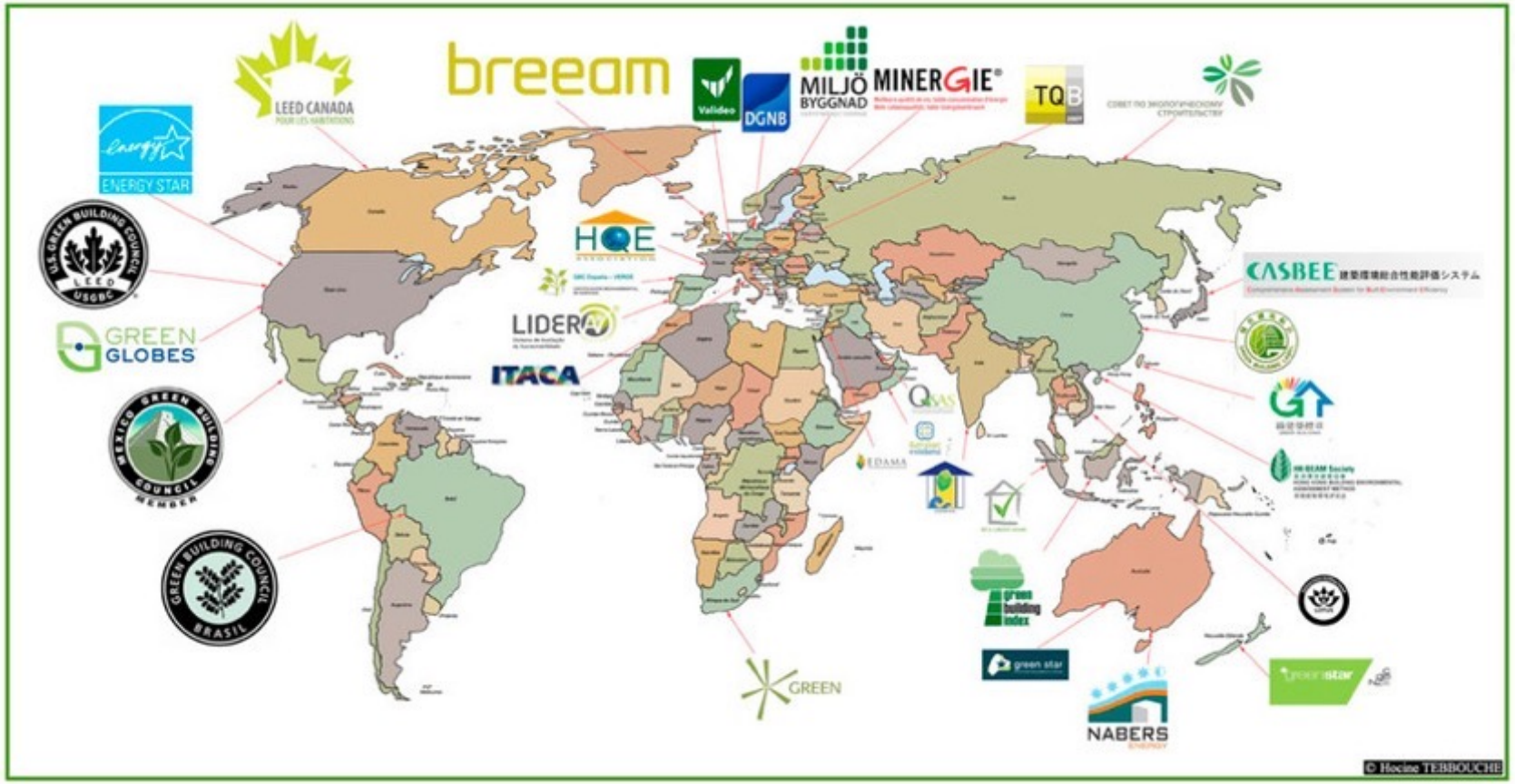
GREEN BUILDING CERTIFICATION SYSTEMS



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ABOUT GREEN BUILDING CERTIFICATION

Voluntary application

3rd party independent verification

Applicable to all sectors, public, private

Applicable to different types of buildings – residential, office, hospitals etc.

Applicable at different stages of building life cycle – new construction, refurbishment, in-use

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CRITERIA CATEGORIES AND MAIN INTENT

BREEAM

LEED

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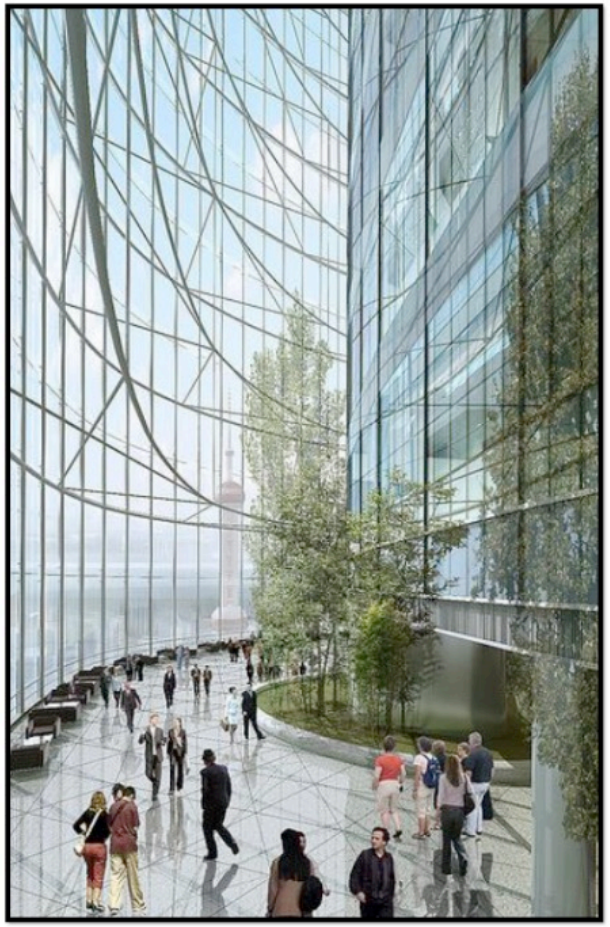
PURPOSE OF BUILDINGS



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HOW MUCH TIME WE SPEND INSIDE?

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HOW MUCH TIME WE SPEND INSIDE?

70-90%

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FACTORS OF HEALTHY INDOOR ENVIRONMENT

TEMPERATURE

ERGONOMICS

AIR QUALITY

LIGHTING

MATERIALS

DAYLIGHT

ACCOUSTICS

VIEWS

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

1. Passive Design Strategies

Optimized Building Orientation:

- Maximizes natural lighting (reducing artificial lighting energy use) while minimizing glare and overheating.
- Reduces energy demand for heating and cooling.

Natural Ventilation:

- Promotes fresh air exchange, improving indoor air quality while reducing reliance on mechanical ventilation systems.

Thermal Mass and Insulation:

- Materials like exposed concrete or stone regulate indoor temperature naturally, decreasing HVAC energy needs and maintaining thermal comfort.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

2. Use of Low-Impact, Healthy Materials

Low Embodied Carbon Materials:

- Select materials such as cross-laminated timber, bamboo, or recycled steel.
- These are sustainable and often free of harmful chemicals like volatile organic compounds (VOCs).

Non-Toxic Finishes:

- Specify paints, adhesives, and sealants that are low in VOCs to improve air quality.
- Many sustainable materials with low embodied carbon also meet health criteria, such as untreated natural wood.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

3. Renewable Energy with IAQ Enhancement

Solar-Powered Ventilation:

- Solar chimneys use renewable energy to drive natural ventilation, improving air quality while reducing carbon footprint.

Heat Recovery Systems:

- Mechanical ventilation with heat recovery (MVHR) systems improve energy efficiency and ensure continuous supply of filtered fresh air.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

4. Biophilic Design

Green Walls and Roofs:

- Vegetated systems sequester carbon while filtering indoor air and reducing urban heat island effects.
- They also enhance mental well-being and reduce noise pollution indoors.

Access to Nature:

- Incorporate outdoor green spaces or views of natural landscapes to promote health and lower cooling demands via shading.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

5. Efficient HVAC and Smart Building Systems

Electrification of HVAC:

- Use electric heat pumps powered by renewable energy for heating and cooling.
- Advanced HVAC designs improve air circulation and reduce reliance on fossil fuels.

Sensors and Smart Controls:

- Monitor and optimize energy usage and indoor air quality with integrated building management systems.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

6. Lighting Design

Daylighting:

- Optimize window placement and glazing to provide natural light, reducing artificial lighting energy use.
- Use materials and layouts that prevent glare and promote even light distribution.

Efficient Lighting Systems:

- Install LED lighting with circadian control to support well-being while using less energy.
- usage and indoor air quality with integrated building management systems.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

7. Water Efficiency with Air Quality Benefits

Low-Carbon Plumbing Fixtures:

- Greywater recycling and rainwater harvesting reduce energy used in water processing and support decarbonization goals.

Humidification Control:

- Efficient water systems that maintain optimal indoor humidity levels reduce respiratory discomfort and the growth of allergens.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

8. Prefabrication and Modular Construction

Off-Site Construction:

- Prefabricated components minimize construction waste and embodied carbon.
- Factories can produce modules in controlled environments with healthier materials, reducing pollutant exposure during assembly.

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INTERCONNECTIONS BETWEEN DECARBONISATION AND HEALTHY INDOOR ENVIRONMENTS

Examples of Overlap Benefits

Triple-Glazed Windows:

- Reduce heat transfer (energy savings) and improve acoustic comfort (health benefit).

Insulated Green Roofs:

- Provide insulation (reducing energy use), enhance IAQ, and offer a calming visual connection to nature.

Photovoltaic-Powered HVAC:

- Solar energy decarbonizes operations, while high-performance systems improve air quality and occupant comfort.

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THANK YOU!

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